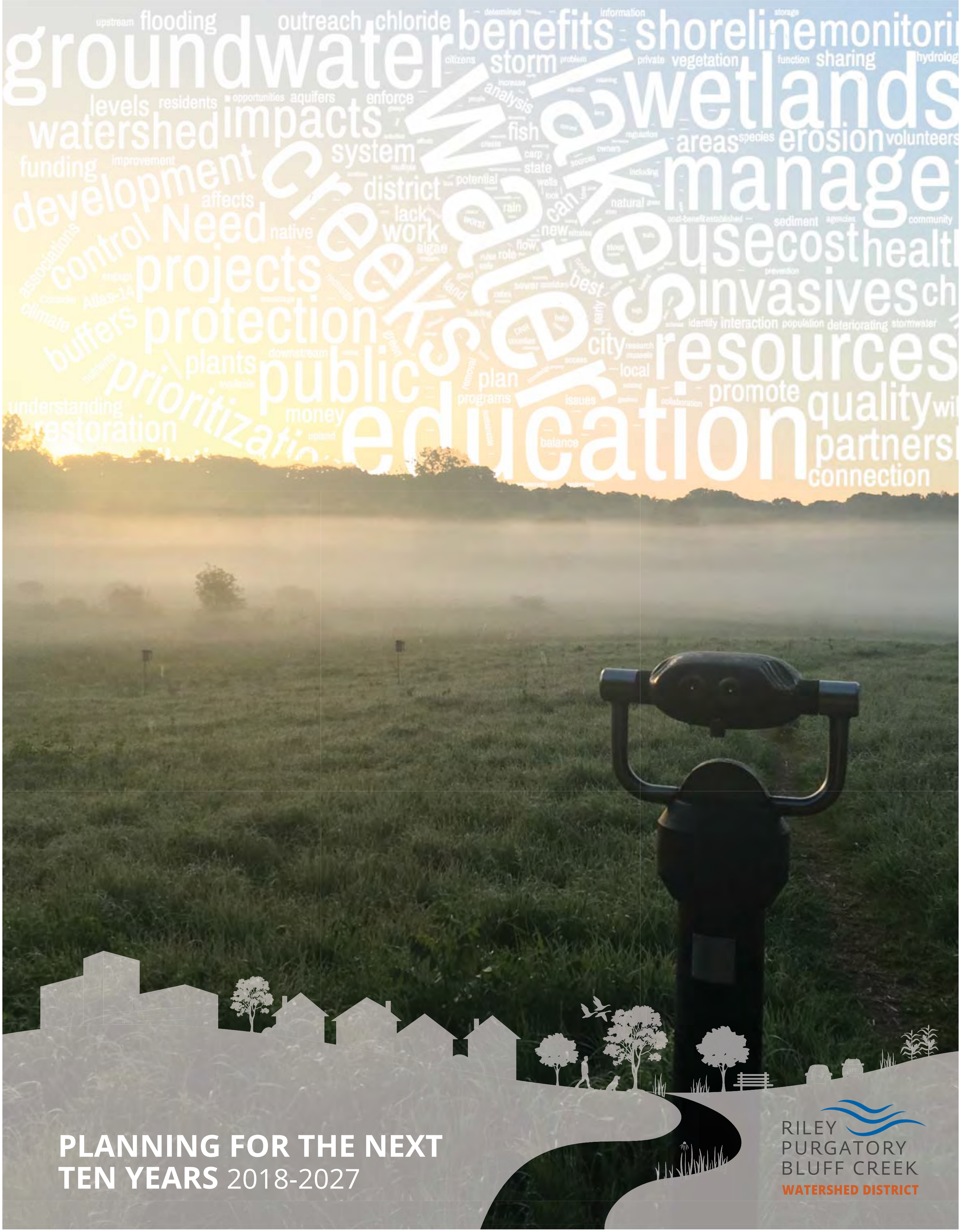

PLANNING FOR THE NEXT TEN YEARS 2018-2027

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY
PURGATORY
BLUFF CREEK
WATERSHED DISTRICT

Planning for the Next Ten Years

2018-2027

Prepared for
Riley Purgatory Bluff Creek Watershed District

July 11, 2018

Citation:
RPBCWD 2018. Planning for the Next Ten Years
2018-2027

Minnesota Board of Soil and Water Resources Apporval: June 27, 2018*

Riley Purgatory Bluff Creek Watershed District Adoption: July 11, 2018*

*See Appendix H

Planning for the Next Ten Years

July 11, 2018

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Acronyms

Acronym	Description
ACEC	American Council of Engineering Companies
AIS	Aquatic Invasive Species
APWA	American Public Works Association
ASCE	American Society of Consulting Engineers
BFE	Base Flood Elevation
BMP	Best Management Practices
BWSR	Board of Water and Soil Resources
CAC	Citizens Advisory Committee
CIP	Capital Improvement Program
CRAS	Creek Restoration Action Strategy
CWA	Clean Water Act
CWF	Clean Water Fund
District	Riley Purgatory Bluff Creek Watershed District
DWSMA	Drinking Water Supply Management Area
E&O	Education and Outreach
FEMA	Federal Emergency Management Agency
FIS	Flood Insurance Study
GIS	Geographic Information Systems
IAP2	International Association of Public Participation
IDDE	Illicit Discharge Detection and Elimination
LID	Low Impact Development
LGU	Local Government Unit
LOMA	Letter of Map Amendment
LVMP	Lake Vegetation Management Plan
MAWD	Minnesota Association of Watershed Districts
MBS	Minnesota Biological Survey
MCES	Metropolitan Council Environmental Services
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MDNR	Minnesota Department of Natural Resources

MnDOT	Minnesota Department of Transportation
MnRAM	Minnesota Routine Assessment Methodology
MLCCS	Minnesota Land Cover Classification System
MOU	Memorandum of Understanding
MPCA	Minnesota Pollution Control Agency
MRCC	Midwestern Regional Climate Center
MS4	Municipal Separate Storm Sewer System
MSHA	Minnesota Stream Habitat Assessment
MSL	Mean Sea Level
MSP	Minneapolis-St. Paul International Airport
MUSA	Metropolitan Urban Service Area
NAPP	National Aerial Photography Program
NFIP	National Flood Insurance Program
NHIS	Natural Heritage Information System
NPDES	National Pollutant Discharge Elimination System
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	Natural Resources Inventory
NURP	Nationwide Urban Runoff Program
NWI	National Wetland Inventory
OHWL	Ordinary High Water Level
PAHs	Polycyclic Aromatic Hydrocarbons
PRAP	Performance Review and Assistance Review
PWI	Public Waters Inventory
RCL	Riley Chain of Lakes
RPBCWD	Riley Purgatory Bluff Creek Watershed District
RWI	Restorable Wetlands Inventory
SHPO	State Historic Preservation Office
SSTS	Subsurface Sewage Treatment Systems
SSURGO	Soil Survey Geographic dataset
SWCD	Soil and Water Conservation District
SWPPP	Stormwater Pollution Prevention Plan

TAC	Technical Advisory Committee
TMDL	Total Maximum Daily Load
TP	Total Phosphorus
TP-40	Technical Paper 40
TP-49	Technical Paper 49
TSS	Total Suspended Solids
UAA	Use Attainability Analysis
UMN	University of Minnesota
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USDA	United States Department of Agriculture
USGS	United States Geologic Survey
VIC	Voluntary Investigation and Cleanup
WCA	Wetland Conservation Act
WHPP	Wellhead protection plan
WMO	Watershed Management Organization
WOMP	Watershed Outlet Monitoring Program
WRAPS	Watershed Restoration and Protection Strategy
WSTMP	Wetland Status and Trends Monitoring Program
YOY	Young of the Year

Partnerships & Volunteers

Caring for local waters is a big task, and we can't do it alone. It is only through partnerships with other organizations, and the support of community volunteers that together we can protect and improve water quality.

Riley Purgatory Bluff Creek Watershed District

18681 Lake Drive East | Chanhassen | 55317

952-607-6481 | info@rpbcwd.org | rpbcwd.org

PLANNING FOR THE NEXT TEN YEARS

EXECUTIVE SUMMARY

July 11, 2018

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

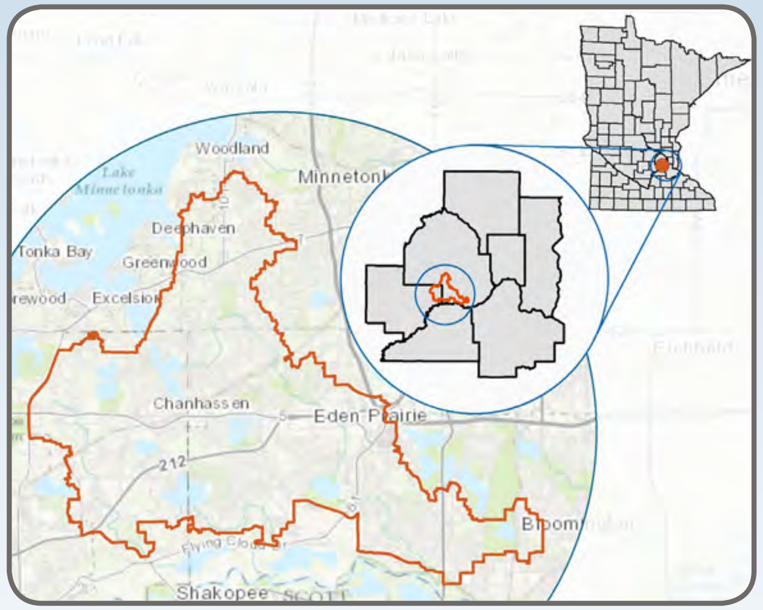
COVER GRAPHIC:
The word cloud on the front cover was created using all of the comments from the six public input meetings. The larger the word, the more often it appeared in the comments. Prepositions, conjunctions, etc were omitted. Words with fewer than three occurrences were omitted.

WANT TO LEARN MORE about the Watershed District? Check out Section 1 of our plan!

About us

The Riley Purgatory Bluff Creek Watershed District (RPBCWD) is a local unit of government tasked with protecting, managing and restoring the water resources within its boundaries. The District was established on July 31, 1969 and is one of 65 Minnesota watershed mangement organizations. It is located in the southwestern portion of the Twin Cities metropolitan area in a largely developed urban landscape, which encompasses portions of Bloomington, Chanhassen, Chaska, Deephaven, Eden Prairie, Minnetonka and Shorewood.

