
9.0 Implementation: The Next 10 Years

The implementation program described in this section includes the projects, programs, studies, and other activities necessary to accomplish the District's goals during the life of this Plan. This section also describes the District's resource management frameworks, funding approach for projects and programs, and process for amending this plan, if necessary.

The RPBCWD implementation program includes both capital improvement (i.e., structural) projects and non-structural activities. Table 9-1 lists the components of the RPBCWD implementation program, the planned implementation schedule, and a planning-level levy estimate (in 2017 dollars) for each component. Table 9-1 lists projects by major watersheds first with the remainder of the activities organized according to ongoing programs and activities. While some of the expenditures stated in the tables are well-known and understood, many others represent *possible* costs of *possible* projects and programs. The table will guide RPBCWD's annual planning, budgeting and levying processes, but does not represent budgets themselves. In addition, funding shown in a given year does not guarantee those expenditures in that year. The District intends to use an adaptive management philosophy following the management approaches described in Section 9.1 Watershed Management Approach, Section 9.11 Wetland Management Program, and Section 9.12 Groundwater Conservation.

As part of the implementation of this Plan, the District will develop methods for measuring, tracking, and reporting progress towards meeting District goals. Measurement methods and programs will leverage the District's data collection programs (see Section 9.5.2). Methods and processes to evaluate District performance are described in greater detail in Section 10.0.

The overarching district-wide outcomes of implementing this plan over the next 10 years will be:

- 41,000 linear feet of streambank, shoreline, ravine and slope stabilization
- 3,200 pounds of phosphorus reduction per year
- 11 acres of habitat restored
- 4.1 million gallons of groundwater conserved per year

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- Ten (10) annual reports summarizing the following items:
 - Budget
 - Capital Improvement Program
 - Data Collection
 - Education and Outreach
 - Regulatory

Table 9-1 RPBCWD Implementation Table 2018-2028 (Planned Levy)

RPBCWD ID	Capital Project Description	Score ¹	Estimated Levy ^{2,3}	Year										Partner(s)	Partner(s) Additional Funds
				2018	2019	2020	2021	2022	2023	2024	2025	2026	2027		
Riley Creek Watershed Restoration															
R4	Upper Riley Creek Stabilization and restoration	39	\$1,625,000	-	\$425,000	\$675,000	\$525,000	-	-	-	-	-	-	-	-
LU-A1.10c	Watershed Phosphorus Load Control	34	\$350,000	-	-	-	-	-	-	\$350,000	-	-	-	-	-
LU-A3.4	Watershed Phosphorus Load Control	32	\$190,000	-	-	-	-	-	-	-	-	\$190,000	-	-	-
Lake Susan Park Pond	Watershed Phosphorus Load Control	34	\$80,000	\$80,000	-	-	-	-	-	-	-	-	-	-	-
Susan In-Lake	In-Lake Phosphorus Load Control	32	\$310,000	-	-	-	-	\$110,000	-	\$100,000	-	\$100,000	-	-	-
Riley In-Lake	In-Lake Phosphorus Load Control	30	\$300,000	-	-	\$300,000	-	-	-	-	-	-	-	-	-
Rice Marsh In-Lake	In-Lake Phosphorus Load Control	28	\$335,000	\$150,000	-	\$15,000	-	\$75,000	-	-	\$20,000	-	\$75,000	-	-
RM_12a	Watershed Phosphorus Load Control	28	\$300,000	-	\$150,000	\$150,000	-	-	-	-	-	-	-	-	-
R3	Creek Restoration and Stabilization	27	\$954,000	-	-	-	-	-	-	-	\$477,000	\$477,000	-	-	-
Lower Riley Crk	Lower Riley Creek Restoration and Stabilization (Reach D3 and E)	39	\$700,000	\$400,000	\$300,000	-	-	-	-	-	-	-	-	-	-
Subtotal			\$5,144,000	\$630,000	\$875,000	\$1,140,000	\$525,000	\$185,000	\$0	\$450,000	\$497,000	\$767,000	\$75,000	\$0	
Purgatory Creek Watershed Restoration															
Scenic Heights	Scenic Heights Habitat Restoration	43	\$0	-	-	-	-	-	-	-	-	-	-	-	-
Staring Lake StL_21	Creek Restoration and Stabilization	35	\$450,000	-	-	-	\$450,000	-	-	-	-	-	-	-	-
Lotus Lake LL_6	In-Lake Phosphorus Load Control	32	\$690,000	\$345,000	-	-	-	-	\$345,000	-	-	-	-	-	-
Silver Lake SiL_2	Watershed Phosphorus Load Control	32	\$535,000	-	\$167,500	\$367,500	-	-	-	-	-	-	-	-	-
Lotus Lake LL_1	Watershed Phosphorus Load Control	26	\$186,000	-	-	-	-	\$186,000	-	-	-	-	-	-	-
Lotus Lake LL_3	Watershed Phosphorus Load Control	26	\$390,000	-	-	-	-	\$390,000	-	-	-	-	-	-	-
Lotus Lake LL_7	Watershed Phosphorus Load Control	26	\$586,000	-	-	-	-	-	\$586,000	-	-	-	-	-	-
Lotus Lake LL_8	Watershed Phosphorus Load Control	22	\$142,000	-	-	-	-	-	\$142,000	-	-	-	-	-	-
Lotus Lake LL_9	Watershed Phosphorus Load Control	22	\$556,000	-	-	-	-	-	-	-	-	-	-	\$556,000	-
Duck Lake DL_3	Watershed Phosphorus Load Control	37	\$220,000	\$220,000	-	-	-	-	-	-	-	-	-	-	-
Staring Lake StL_1	Creek Restoration and Stabilization	29	\$1,173,000	-	-	-	-	-	\$391,000	\$391,000	\$391,000	-	-	-	-
Red Rock Lake RRL_7	Watershed Phosphorus Load Control	28	\$441,000	-	-	-	-	-	-	-	-	\$441,000	-	-	-
Staring Lake StL_17	Creek Restoration and Stabilization	29	\$550,000	-	-	-	-	\$550,000	-	-	-	-	-	-	-
Mitchell Lake ML_3	Watershed Phosphorus Load Control	24	\$579,000	-	-	-	-	-	-	-	-	-	\$579,000	-	-
Hyland In-Lake	In-Lake Phosphorus Load Control	32	\$320,000	\$20,000	\$150,000	-	-	\$150,000	-	-	-	-	-	-	-
PC_1	Creek Restoration and Stabilization - Restoration and stabilization of 10 locations (725 feet) downstream of Pioneer Trail (Group 1)	31	\$265,000	-	-	-	-	-	-	-	\$265,000	-	-	-	-
PC_2	Creek Restoration and Stabilization - Restoration and stabilization of 6 locations (380 feet) downstream of Pioneer Trail (Group 2)	31	\$185,000	-	-	-	-	-	-	-	\$185,000	-	-	-	-
Subtotal			\$7,268,000	\$585,000	\$317,500	\$367,500	\$450,000	\$1,276,000	\$1,464,000	\$391,000	\$841,000	\$441,000	\$579,000	\$556,000	
Bluff Creek Watershed Restoration															
BT3A	Creek Restoration and Stabilization	43	\$0	-	-	-	-	-	-	-	-	-	-	-	-
BT3	Creek Restoration and Stabilization along SW Branch, excludes BT3A	39	\$0	-	-	-	-	-	-	-	-	-	-	-	-
B4	Creek Restoration and Stabilization	37	\$566,000	-	-	-	-	-	-	\$566,000	-	-	-	-	-
B5	Creek Restoration and Stabilization	37	\$614,000	-	-	-	\$614,000	-	-	-	-	-	-	-	-
B3	Creek Restoration and Stabilization	39	\$1,476,000	-	-	-	-	-	-	-	-	-	\$738,000	\$738,000	-
Wetland Resto.	Wetland Restoration and Flood Mitigation @ 101 and Pioneer Trail	35	\$350,000	-	\$350,000	-	-	-	-	-	-	-	-	-	-
Chan HS Reuse	Chanhassen High School Stormwater Reuse	31	\$75,000	\$75,000	-	-	-	-	-	-	-	-	-	-	-
Subtotal			\$3,081,000	\$75,000	\$350,000	\$0	\$614,000	\$0	\$0	\$566,000	\$0	\$0	\$738,000	\$738,000	

Table 9-1 RPBCWD Implementation Table 2018-2028 (Planned Levy)

RPBCWD ID	Capital Project Description	Score ¹	Estimated Levy ^{2,3}	Year										Partner(s)	Partner(s) Additional Funds
				2018	2019	2020	2021	2022	2023	2024	2025	2026	2027		
District-Wide Programs and Operations (non-CIP)															
Administration and Planning	Accounting and Audit		\$550,000	\$40,000	\$42,000	\$44,000	\$46,000	\$48,000	\$50,000	\$52,000	\$54,000	\$56,000	\$58,000	\$60,000	
	Advisory Committees (TAC/CAC)		\$99,000	\$4,000	\$5,000	\$6,000	\$7,000	\$8,000	\$9,000	\$10,000	\$11,000	\$12,000	\$13,000	\$14,000	
	Insurance and Bonds		\$187,000	\$12,000	\$13,000	\$14,000	\$15,000	\$16,000	\$17,000	\$18,000	\$19,000	\$20,000	\$21,000	\$22,000	
	Manager Compensation		\$264,000	\$19,000	\$20,000	\$21,000	\$22,000	\$23,000	\$24,000	\$25,000	\$26,000	\$27,000	\$28,000	\$29,000	
	Dues and Publications		\$143,000	\$8,000	\$9,000	\$10,000	\$11,000	\$12,000	\$13,000	\$14,000	\$15,000	\$16,000	\$17,000	\$18,000	
	Office Cost		\$1,311,000	\$100,000	\$103,000	\$107,000	\$111,000	\$115,000	\$119,000	\$123,000	\$127,000	\$131,000	\$135,000	\$140,000	
	Recording Services		\$220,000	\$15,000	\$16,000	\$17,000	\$18,000	\$19,000	\$20,000	\$21,000	\$22,000	\$23,000	\$24,000	\$25,000	
	Staff Cost		\$5,594,000	\$434,000	\$448,000	\$462,000	\$476,000	\$491,000	\$506,000	\$522,000	\$538,000	\$555,000	\$572,000	\$590,000	
	Technical Services (Engineering and Legal)		\$2,310,000	\$178,000	\$184,000	\$190,000	\$196,000	\$202,000	\$209,000	\$216,000	\$223,000	\$230,000	\$237,000	\$245,000	
10-yr Management Plan Update/Amendments		\$265,000	\$5,000	\$5,000	\$5,000	\$5,000	\$25,000	\$5,000	\$5,000	\$5,000	\$5,000	\$100,000	\$100,000		
Regulatory Program	Permit Review and Inspections		\$1,176,000	\$90,000	\$93,000	\$96,000	\$99,000	\$102,000	\$106,000	\$110,000	\$114,000	\$118,000	\$122,000	\$126,000	
Assessment and Analysis	Creek Restoration Action Strategy		\$140,000	\$20,000	\$20,000	\$20,000	\$20,000		\$20,000	\$20,000		\$20,000			
	Data Collection and Monitoring		\$2,332,000	\$180,000	\$186,000	\$192,000	\$198,000	\$204,000	\$211,000	\$218,000	\$225,000	\$232,000	\$239,000	\$247,000	
	District-Wide Floodplain Evaluation		\$120,000	\$30,000			\$30,000			\$30,000			\$30,000		
	Plant Restoration - U of M		\$200,000	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000							
	TMDL Work		\$20,000	\$10,000	\$10,000										
UAA Updates		\$500,000					\$100,000	\$100,000	\$100,000	\$100,000	\$100,000				
Education	Education and Public Outreach		\$1,500,000	\$115,000	\$119,000	\$123,000	\$127,000	\$131,000	\$135,000	\$140,000	\$145,000	\$150,000	\$155,000	\$160,000	
	Cost Share		\$2,200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	
Additional Programs	Annual allocation to Repair & Maintenance Fund		\$300,000			\$100,000			\$100,000			\$100,000			
	Aquatic Invasive Species Work (Inspection & early Response)		\$825,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	
	Lake Vegetation Management Implementation		\$825,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	
	Wetland Management		\$1,150,000	\$150,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	
	Groundwater Conservation		\$1,220,000	\$130,000	\$100,000	\$100,000	\$100,000	\$130,000	\$100,000	\$100,000	\$130,000	\$100,000	\$100,000	\$130,000	
Opportunity Projects		\$1,100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000		
Subtotal			\$24,551,000	\$2,030,000	\$1,963,000	\$2,097,000	\$2,071,000	\$2,216,000	\$2,294,000	\$2,274,000	\$2,304,000	\$2,445,000	\$2,401,000	\$2,456,000	
Reserve			\$1,100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	
Estimated Annual Levy			\$41,144,000	\$3,420,000	\$3,605,500	\$3,704,500	\$3,760,000	\$3,777,000	\$3,858,000	\$3,781,000	\$3,742,000	\$3,753,000	\$3,893,000	\$3,850,000	

- Notes:
- For more information on the scoring details and multiple benefits see Tables 6-2, 7-2, and 8-2.
 - Estimated levy presented in 2017 dollars. The District levied funds for some multi-year projects before 2018.
 - Estimated costs are from UAA studies, City information, RPBCWD 2015 Creek Restoration Action Strategy, or other RPBCWD studies, preliminary cost estimates will be added to the 5-year working CIP and refined through the feasibility study process.

9.1 Watershed Management Approach

The District's deep understanding of the water resource systems in the watershed has been vital to the success of its management and regulatory efforts to date. The District has conducted numerous assessments (e.g., Use Attainability Analysis, Creek Restoration Action Strategy, Paleolimnological Studies, Feasibility Studies, Risk Assessments, etc.) to help it work with its watershed cities to prioritize and develop capital improvement projects that restore the health of the wetlands, lakes, streams and groundwater; to stabilize streams suffering the effects of increased urbanization; and to protect infrastructure from flood damage. While the District has a rich database of information to draw on to develop further projects to address threats to water resource health, the implementation of this plan will necessarily involve continued assessment and analysis through an adaptive management approach. Adaptive management recognizes that protecting and restoring water resources is rarely a linear endeavor where one can develop a plan, implement the plan, and come to the predicted result without any changes along the way (i.e., incorporating what is learned into ongoing or future management decisions). Adaptive management requires the following steps highlighted in Figure 9-1:

1. Data Collection,
2. Interpretation,
3. Solution Identification,
4. Implementation, and
5. Return to Data Collection to adjust the plan based on the results evaluation

FIGURE 9-1

Adaptive Management within RPBCWD

Management & Restoration In each of its three watersheds, the Riley Purgatory Bluff Creek Watershed District utilizes a One-Water Management Strategy. Rather than focusing on a single water body at a time, the strategy looks at the watershed as a whole.