The District is led by district residents and water professionals who focus on managing local water resources. The District partners with local communities to identify top priorities and plan, implement, and manage efforts to protect, manage, and restore our water resources. We educate and engage residents and the efforts they undertake benefit the quality and quantity of water in local and downstream watersheds and communities.



RPBCWD is located in the southwestern portion of the Twin Cities metropolitan area.

Plan Purpose

The purpose of this watershed management plan is to guide how the District will manage activities in the watershed between 2018 and 2028. The plan also meets Minnesota Statutes 103B and 103D, and Minnesota Rules 8410 requirements which governs our actions.

This plan presents a summary of the District's goals, strategies, and activities necessary to accomplish the District's mission during the life of this Plan. The plan also describes the District's resource management framework and funding approach for projects and programs.

The Riley-Purgatory-Bluff Creek Watershed District protects, manages, and restores water resources within its boundaries. The District views all the following elements as essential for achieving its mission:

- Effective administration and judicious use of public resources
- Data collection and analysis to ensure decisions are based on sound science
- Planning to achieve District goals in a strategic and equitable manner
- Education and outreach to promote watershed stewardship
- Regulation to protect District natural resources from degradation
- Projects and programs addressing both surface water and groundwater quality and quantity, and related habitat

Education and Outreach

Community scale problems require community scale actions — water quality affects and belongs to everyone. Education and outreach leverages the power of an engaged community to effect positive change to help improve our waters. Through increasing awareness, growing stewardship and building capacity, education and outreach empowers each of us to do our part in making our waters healthy.

$ The District offers a cost-share program, which 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.

Regulatory

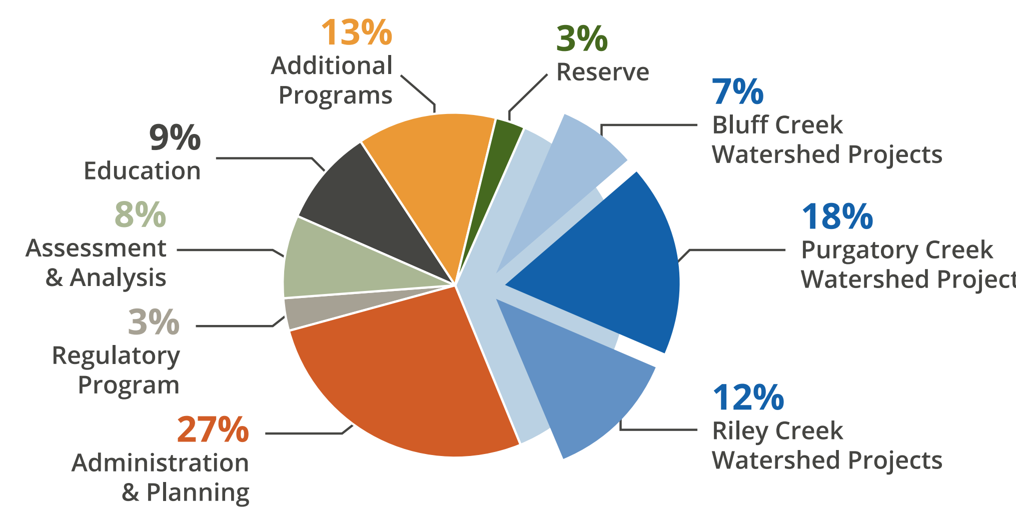
Regulation plays an important role in protecting water resources from the impacts of development and redevelopment. The District's permitting program includes rules that cover topics like buffers, stormwater, streambanks and shorelines, among others.

In 2016, the District's permitting program resulted in projects that removed an estimated 48,000 lbs of Total Suspended Solids (sediment) and 130 lbs of Total Phosphorus (nutrient) from site runoff.

260,000 cubic feet of runoff from each rainfall event can be retained through infiltration, retention ponds and rainwater reuse systems; 20 projects included buffers.

Finance (the next 10 years)

Where will the funds go? This pie chart explains the District's planned expenditures for 2018-2028.



A Closer Look

Adaptive Management and Prioritization

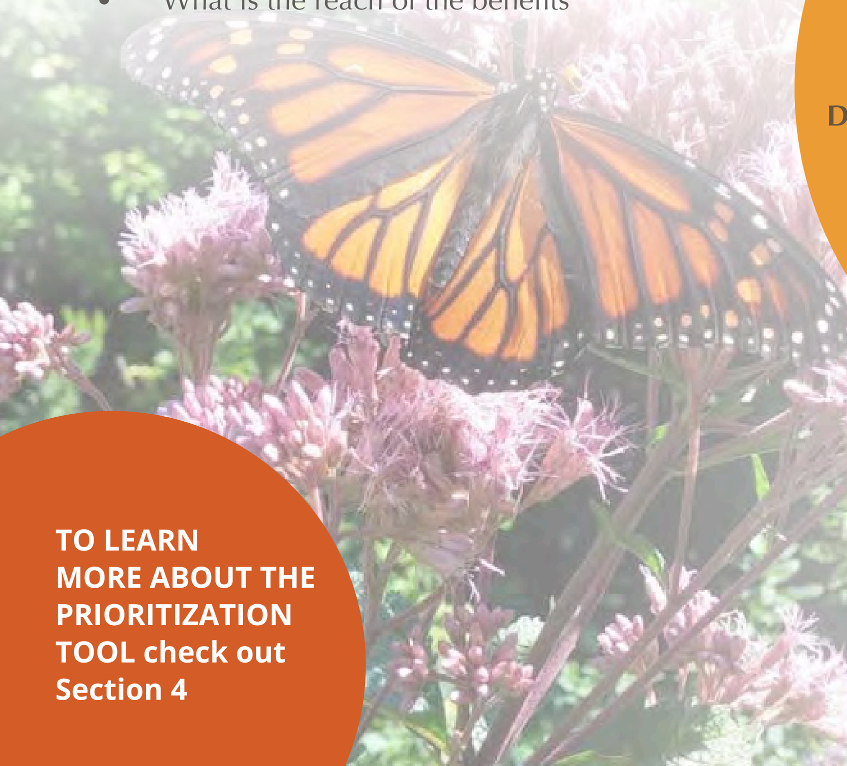
The District has conducted numerous assessments to help its work to protect, manage and restore our waters using an adaptive management approach. Adaptive management begins with the collection and interpretation of data to understand current conditions. The District then identifies solutions to improve water quality based on the best available science. Projects are then prioritized and implemented.

DATA COLLECTION / STUDIES / RESEARCH → IDENTIFY PROJECTS → PRIORITIZE → DETERMINE LOGISTICAL CONSTRAINTS → IMPLEMENT

PRIORITIZE
District goals
Habitat restoration
Partnerships
Pollutant management
Public access & education
Shoreline/Streambank restoration & stabilization
Sustainability
Volume management
Watershed benefits

As part of this plan, the District worked with stakeholders to develop a prioritization tool. The tool identified several criteria to help the District prioritize, including:

- How many district goals are met
- How much habitat is restored
- Whether there are partners
- How much pollutant is removed
- Accessibility of the site
- How much shoreline/streambank is stabilized
- Sustainability of the project
- How much volume is infiltrated
- What is the reach of the benefits



Decision Tree

With nearly 50 years of experience managing our water resources, the District has extensive resource knowledge. Combining this knowledge with the adaptive management techniques the District was able to develop management decisions trees for lake, creek, wetland, and groundwater resources. The decision trees are instrumental in guiding the District to ensure our actions protect, manage and restore the resources.

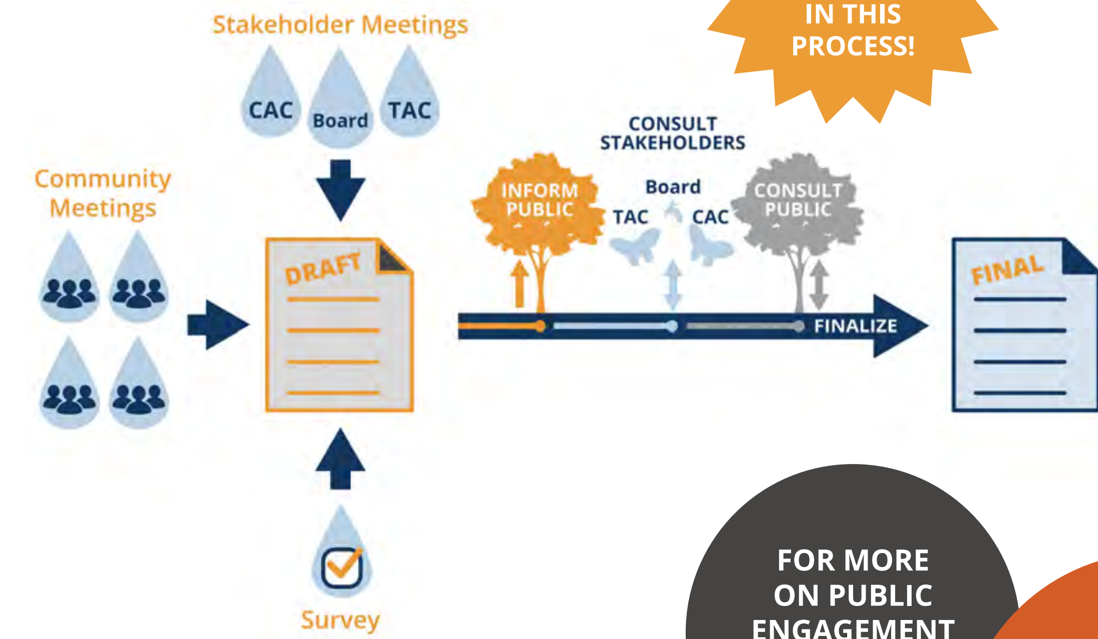
TO LEARN MORE, GO TO SECTION 9

TO LEARN MORE ABOUT THE PRIORITIZATION TOOL check out Section 4

Public Engagement Process

NEARLY 500 STAKEHOLDERS TOOK PART IN THIS PROCESS!

Understanding that public support is critical for the efficient and effective operation of any government organization, the District emphasized public engagement and outreach throughout the development of this plan. As a result, the issues identified and emphasized in this plan are a direct result of stakeholders input.



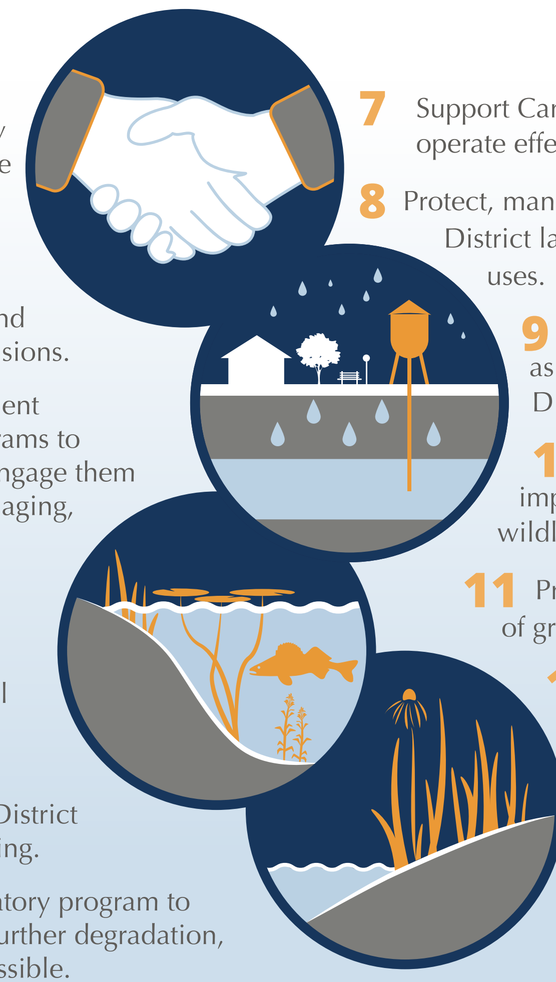
FOR MORE ON PUBLIC ENGAGEMENT Check out Section 2

OUR GOALS? Find out more in Section 3

Goals Identifed

Through our public input process, the following goals were identified:

1. Operate in a manner that uses District resources and capacity efficiently and effectively while advancing the District's vision and goals.
2. Collect data and use the best available science to recommend and support management decisions.
3. Design, maintain, and implement Education and Outreach programs to educate the community and engage them in the work of protecting, managing, and restoring water resources.
4. Plan and conduct the District's implementation program to most effectively accomplish its vision with consideration for all stakeholders and resources.
5. Include sustainability and the impacts of climate change in District projects, programs, and planning.
6. Implement the District's regulatory program to protect water resources from further degradation, enhancing resources when possible.



7. Support Carver and Hennepin County to operate effectively as Ditch Authorities.
8. Protect, manage, and restore water quality of District lakes and creeks to maintain designated uses.
9. Preserve and enhance the quantity, as well as the function and value of District wetlands.
10. Preserve and enhance habitat important to fish, waterfowl, and other wildlife.
11. Promote the sustainable management of groundwater resources.
12. Protect and enhance the ecological function of District floodplains to minimize adverse impacts.
13. Limit the impact of stormwater runoff on receiving waterbodies.

AT A GLANCE: The Next 10 Years

Where will we go?

With three creeks, over a dozen lakes, multiple wetlands, and seven cities, there are many things to do and places to go in the district. Some of the things we do include: collect data on the health of the waters; conduct projects to improve them; host and collaborate on educational events to engage the public; and award cost share grants to support water quality projects in the community.

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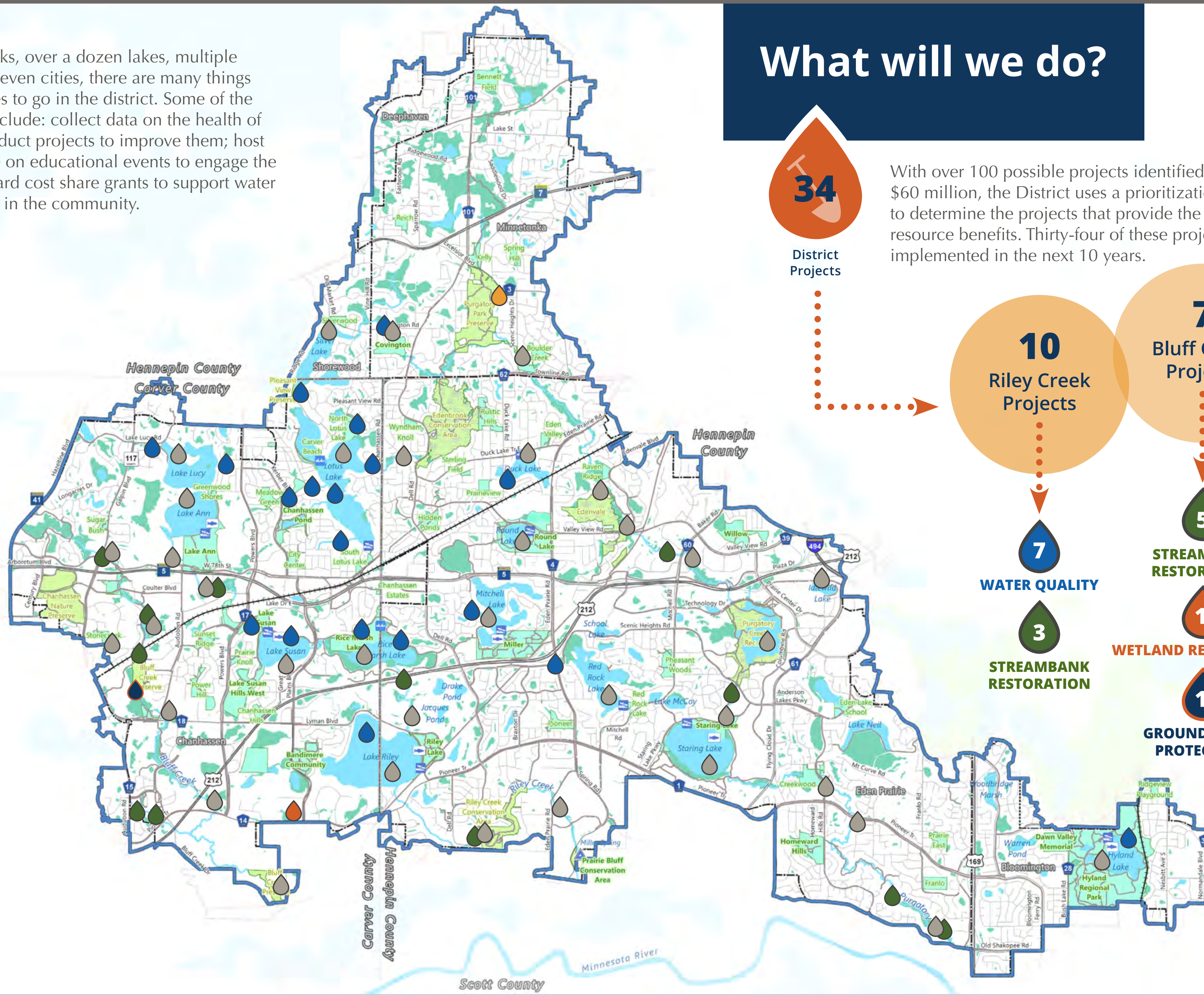
Long-Term Monitoring Sites

Assessment and Analysis

Assessment and analysis of our water resources is the foundation for RPBCWD's work. Regular, detailed water quality monitoring provides the District with scientifically reliable information that is needed to decide if water improvement projects are needed. The District then conducts studies to identify potential projects that would help protect or restore our water resources. Finally, after implementation, the District not only assesses these projects to see how effective they are in the watershed, but also if further actions are needed. Check the map to see where we monitor!



What will we do?

34

District Projects

With over 100 possible projects identified costing nearly $60 million, the District uses a prioritization process (see next page) to determine the projects that provide the most comprehensive resource benefits. Thirty-four of these projects are planned to be implemented in the next 10 years.

10 Riley Creek Projects
- **7** WATER QUALITY
- **3** STREAMBANK RESTORATION

7 Bluff Creek Projects
- **5** STREAMBANK RESTORATION
- **1** WETLAND RESTORATION
- **1** GROUNDWATER PROTECTION

17 Purgatory Creek Projects
- **11** WATER QUALITY
- **5** STREAMBANK RESTORATION
- **1** HABITAT RESTORATION

WANT TO LEARN MORE ABOUT OUR PROJECTS AND PROGRAMS?

Check out Section 9

RESEARCH FOR SOLUTIONS: Our environment is always changing and so are the tools that help us understand it. Over the next 10 years, the District will continue to study its waters to find solutions to protect and restore them. Learn more by visiting our website: rpbcwd.org

rpbcwd.org

1.0 Introduction

When it rains, water that falls on the landscape follows a natural path downstream to a waterbody or watercourse. This area of land is the body's watershed. Anything that happens within a watershed impacts the lakes, creeks, wetlands, or ponds it feeds. Watershed districts are special units of government with boundaries based on watersheds, and are charged with protecting and improving our communities' water resources. The Riley-Purgatory-Bluff Creek Watershed District (District) was established on July 31, 1969, by the Minnesota Water Resources Board acting under the authority of the Minnesota Watershed Act of 1955.

Watershed districts are led by district residents and water professionals who focus on managing local water resources. Districts partner with local communities to identify top priorities and plan, implement, and mange efforts, which protect and improve local water resources. Watershed districts educate and engage residents in protecting and improving local water resources, and the efforts they undertake benefit the quality and quantity of water in local, as well as downstream watersheds and communities.