It begins with the **1** collection and **2** interpretation of data to understand current conditions. **3** Solutions to improve water quality are then identified based on the best available science. **4** Finally, projects are prioritized and implemented, working from upstream to downstream and taking advantage of partnerships.

1 Data collection

The first step in managing water resources is to understand their current condition. Monitoring and data collection are the foundation for this understanding.



2 Interpretation

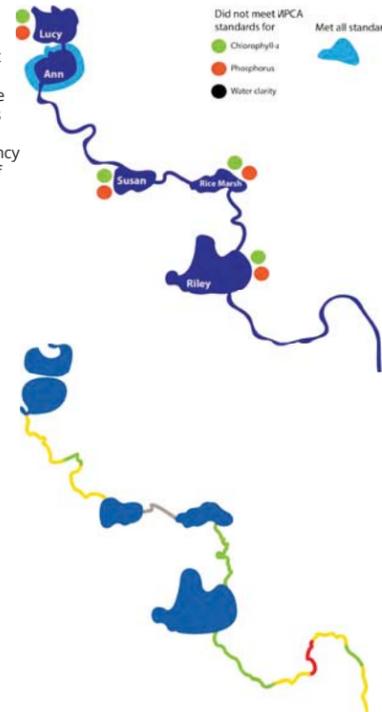
After the data are collected, they need to be interpreted: what do they mean, and what can they tell us about the health of our water resources? There are several tools to help in this process.

Hydrology & Hydraulics Modeling
Lake and creek water level data are used in modeling the movement of water through the watershed during a rainfall. These models can be used to predict flooding.

Lake water quality report
Every year, the district compares lake monitoring data to the clean water standards set by the Minnesota Pollution Control Agency and submits a state of the water report.

Creek Restoration Action Strategy (CRAS)
The CRAS assess stream conditions to identify those reaches in most need of restoration.

Creek condition
— Best
— Good
— Fair
— Poor
— No score



3 Solution identification

Once the problems have been determined, the next step is to develop solutions. The district conducts studies to identify cost-effective, innovative projects that will reduce pollution and improve water quality.



4 Implementation

Projects are implemented based on a prioritization strategy that moves from upstream to downstream, takes advantage of partnerships, adapts to new data and integrates all of the information gathered in steps 1-3. Two examples are detailed below.

Lake Susan Spent Lime Project



The chamber that will hold the spent-lime

The watershed district, together with the City of Chanhassen, built a filtration system to treat stormwater flowing into Lake Susan. The structure, called a spent-lime treatment system, will remove phosphorus, a nutrient that can cause cloudy water and algae blooms and is contributing to poor water quality in Lake Susan. Spent-lime is calcium carbonate that is left over after being used in a drinking water treatment plant, and when water flows through it, phosphorus sticks to it. The system will remove approximately 45 pounds of phosphorus from runoff before it enters Lake Susan each year. This is the equivalent of 22,500 pounds of algae.

Rice Marsh Lake Aeration

Common carp are an invasive species that can degrade water. In 2014, the University of Minnesota completed a study of carp in the Riley chain and determined a population threshold below which they do not impact water quality. The researchers also developed methods for controlling carp at this level. The methods include aerating Rice Marsh Lake (sending compressed air through tubing into the lake, much like a fish tank) during winter to keep game fish alive. These fish eat the eggs of carp, which use the lake as a spawning ground. Preventing winter fish kills promotes a robust population of game fish that can control carp reproduction.



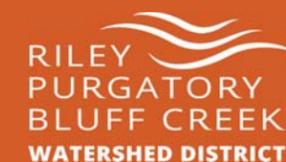
The aeration unit causes an area of thin ice that must be marked for safety

Protection

The District's permitting program includes for both development and redevelopment. These rules provide protection for water quality and cover topics like buffers, stormwater and streambanks, among others.

In 2016, the district's permitting program resulted in the removal of an estimated

48,000 lbs of Total Suspended Solids and **130 lbs of Total Phosphorous** from site run-off



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9.1.1 Lake Management

Nearly 90% of all respondents to the 10-year plan public survey considered lakes to be very important to the quality of life in the community. In addition, during the three workshops and public input summits roughly 20% of the comments received were related to lakes. These comments reaffirm the District's founding petition.

In implementing this Plan, the District will expand its emphasis on the role of ecological indicators in overall lake health, as well as the feedback mechanisms between these indicators (e.g., aquatic plant index of biological integrity (IBI), fish IBI, lakeshore habitat assessments, etc.). The District's approach to lake health assessment and management establishes the analytical basis for the District's efforts to protect and improve water resource health as illustrated in Figure 9-2.

The District's lake management decision tree begins and ends with monitoring and assessing the health of the resource. The District will review lake monitoring data annually to assess progress toward the District's lake management goals. This approach considers the following primary factors affecting lake ecological health:

- Fisheries
- Vegetation (macrophytes)
- Water quality (e.g., phosphorus concentrations)

The District's approach also considers how water quantity (groundwater and surface water) and wildlife habitat affect and are affected by overall lake health.

Figure 9-2

LAKE MANAGEMENT DECISION TREE

MONITORING & ASSESSMENT

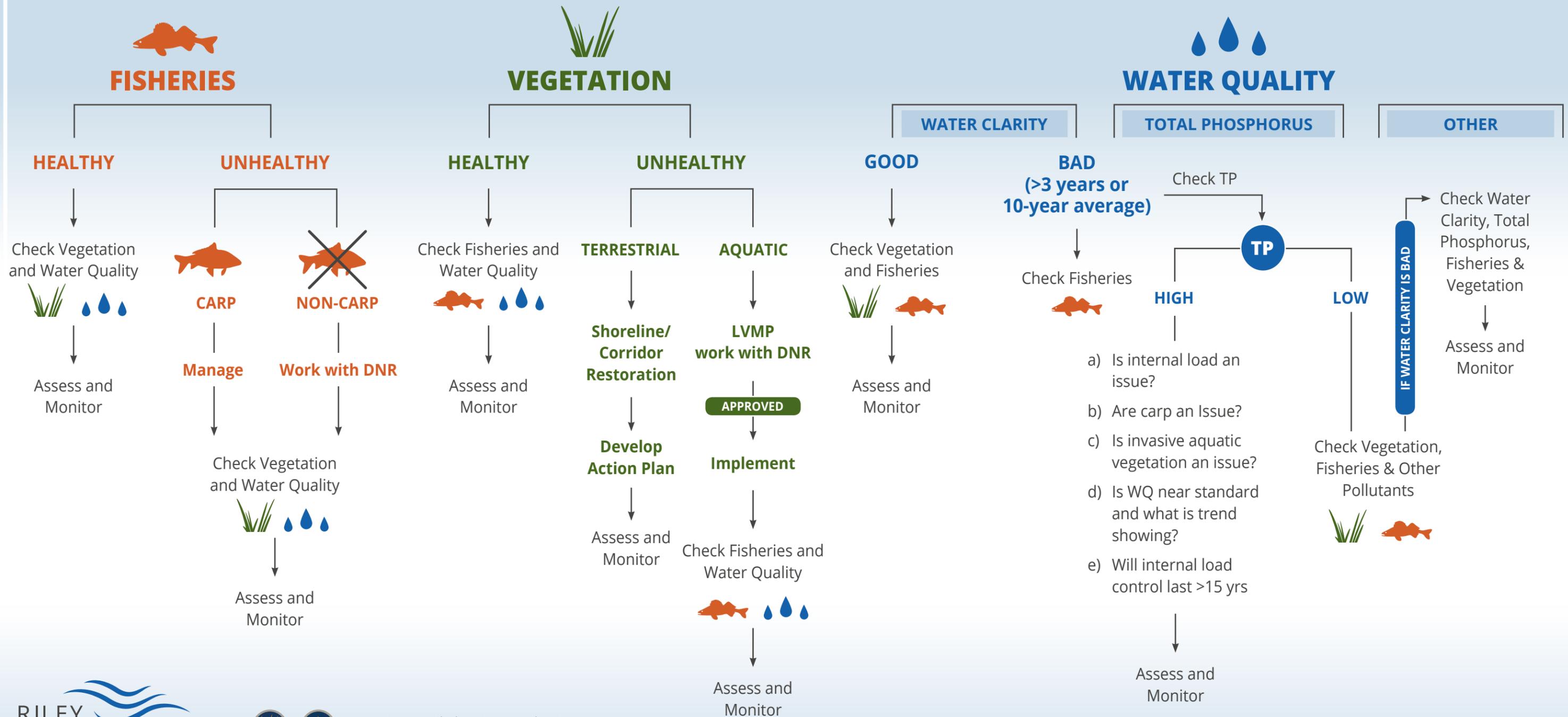


Table 9-2 summarizes typical factors to be considered in the District’s lake assessment approach. Numerical goals exist for some factors (e.g., see Table 5-4MPCA Water Quality Standards), while other ecological lake health factors are assessed relative to narrative criteria without strict numerical goals. The District will collaborate with stakeholders and regulatory agencies (e.g., MPCA, MDNR) to develop lake-specific numerical goals for ecological indicators (e.g. macrophytes) where appropriate.

Table 9-2 Ecological Lake Health Evaluation Factors

Fisheries	Water Quality	Vegetation	Water Quantity	Wildlife
Diversity	Phosphorus	Macrophyte Species Richness and Floristic Quality	Water levels	Upland Biodiversity
Carp Population	Clarity	Non-native Invasive species	Bounce	Shoreline Buffer Extent/Width
	Sediment	Phytoplankton Populations	Groundwater levels	
	Chloride			
	Chlorophyll a			

For lakes that are meeting the goals, the District will continue periodic monitoring to track variations and potential trends in the lakes health. The lake-specific goals may include targets for lake health factors beyond water quality, such as aquatic plant communities or fisheries. For lakes that are not achieving the goals, the District will work with stakeholders and agencies to develop an action plan and implement projects included in the capital improvement program (see Table 9-1).

9.1.1.1 Fisheries

Fisheries management in the District extends back to the 1980’s when the District coordinated with the DNR and city of Eden Prairie to undertake the Round Lake biomanipulation project which involved resetting the entire fisheries in the lake.

In keeping with the watershed approach of adaptive management the District contracted with the University of Minnesota to establish carp management strategies for the Riley and Purgatory Major Watershed. Carp management, for example, within the Riley Creek Watershed requires prevention of winter fish kill in Rice Marsh Lake, Lake Susan, and Lake Lucy. Winter fish kill results in the reduction of fish populations that otherwise would feed on carp larvae and fry. When a winter fish kill occurs, carp

populations rebound and destroy the water quality improvements made in carp removal. No lake within the Riley Creek watershed can be successfully managed for carp on an individual basis. Since 2010, the District has successfully operated a winter aeration unit in Rice Marsh Lake, the identified spawning and nursery for carp in the Riley Watershed, to maintain the carp population below the University identified target, thus limiting carp impacts on the lakes.

During the implementation of this plan, the District will work with local and state stakeholders (i.e., cities, MDNR, etc.) to implement fisheries management activities, such as coordinating with MDNR, operating the Rice Marsh Lake winter aeration system, conducting fish survey, leading carp seining efforts, etc.

9.1.1.2 Vegetation

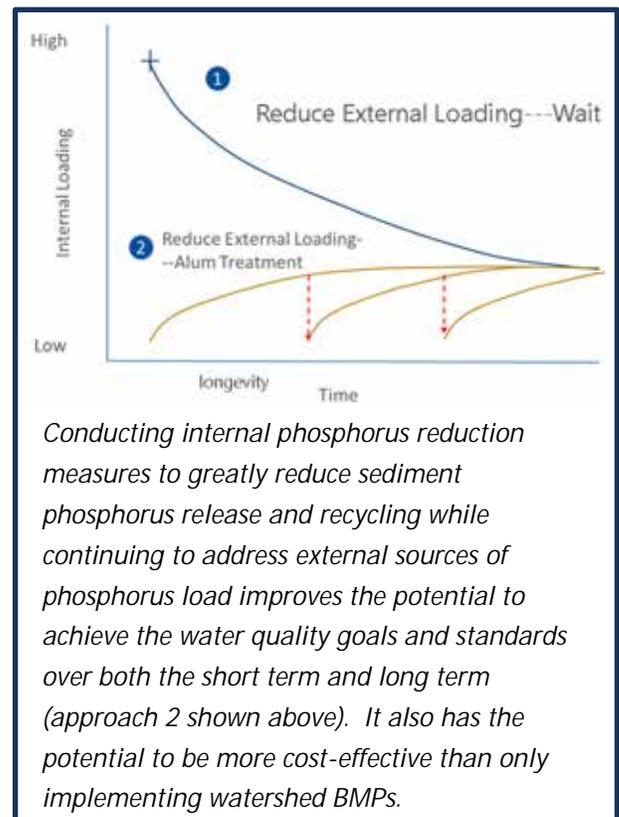
The District will continue to partner with the University of Minnesota to further the District's understanding on ecological restoration in our lakes. This partnership is beneficial as it helps determine the health of our aquatic plants, which has been identified as key element in lake management. It is important to note that the focus for the RPBCWD is to manage non-native aquatic invasive species, especially those species that affect water quality (e.g., curlyleaf pondweed) and ecological health of the lake. Prior to managing non-native macrophytes the District will work with stakeholders and the MDNR to develop a lake vegetation management plan (LVMP) to determine a suitable management strategy for the specific lake. The District plans to continue vegetation monitoring and management activities consistent with a MDNR approved LVMP and/or as suggested by aquatic vegetation experts (i.e., University of Minnesota). These management activities include, but are not limited to herbicide treatments, plant transplanting, and water clarity improvement measures. The District will continue monitoring lakes for aquatic invasive species (AIS) and implement a rapid response to new infestation, with close coordination with the MDNR (see Section 9.9).