1.1 Plan Purpose

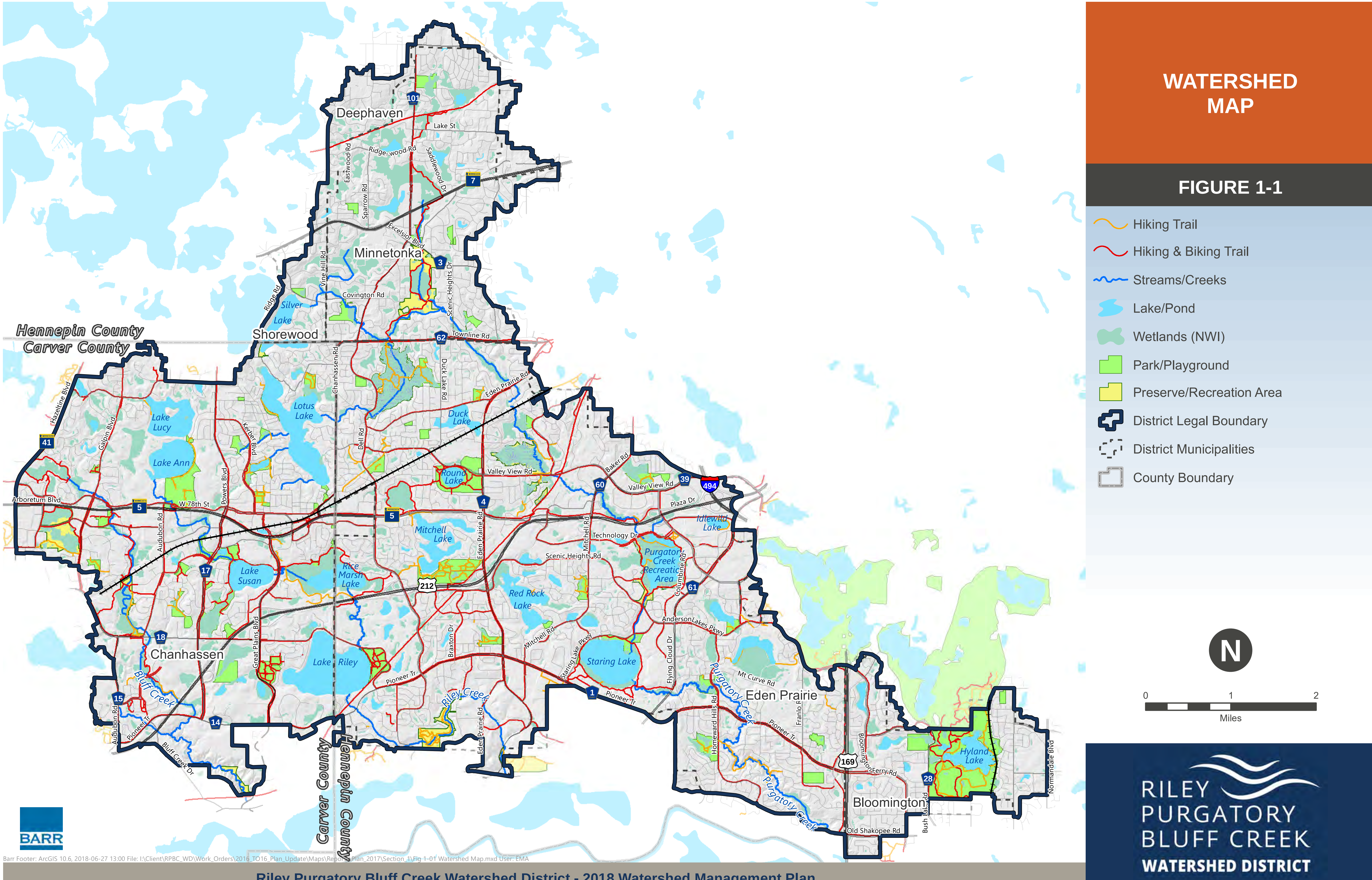
The purpose of this watershed management plan is to guide how the District will manage activities in the watershed between 2018 and 2028. The plan also describes how the District will fulfill the requirements given in Minnesota Statutes chapters 103B and 103D. In addition to the plan requirements given in statute, watershed districts in the Twin Cities metropolitan area must also follow the detailed plan requirements of Minnesota Rules chapter 8410. The rules, adopted by the Minnesota Board of Water and Soil Resources (BWSR), also contain requirements for local plans (see Section 9.15.1), and require the establishment of the necessary authorities to ensure implementation of programs.

This plan presents a summary of the District's goals, strategies, and activities necessary to accomplish the District's goals during the life of this Plan. The plan also describes the District's resource management frameworks and funding approach for capital improvement projects and programs.

1.2 Location and Boundaries

The Riley-Purgatory-Bluff Creek Watershed District (District) is located in the southwestern portion of the Twin Cities metropolitan area and primarily consists of a developed urban landscape. It encompasses portions of Bloomington, Chanhassen, Chaska, Deephaven, Eden Prairie, Minnetonka, and Shorewood (Figure 1-1). It covers an area close to 50 square miles and includes three distinct major watersheds: the land that drains to Riley Creek, Purgatory Creek, and Bluff Creek. Approximately 32.8 square miles of the District are within Hennepin County and 14.5 square miles are in Carver County.

Other than an area along the southern limits of the District, along the Minnesota River, and the far western portion of the District, the entire District is within the Metropolitan Urban Service Area (MUSA) boundary set by the Metropolitan Council. The District is bounded on the south by the Lower Minnesota River Watershed District, on the east by the Nine Mile Creek Watershed District, on the north by the Minnehaha Creek Watershed District, and on the west by the Carver County Water Management Organization which is administered by Carver County.


WATERSHED MAP
FIGURE 1-1
Hiking Trail
Hiking & Biking Trail
Streams/Creeks
Lake/Pond
Wetlands (NWI)
Park/Playground
Preserve/Recreation Area
District Legal Boundary
District Municipalities
County Boundary
N
0
1
2
Miles
RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT
BARR
Hennepin County
Carver County
Deephaven
Minnetonka
Shorewood
Chanhassen
Eden Prairie
Bloomington
Silver Lake
Lake Lucy
Lake Ann
Lotus Lake
Duck Lake
Round Lake
Mitchell Lake
Lake Susan
Rice Marsh Lake
Red Rock Lake
Lake Riley
Staring Lake
Idlewild Lake
Purgatory Creek Recreation Area
Hyland Lake
Bluff Creek
Riley Creek
Purgatory Creek
Lake St
Ridgewood Rd
Eastwood Rd
Sparrow Rd
Saddlewood Dr
Excelsior Blvd
Vine Hill Rd
Covington Rd
Ridge Rd
Scenic Heights Dr
Townline Rd
Chanhassen Rd
Duck Lake Rd
Eden Prairie Rd
Hazeltine Blvd
Galpin Blvd
Kerber Blvd
Dell Rd
Valley View Rd
Baker Rd
Plaza Dr
Arboretum Blvd
W 78th St
Powers Blvd
Audubon Rd
Technology Dr
Mitchell Rd
Scenic Heights Rd
Columbine Rd
Anderson Lakes Pkwy
Great Plains Blvd
Braxton Dr
Pioneer Tr
Staring Lake Pkwy
Flying Cloud Dr
Mt Curve Rd
Homeward Hills Rd
Franlo Rd
Bloomington Ferry Rd
Bush Lake Rd
Old Shakopee Rd
Normandale Blvd
Bluff Creek Dr
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15
14
212
1
60
39
494
61
169
28
Barr Footer: ArcGIS 10.6, 2018-06-27 13:00 File: I:\Client\RPBC_WD\Work_Orders\2016_TO16_Plan_Update\Maps\Reports\Plan_2017\Section_1\Fig 1-01 Watershed Map.mxd User: EMA

1.3 Governance Structure

Multiple individuals contribute to the work of the District. These include the board of managers, advisory committees, staff, consultants, and volunteers. Figure 1-2 and the following sections summarizes roles and interaction of the various groups.

1.3.1 Board of Managers

Five managers govern the watershed District. Four managers are appointed by the Hennepin County Commissioners and one manager is appointed by the Carver County Commissioners. Each of the District's five managers serves a three-year term.

Table 1-1 2017 Riley-Purgatory-Bluff Creek Board of Managers

President Leslie Yetka (Hennepin 7/31/19) 17452 Hampton Court Minnetonka, MN 55345 Home: (952) 933-3281 Email: lyetka@rpbcwd.org	**Vice President** Dorothy Pedersen (Hennepin 7/31/20) Home: 6155 Ridge Road Shorewood, MN 55331 Home: (952) 933-2141 Email: dpederson@rpbcwd.org
Secretary Richard Chadwick (Carver 7/31/18) 9530 Foxford Road Chanhassen, MN 55317 Home: (952) 445 2425 Email: rchadwick@rpbcwd.org	**Treasurer** Jill Crafton (Hennepin 7/31/18) 10351 Decatur Avenue South Bloomington, MN 55438 Home: (952) 944-5583 Email: jcrafton@rpbcwd.org
Manager Dick Ward (Hennepin 7/31/20) Home: 8625 Endicott Trail Eden Prairie, MN 55347 Home: (612) 759-9150 Email: dickward@rpbcwd.org	
Retired Manager Perry Forster (Hennepin 7/31/17) 9505 Highview Drive Eden Prairie, MN 55347 Home: (952)-934-0938	**Retired Manager** Mary Bisek (Hennepin 7/31/17) 4700 Sparrow Road Minnetonka, MN 55345 Home: (612) 599-4479

Board of Managers: (from left) Dorothy Pedersen, Richard Chadwick, Leslie Yetka, Dick Ward, Jill Crafton

FIGURE 1-2

RILEY PURGATORY BLUFF CREEK **WATERSHED DISTRICT**

2017

ORGANIZATIONAL STRUCTURE

Multiple individuals are included in the governance of the Riley Purgatory Bluff Creek Watershed District. These include a board of managers, advisory committees, consultants, staff, and volunteers.

BOARD OF MANAGERS

Five managers govern the watershed district. Four are appointed by the Hennepin County Commissioners and one by the Carver County Commissioners. Each serves a three-year term.

CONSULTANTS

LEGAL

Aids in drafting legal documents and advises on matters of law.

ENGINEERING

Provides engineering expertise when required for projects and programs. Assists with permits.

ACCOUNTING

Processes and tracks financial accounts.

AUDITOR

Reviews and evaluates District financial statements.

ADMINISTRATOR

Oversees daily operations and represents the District on numerous state-wide committees.

PROJECTS MANAGER & PERMIT COORDINATOR

Manages the District's permitting program, & projects to improve water resources.

DATA COLLECTION & FISHERIES COORDINATOR

Coordinates data collection and fisheries monitoring.

COMMUNITY OUTREACH COORDINATOR

Implements Education & Outreach plan, including the cost-share program.

WATER RESOURCE TECHNICIAN

Supports data collection and monitoring.

ADVISORY COMMITTEES

CITIZEN ADVISORY COMMITTEE

Provide feedback to board on decision making as representatives of citizen interests.

TECHNICAL ADVISORY COMMITTEE

Provides feedback on technical aspects of programs, projects, and rules.

Members appointed by Board of Managers

VOLUNTEERS, SERVICE LEARNERS & INTERNS

Increase District capacity through service, stewardship, and learning.