9.1.1.3 Water Quality

If water quality is poor or exhibits a declining trend, the District may implement watershed and/or in-lake management practices to improve the lake health based on recommendations from the lake-specific UAA updates, including but not limited to those listed in Table 6-2, Table 6-3, Table 7-2, Table 7-3, Table 8-2, Table 8-3, and Table 9-1, or update the assessments.

The District recognizes the need to control phosphorus levels in the lakes as a primary means to reduce the occurrence of algal blooms, improve water clarity, and promote diverse vegetation growth. As part of the lake management framework, the District intends to pursue a balanced approach to reducing phosphorus levels in the lakes to protect and restore the resources. Based on public input, no preference is given to impaired lakes over non-impaired lakes as the Managers recognize the importance of protecting and preserving the resource as way to cost effectively achieve the established goals.

The District will implement a balanced nutrient reduction approach as part of their lake management framework including watershed, in-lake, and housekeeping BMPs. Some BMPs represent a "quick-fix" (e.g., point source reduction and internal load control) while other are long-term management options (e.g., P-fertilizer elimination and watershed BMPs). Because internal loading has the potential to continually replenish the phosphorus in the water, the benefits of external load reduction will take time to materialize and could be less likely to result in long-term success for lakes with low flushing rates. In addition, decreasing the phosphorus in the lake's water has the potential to exacerbate the release of phosphorus from lake sediment.



The District will consider internal load control measures after considering the impacts of carp, non-native vegetation and uncontrolled or unmitigated external sources (e.g., streambank/shoreline erosion, watershed development, etc.), all of which are key elements considered in the District's Lake Management Decision Tree to address internal and external nutrient sources. These considerations are critical because failure

to address them could lead to the internal measure being compromised and reducing the effective life of the treatment.

9.1.2 Creek Management

Streams were identified in the 10-year plan public survey as being important to a majority of the citizens within the District. When ranking resource importance within the District, Purgatory Creek was ranked the number one most valuable resource with over 60% of the survey respondents indicating its importance, Riley Creek ranked third, and Bluff Creek ranked seventh.

Major stream reaches were previously delineated in 1996 and 2003 using the Rosgen stream classification system (Rosgen, 1994). Additionally, all three creeks were divided into 88 total subreaches whose boundaries were defined in multiple ways, including but not limited to, stream crossings, obvious changes to the characteristics of the stream and surrounding area (channel shape, valley shape, or surrounding vegetation), or observed locations where erosion issues begin or end. Streams were specifically monitored for infrastructure risk (quantitative assessment), channel erosion and stability (Pfankuch, 1975) surrounding and instream habitat (Minnesota Pollution Control Agency – Stream Habitat Assessment, 2014) and water quality (review of previous 5 years of data). Through the CRAS the District identified low, medium, and high risk sites. Low risk sites require continual monitoring to ensure no degradation is occurring and special emphasis is placed on protecting high-quality areas. The sites deemed high risk undergo more evaluation to determine the root cause of the underlying issue. After being identified, the stream section will undergo a corrective action to solve the identified problem. Following implementation of the remedial measures, such as those listed in Table 6-2, Table 8-2, and Table 9-1, continued monitoring should occur to make sure the section does not return to a degraded state. The RPBCWD creek management decision tree illustrated in Figure 9-3 is based on the CRAS.

Figure 9-3

STREAM MANAGEMENT DECISION TREE

MONITORING & ASSESSMENT

SCORE	CREEK STABILITY	+	WATER QUALITY 5-YEAR REVIEW	+	HABITAT	+	INFRASTRUCTURE
1	Very stable		No impairments		Excellent		No threat
3	Moderately stable		Water quality parameters near or infrequently exceed standards		Good		Long-term threat
5	Moderately unstable		Chronic water quality violations		Fair		Medium-term threat
7	Unstable		Impaired		Poor		Short-term threat

PRIORITY CLASS	LOW	MEDIUM	HIGH	SEVERE
SUM	≤12	13-17	18-21	≥22
DESCRIPTION	No restoration needed	Low priority	Restoration needed	Immediate restoration needed

CONTINUE MONITORING
Assess Temporal Changes
Preserve High-Quality Areas

Identify Problems & Solutions (Examples)	
Increased Water Volume	Increase Watershed Storage/Stormwater Ponds
Severe Erosion	Perform Stream Stabilization
Poor Water Quality	Construct Treatment System
Degraded Habitat	Create Wildlife Corridor/Install In-stream Habitat
Failing Infrastructure	Repair/Replace/Improve



Consistent with the District's adaptive management approach to resource management, the District will collect and evaluate data with changing climate in mind while using available tools to implement projects resilient to predicted climate change impacts.

9.2 Capital Improvements Program

The District's implementation plan includes a capital improvement program (CIP) which identifies and describes structural solutions and internal control measures over \$100,000 to attain the District's goals while following the general management frameworks described in Section 9.1 Watershed Management Approach, Section 9.11 Wetland Management Program, and Section 9.12 Groundwater Conservation.

The CIP is a planning and budgeting tool, and a means to inform partners, District residents and other interested parties as to the District's scope and priorities for its capital work over the next 10 years. A capital improvement is "a physical improvement that has an extended useful life." (Minn. Rules 8410.0020, subpart 3.). The District chooses to handle internal control measures as a capital improved when the anticipated cost is over \$100,000. A project's inclusion in the CIP does not mean that the project will be constructed, only that the District has identified it as an action that may be a cost-effective way for the District to achieve its water resource goals. A project identified in the CIP always will need further review as to technical feasibility, cost and financing, consistency with local needs and other considerations before a formal decision to proceed to construction is made. Appendix E describes the development and evaluation steps that will occur before the District will commit resources to a project, as well as the process for the District's ongoing review and updating of the CIP.



The general process the District follows when implementing capital projects is based on sound science, solicits public input, and monitors project effectiveness. Additional information is available in Appendix E.

During project development and evaluation, the District expects to maintain close coordination with the LGU(s) where the project is located. Local Government Unit (LGU) support and partnership for a project will be an important consideration in the District

decision to advance a project. In assessing the feasibility of a project, the District will seek a resolution of support or equivalent project concurrence from the applicable LGU(s).

In addition, before the Board approves final design of such a project, the District will hold at least one public information meeting at a location near the project site, and will work with the LGU to identify the appropriate scope of notice to property owners near the project and publish notice in an appropriate local newspaper.

The capital projects listed in Table 9-1 and shown on Figure 9-4 include projects identified as part of CRAS, UAAs, TMDL studies and other investigations, and prioritized as discussed in Section 4.0. Additional potential capital improvement projects to protect and restore the water resources in the District identified in the various studies are included in Table 6-2, Table 7-2, and Table 8-2. While RPBCWD will be the lead agency for implementing the activities, the District will seek partners and cooperate with LGUs, agencies, property owners and organizations as opportunities arise.

The projects included in Table 9-1 are included at the feasibility/conceptual level. As projects become better-defined, so will the estimated project costs and responsibilities of the RPBCWD and the other participating agencies/organizations. The costs given in the table are the estimated amounts that would be levied for the project; the District will pursue collaborations and grant opportunities to reduce the portion of the total cost borne by watershed property owners. Costs for projects in Table 9-1 may be revised as part of feasibility studies completed prior to implementation. If the anticipated cost is significantly greater than the original estimate, as adjusted to reflect inflation, the District will undertake a minor plan amendment to ensure the plan and CIP reflect the accurate scope of the project. The District may implement the activities and projects listed in Table 9-1 at a different time than shown in the table, as circumstances dictate, and to fit in with the District's financing strategies. For example, the availability of grants and partnerships could result in either the acceleration or delay of projects.

The District will consider the logistical factors in Section 9.2.1 and re-sort the projects into a District implementation table. The District will review the implementation table at least every 2 years and adjust the sequencing of projects based on changes to logistical factors and the addition of new projects to meet the requirements of Minnesota Rules 8410.0150, subpart 3.E.

The District will also review its CIP annually, as a part of its budgeting process. The District will review the status of all capital projects and their priority for budget and levy purposes, and will allocate funds for the following year accordingly.

Minnesota Rules 8410.0140 and Section 9.14 of this Plan describe the procedures to amend the Plan. An amendment will be undertaken when the District elects to proceed beyond feasibility or conceptual design to advance a capital improvement that is not in the CIP.

CAPITAL IMPROVEMENT PROJECTS

FIGURE 9-4

FIGURE DESCRIPTION

Watershed and in-lake BMPs as well as other management strategies are needed to improve and protect the water resources within the watershed. Based on studies completed since the 2011 3rd generation plan, the recommended phosphorus reduction management strategy to protect, enhance, and restore the health of the water resources in the RPCWD are shown in this figure and included in this plan for potential implementation. The figure illustrates the distributed nature of recommended BMP locations. In general, the RPCWD will follow an adaptive management approach to implement the various projects. The recommended BMPs are intended to be a guide rather than a prioritization list. Additional data collection, future study efforts and innovation could result in revisions to those shown or additional BMPs being added.

Other watershed-wide management strategies are also needed to improve and protect the resources (e.g. wetlands, lakes, and creeks) in the District, including:

- Watershed-wide volume reduction and detention
- Water quality/biological monitoring
- Carp management
- Educate and partner with residents, businesses, cities, and developers to maximize restoration and protect opportunities
- Aquatic invasive species management
- Shoreline assessment and vegetation management
- Promote cost-share opportunities and enhance education outreach

Capital Improvement Locations

- In Lake
- Watershed
- Capital Improvement Creek Restoration/Stabilization

Major Watersheds

- Bluff Creek
- Riley Creek
- Purgatory Creek
- Streams/Creeks

Lake/Pond

Lake/Pond

Wetlands

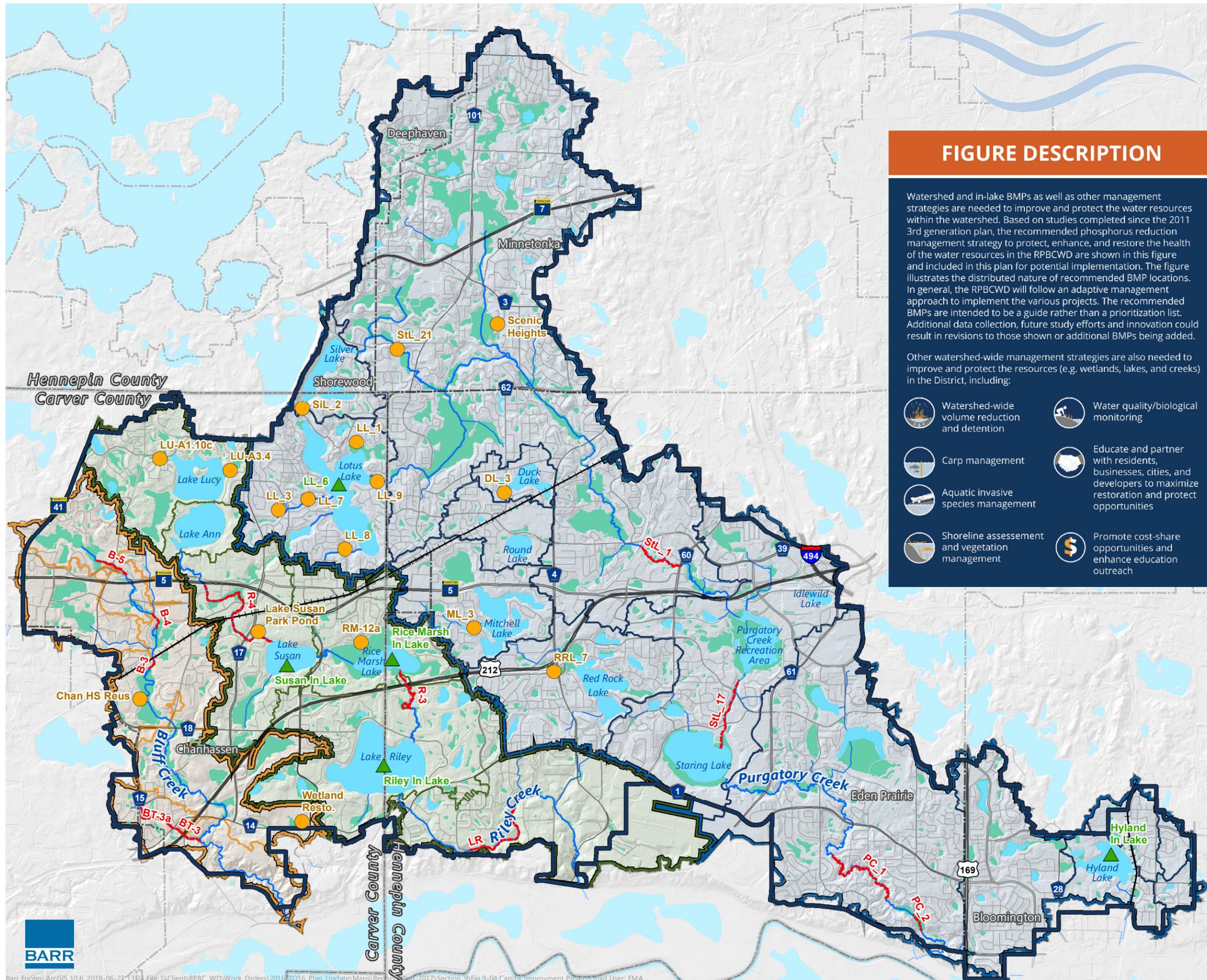
Wetlands

District Legal Boundary

District Legal Boundary

Municipalities

Municipalities



9.2.1 Logistical Considerations

The District recognizes that it is not necessarily most efficient, or even possible, to implement projects with the greatest benefit score from the prioritization process, described in Section 4.0, first. Therefore, when developing Table 9-1, the District considered additional logistical factors to determine an appropriate schedule for implementing the projects with greatest benefit in the most efficient manner possible. These factors will also be reviewed as future capital improvement projects are identified and considered for implementation. Logistical factors considered in this process include:

- Funding availability
 - § District funding
 - § Cost-share funding
 - § Grants
- Timing of partnership (and cost sharing) opportunities
- Coordination with other planned activities
- Access to the proposed project site/land ownership issues
- Cost-effectiveness (e.g., overall cost, load reduction, cost per load reduction, if applicable)
- Resource management frameworks (see Section 9.1 Watershed Management Approach, Section 9.11 Wetland Management Program, and Section 9.12 Groundwater Conservation)

The District organizes its implementation program to maintain a balanced budget. Expensive projects may need to be implemented in phases over longer periods or delayed until additional external funds are obtained. Conversely, some projects will be accelerated to take advantage of grant availability or cost-share partnership opportunities. The availability and timing of partnership opportunities may also influence project prioritization. The District will partner with cities, residents, businesses, and other cooperators to implement projects. Factors affecting a partner's ability to cooperate may affect project scheduling and may be outside District control.