1.3.2 Employees and Consultants

Pictured from left to right: Terry Jeffery, Zach Dickhausen, Dr. Claire Bleser, Josh Maxwell and Michelle Jordan.

The District employs five full-time employees. The administrator oversees daily operations and represents the District on numerous state-wide committees. A Community Outreach Coordinator, and a Water Resources Coordinator were hired in spring of 2014. A Water Resources Technician was hired in December of 2016. In 2017, the District hired a Permit and Project Manager. The District solicits and selects the services of an engineering consultant, a legal advisor and an accountant to assist with District activities every two years. The District contracts with another accounting firm to perform its annual financial audit.

Table 1-2 2017 Employees

Administrator Dr. Claire Bleser 18681 Lake Drive East Chanhassen, MN 55317 Telephone: (952) 607-6512 Email: cbleser@rpbcwd.org	**Project Manager & Permit Coordinator** Terry Jeffery 18681 Lake Drive East Chanhassen, MN 55317 Telephone: (952) 607-6512 Email: tjeffery@rpbcwd.org
Community Outreach Coordinator Michelle Jordan 18681 Lake Drive East Chanhassen, MN 55317 Telephone: (952) 607-6481	**Water Resources Coordinator** Joshua Maxwell 18681 Lake Drive East Chanhassen, MN 55317 Telephone: (952) 607-6486 Email: jmaxwell@rpbcwd.org
Water Resources Technician Zachary Dickhausen 18681 Lake Drive East Chanhassen, MN 55317 Telephone: (952) 607-6036 Email: zdickhausen@rpbcwd.org	

Table 1-3 Primary Consultants

Legal Counsel Louis Smith, Smith Partners PLLP Old Republic Title Building 400 Second Avenue South, Suite 1200 Minneapolis, MN 55401 Telephone: (612) 344-1400 Facsimile: (612) 344-1550	**Engineer** Scott Sobiech, BARR Engineering Co 4300 MarketPointe Drive, 200 Edina, MN 55435 Telephone: (952) 832-2755 Facsimile: (952) 832-2601 Email: ssobiech@barr.com
Accountant Dan Cavanaugh, JMSC Futurity, P.A. 5000 West 36th Street, #240 St. Louis Park, MN 55416 Telephone: (952) 697-3577 Facsimile: (952) 697-3566 Email: dan@jmscfuturity.com	**Auditor** Peggy Moeller, Redpath and Company 4810 White Bear Parkway White Bear Lake, MN 55110 Telephone: (651) 426-7000 Facsimile: (651) 426-5004 Email: pmoeller@hlbtr.com

1.3.3 Advisory Committees

The Board of Managers appoints two advisory committees, the Citizen Advisory Committee (CAC) and the Technical Advisory Committee (TAC), to provide recommendations on matters affecting the District, including all contemplated projects and improvements. Both groups play an important role in ensuring that the District is fulfilling the needs of the community and is aware of citizen concerns.

The CAC is a volunteer advisory board comprised of community members. As representatives of citizen interests, committee members support the District's board of managers in their mission to protect, manage, and restore water resources. They provide recommendations to aid in decision making, communicate concerns from the public, and help educate the community on best practices for protecting clean water.

2017 CAC Members: Back Row: Paul Bulger, Anne Deuring, Judy McClellan, Jim Boettcher, Dorothy Pedersen (past Chair), Pete Iversen Front Row: David Ziegler (Chair), Joan Palmquist (Recorder), Matt Lindon [not picture: Sharon McCotter (Vice Chair)]

Table 1-4 2017 Citizen Advisory Committee Members

Name	Residence	Mailing address
Jim Boettcher	Chanhassen	7476 Crocus Court Chanhassen, MN 55317
Sharon McCotter	Chanhassen	7000 Utica Lane Chanhassen, MN 55317
Paul Bulger	Eden Prairie	15807 South Lund Rd Eden Prairie, MN 55346
Matt Lindon	Eden Prairie	9026 Belvedere Drive Eden Prairie, MN 55347
Peter Iversen	Eden Prairie	8002 Island Rd Eden Prairie, MN 55347
Joan Palmquist	Eden Prairie	8905 Cove Pointe Road Eden Prairie, MN 55347
David Ziegler	Eden Prairie	16729 Baywood Terrace Eden Prairie, MN 55346
Anne Deuring	Minnetonka	17149 Chiltern Hills Road Minnetonka, MN 55345

The Technical Advisory Committee includes members of local government unit and agency technical staff involved in water resources. Agencies represented on the committee vary from the Metropolitan Council, to the Minnesota Department of Natural Resources, Counties, and Cities. The TAC provides feedback specific to the technical aspects of programs and projects, and to the District's regulatory program.

2017 TAC Members: Back Row: Paul Oehme (Chanhassen), Mike Wanous (Carver County Soil and Water Conservation District), Steve Segar (Bloomington), Tom Dietrich (Minnetonka), Vanessa Strong (Chanhassen), Leslie Stovring (Eden Prairie), Dave Modrow (Eden Prairie), Front Row: Bill Alms (Shorewood), Jennie Skancke (MDNR), Steve Christopher (BWSR), Bob Bean (Deephaven), Rod Rue (Eden Prairie).

Table 1-5 2017 Technical Advisory Committee Members

Name and Office	Organization	Mailing address
Steve Christopher Board Conservationist	Board of Water and Soil Resources	520 Lafayette Road North Saint Paul, MN 55155 (651) 296-2633
Matt Lindon Citizen Advisor	Citizen Advisory Committee	9026 Belvedere Drive Eden Prairie, MN 55347
Paul Moline	Carver County	Government Center-Administration Building 600 East Fourth Street Chaska, MN 55318 (952) 361-1825
Mike Wanous	Carver County Soil and Water Conservation District	11360 Highway 212, Suite 6, Cologne, MN 55322 (952) 466-5230
Steve Segar Water Resources Engineer	City of Bloomington	1700 West 98th Street Bloomington, MN 55431 (952) 563-4867
Paul Oehme City Engineer/Director of Public Works	City of Chanhassen	7700 Market Boulevard P.O. Box 147 Chanhassen, MN 55317 (952) 227-1169
Matt Clark City Engineer	City of Chaska	One City Hall Plaza Chaska, MN 55318 (952) 448-9200
Robert Bean Jr. Water Resources Engineer	City of Deephaven (Bolton & Menk, Inc.)	2638 Shadow Lane, Suite 200 Chaska, MN 55318 (952) 448-8838 x2607
Leslie Stovring/ Dave Modrow Water Resources Coordinator/ Water Resource Engineer	City of Eden Prairie	8080 Mitchell Road Eden Prairie, MN 55344 (952) 949-8327
Tom Dietrich Water Resources Engineering Coordinator	City of Minnetonka	14600 Minnetonka Boulevard Minnetonka, MN 55343 (952) 939-8239

Name and Office	Organization	Mailing address
Bill Alms	City of Shorewood (WSB Engineering)	701 Xenia Avenue South, Suite 300 Minneapolis, MN 55416 (763) 231-4845
Karen Gallas Land & Water Unit	Hennepin County	701 Fourth Ave S, Suite 700, Mpls MN 55415 (612) 348-2027
Linda Loomis District Administrator	Lower Minnesota River Watershed District	6677 Olson Memorial Highway Golden Valley, MN 55427 (763) 545-4659
Joe Mulcahy Water Resources	Metropolitan Council	390 North Robert Street St. Paul, MN 55101
Jennie Skancke/ Jason Spiegel Area Hydrologist	Minnesota Department of Natural Resources	1200 Warner Road St. Paul, MN 55106 (651) 259-5790
Chris Zadak Watershed Division	Minnesota Pollution Control Agency	520 Lafayette Rd. N. St. Paul, MN 55155 (651) 757-2837
Melissa Jenny/Ryan Malterud Senior Project Manager	US Army Corps of Engineer	St. Paul District, Regulatory Branch 180 Fifth Street East, Suite 700 St. Paul, Minnesota 55101-1678 (651)290-5286

1.4 Local and State Coordination

The watershed district works regularly with various other units of state and regional government involved in regulating water resource related activities that have some jurisdiction overlapping that of the District. The roles of these agencies are described summarized in Figure 1-3.

> *Did you know?*
>
> *The stormwater pipes and facilities are typically owned and maintained by the property owner or government unit responsible for installing it.*

FIGURE 1-3

Agencies involved in WATER PROTECTION

The work of the Riley Purgatory Bluff Creek Watershed District to protect, manage, and restore water resources does not take place in isolation. There are federal, state, regional, and local agencies that work together for water protection.

FEDERAL

ARMY CORP OF ENGINEERS

includes water resource development activities including flood control, navigation, recreation, and infrastructure, environmental stewardship and emergency response.

FEMA

FEDERAL EMERGENCY MANAGEMENT AGENCY

identifies flood hazards, assesses flood risks and partners with states and communities to provide accurate flood hazard and risk data to guide them to mitigation actions; runs the National Flood Insurance Program (NFIP).

REGIONAL

METROPOLITAN COUNCIL

is a regional planning authority for the seven-county metropolitan area; conducts water quality monitoring including citizen science.

CARVER & HENNEPIN COUNTIES

Riley Purgatory Bluff Creek Watershed District lies within two counties: Carver and Hennepin. Counties are involved in a variety of different activities that affect water resources.

CARVER COUNTY SOIL & WATER CONSERVATION DISTRICT

provides assistance to the land managers and citizens of Carver County for the protection of land and water resources; provides technical support to watershed district in support of its cost share program.

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

is an independent local government unit tasked with protecting, managing, and restoring the water resources within the 50 square miles that drain to Riley, Purgatory, and Bluff Creeks; regulates impacts to water resources through a permitting program; is not the wetland conservation act authority.

STATE

POLLUTION CONTROL AGENCY

monitors environmental quality, offers technical and financial assistance, and enforces environmental regulations; finds and cleans up spills or leaks; develops statewide policy; supports environmental education.

DEPARTMENT OF HEALTH

MDH

works on many environmental issues, including water quality; handle drinking water regulation, microbial and other contamination.

DEPT OF NATURAL RESOURCES

DNR

works with citizens, cities, and other governmental units to conserve and manage the state's natural resources (e.g., aquatic vegetation) to provide outdoor recreation opportunities and provide for commercial use of natural resources in a way that creates a sustainable quality of life, such as aquifer management.