Coordination of proposed projects with other activities and projects will also affect project prioritization. For example, the District may delay implementation of a project until it can be constructed in conjunction with city road reconstruction or redevelopment. Implementation of other District projects may also affect prioritization.

In addition to the logistical factors listed above, the District proposes to implement the following project sequencing strategies:

- The District will implement creek restoration projects on a rotational basis between the three major watersheds.
- The District will implement in-lake phosphorus reduction projects (e.g., alum treatments) only if:
 - § Internal phosphorus loading is an issue needing control.
 - § Carp population density is below the critical biomass threshold for a lake of 100 kilograms per hectare, which was proposed as the desired threshold in carp management (Sorensen, Bajer, & Headrick, 2015)
 - § Non-native invasive aquatic vegetation is adequately managed.
 - § Internal load-control efforts are anticipated to remain effective for at least 15 years.

9.2.2 Project Funding

When the District cooperates with public or private partners in the construction of a capital project, each party's responsibilities, commitments, rights and role will be documented in a project specific agreement. The District will fund only those project elements identified in the agreement. The District intends to fund its share of project costs through its use of the watershed-wide ad valorem property tax levy, though in an unusual circumstance, it may consider other means of allocating its costs. Any decision to depart from use of the ad valorem levy would be publicly made and, if required, would be the subject of an amendment of the Plan. In addition to other sources of funding, the District will actively pursue grants and financing from state, federal and other sources.

9.3 District Administration and Planning

The District's administration and planning efforts are integral to achieve the goals set by the RPBCWD Plan and the Board of Managers. Effective execution of RPBCWD projects, programs, and other strategies requires sound fiscal management, adequate staff capacity and expertise, and planning efforts that are informed by past performance and adaptable to an evolving future.

9.3.1 Accounting and Audit

The District works with an accountant who provides monthly services which include the monthly treasurer's reports as well as payroll services. The accountant also prepares information for the District's annual audit. In addition, the District hires a separate independent certified public accounting firm to perform the District's annual audit.

9.3.2 Advisory Committees

The District has two Advisory Committees (CAC and TAC) that meet on a regular basis. The funds allocated to this line item in Table 9-1 are to cover miscellaneous expenses related to the duties and activities of District advisory committees.

9.3.3 Insurance

The District is insured for general liability, workers compensation, property/casualty, and public official liability.

9.3.4 Manager Compensation

The Manager per diems for regular and special meeting attendance and expenses incurred in the performance of official manager duties, such as attendance at conferences and meetings and related expenses, are covered within this line item in the implementation plan.

9.3.5 Dues and Publication

This line item covers dues for appropriate organization memberships (e.g., MAWD, American Water Resources Association) and for purchase of necessary publications and reference materials.

9.3.6 Office Cost

The District has office space where its staff conduct daily business, store equipment; as well as host board meetings, TAC meetings, CAC meetings, and training. This line item covers the rent for the office, as well as office supplies, utilities, janitorial expenses, and any equipment needed for the office (e.g., printer).

9.3.7 Recording services

The District utilizes a recording service to help in the transcribing of District minutes.

9.3.8 Staff Cost

This line item covers salary, taxes, benefits and employee expenses such as mileage, parking, professional development and supplies for District staff. Also included is an allowance for salary increases and benefit costs.

9.3.9 Technical Services

Technical services include both engineering and legal services.

The District engineer oversees all District engineering activities. The District engineer is in attendance at meetings of the District: – this covers Board and related project meetings, mini case studies, assisting in District water management planning activities, and other matters requiring the District Engineer.

The District also uses a legal advisor to: attend and advise at meetings, research various issues for Board consideration, prepare and publish legal notices, prepare Board resolutions, and assist with other matters requiring legal counsel.

9.3.10 10 Year Management Plan/Amendments

From time to time, projects/programs may emerge that were not anticipated when this plan was drafted. Consequently the plan must be amended in accordance with statutory and regulatory requirements before projects/programs can be implemented.

9.4 Regulatory Program

Regulation plays a very important role in managing water resource problems. For instance, municipal land use planning and zoning powers are invaluable in ensuring that land uses are compatible with the surrounding environment. City planning and zoning also establish best practices for preventing potentially harmful drainage patterns that may pollute our waters.

In 2007, District municipalities requested, and the Managers accepted, streamlined and simplified local regulatory controls. District municipalities assumed responsibility for permitting of land-disturbing activities presenting risk of harm to water resources and administration of the Wetland Conservation Act. The updated Riley Purgatory Bluff Creek Watershed District management plan completed in 2011 included a commitment by the District to an advisory role only on regulatory matters. After several years of exercising sole regulatory authority, however, several watershed cities reported to the

District that municipal regulation alone was proving insufficient. A watershed approach to potential impacts to water resources – especially from stormwater runoff – is needed. Further, some critical water-resource protections – such as management of work in water resources that traverse municipal boundaries – must be implemented by a watershed organization. A watershed district regulatory framework is necessary to ensure a consistent level of resource protection across the watershed, as required by the Metropolitan Surface Water Management Act (Minnesota Statutes chapter 103B).

Further, watershed regulations are informed by watershed organizations' uniquely detailed and specific knowledge of hydrological and hydraulic systems. Such information and expertise are helpful to ensure proper integration of water resource protection when development and redevelopment projects occur. Informed by these considerations, the managers reinstated the regulatory program effective January 1, 2015.

The various rules adopted by the Board of Managers on November 5, 2014, after extensive public input, are highlighted below and the rule text itself and the Wetland Conservation Act are incorporated herein by reference as the thresholds, standards and criteria for regulatory protection of water resources in the watershed. (WCA is incorporated for purposes of RPBCWD's serving, where requested by the relevant city, as the Local Government Unit.) Detailed information about the rule development process (i.e., the Statement of Needs and Reasonableness) and complete rule language are available on the RPBCWD website (www.rpbcwd.org/permits/).

- Rule A: Procedural Requirements
- Rule B: Floodplain Management and Drainage Alterations
- Rule C: Erosion and Sediment Control
- Rule D: Wetland and Creek Buffers
- Rule E: Dredging and Sediment Removal
- Rule F: Shoreline and Streambank Stabilization
- Rule G: Waterbody Crossings and Structures
- Rule H: Appropriation of Public Surface Waters
- Rule I: Appropriation of Groundwater
- Rule J: Stormwater Management
- Rule K: Variances and Exceptions
- Rule L: Permit Fees

- Rule M: Financial Assurances

These rules provide the backbone of the District's regulatory program. The rules apply to land and water resource-disturbing activities as delineated in detail in rule B through J. Any person or entity undertaking an activity that triggers one or more District regulatory thresholds must obtain the required RPBCWD permit prior to commencing the activity. The District rules specify the requirements and performance standards applicable to these activities, and the process for obtaining District permits. The District has a permit coordinator to assist developers and residents through the permitting process and to answer any regulatory questions (see District website for contact information, <http://www.rpbcwd.org/about/>). In addition, the District reaches out to permit applicants through education workshops about the regulatory program.

The District began the process of updating provisions of its rules in parallel with the development of this management plan. The rulemaking was largely focused on clarifications and process-improvements, though specific policy-driven enhancements and the adoption of an enforcement rule were undertaken as well. More information about the process and outcome of the concurrent rulemaking can be found on the regulatory section of the District's website: www.rpbcwd.org/permits.

9.4.1 Enforcement

The District regularly inspects all permitted work sites and a monthly report is made to the Managers. To a significant extent, the District has relied on communication with permittees and property owners, and coordination with water resources staff in the relevant city to address noncompliance with relevant permit and rule requirements.

The District routinely examines its enforcement process to ensure it is appropriately scaled to the scope of the District regulatory program. At a minimum, due process protections – procedures to ensure the permittees who have committed an apparent violation receive notice and an opportunity to be heard by the Board of Managers – are incorporated into the District rules and associated program guidance. As a general matter, the District will use an escalating enforcement process, whereby permittees and those who should have a permit but do not are given the opportunity to voluntarily come into compliance with District requirements. A matter will be elevated to a hearing before the Board – and from there, possible district court enforcement – only for

property owners who fail to avail themselves of opportunities to work with District staff to ensure water resource protection.

9.4.2 Regulatory Authority, Roles and Responsibilities

Under state law, watershed districts in the metro area are charged with responsibility for establishing water resource-management policy, standards and goals, then working with other local governmental agencies – cities, most notably – to give effect to the policies, set the standards and achieve the goals watershed-wide. The District not only has the authority to adopt rules but an obligation to do so under Minnesota Statutes section 103D.341. Watershed district rules represent one of the primary ways a board of managers implements the purposes of the state watershed law. In the Twin Cities metropolitan area, rules are also specified by the Metropolitan Surface Water Management Act, chapter 103B, and implementing rules is a critical and necessary component of districts' implementation of their watershed plans. The law recognizes that watershed organizations implement their plans in conjunction with cities exercising primary land-use jurisdiction. To harmonize these authorities and jurisdictions, the law provides for a framework whereby cities and watershed organizations jointly develop and implement water-resource protection and improvement strategies and tactics.

Chapter 103B provides that watershed management organizations in the Twin Cities must develop comprehensive watershed-wide water-resource management plans. By rule, the state requires that watershed plan's implementation program include regulatory controls to protect wetlands, prevent erosion and sedimentation, protect shoreline and floodplains, and mitigate the deleterious effects of certain land uses on water resources. Watershed organizations also must set stormwater-management design performance standards to protect water resources from degradation. Cities in the watershed are required, in turn, to update their local water management plans and associated local controls to conform to and implement the watershed plan. The law recognizes the primacy and effectiveness of cities' land-use authority, and states a clear path for cities to take the lead in implementing a regulatory program to achieve the water-resource protections specified by the watershed organization plan. But the law also explicitly provides for cities to opt to have watershed management organizations regulate to this end.

Municipalities within the RPBCWD have established and implement an array of water resource protection ordinances. At the same time, watershed organizations have a

unique capacity to harmonize regulatory protections for all water resources and address gaps in the regulatory framework. The District will work with watershed cities and counties, as well as state and regional agencies, to maintain an efficient and effective regulatory program that achieves these goals.

Local plans shall conform to the rules and policies promulgated by the Board of Water and Soil Resources. Minnesota Rules Chapter 8410 outlines the structure and required sections in detail (part 8410.0160).

Watershed districts and cities have customarily opted to collaborate on the development of standards and criteria in rules to implement the watershed plan, then determine which entity will implement those standards and criteria of the rules. In its local water management plan in accordance with Minnesota Statutes section 103B.235, a city must determine whether to amend its official controls (ordinances) and policies to provide protection of water resources at least as effective as provided by the District rules or defer exercise of regulatory authority to the District.

If the city elects to exercise sole regulatory jurisdiction over the subject matter of one or more District rules, the city must amend its official controls (ordinances) and policies to provide protection of water resources at least as effective as provided by the RPBCWD rules or defer exercise of regulatory authority to RPBCWD within 180 days. The delineations of authority agreed upon by the city and district are commonly articulated in a memorandum of understanding (MOU) detailing the scope of each entity's exercise of regulatory authority (i.e., who will regulate what) for presentation to the city council and Board of Managers for approval. The MOU also will establish a process and schedule for exchanging progress reports, the city's submission of permitting information to the District and regular meeting to ensure water-resources management concerns and projects are pursued via the most effective and cost-efficient route possible. The MOU also will provide procedures and a timeline for the District's reengagement of all of its regulatory authority if the city is found not to have adopted the necessary official controls or implemented a complete and effective regulatory program.

Cities that defer exercise of regulatory authority to the District need to establish protocols to ensure that applicants for other city land-use approvals are referred to the District to obtain relevant necessary approvals under the District rules. In the resolution

approving a city plan providing for such a regulatory implementation program, the District will outline a schedule for regular meetings to update city representatives on the District regulatory program and ensure water-resources management concerns and projects are pursued effectively and cost-efficiently.

Consistent with this regulatory framework (which is outlined in Minnesota Rules 8410.0105, subpart 9, and part 8410.0160), RPBCWD will require as a condition of approval that the local water management plan articulate the city's decision as to whether it will update its ordinances to maintain conformity to the RPBCWD rules or defer exercise of regulatory authority to RPBCWD. A city opting to exercise sole regulatory authority itself will also need to commit to updating its ordinance(s) within one year after RPBCWD provides notice that it has significantly revised an RPBCWD rule. (The city's plan should allow 60 days for RPBCWD review). A city that elects to exercise sole regulatory authority in its plan may later – in response to a District rule update or otherwise – choose to defer exercise of regulatory authority to the District.

9.5 Data Collection and Analysis

The District understands that data collection and decisions based on sound science are critical to the success of this Plan. Because of the dynamic and ever changing nature of the water resources, the District operates an extensive lake and stream management program. This program is intended to improve the District's understanding and inform sound decision making to protect and enhance the surface and groundwater resources in the District. Generally, the program includes:

- Data Collection (monitoring)
- Analysis (e.g., research, studies, etc.)

9.5.1 Creek Restoration Action Strategy (CRAS)

The CRAS is an on-going effort to evaluate the overall health of the creeks and determine where sites in most need of restoration are located. This program continues to evaluate all three creeks' health but also determines causes of deterioration and identifies solutions to help restore it.

9.5.2 Data Collection Program

Data collection and reporting is the foundation for the RPBCWD's work. Regular, detailed water quality monitoring provides the District with scientifically reliable

information used to decide if water improvement projects are needed and how effective they are in the watershed. Data collection remains a key component of the District's work as we strive to protect and restore water bodies within the watershed as identified in goal DC1 of the District's 10 Year Plan. The District with various partners, collects water quality data for 13 lakes and 18 creek sites. These creek and lake sites are the core monitoring sites for the District. The 18 creek sites include five on Bluff Creek, five on Riley Creek, and eight on Purgatory Creek (Figure 5-8). The 13 lakes include Lake Lucy, Lake Ann, Lake Susan, Rice Marsh Lake, Lake Riley, Silver Lake, Lotus Lake, Round Lake, Duck Lake, Mitchell Lake, Red Rock Lake, Hyland Lake, and Staring Lake (Figure 5-8). In addition to the core sites, the District also monitors water quality at special sites. These sites can either be located at a proposed future project site used to determine if predicted pollutant loads are correct, or they can be created post-project to determine if a project was successful at reducing pollutants.

Table 9-3 Main Sampling Parameters

Parameter	Sonde or Wet Chemistry	Summer Lakes	Winter Lakes	Streams	Reason for Monitoring
Total Phosphorus	Wet	■	■	■	Nutrient, phosphorus (P) controls algae growth
Orthophosphate	Wet	■	■		Nutrient, form of P available to algae
Chlorophyll-a, pheophytin	Wet	Surface	Surface	■	Measure of algae concentration
Ammonia as N	Wet	■	■		Nutrient, form of nitrogen (N) available to algae
Nitrate + Nitrite as N	Wet	■	■		Nutrient, also oxygen substitute for bacteria
Total Alkalinity, adjusted	Wet	Surface	Surface		Measure of ability to resist drop in pH
Total Suspended Solids	Wet			■	Measure of the solids in water (block light)
Chloride	Wet		■		Measure of chloride ions, salts in water
Temperature	Sonde	■	■	■	Impacts biological and chemical activity in water
pH	Sonde	■	■	■	Impact chemical reactions (acidic or basic)
Conductivity	Sonde	■	■	■	Ability to carry an electrical current (TSS & Cl)
Dissolved Oxygen	Sonde	■	■	■	Oxygen for aquatic organisms to live
Oxidation Reduction Potential	Sonde	■	■	■	Tracks chemistry in low or no oxygen conditions
Phycocyanin	Sonde	■	■		Pigment, measures cyanobacteria concentration
Photosynthetic Active Radiation	Sonde	■	■		Measure of light available for photosynthesis
Secchi disk depth	Observation	■	■		Measure of light penetration in deeper water
Transparency Tube/Turbidity	Observation /Meter			■	Measure of light penetration into shallow water
Zooplankton/ Phytoplankton	Wet Analysis	■			Organisms fluctuate due to environmental variables
Zebra Mussel Veligers	Wet/ Observation	■			Larval form of zebra mussels/plate checks (AIS)

9.5.2.1 Lake and Stream Monitoring

Water quality and water quantity is monitored at each stream site during the field season (April through September) approximately twice a month. District staff also assists the Metropolitan Council with the operation of continuous monitoring stations near the bottom of each creek as part of its long-term monitoring program which identifies pollutant loads entering the Minnesota River.

Lakes are also monitored approximately twice a month during the summer growing season (June through September) for water quality and quantity. Lake levels are continuously recorded from ice out to ice in. A general table showing monitoring frequency for both lakes and streams can be seen in Table 9-4. At the time of each lake and stream sampling event, climatic data, sonde measurements (automated water quality field measurement), water clarity readings, and water samples (nutrients) are taken. This data is then compared to the water quality standards set by the Minnesota Pollution Control Agency to determine if the waterbody is healthy or unhealthy. Table 9-3 includes a list of the various parameters assessed by the District, followed by a brief description of why each parameter is assessed.

Lake water samples are also collected and analyzed in early summer for the presence of zebra mussel veligers. During every lake sampling event, the area around each boat launch and the zebra mussel monitoring plates are scanned for the presence of adult zebra mussels. In addition, the District works with volunteers through the adopt-a-dock program to monitor for zebra mussels.

Zooplankton and phytoplankton samples are also collected on lakes once a month to assess the overall health of the populations as it applies to the fishery and water quality and scan for invasive species. Plankton are collected on lakes with current or proposed projects to assess changes that may occur. Winter monitoring, specifically related to chloride levels, will take place on lakes on a rotational basis moving forward (Riley Watershed and Purgatory Watershed) to determine the pollutants effect on our freshwater systems.

Table 9-4 Monthly Field Data Collection Schedule

Water Resource	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lake Ann	■	■		■	■	■	■	■	■	■		■
Duck Lake	■	■		■	■	■	■	■	■	■		■
Hyland Lake	■	■		■	■	■	■	■	■	■		■
Lotus Lake	■	■		■	■	■	■	■	■	■		■
Lake Lucy	■	■		■	■	■	■	■	■	■		■
Mitchell Lake	■	■		■	■	■	■	■	■	■		■
Red Rock Lake	■	■		■	■	■	■	■	■	■		■
Rice Marsh Lake	■	■		■	■	■	■	■	■	■		■
Round Lake	■	■		■	■	■	■	■	■	■		■
Lake Riley	■	■		■	■	■	■	■	■	■		■
Staring Lake	■	■		■	■	■	■	■	■	■		■
Lake Susan	■	■		■	■	■	■	■	■	■		■
Silver Lake	■	■		■	■	■	■	■	■	■		■
Bluff Creek (5 sites)				■	■	■	■	■	■	■		
Purgatory Creek (8 sites)				■	■	■	■	■	■	■		
Riley Creek (5 sites)				■	■	■	■	■	■	■		
*Water level sensors are placed on all lakes from April to November. *Winter sampling is conducted monthly and will rotate between group A (Ann, Lucy, Susan, Rice Marsh, Riley) and B (Staring, Lotus, Silver, Mitchell, Red Rock, Hyland, Duck).												

Additionally, the corridors of the creeks are regularly assessed using methodologies identified in the Creek Restoration Action Strategy study (CRAS) using the following variables: surrounding land use/floodplain qualities, riparian zone qualities, in-stream qualities (including substrate, aquatic vegetation, deposition, etc.) erosion and mass-wasting, channel morphology (including capacity, development, sinuosity, stability, modifications, cutting, etc.) and morphology of upper and lower banks .

9.5.2.2 Lake Vegetation and Fisheries

Aquatic plant surveys have been conducted on a rotational basis within RPBCWD to ensure all lakes have received adequate assessments. The target is for each lake to be sampled at least every third year to efficiently use District resources. Additionally, as projects arise or issues occur, additional plant surveys are conducted to aid in the decision-making process. Aquatic plant surveys are important because they allow the

District to map out invasive plant species for treatment, locate rare plants for possible protection, create plant community/density maps which are used to evaluate temporal changes in the vegetation community, and they can assess the effectiveness of herbicide treatments and/or physical removal. The District will continue to monitor the aquatic plant communities within our lakes.

In cooperation with the University of Minnesota (UMN), RPBCWD has been a key leader in the development of successful carp management strategy for lakes within the state of Minnesota. Following the completion of the Riley Chain of Lakes (RCL) Carp Management Plan drafted by the UMN in 2014 and the Purgatory Creek Carp Management Plan drafted in 2015 (Sorensen, Bajer, & Headrick, 2015), the District took over monitoring duties. Adult carp are monitored every other year by conducting three surveys which include three, 20-minute electrofishing transects per lake between late July and October. If the total biomass estimate of carp in a lake is above 100 kg/h, the District would consider hiring commercial fisherman to conduct winter seining. Young of the year (YOY) carp are monitored by conducting one survey per lake using five, 24-hour small mesh fyke net sets between August and September. If YOY carp were captured during this event, it meant successful recruitment occurred and monitoring efforts should be increased with the additional option of conducting winter seining. Winter seining has been successful in the past at eliminating large populations of common carp within the District. The most effective method involves the implantation of common carp with F1850 acoustic tags, allowing for large winter aggregations of common carp to be located and targeted. The District plans to implant roughly 15 fish/year in waterbodies with common carp populations above the biomass threshold to guide winter seining.

9.5.2.3 Wetlands and Groundwater

The Riley Purgatory Bluff Creek Watershed District understands the critical importance of healthy wetlands as identified in goal WQaul 2 and the sustainable use and safe groundwater as identified in goal Ground 1 of the District's 10 year plan. Over 60% of the survey respondents indicated that wetlands were important to their quality of life and 80% indicated concerns about groundwater. Wetlands are important because they help reduce the impacts from storm damage and flooding, maintain good water quality, recharge groundwater, store carbon, increase biodiversity, and they provide a variety of economic, social, and cultural benefits. Groundwater is often overlooked, but it is critically important and needs to be utilized in a sustainable manner. Beginning in 2018, the District plans to begin looking into the development of a strategy to monitor and

evaluate wetlands and groundwater using established methods currently available. The intent is to develop the programs within the first two years after plan adoption.

The RPBCWD will assess the number, location and functions and values of wetlands in the watershed (utilizing and, where necessary, updating existing data and analyses), then will identify specific subwatersheds within which hydrologically integrated wetland systems can be preserved and/or restored. **The near-term goal of the wetland program will be the identification of high-priority wetland areas for restoration, enhancement, and preservation . Based upon the identification of these areas, the District may take further action as necessary** to ensure that wetlands are protected consistent with WCA and its implementing rules. The District will develop and implement its program in partnership with key stakeholders, with particular focus on working closely with cities to integrate the District's wetland-protection efforts with their land-use plans and goals. This will provide the full suite of associated benefits and that groundwater is preserved and used sustainably for future generations.

9.5.2.4 Reporting

Following each year of monitoring within the Watershed District, an annual Water Resources Report is created which summarizes all the data collected for that year. An example of such a report can be viewed in Appendix F.

9.5.3 District Wide Floodplain Evaluation

Hydraulics and hydrology models help us predict where, and how frequently floods will occur. Flooding remains a concern for our communities. Our communities would like the District to increase the level of detail in the District's floodplain models to improve model predictions on a localized BMP scale, identify locations for flood-risk mitigation projects to increase community resilience, among others. This line item dedicates funds to keep the models up to date and increase the detail level in the model.

9.5.4 Plant Restoration

The District, with the University of Minnesota, partners to learn more about ecological restoration in our lakes. This partnership is beneficial as it helps us determine the health of our aquatic plants, which has been identified as key element in lake management. Funds identified in this category goes to funding this partnership.

9.5.5 Total Maximum Daily Load (TMDL) Work

The District partnered with the MPCA on the development of the Lower Minnesota River Watershed Restoration and Protection Strategy (WRAPS) and associated TMDLs for the impaired waterbodies in the District. The District will continue this collaboration effort to assist and provide input on the TMDL process and resulting implementation plan. Funds identified in this category go to funding this partnership.

9.5.6 Use Attainability Analyses (UAAs)

The District has historically used a process referred to as Use Attainability Analyses (UAAs) to assess water quality conditions relative to the desired beneficial uses that can reasonably be achieved and maintained for a given waterbody and identify management recommendations. The District will update the lake-specific UAAs, as needed, to identify additional protection and improvement measures. For lakes that do not meet the District's lake management goals, watershed and/or in-lake management practices will be completed to improve the lake health based on recommendations from the lake-specific UAA. In following the District's adaptive management philosophy, the UAA may need to be updated prior to implementing improvement projects to verify conclusions and recommendations based on additional data, changes in lake conditions, availability of more sophisticated modeling approaches, advancements in stormwater treatment techniques, and/or in-lake management practices.

9.6 Education and Outreach Program

The Education and Outreach Program exists to support the goals of the 10-Year Plan and improve water quality by leveraging the power of the community to effect positive change. Restoration projects, regulation, and management by the District are important components of its mission to protect clean water. However, without the participation of district citizens it is an incomplete approach. By fostering an engaged community, the District can increase awareness, grow stewardship, and build capacity to do the shared work of protecting clean water. The District will continue to seek out and foster partnerships with community groups, local government, and other stakeholder.

Audiences are groups within a community who share similar motivations and common goals, needs, or issues. The topics of interest for each group, and the District's messaging for each may vary considerably (e.g., lakes, creeks, wetlands, boating, parks, trails, wildlife viewing, etc.). Even when the topics or messages are similar, the delivery

methods may differ. Therefore important that programs and resources be created with specific audiences in mind. The District has identified four audiences for its education and outreach programming.

- **Residents.** This is a diverse audience that includes homeowners as well as renters. Residents may include families, couples, and single people. Their local identity may be influenced by the city they live in, their proximity to a water body, and the community groups they belong to. These groups can be informal and formal including neighborhood organizations, lake and homeowner associations, and community and outdoor groups.
- **Local leaders.** Local elected and appointed leaders may include mayors, city council members and commissioners. This audience generally includes individuals with decision-making power on a local (city, county, state) level.
- **Pre-K-12.** There are three school districts within the Watershed District. Local schools include, Elementary, Middle, and High Schools. There are both public and private schools, as well as language immersion schools.
- **Businesses and Professionals.** Local businesses have the potential to be leaders in the implementation of best practices to protect water. Business campuses often have large footprints and their own community of employees who are impacted by the business culture. Professionals are those who do work that impacts water resources and may be in private businesses or government. These include individuals who manage winter snow and ice or turf grass as well as landscapers, builders and developers.

The E&O Program contributes to the goals and strategies of the 10-Year Plan. Additionally, the District defined one goal and nine strategies specific to E&O (see Section 3.2.3). To implement these strategies and achieve this goal, the District developed an Education and Outreach Plan (E&O Plan). The E&O Plan is attached as Appendix B.

9.7 Cost-Share Program

The Cost Share Program provides funding and technical assistance for projects that protect and conserve water resources and increases public awareness of the vulnerability of these resources and solutions to improve them. The program seeks to decrease barriers to - and incentivize the implementation of - best management practices, and shift cultural norms toward making these practices common-place. The

Cost Share Program supports several of the District's Goals and Strategies as listed in Table 9-5.