DEPT OF AGRICULTURE

is responsible for or involved in many water quality programs including: the Agricultural Best Management Practices Loan Program, and the Comprehensive Groundwater Protection Act of 1989 - the department regulates most matters relating to pesticides and fertilizers.

DEPT OF TRANSPORTATION

TRANSPORTATION

works with design, construction and maintenance project managers to develop plans and procedures that promote cleaner project sites, and to protect the waters of the state during construction and maintenance activities.

BOARD OF WATER & SOIL RESOURCES

BWSR

administers programs that prevent sediment and nutrients from entering our lakes, rivers, and streams; enhance fish and wildlife habitat; and protect wetlands.

The watershed district is overseen by BWSR

LOCAL

CITIES **Bloomington, Chanhassen, Chaska, Deephaven, Eden Prairie, Minnetonka, Shorewood**

can regulate impacts to water resources, or leave that authority to the local watershed district or management organization; some are the wetland conservation act authority.

1.5 Early District History and Accomplishments

In the mid-1960s several single-family homes were built on the western bay of Duck Lake. Duck Lake was a landlocked lake (not having a low level piped outlet) resulting in the lake level responding to wet or dry conditions. The lake water level was at a low elevation because of dry climatic conditions when the homes were built. Several years after the homes were built, the lake level responded to more normal rainfall conditions that resulted in higher lake level elevations and flooding of the basements of these homes.

On August 16, 1968, 70 citizens from the cities of Bloomington and Minnetonka and the Villages of Eden Prairie, Chanhassen, Shorewood and Deephaven petitioned the Board of Water and Soil Resources for the formation of the Riley Purgatory Creek Watershed District. In the petition, residents identified 11 purposes for the District. These included flood control, restoration, regulation and action to improve water quality (see Figure 1-4).

Figure 1-4 Original 1968 Purposes for District Establishment

The watershed district should be established to include, but not be limited to, the following purposes:

1. Control and alleviate flood water damage to lands in the Riley Creek and Purgatory Creek drainage basins.
2. Improve stream channels, lakes, marshes and other watercourses for drainage, recreation, wildlife, and other public purposes.
3. Regulate and manage the flow of surface waters and conserve the surface and ground waters of the basin for beneficial purposes.
4. Prevent damage to roads, bridges, and other public and private improvements within the basin.
5. Provide and conserve water for industrial, domestic, recreational or other public uses.
6. Consolidate and coordinate the drainage resulting from existing public drainage systems within the Riley Creek and Purgatory Creek drainage basins.
7. Adopt preventive and remedial measures for the control of waste discharges, land and soil erosion, the prevention of siltation of watercourses or other bodies of water within the proposed district.
8. Regulate improvements by riparian owners of the beds, banks, and shores of lakes, streams and marshes by permit or rules and regulations of the managers in order to preserve the same for beneficial public uses.
9. Provide for wildlife and recreational areas such as parks and camps by controlling, preserving, and regulating waters through reclaiming and filling wet and overflowed lands and acquiring lands where necessary in the public interest.
10. Provide for the regulation of improvements by individual municipalities within the Riley Creek and Purgatory Creek drainage basins, and regulate the installation of utilities, including water lines, sewer lines, natural gas lines, and other construction facilities placed in, under, or adjacent to the creek channels or water areas of the proposed district. Maintain and preserve the water quality of the drainage basin so as to preserve the natural and aesthetic characteristics to the fullest extent possible in an urban area
11. Create artificial water storage areas and maintain and improve natural water storage areas such as lakes and marshes within the basin.

Less than a year later, on July 31, 1969, the Riley-Purgatory Creek Watershed District (RPCWD) was formed and the first five managers were appointed: Donald Pennie, Howard Peterson, and Howard Merrimam from Eden Prairie, John Youngst from Minnetonka and Ray Peterson from Excelsior (4 from Hennepin and 1 from Carver Counties).

In 1983, the Cities of Chanhassen and Chaska requested that BWSR consider enlarging Riley-Purgatory Creek Watershed District to include the Bluff Creek watershed. On June 8, 1984, Bluff Creek Watershed District was incorporated into RPCWD and the name of the District was changed to Riley-Purgatory-Bluff Creek Watershed District (RPBCWD).

Did you know?

One of the names BWSR considered naming the District as per the 1983 petition was The Tri-Creek Watershed District

During the first three decades of existence the District focused on establishing a robust flood control approach, lake water quality improvements, and development/implementation of rules and regulations to protect the resources. Some of the District's key accomplishments during this timeframe are highlighted below:

1970: The District began the preparation of an Overall Plan to guide the District in the management of water. This included the development of a 100-year frequency floodplain along the various reaches of Riley and Purgatory Creeks. The District also started a data collection program that included monitoring of lake levels, groundwater levels, precipitation, stream flow, and water quality.

1971: The District began a multi-year study of the eutrophication of Hyland Lake, which was finished in 1973. The monitoring of Hyland Lake indicated that the lake was hypereutrophic and had a definite algal and nutrient problem. Because of the importance of Hyland Lake as a recreational resource, the District began working with the Hennepin County Park Reserve District (now Three Rivers Park District) in implementing a program to locate nutrient sources entering the lake. As part of the District's core flood control mission, RPBCWD reviewed and commented on plans and a Minnesota Department of Natural Resources (MDNR) permit submitted by Eden Land Corporation for the installation of a 54-inch reinforced concrete pipe or a 60-inch corrugated metal pipe for the Mitchell Road crossing of Purgatory Creek. This crossing created the flood storage impoundment within the Edenvale (now Bent Creek) Golf Course.

1972: The District's 100-year frequency floodplain along the creeks and major tributaries was published. The MDNR approved of the floodplain delineation in 1973. The District also completed an inventory of the water quality of the lakes within the District.

1973: The District Overall Plan was prescribed by the Minnesota Water Resources Board on August 5, 1973. In addition, the District initiated a study in cooperation with Eden Prairie and Minnetonka to investigate the open space possibilities along Purgatory Creek throughout the communities.

1974: The District's Rules and Regulations were enacted by the Board in June that required permits to be obtained from the District for land altering activities associated with development within the urbanizing watershed. The goal of the permitting program was to minimize sediment and nutrient loading from reaching the waters of the District, resulting in a decline in water quality.

1977: A petition was received from the City of Minnetonka for the improvements of the roadway crossings of Purgatory Creek at Trunk Highway 101, Trunk Highway 7, and Excelsior Boulevard (County Road 3). The District contributed $100,000 of a $3.5 million dollar roadway and drainage improvement project undertaken by MnDOT. The District funding was for the upgrading of the culverts at these three crossings.

1977: The District Rules and Regulations were updated.

1980: The Round Lake Restoration project through biomanipulation was completed. This project was undertaken in conjunction with the University of Minnesota Limnology Research Center and MDNR. The purpose of the project was to restore a balanced fishery in the lake and provided some temporary improvement in water clarity.

1985: A petition was received from the city of Eden Prairie for the Eden Prairie Chain-of-Lakes Project to provide low-level piped outlets to these landlocked lakes: Round Lake to Mitchell Lake, Mitchell Lake to Red Rock Lake, Red Rock to McCoy Lake and McCoy Lake to Staring Lake. Prior to this project being undertaken, during a wet cycle resulting in high water levels in Round Lake, the city of Eden Prairie pumped water from Round Lake, in 1984 to Mitchell Lake and in 1986 to Purgatory Creek (along Valley View Road). The Chain-of-Lakes system was completed and functioning in 1988.

1987: The success of the District's flood control efforts were clearly seen in 1987. Metropolitan Minneapolis-St Paul experienced what is commonly called the 1987 Superstorm on July 20 – 23. This was composed of two high volume rain events totaling over 10 to 12 inches that caused flash flooding throughout the region. Within the District, several neighborhoods and dozens of homes were impacted with flood damage, and reports of severe erosion or road wash out were

Plaque commemorating the completion of the Eden Prairie Chain-of-Lakes Basic Water Management Project

TWIN CITIES METROPOLITAN AREA

Source: Earl Kuehnast & Jim Zandlo, DNR, Division of Waters and State Climatology Office

In the Interagency Flood Hazard Mitigation Report for Minnesota, dated August 21, 1987, the report stated the following: *" It was evident from this significant rainfall event that a tremendous amount of damages were prevented by the sound development policies and capital improvements programs of the communities and watershed organizations in the metropolitan area. These local governmental bodies are to be congratulated."*

noted in extreme cases. Overall flood control was successful, especially given the historic circumstances.

1991: Petition received from the city of Eden Prairie for the Purgatory Creek Recreation Area project to provide for control of flood water, water quality improvement, wildlife recreation, and wetland restoration, while achieving the primary benefit of controlling the discharge of waters entering the Purgatory Creek valley. The project was delayed for several years while the City of Eden Prairie received easements or dedication of properties within and riparian to the project area. The project was divided into phases; construction of the outlet structure located between Anderson Lakes Parkway and the major floodplain area; the construction of the embankment separating the open water area from the rest of the project area; excavation of the open water area for water quality treatment; and the construction of the pedestrian trails encircling the project area and connecting to the pedestrian system around Staring Lake. This project was completed in the early-2000's and continues to serve the community as a much enjoyed valued recreation area within Eden Prairie. This project also continues performing a key water quality improvement role for Staring Lake.

Purgatory Creek Park Area provides for control of flood waters, water quality improvement, recreation and wetland restoration.

1996: With completion and approval of the District's 2nd Generation Water Management Plan, the District's emphasis started to change to ecological classification and eventually use attainability. Following the 1996 plan, the District developed Use Attainability Analyses (UAAs) for all the lakes in the District and Purgatory Creek.

2003: A petition was received from the cities of Chanhassen and Eden Prairie for the Lake Riley Water Quality Improvement Project. The purpose of the project was to reduce phosphorus loading to Rice Marsh Lake and Lake Riley through the enhancement of existing and construction of new stormwater ponds, controlling the release of internal phosphorus to both lakes, and installing fish barriers. The project also included the recommendation for internal phosphorus load control for both lakes. The District's portion of the pond enhancement and construction project was completed in 2007. The Minnesota Department of Transportation also played a key role in the project by implementing the recommended stormwater ponds with the construction of US 212. Based on the recommendation from the University of Minnesota, the internal phosphorus load control was put on hold until a strategy could be developed to effectively manage the overabundance of carp in the system.