Table 9-5 Goal and Strategies Supported by the Cost Share Program

Goal	Strategy
EO3 (Education & Outreach)	EO S9. The District will continue to implement its cost-share program to provide incentive for residents, businesses, institutions and local governmental units to implement watershed best management practices.
WQual1, WQual2, & WQual3 (Water Quality)	<p>WQual S1. The District seeks to minimize the negative impacts of erosion and sedimentation through the District’s regulatory, education and outreach, and incentive programs.</p> <p>WQual S3. The District encourages cities and developers to seek opportunities to incorporate habitat protection or enhancement into development and redevelopment projects.</p> <p>WQual S6. The District will seek opportunities to establish and preserve natural corridors for wildlife habitat and migration.</p> <p>WQual S7. The District will promote the use of natural materials and bioengineering for the maintenance and restoration of shorelines and streambanks where appropriate.</p> <p>WQual S11. The District recognizes the multiple benefits of vegetated buffers and promotes the use of vegetated buffers around all waterbodies.</p> <p>WQual S12. The District will assist and cooperate with cities, MPCA, MDNR, MnDOT, other watershed and other stakeholders in implementing projects or other management actions based on the Minnesota Pollution Control Agency’s Twin Cities Metro Chloride TMDL.</p> <p>WQual S13. The District will continue to minimize pollutant loading to water resources through implementation of the District’s capital improvement, regulatory, education and outreach, and incentive programs.</p> <p>WQual S15. The District will cooperate with other entities to investigate treatment effectiveness of emerging practices.</p>
Ground1 (Groundwater)	Ground S1. The District will promote the conservation of groundwater resources through its education and outreach program and will work with cities to encourage conservation practices (e.g. water reuse).
WQuan2 (Water Quantity)	<p>WQuan S1. The District will preserve and enhance the natural function of the floodplain and maintain floodplain storage volume.</p> <p>WQuan S2. The District will promote strategies that minimize baseflow impacts.</p> <p>WQuan S3. The District will continue to promote infiltration, where feasible, as a best management practice to reduce runoff volume, improve water quality, and promote aquifer recharge.</p> <p>WQuan S7. The District promotes/encourages cities and developers to implement Low Impact Development (LID) practices and will work with cities to reduce regulatory barriers to LID practices.</p> <p>WQuan S9. The District will work with cities and other stakeholders to encourage conservation practices (e.g. water reuse) to protect creeks, lakes and wetlands.</p>

The cost-share program is organized into three tiers by stakeholder group:

1. Local Government and Commercial Facilities – aimed at building capacity for installation of water-quality improvement practices in conjunction with projects such as municipal street reconstruction, stormsewer retrofits, school property improvements and commercial property projects.
2. Lake Associations, Homeowners Associations and Nonprofits – designed to tap into the knowledge these organizations have regarding opportunities and priorities for stormwater-management in their areas, and their potential to ensure installation of shoreline and streambank restorations, rain gardens, filter strips, pervious surfaces and restoration of wetlands and habitat.
3. Single-Family Residential Projects – designed to support community member interest in protecting clean water through restoration of residential shorelines and streambanks, installation of filter and buffer strips, restoration of wetlands and habitat, construction of rain gardens and use of pervious surfaces.

Participants contribute in-kind (labor or materials) and/or monetary resources to their projects and commit to long-term maintenance. They sign a funding agreement detailing the location and specifications of the project. The District provides technical assistance in review of project design and inspection to help ensure that best practices are properly and effectively constructed.

Applications for cost-sharing will be accepted on an annual basis. After being awarded a grant, participants have one year to complete the project or request an extension. Funds are disbursed to participants after documented completion of the project to the specifications detailed in the funding agreement. The District will annually assess outcomes of the cost-share program to determine whether alterations or additions to the focus areas is warranted.

9.7.1 Available Funding

The District will fund its cost-share programs from the *ad valorem* property tax levied annually on property within the watershed, as well as through other funding sources such as regional, state or federal grants. The budget for the program in 2018 will be \$200,000. The Board of Managers will annually set the budget for the cost-share programs in a manner that meets program needs and prudently aligns with the District's overall financial capacity.

9.7.2 Eligibility Criteria for Disbursing Funds

Applicants are eligible for one cost-share grant per property per year. Applications are reviewed and ranked based on their potential to contribute to the goals of the program:

- improve watershed resources
- foster water resource stewardship
- increase awareness of the vulnerability of watershed resources
- increase familiarity with and acceptance of solutions to improve waters

Projects must be located within the District. Funding will not be awarded for work required as part of a permit requirement, but may be awarded toward the incremental cost of BMPs that will provide water quality treatment beyond permit requirements.

The Board of Managers will review and approve all cost share applications. Prior to approving a cost share award in excess of \$20,000 for capital construction, the Board of Managers will hold a noticed public hearing according to Minnesota Statutes section 103B.251.

9.8 Stormwater Repair Funds

The District understands the importance of maintaining capital projects in a condition so that they will accomplish the purpose for which they were constructed. Proper maintenance of the stormwater-management system will ensure that the stormwater system provides the necessary flood control and water quality treatment. Maintenance responsibilities for District-ordered projects are typically defined in the cooperative agreement between the RPBCWD and the city and other partners for each project. Generally, cities are responsible for routine maintenance of District capital improvements located in their city because they own stormwater infrastructure, are MS4 permit holders, typically have maintenance staff, and already manage their systems according to system maintenance plans detailed in each city's Stormwater Pollution Prevention Program (SWPPP).

Normal and routine maintenance of District capital improvements not undertaken by a LGU through a cooperative agreement, will be programmed and carried out under the District's Operation and Maintenance Program and funding determined through annual budgeting based on Minnesota Statutes section 103B.251. LGUs within the District may request assistance from this fund to help them cover some of the normal and routine

maintenance cost in achieving similar maintenance goals consistent with Minnesota Statutes section 103B.251.

9.9 Aquatic Invasive Species (AIS)

The District understands the importance of AIS monitoring, inspections, and preventions. The District also recognizes that it is more cost effective to prevent an infestation than to restore a resource after an AIS has established itself. The AIS program is to help support AIS inspections and rapid responses to a new infestation.

9.10 Lake Vegetation Management Implementation

The District will continue to partner with the University of Minnesota to help the District determine the health of the aquatic plants. The District's lake vegetation management strives to manage non-native aquatic invasive species, especially those species that affect water quality (e.g., curlyleaf pondweed) and ecological health of the lake. Prior to managing non-native macrophytes the District will work with stakeholders and the MDNR to develop a lake vegetation management plan (LVMP) to determine a suitable management strategy for the specific lake. The LVMP are typically valid for only a 5 year period. The District plans to continue vegetation monitoring and management activities consistent with a MDNR approved LVMP and/or as suggested by aquatic vegetation experts (i.e., University of Minnesota). The funds allocated under this item are intended for management activities including, but are not limited to: herbicide treatments, plant transplanting, and other techniques that may be used to improve water quality.

9.11 Wetland Management Program

Although it varies throughout the state, it is estimated that Minnesota has lost about half of the pre-settlement wetlands with some areas of the state experiencing as great as 90% loss. In Hennepin and Carver Counties, more than 50% of the historic wetlands have been drained or developed to different land uses. Minnesota Statutes section 103A.201, subdivision 2(b) sets out a goal of "no net loss" of wetlands. The Minnesota legislature also found that it would be in the public interest to "[i]ncrease the quantity, quality, and biological diversity of Minnesota's wetlands by restoring or enhancing diminished...wetlands." *Id.* This goal is echoed by the U.S. federal government (CEQ, 2008).

Unfortunately, it is difficult to quantify the actual extent of wetland loss and those attempts to do so appear limited. A multi-agency study concluded that "Existing efforts

to assess wetland status and trends in Minnesota are inadequate” (Gernes, 2006). The authors went on to observe that “Even less comprehensive data are available concerning the status and trends in wetland quality throughout the state.” The full study report is available from the MPCA at <https://www.pca.state.mn.us/sites/default/files/wq-bwm6-03.pdf>. The State of Minnesota has developed a monitoring program to “provide scientifically-sound data regarding long-term changes in wetland quantity and quality” (Kloiber, 2013).

Despite this no-loss goal identified in Minnesota Statutes section 103A.201, remaining wetland areas continue to be at risk for conversion to other land uses or for a decrease in quality as development and agricultural pressures encroach. For example, the conversion of emergent wetlands to cultivated wetlands is not considered a wetland loss. It does result in a loss of wetland functions and values – i.e. a wetland of diminished quality. When comparing data from the 2006-2008 monitoring period to the 2009-2011 monitoring period the wetland status and trends monitoring program (WSTMP) noted a net conversion of 1,890 acres of emergent wetland to cultivated wetland (Kloiber, 2013). Even wetlands not directly impacted by land use changes are prone to secondary impacts as a result of changes in hydrology, increased stormwater inputs and the associated pollutant load, and the loss of buffer or connections to other ecological features that come with urbanization of the landscape.

9.11.1 Value of Wetlands

The citizens who reside within the District boundaries also place a high value on wetlands. Of the 408 respondents to the Riley Purgatory Bluff Creek Watershed District Community Survey, 176 of them considered wetlands to be one of the most valuable water resources. This was second most selected water resource among all choices.

This was the second-most selected water resource among all choices. With this knowledge, the District acknowledges that the protection of this resource is tremendously important. Among other efforts described elsewhere in this section, the District is willing to partner with and assist local government units (LGU) in their efforts to protect and enhance wetland resources. The District also is willing to assume LGU responsibility for the administration of the Wetland Conservation Act, if desired by a watershed city currently serving such role.

In addition to the aesthetic, recreational, and educational opportunities that wetlands provide, there are numerous ecological and hydrological benefits as well.

- Climate Change Resiliency - As we see more intense storms resulting from our warming planet, flooding increases, resulting in loss of property and infrastructure damage. Wetlands mitigate some of the damage that would otherwise result from these intense storms.
- Flood storage and protection – Wetlands slow runoff to our rivers. This prevents some of the flash flooding that results when runoff from storms reach the rivers in a short period of time.
- Shoreline Protection/Erosion Control – Riparian wetlands protect shores from the erosive forces of wave action and flowing water. The same wetlands that are preventing the flashiness in our streams and rivers also help prevent in channel erosion from these flashy events. This become especially important in watersheds like Bluff Creek which has no lakes to provide storage and where the volume and rate of runoff is the primary cause of the erosion and turbidity issues.
- Groundwater Recharge – These areas hold surface waters that would otherwise flow to streams and lakes, allowing time for water to percolate into the soils and recharge our aquifers.
- Groundwater Discharge – Some wetland areas occur where land surface and groundwater intersect, providing for base flows in streams and lakes during drought periods.
- Water Quality – Wetlands can slow the flow of runoff which provides an opportunity for sediments to settle out of the runoff. These areas also can act as sinks for nutrients that lead to the eutrophication of our lakes.
- Wildlife Habitat – Wetlands are some of the most productive ecosystems on the planet; rivalling rain forests and coral reefs.

Do you know?

- *Maintaining only 15% of the land area of a watershed as wetlands can reduce flooding peaks as much as 60%. (USEPA, 2006)*
- *“Wetlands cover only 5% of the land area in the lower 48 states yet are home to 31% of plant species.” (USFWS, 1988)*
- *As many as one-half of all bird species nest or feed in wetlands. (USEPA, 2006)*

9.11.2 Wetland Management Approach

The RPBCWD developed the wetland management approach to achieve the goals in Section 3.2 as outlined in Figure 9-5. This is intended to provide a framework for

collaborative efforts between state, federal, local, and non-governmental organizations to share resources and to promote the protection, restoration, and rehabilitation of Minnesota's wetlands.

9.11.2.1 Wetland Restoration

The District will develop a program to identify potential restorable wetlands, and prioritize the restoration of those identified wetlands. The first step will be to develop an inventory of the wetlands within the District as described in the data collection strategy (DC S1). The District will rely on the Wetlands Restoration Strategy developed by several Minnesota Agencies.

To identify wetlands for restoration purposes, the District will begin with the United States Fish and Wildlife Service Habitat and Population Evaluation Team developed Restorable Wetlands Inventory (RWI) in Carver County. Hennepin County was not one of the 55 counties included in the target area. Where an RWI has not been developed, and in support of existing RWI, Geographic Information Systems (GIS) will be employed to identify restorable wetlands. This will involve performing terrain analysis of digital elevation models and overlaying soils information and the NWI to identify areas that should be field verified to determine if they are restorable wetland areas.

9.11.2.2 Wetland Rehabilitation and Protection

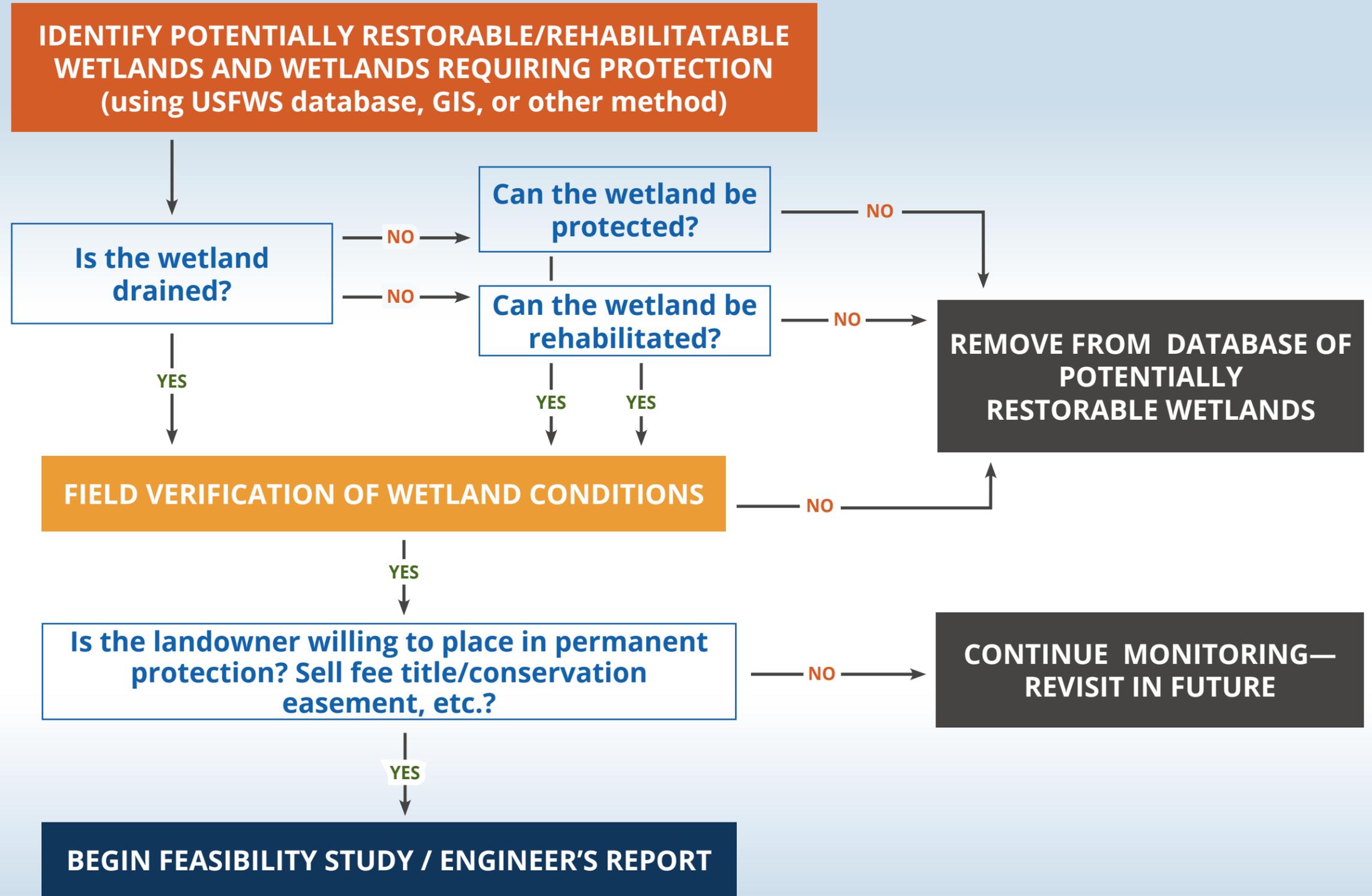
Several of the communities served by the District have developed wetland protection programs. In conjunction with these programs, the Minnesota Routine Assessment Methodology for Evaluating Wetland Functions (MnRAM) was used to assess the quality of wetlands based upon their functions and values. These assessments were done with previous Local Water Management Plan updates and may be outdated. The district will use these MNRAMs, where possible or prudent, to begin to develop a database of wetland locations, areas, public values, and functions within the District boundaries. These assessments will be used to determine if the potential exists for a wetland to be rehabilitated to provide additional – or enhance existing - functions and values and improve the understanding of functions and value being protected. These assessments, and additional functional assessments will also be used to identify high-priority **areas and wetland protection areas as defined in Minnesota Rules 8420.0835 and 8420.0840.**

When an area is identified for rehabilitation, the site will be evaluated on different criteria to determine the benefits provided compared to the costs incurred. This evaluation will look at the:

- relative ease or difficulty of enhancement,
- condition of the downstream receiving water and the wetland's connection to that,
- wildlife habitat benefits,
- relative abundance of wetland within the subwatershed,
- abundance or scarcity of that wetland type within the subwatershed, and
- connectivity of the wetland to other ecosystems on the landscape.

Figure 9-5

WETLAND MANAGEMENT DECISION TREE



Consistent with the District's adaptive management approach to resource management, the District will collect and evaluate data with changing climate in mind while using available tools to implement projects resilient to predicted climate change impacts.

9.12 Groundwater Conservation

Groundwater is a vital part to our daily activities. It plays an important part in our natural resources and is used for drinking, cooking, and personal hygiene. However, groundwater is a limited resource. As we increase our use of it, less supply is available. However, there are practices that we can adopt to reduce our water consumption footprint and enhance groundwater sustainability. These include capturing rainwater and using stormwater to irrigate our lawns. Recently, the District teamed up with Recycle Association of Minnesota and sold rain barrels to residents to promote the use of rainwater rather than groundwater. The District also partnered with the City of Eden Prairie to do a larger scale capture of rainwater and reuse at Fire Station 2. The project captured rainwater from the roof top of the fire station, placed it in a cistern and the water was then used to wash their trucks and irrigate their landscape. The aim of this project was to increase awareness to groundwater conservation and the ability to capture rainwater and “reuse” it. District recognizes the value of groundwater conservation and plans to work with LGUs and residents as opportunities arise.

In addition, groundwater sustainability has become a critical concern in the Twin Cities, and the District has determined that its regulatory program has an important data-gathering role to play in the effort – in collaboration with other agencies – to understand the unique dynamics of groundwater and to help ensure the continued health and availability of the resource. More information is available from the Metropolitan Council at <https://metro council.org/About-Us/Facts/Wastewater-WaterF/FACTS-Water-Supply-TCMA.aspx> and MNDNR at <http://www.dnr.state.mn.us/gwmp/areas.html>.

Minnesota Statutes sections 103D.201 and 103D.341 together support RPBCWD regulation of groundwater use to protect the resource and preserve it for beneficial purposes. Other activities the District performs related to groundwater management include:

- Conducting groundwater studies independently or in collaboration with other agencies and organizations (e.g., 2017 *Groundwater/Surface Water Interaction Study* (Barr Engineering Co., 2017)).
- Participating in regional and county groundwater planning efforts (e.g., Carver County 2016-2025 Groundwater Plan [Carver County Public Services Division, 2016] groundwater planning efforts).

In addition, Minnesota Statutes section 103B.255 requires counties to develop and implement a county groundwater management plan. The Carver County 2016-2025 Groundwater Plan (Carver County, 2016) lists three goals related to groundwater management:

1. prevent groundwater contamination,
2. ensure the County's groundwater supply, and
3. protect groundwater dependent natural resources (including increasing the County's understanding of groundwater and surface water interactions).

The RPBCWD's primary goal is to promote the sustainable management of groundwater resources. The District will endeavor to gain a better understanding of groundwater-surface water interaction and develop management strategies that consider the protection of both resources. The District's groundwater management decision tree is adapted from the MDNR's recommendation in *Report to the Minnesota State Legislature: Definitions and Thresholds for Negative Impacts to Surface Waters* (MDNR, Report to the Minnesota State Legislature: Definitions and Thresholds for Negative Impacts to Surface Waters , 2016) and is illustrated in Figure 9-6. This decision tree allows the District to continue collaboration with other LGUs to monitor, assess, identify gaps, model, and identify protective and restoration measures for groundwater and surface water. It also represents an opportunity for the District to be a leader in understanding the interaction between groundwater and surface water within the District and determine critical areas of preservation and infiltration to improve the health of surface water resources while promoting the conservation of groundwater. The District will accomplish this by working with stakeholders to establish critical thresholds, essentially the point at which negative impacts occur, for the creeks, lakes and wetlands in the District based on the MDNR's *Report to the Minnesota State Legislature: Definitions and Thresholds for Negative Impacts to Surface Waters* as summarized below. The RPBCWD will continue its collaborative efforts with MDNR, MDH, Carver and Hennepin counties in the area of groundwater management.

Figure 9-6

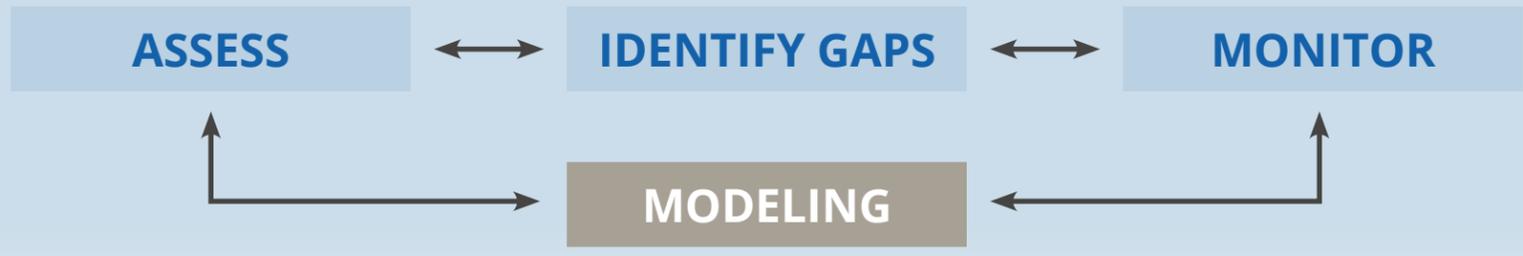
GROUNDWATER MANAGEMENT DECISION TREE

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

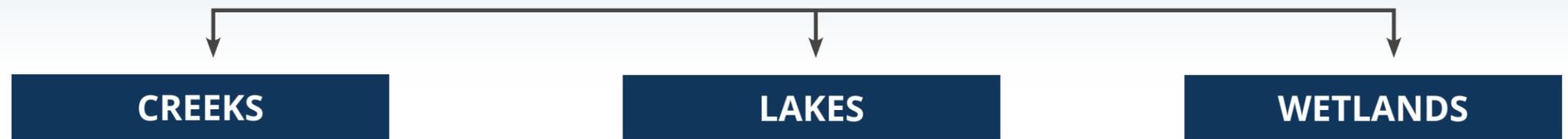


Consistent with the District's adaptive management approach to resource management, the District will collect and evaluate data with changing climate in mind while using available tools to implement projects resilient to predicted climate change impacts.

SHARE FINDING



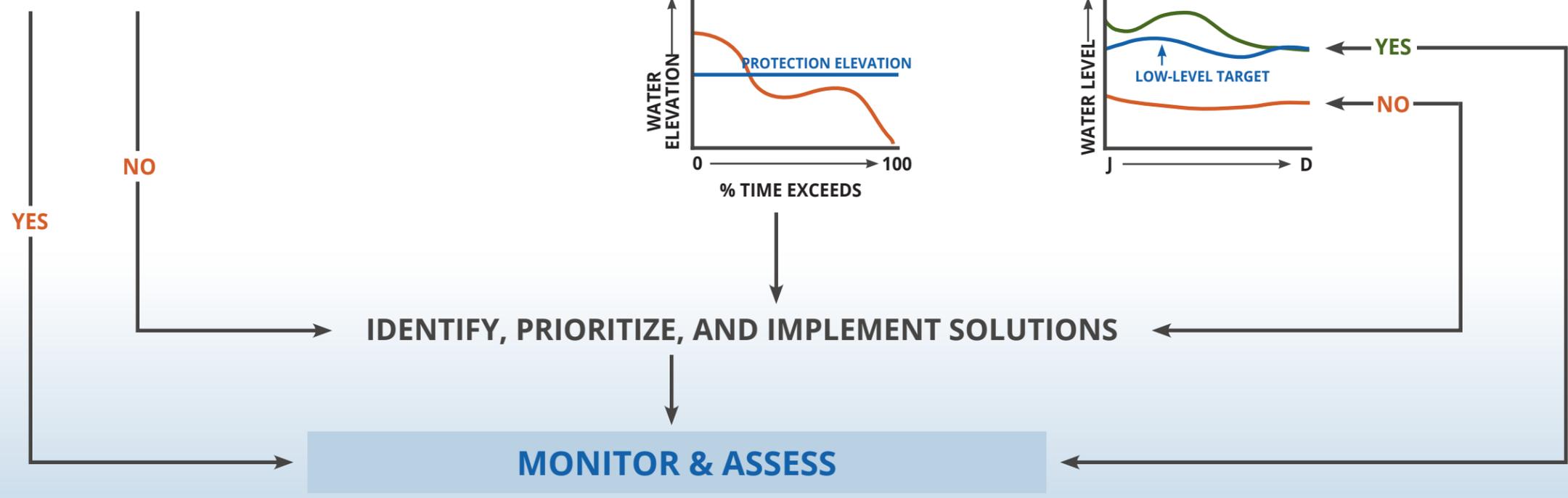
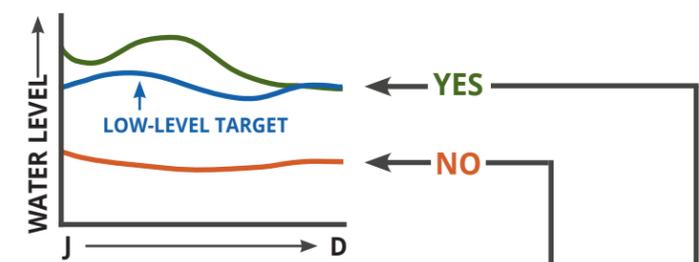
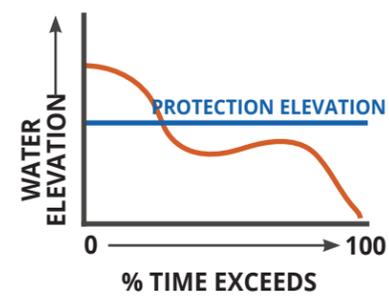
DETERMINE GROUNDWATER BUDGET WORKING WITH AGENCIES



DIVERSION LIMIT
≥ 10-15%
BASE FLOW

FREQUENT DISCHARGE **INFREQUENT DISCHARGE**

ACHIEVING TARGET HYDROGRAPH



Some of the activities identified in Table 9-1 under groundwater conservation include, but are not limited to, the following:

- Implementing groundwater conservation and recharge measures including but not limited to infiltration basins, stormwater reuse systems, permeable pavement, rainwater harvesting and reuse systems, and vegetation management.
- Establishment of baseflow thresholds for the creeks within the District. The Minnesota DNR suggests establishing a threshold of 10-15% the median low flow (MDNR, Report to the Minnesota State Legislature: Definitions and Thresholds for Negative Impacts to Surface Waters , 2016). Generally, the median low flow occurs in August. The downstream reaches of Riley Creek and Purgatory were identified as most vulnerable to changes in the groundwater system and should be prioritized as such for establishing baseflow thresholds.
- Establishment of thresholds, either lake stage or outlet discharge, for lakes identified as vulnerable to changes in the groundwater system.
- Establishing target hydrographs for wetlands identified as vulnerable to changes in the groundwater system.
- Re-establishing a monitoring well network within the District and implement a monitoring program. Priority should be given to those areas that have been identified as areas of projected future drawdown and areas near surface waters that were classified as vulnerable to changes in the groundwater system.
- Developing a fully coupled groundwater-surface water model for the District. To fully understand how surface waters are affected by changes in the groundwater system and how infiltration will affect the groundwater system and nearby surface waters, a model capable of tracking the full water balance, for both groundwater and surface water, is necessary.