2008: A petition was received from the city of Minnetonka for the District to reestablish, improve, enhance and protect Purgatory Creek between County State Aid Highway 101 and 62, which had deteriorated due to urbanization of the watershed. The project was intended to improve the physical characteristics of Purgatory Creek by providing the stream with the ability to continue to meander naturally without excessive bank erosion and improve the ability of the stream to convey flood flows effectively without degradation. Following completion of an engineer's report and public hearing on the project, the Managers ordered the streambank restoration of 1100 feet along the petitioned portion of Purgatory Creek in 2014. Construction activities to restore and stabilize the streambank began in 2016 with the project being substantially complete in 2017. The District began working on a 3rd generation watershed management plan (later known as the 2011 Water Management Plan) as required by Minnesota Statutes section 103B.231.

2009: In 2009, the District completed the Lake Riley Outlet Basic Water Management Project petitioned by the City of Eden Prairie to stabilize lake water levels and abate persistent high water levels which were impairing recreational use. Work in Mitchell Lake focused upon an Oxygenation Pilot Project. In this project pure oxygen was injected into the deep area in the northern bay of Mitchell Lake. The technical criterion was met, but at a flow of oxygen lower than was intended occurred due to iron-fouling issues of the diffuser system. Even with lower than expected oxygen flow, data showed tremendous success in reducing phosphorus discharge. The success though also revealed potential difficulty in application to shallow lakes due to repeated wind mixing potential. The District's continued carp management efforts, with assistance from the University of Minnesota, successfully completed under-ice seining of the adult carp in Lakes Susan and Riley with single, strategic hauls. The District continued working on a 3rd generation watershed management plan (2011 Water Management Plan).

2010: The District completed the Round Lake Basic Water Management Project after complying with recently promulgated sediment analysis and disposal requirements. During the project additional minor repairs were made to outlet structures. The maintenance of this basin provided a control pond for assessment of soluble phosphorus loadings associated with detention basins. For the Lotus Lake Outlet Analysis and Volume Control Project the District continued development the hydraulic and hydrologic model. With 2010 seining, approximately 80% of all adult common carp found in the Riley Creek Watershed (lakes Riley, Rice Marsh Lake, Susan, Ann and Lucy) have been removed. Lake vegetation harvesting for curlyleaf pondweed and Eurasian milfoil removed roughly 900,000 pounds of vegetation from Mitchell Lake. The District continued working on a 3rd generation watershed management plan to be known later as the 2011 Water Management Plan.

2011: An aeration system was installed in Rice Marsh Lake in November and December of 2010 and began full operation in January of 2011. The system aerated the deeper portion of the lake from January through ice-out in April. The purpose of aerating is to prevent winter fish kills, which provide opportunity for carp recruitment to gain an advantage over other species and allow re-infestation and re-injury to the aquatic plant communities. A temporary winter aeration system was also installed in Lake Lucy. The primary purpose of the aeration system is to maintain a low carp population by preventing winter fish kills. The secondary purpose is to improve water quality by reducing winter internal phosphorus loading. The District ordered implementation of a low impact development project within the Lotus Lake Watershed to construct infiltration and related treatments to reduce runoff. Third generation plan was approved by BWSR and adopted by the Board of Managers.

1.6 2011 10-Year Management Plan Accomplishments

In the years since completion of the 2011 Plan, the District has been actively implementing the programs and projects it outlined. Below is a yearly summary of District activities and accomplishments from the 2011 Plan.

1.6.1 2012 Summary

The District hired its first full-time employee and opened its first office at Eden Prairie City Center. It hosted two "Evening with the Watershed" educational events for residents, staff, and elected officials, presenting updates on District activities and presentations on current and emerging topics and technologies. The Board of Water and Soil Resources awarded the District its first Clean Water Fund Grant. The grant called for the development of a cost-share program targeting non-profits to implement medium-sized best management practices. The District also worked with the University of Minnesota to restore waters that have been impacted by carp. The focus in the Riley Creek watershed was on restoration and for the Purgatory Creek watershed on controlling invasive species (plants and carp). Another project worth noting was the completion of the Lotus Lake Low Impact Development Pilot Project.

Commercial fishermen remove carp through winter seining.

1.6.2 2013 Summary

The District moved its data-collection in-house by hiring two temporary staff to run the program. It also began the rulemaking process, developed a cost-share program to implement projects that would help improve water quality, and revised the website. The District again hosted its semi-annual "Evening with the Watershed" educational events. In Spring of 2013, the Department of Natural Resources awarded the District two aquatic invasive species (AIS) grants for its lake-wide treatment of Lake Susan and Lake Riley for curlyleaf pondweed. Furthermore, the District applied for Clean Water Funds from the Board of Water and Soil Resources for projects in the Lake Lucy subwatershed, Lake Susan subwatershed and Bluff Creek Watershed. The District was notified in 2014 that the Bluff Creek application was awarded the grant. The District continued its work with the University of Minnesota to restore waters that have been impacted by carp.

A volunteer helps staff collect water data.

1.6.3 2014 Summary

The District was awarded three MDNR grants (two for curlyleaf pondweed management, one for invasive species inspections) as well as a Clean Water Legacy grant for the Bluff Creek fish passage and stabilization project. The District hired two full-time employees to run its data collection program and developed a broad outreach program. Outreach efforts included a forum on shallow lakes, continuing education workshops for professionals, youth engagement programs

Students learn to inspect a boat for aquatic invasive species through the AIS Jr Inspector program around invasive species, and water quality fact sheets for local lakes and creeks. In 2014, the District finalized carp management in the Riley Creek Chain of Lakes. This project was part of a multiple-year grant with the University of Minnesota. Finally, the Board of Managers adopted new regulatory requirements to ensure proper integration of water resource protection when development and redevelopment projects occur.

1.6.4 2015 Summary

Riley-Purgatory-Bluff Creek Watershed District receiving Minnesota Association of Watershed District Program of the Year Award

Two District programs were finalists for the Minnesota Association of Watershed Districts (MAWD) Program of the Year Award: Adopt-A-Dock and the Creek Restoration Action Strategy (CRAS) programs. The CRAS won the award. The CRAS was a staff and engineer led effort to evaluate the overall health of the creeks and determine where sites in most need of restoration were located. The District was also awarded two Clean Water Legacy grants. The Clean Water Legacy grants focused on studying downtown Chanhassen to determine where best management practices could be implemented, as well as grant funds to retrofit a stormwater pond to reduce phosphorus loads discharging to Lake Susan and reusing pond water to irrigate ball fields adjacent to the pond. A Department of Natural Resources grant enhanced our efforts on Lake Riley to manage the invasive curlyleaf pondweed as part of the District's effort to restore the ecological balance in the lake after reducing the carp population. 2015 also marked the first full year of implementing the District's reinstated regulatory program to ensure proper integration of water resource protection when development and redevelopment projects.

1.6.5 2016 Summary

The District completed 10 projects, engaged residents in developing the next 10-Year Management Plan, received over $300,000 in grants, and was recognized as the "District of the Year" by the Minnesota Department of Natural Resources. Projects included combating aquatic invasive species with herbicide treatments, reducing phosphorus pollution, and implementing the District's first creek restoration. Phosphorus reduction projects included a spent-lime filtration system at Lake Susan, and an aluminum sulfate treatment on Lake Riley. The creek restoration project took place along Purgatory Creek. In partnership with the city of Minnetonka, the District stabilized close to 2,000 feet of eroding banks. District staff continued to monitor carp populations in the Riley Creek and Purgatory Creek chain of lakes. In 2016, the District sponsored its first cohort of master water stewards.

Riley-Purgatory-Bluff Creek Watershed District receiving Minnesota Department of Natural Resources District of the Year Award Program of the Year Award

1.6.6 Key Lessons Learned from the 2011 Plan

While the 2011 plan focused primarily on lakes, with some recognition of the interconnective importance of creeks, the District adopted the "One Waters" approach recognizing the benefits to downstream resources by activities performed to improve lakes and creeks in the upper watershed. The District also implemented an adaptive management approach to protecting and restoring the resources. The One Waters philosophy continues to be a key element to resource management and a component of the District's prioritization approach (see Section 4.0). The adaptive management philosophy is also carried forward into this plan and is instrumental in the District's lake and creek management approach (see Section 9.1.1 and Section 9.1.2).

The creek management framework used in the CRAS is highlighted above and will be key to future District management efforts in this Plan. (see Section 9.1.2)

1.7 The Next 10 Years

To help guide the District in its work, the District engaged its stakeholders in the development of this 10-year management plan. These groups and individuals included the TAC and CAC, community members, city partners, and local and state government organizations, among others. The plan identifies goals and strategies – developed through an extensive public input process - and establishes the basis for the District's regulations and funding authority.

The plan gives the District the foundation for choosing projects and activities. It is also a tool that ensures the District is in tune with the issues and solutions our water resources need in the future. Our plan includes the following elements:

1. Watershed issue identification and assessment through a public input process
2. Goals and strategies developed as a result of the public input process
3. Project prioritization process
4. Land and water resource inventory

5. Problem and solution assessment for each watershed
6. Implementation: Identifying programs for the next 10-years
7. Evaluation scheme

1.8 Acknowledgements

The District would like to thank all of the stakeholders who contributed their thoughts, concerns, time and effort, and technical expertise to the creation of the new 10-Year Plan.

2.0 Watershed Issue Identification and Assessment

Understanding that public support is critical for the efficient and effective operation of any government organization, the District emphasized public engagement and outreach throughout the development of this Plan. As a result, the issues identified and emphasized in this Plan are a result of stakeholder input. This section describes the District's public engagement strategy and summarizes the issues identified through its implementation.

2.1 Methodology

2.1.1 IAP2 Spectrum Planning Process

In developing this Plan, the District utilized a public engagement "spectrum" developed by the International Association of Public Participation (IAP2). The Spectrum is organized around the principle that the level of public participation is directly tied to the level of potential public influence on the decision or action being considered. The spectrum is separated into the following five levels of public involvement, each with differentiated goals:

Inform – the inform level provides the public with the information they need to understand an organization's (e.g., the District's) decision-making process, but does not provide the opportunity for public participation before decisions are made. This process does not attempt to persuade or manipulate the public, and thus differs from a public relations campaign. The goal of the public participation process at the inform level is to keep the public informed.