9.13 Opportunity Projects

The District recognizes that unanticipated opportunities may emerge during the life of this Plan. While the District cannot predict the future, the District has established a process to allow the District and its partners to take full advantage of these circumstances through the implementation of "Opportunity Projects."

Opportunity projects include projects which are closely aligned with the District's goals and strategies (see Section 3.0), but are not already included in the District's 10-year capital improvement program (see Section 9.2 and Table 9-1). These may include:

- Projects not previously identified for various reasons (e.g., lack of data to identify or evaluate the problem), or
- Projects previously identified by the District but omitted from the CIP based on project priority (see Section 4.0)

Often, opportunity projects are existing opportunities for which the chances of success are increased through partnership, funding availability, land-owner cooperation, or other factors not present during initial consideration of the project. Examples of opportunity projects may include:

- stream restoration projects on private property with willing land-owners
- water quality or flood risk reduction enhancements implemented concurrently with City projects (i.e., added value projects)
- water quality improvement projects addressing concerns not emphasized in previous studies (e.g., UAA or TMDL)
- demonstration projects or pilot projects to evaluate emerging best management practices
- Water conservation projects to improve the sustainability of groundwater (e.g., Chanhassen High School water reuse project)

Potential opportunity projects may be identified by the District, cities, regulatory agencies, and other stakeholders. The District will generally follow the following process for evaluating and implementing opportunity projects:

1. Evaluate the project's alignment with District goals by scoring the project using the process described in Section 4.0; if the project has been previously evaluated using this method, the project will be re-evaluated to reflect changed conditions. Projects scoring above the minimum threshold (see Section 4.0) will be carried forward to the following steps.
2. Determine whether the project falls within an existing District program (e.g., cost-share, maintenance, monitoring) or CIP project; projects that fall under existing programs or projects will be implemented as part of the applicable project or program.
3. Undertake a Plan amendment to add the opportunity project to the District CIP, if necessary (for projects not falling under an existing District program), following the procedure described in Section 9.14.
4. Prioritize and implement the opportunity project taking into account the logistical factors described in Section 9.2.1).

The District anticipates the periodic implementation of opportunity projects throughout the life of this Plan. The District maintains funds to implement such projects on an as-needed basis as part of its overall CIP budget.

9.14 Amendments to Plan

This Plan will guide District activities through 2028, or until superseded by adoption of a subsequent Plan. Amendments to this Plan will follow the procedures described in this section and will proceed in accordance with the process provided in Minnesota Rules 8410.0140. Plan amendments may be proposed by any person to the Board of Managers, but only the Board of Managers may initiate the amendment process. All recommended plan amendments must be submitted to the District in writing, along with a statement of the problem and need, the rationale for the amendment, and an estimate of the cost. Only significant changes or additions to goals, policies, standards, administrative procedures or capital improvements as described in the Plan will prompt the District to amend the Plan.

Amendments to this Plan will be presumed to be subject to the minor-amendment review process provided in Minnesota Rules 8410.0140, subpart 2. This assumption is based on several factors:

1. RPBCWD's long history of research, planning and engagement in and rich knowledge of threats to water resources' health in the watershed;
2. RPBCWD's long history of engagement of city representatives and others in the development, design and implementation of projects and programs; and
3. RPBCWD's extensive outreach to and close collaboration with city and state agency representatives and watershed residents in the development of this Plan.

Approximately 2 years prior to the expiration date of this Plan (in 2028), the District will begin the process of updating its Plan (unless a revised schedule is developed by BWSR in accordance with Minnesota Statutes section 103B.231, subdivision 3a).

The District will review its implementation program at least every 2 years as part of its evaluation and reporting duties (see Section 10.0) and revise its implementation program as needed and identified in Table 9-1.

9.14.1 Form of Amendments and Distribution

The District will prepare and distribute plan amendments in accordance with and in a format consistent with Minnesota Rules chapter 8410. The District will maintain a distribution list of everyone who receives a copy of the Plan. Amendments proposed by RPBCWD will be distributed in strikeout/underline form of replacement pages for the plan. Draft amendments will be distributed electronically to the list of required agencies and will be posted on the RPBCWD website. Proposed amendments will be provided in hard-copy form only if requested. A current copy of this Plan will be available on the District web site.

9.15 Local Government Responsibilities

The District's success is dependent upon its leadership and the cooperation of the seven cities and two counties in the watershed, along with state agencies. The RPBCWD's intention is to continue to work cooperatively with its cities and to limit imposition of requirements on local units of government as much as possible while still accomplishing the District's purposes and implementing the Plan. Local (city) water management responsibilities, including requirements for local water management plans, are described in Section 9.15.1.

9.15.1 Local (City) Water Management Plan Requirements

This section outlines local water management planning requirements for cities and how the RPBCWD's implementation program will integrate with other local governments' water resources protection and improvement work. This section also assesses the financial and administrative impacts of the Plan on local units of government.

Local water management plans are required to conform to applicable state law and the RPBCWD Plan. Minnesota Rules chapter 8410 and Minnesota Statutes section 103B.235, subdivision 2, include specific requirements for local water management plan content, and this plan does not amend the requirements imposed by state law. Particularly relevant among those is that cities in the watershed must submit their draft local water management plans to the District for review and approval (Minn. Stat. § 103B.235).

Generally, the policies and goals established in each city's local water management plan must be consistent with the RPBCWD Plan. More specifically, the District requires that local water plans include the city's commitment to:

- Providing any updates to the city's wellhead protection plan.
- Consideration in collaboration with the District of the necessary controls to prevent flooding caused by changes in land use or re/development of specific properties.
- Coordination with the District in developing floodplain information and setting consistent flood elevations.
- Maintaining critical 100-year flood storage volumes.

Cities are encouraged to consult with RPBCWD staff early on in their planning process to determine collaboratively the most practical approach to meeting the requirements of

the RPBCWD Plan and Minnesota statutes and rules. RPBCWD review and approval of local water management plans will be conducted in accordance with relevant state law.

The District will promote ongoing collaboration and partnership to implement this Plan and the LGUs' local water management plans. The District will meet at least annually with LGU representatives to evaluate local water management plan implementation progress and to identify collaboration opportunities. These annual meetings will also address any outstanding issues of local water management plan implementation, including coordination of regulatory roles as provided in Section 9.4.2 and the applicable memoranda of understanding.

9.15.1.1 Permitting Authority

Under Minnesota Statutes section 103B.235 and the related structure in Minnesota Rules chapter 8410, after RPBCWD reviews and approves a watershed city's local water management plan, the city must adopt and implement the plan within 120 days. In its plan, the city must state whether it intends to amend its official controls (ordinances) and policies to provide protection of water resources at least as effective as provided by the RPBCWD rules or defer exercise of sole regulatory authority to RPBCWD. See Section 9.4.2 for further details on exercise of permitting authority.

9.15.2 Local Water Management Plan Amendment Format and Distribution

Local water management plans should be amended in accordance with Minnesota Statutes section 103B.235, subdivision 5, and Minnesota Rules 8410.0160, subpart 4. Amendments will be reviewed in a timely manner and, in accordance with applicable requirements of state law, approved if the RPBCWD determines the amendment ensures that the local water plan remains consistent with RPBCWD's plan.

9.15.3 Impact on Local Governments

The District's intention is to limit additional requirements imposed upon local units of government while still accomplishing the District's purposes and implementing the Plan. As already noted, this Plan does not add to the planning burden imposed by state law, and in fact creates opportunities for cities and others to reduce costs through collaboration. The District's implementation program will be funded through tax levies.

Cities and other local units of government may be affected by additional costs of compliance of projects (e.g., road reconstruction) with District regulatory standards and

criteria. But these costs could well be offset by the diminished burden of implementing regulatory requirements for water resources protection for cities that opt to defer those duties to the District.

Cities, as part of their local water management plans, need to commit to the specific actions described in subsection 9.15.1 and to open communications with the District. But the requirements there involve communication and coordination that should be a nominal burden and one that will be more than offset by the resulting support from the District. This plan was generally developed with a mind to providing cities opportunities to collaborate and partner with the District for water resource protection work, consistent with the past productive relationship between the District and cities.

While the District presently does not administer the Wetland Conservation Act (WCA), the District would consider assuming WCA authority from any of the cities presently administering the law if asked to do so.

9.15.4 Additional Local Government Collaboration Opportunities

This Plan provides many opportunities for collaboration and partnership. The District generally relies on the cities for the following roles and responsibilities:

1. **Technical Advisory Committee (TAC):** The Technical Advisory Committee (TAC) provides a forum for member communities to engage with the District on watershed issues. The TAC allows the LGUs to appoint a technical advisor to the RPBCWD. The TAC helps maintain continuity across the District and an important opportunity for communication between the member cities and the District. The technical advisors are welcome to ask questions and express opinions on RPBCWD programs, projects and operations. It is the responsibility of each city to appoint a technical advisor and encourage the technical advisor to attend the RPBCWD and TAC meetings. The TAC meetings occur on an as needed basis to discuss and provide recommendations on topics and issues within the District. The District will continue outreach to municipalities to maintain an ongoing list of city priorities in watershed management.
2. **Citizen Advisory Committee (CAC):** Cities will encourage interested candidates to apply to be a citizen advisor. See Section 1.3.3 and Figure 1-2 for information about the CAC's responsibilities.

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3. **Development Review & Permitting:** While the cities in the watershed address some of the same activities governed by the RPBCWD rules in the course of exercising their primary authority over land use, cities can alleviate any burden of imposing water resources protection requirements by deferring exercise of regulatory authority to RPBCWD, as discussed in more detail in Section 9.4.2. Cities that defer exercise of regulatory authority to the District need to establish protocols to ensure that applicants for other city land-use approvals are referred to the District to obtain relevant necessary approvals under the District rules.
 4. **Local Water Management Plan:** Each city is required to prepare a local water management plan that conforms with the RPBCWD Plan. The RPBCWD is required to review and approve each local water management plan. See Section 9.15.1 for more information about local water management planning and requirements.
 5. **Capital Improvement Projects:** The District often collaborates with cities on the implementation of capital improvement projects. Cities agree to allow the District to use publicly owned property for the District to implement capital projects in accordance with project-specific cooperative agreements.
 6. **Project/Program Recognition:** City and other partners are expected to work closely with the District on all communications when using District materials or referencing District projects. This includes acknowledging the full extent of project partner roles. The District will do the same.
 7. **Capital Project Maintenance:** Maintenance responsibilities for District-ordered projects are typically defined in the cooperative agreement between the RPBCWD and the city for each project. Generally, cities are responsible for routine maintenance of District capital improvement located in their city because they own stormwater infrastructure, are MS4 permit holders, and typically have maintenance staff.
 8. **City CIP:** Each city will work with the District to coordinate water resource protection projects. As part of this effort the cities should provide the District information of their anticipated project (planning and construction) on an annual basis. The District expects municipalities to work cooperatively (at the

TAC level) toward the identification of projects that match municipality priorities and District objectives. This will help minimize duplication of efforts and will improve efficient use of public resources.

9. **Stormwater Management Information:** As MS4s the cities have developed an extensive inventory of stormwater management information (e.g., as-builts, topography data, water quality information, wetland inventories, feasibility studies, models, etc.). The District hopes the cities will openly share these and other data in a collaborative effort. The District has also compiled large amounts of information and intends to share the data with the cities when requested.

9.16 MPCA TMDL Coordination

While the stakeholder input and RPBCWD goals recognize that protection of healthy resources is equally as important as restoration of impaired resources, the District plans to work cooperatively with the MPCA to develop load allocations, implement restoration measures, and track the pollutant reduction realized by the District's implementation of capital projects. Table 9-6 summarizes the potential benefits implementation of the District's planned capital projects might provide to the MPCA impaired resources.

Table 9-6 Impaired Waters Potential Benefits from RPBCWD Plan Implementation

Waterbody	Impaired Use	Pollutant or Stressor	Required Load Reduction	Required Percentage Reduction	Potential Load Reduction from Implementing the 10-Year Plan	Potential Percentage of Needed Reduction from Implementing the 10-Year Plan
Bluff Creek	Aquatic Life	Turbidity/TSS	Depends on flow regime	~87%	TBD	
	Aquatic Life	Fish Bioassessments			TBD	
Purgatory Creek ¹	Aquatic Life ¹	Aquatic Macroinvertebrate Bioassessments			TBD	
	Aquatic Recreation ⁴	Escherichia coli			TBD	
Riley Creek	Aquatic Life	Turbidity/TSS	Depends on flow regime	~88%	TBD	
	Aquatic Life ⁴	Aquatic Macroinvertebrate Bioassessments			TBD	
	Aquatic Life ¹	Fishes Bioassessments			TBD	
	Aquatic Recreation ⁴	Escherichia coli			TBD	
Lotus Lake	Aquatic Recreation	Nutrients/ Eutrophication	401lbs	38%	716 lbs	>100%
	Aquatic Life ¹	Fishes Bioassessments	N/A	N/A	Reduction in nutrients will improve water clarity and promote vegetation growth which can benefit aquatic life	
Silver Lake	Aquatic Recreation	Nutrients/ Eutrophication	32 lbs	15%	6 lbs	20%
Hyland Lake	Aquatic Recreation	Nutrients/ Eutrophication	286 lbs	47%	387 lbs	>100%
Lake Susan	Aquatic Recreation	Nutrients/ Eutrophication	230 lbs	18%	512 lbs	>100%

Waterbody	Impaired Use	Pollutant or Stressor	Required Load Reduction	Required Percentage Reduction	Potential Load Reduction from Implementing the 10-Year Plan	Potential Percentage of Needed Reduction from Implementing the 10-Year Plan
Rice Marsh Lake ¹	Aquatic Recreation ¹	Nutrients/ Eutrophication	653 lbs	41%	496 lbs	76%
Lake Riley	Aquatic Recreation	Nutrients/ Eutrophication	806 lbs	28%	811 lbs	>100%
	Aquatic Life ¹	Fishes Bioassessments	N/A	N/A	Reduction in nutrients will improve water clarity and promote vegetation growth which can benefit aquatic life	
Staring Lake	Aquatic Recreation	Nutrients/ Eutrophication	500 lbs	22%	89 lbs	18%

¹ Included on the MPCA's Draft 2018 impaired waters list.