Consult – the consult level of public participation provides the basic minimum opportunity for public input prior to a decision. The consult level includes asking the public for input, but does not include an opportunity to meet together and work on things in any cooperative way. The organization considers the input it receives as it makes a decision. At this participation level, organizations generally ask for input at set points in the process and do not provide an ongoing opportunity for input. The goal at this level is to obtain and consider public input.

Involve – the involve level of public participation is more than a consultation. At the involve level, the public is invited into the process, usually from the beginning, and is provided multiple or ongoing opportunities for input as decision-making progresses.

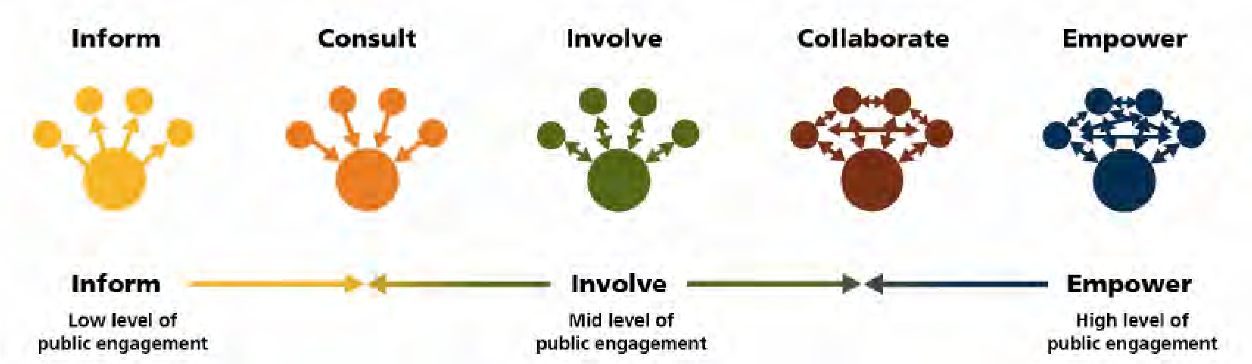
However, the organization is still the decision-maker and there is no expectation of building consensus or providing the public with influence over the decision. The goal at this level is to work directly with the public and consider their input throughout the decision-making process.

Collaborate – at the collaborate level of public participation, the public is directly engaged in decision-making. Collaborate often includes attempts to find consensus solutions. However, the organization is still the ultimate decision-maker. The degree to which consensus will be sought and how much decision authority the organization is willing to share must be clearly identified. In the end, the organization will take all of the input received and make the decision. The goal at this level is to design a process that allows for effective partnering with the public on all aspects of the decision.

Empower – the empower level of public participation provides the public with the opportunity to make decisions for themselves. The most common activities at this level are public voting or ballots, but there are other techniques available as well. Government organizations rarely conduct public participation at the empower level. In general, organizations are not permitted to delegate their decision authority to the public. The goal at the empower level is to create a program that allows the public to make an informed decision.

Throughout the development of this Plan, the District used these various levels of public engagement, see Figure 2-1. Specific public and stakeholder participation activities used during Plan development are described in Appendix A.

Figure 2-1 Public Engagement Spectrum ()



2.2 District Public Engagement Strategy

The District developed a public and stakeholder engagement strategy early in the Plan development process. The goal was to allow a process for residents and other stakeholders to directly influence the issues, strategies, and actions documented in the District's Plan. The process not only solicited information for District staff and Mangers to interpret at the start of the Plan development process (IAP2 "consult" level), but provided ongoing communication for stakeholders to respond to District interpretation of their comments. The District's strategy goes above and beyond the required stakeholder engagement activities identified in Minnesota Statutes chapter 103B and Minnesota Rules chapter 8410. Figure 2-2 illustrates the District's plan development process and identifies public engagement steps and iteration processes.

2.2.1 Plan Update Notification Letter

At the start of 2015, the District notified the cities and state plan review agencies of the Plan update, consistent with the requirements of Minnesota Rules chapter 8410. The notification letter solicited input from these entities regarding key issues to be addressed in the Plan update and served as the start of the District's public input process. The District received responses to the notification letter from the following:

- City of Eden Prairie
- City of Minnetonka
- Metropolitan Council
- Minnesota Board of Water and Soil Resources (BWSR)
- Minnesota Department of Agriculture (MDA)
- Minnesota Department of Natural Resources (MDNR)

For example, the following comment from city of Minnetonka was received: "*The City would like to coordinate education and outreach efforts targeted towards Minnetonka residents for the purposes of promoting the District's cost share initiatives, raising awareness, and engaging the citizen base.*"

FIGURE 2-2

STAKEHOLDER INVOLVEMENT DURING RPBCWD PLAN DEVELOPMENT

RILEY
PURGATORY
BLUFF CREEK
WATERSHED DISTRICT

2.2.2 Issue Identification Workshops

The District's public and stakeholder input process is documented in Appendix A. Public and stakeholder involvement activities seeking input on watershed issues to be addressed in the Plan included the following:

- **Issue identification workshops** – Between March and May 2016, the District conducted six issues identification workshops. The purpose of these workshops was to identify water resource management issues and concerns to be addressed by the District Plan. These workshops targeted the Citizen Advisory Committee, Technical Advisory Committee, Board of Managers, District staff, and watershed residents, as follows:
  - March 21, 2016 – Citizen Advisory Committee workshop
  - March 23, 2016 – Technical Advisory Committee workshop
  - April 11, 2016 – Board of Managers and District staff workshop
  - May 11, 2016 – Bluff Creek Watershed public workshop
  - May 18, 2016 – Riley Creek Watershed public workshop
  - May 24, 2016 – Purgatory Creek Watershed public workshop

TAC members identifying concerns related to creeks in RPBCWD.

The Freshwater Society facilitated the workshops. Each meeting was conducted in the same format:

  - **Introduction** – Each meeting began with a brief introduction to the District and the work it performs.
  - **Issue identification** – Participants were divided into small groups (3-6 people) and each group was assigned a water resource type: lakes, creeks, wetlands, groundwater, and other. Groups were asked to share and write down their concerns about each resource type; the other group was included to capture any concerns that might not fall into one of the identified resource types. Groups then rotated to other resource types and were asked to "star" (using stickers) the already-identified concerns with

which they agreed, and identify any new concerns. This process continued until all small groups had commented on each resource type.

- **Prioritization process** – Following the issue identification exercise, the District Administrator delivered a short presentation describing how the District prioritizes projects. The small groups were asked to discuss the process and write down criteria or strategies they thought would be most effective in prioritizing projects.

All papers from the public meetings were collected and transcribed for analysis preserving the relationship between the comment, the commenting party (e.g., CAC, residents, etc.) and the resource group (e.g., lakes, creeks, etc.).

Following the stakeholder input activities described above, District staff organized and coded all comments received from the public, state review agencies, cities, managers, CAC, TAC, managers, and District staff. Comments were categorized according to topic area (at three levels of increasing specificity (e.g., (1) water quality, (2) pollution, (3) nutrients) and the applicable resource (e.g., lakes, wetlands).

In July 2016, the District distributed the coded results of the stakeholder input activities to all participants to solicit feedback on the comments and District coding. The District performed minor revisions to the comment coding based on feedback received from stakeholders who participated in the process (see Appendix A).

2.2.3 Online Resident Survey

In addition to the stakeholder engagement events described in Section 2.2.4, the District hosted an online survey seeking input from residents. The survey was hosted on the District website from February to June, 2016. The survey contained 23 questions about how residents use and value water resources, resident concerns about water resources, and residents' willingness take action to protect water resources. The District advertised the survey at several community events. Ultimately, over 400 residents participated in the survey.

District staff summarized the full results of the survey in a Survey Summary Report. This was published on our website, social media, distributed to cities and other partners (Appendix A). Key survey results were summarized in a two-page graphic distributed at District events and published in local newspapers.

2.2.4 Watershed Outreach Workshop

As part of its stakeholder engagement process, the District solicited additional public input on the District's education and outreach strategies. An October 24, 2016 notice to local papers and cities invited stakeholders to participate in the workshop. The District also used its email list serve, conventional mailings, as well as social media, and in-person conversations to invite stakeholders to the workshop. Participants included conservation organizations, homeowners associations, lake associations, city commissions, teachers, students, and the District's CAC.

The watershed outreach workshop was held on November 17. District staff summarized the results of the workshop and provided that information to participants for feedback. The District has incorporated the results of the workshop (Appendix A) into its Education and Outreach Plan included as Appendix B to this Plan.

Residents discussing education and outreach at the November 17, 2016 watershed

2.2.5 Teacher Survey

The District also engaged with teachers in the District through a brief survey to identify support needs for water education. The aim of this survey was to determine resources that would best support the work of local educators in teaching water resources. The survey was open for a two month period. District staff summarized the results of the survey (Appendix A) and utilized this information as part of building the Education and Outreach Plan (Appendix B).

> Teacher Comments:
> *"This might be a great way for our classroom to partner with the community."*
>
> *"With 160 students per day, and a super small budget, a field trip is hard. I would attend Professional Development opportunity, if it wasn't costly, during the summer. Mostly filling out this survey, is just to get on your e-mail list, in case you offer good information. Thank you for everything that you do."*
>
> *"Bluff Creek runs directly through our green space at Chan high. Each spring we do Biotic and abiotic tests concerning water quality in this creek. Any maps of our watershed would be useful. thanks for asking!!"*

2.3 Issue Identification and Prioritization

The District's public engagement strategy yielded over 500 stakeholder comments (in addition to online survey responses). Comments were organized into the following issue areas for organizational purposes:

- Administration
- Data Collection
- Education and Outreach
- Planning
- Regulation
- Water Quality
- Water Quantity

These topics are described generally within this section. Major themes identified by the public engagement process are highlighted. Many comments provided by stakeholders apply to multiple topic areas for the various water resources types. For organizational purposes, comments are categorized according to the topic area most closely tied to the comment and with consideration for the intent of the comment, as observed by District staff during the workshops. A complete list of comments, cross-referenced to the above topic areas, are included in Appendix A.

2.3.1 Administration

The District is a local unit of government responsible for performing its statutory duties, and exercising its statutory authorities, with finite resources. The extent to which the District may implement projects and programs to achieve its goals is limited by the availability of funding. The District is challenged to achieve its goals through efficient and effective operation. This requires making informed and sound management decisions and balancing responsibilities among the District Administrator and staff, cities, cooperating agencies, and consultants.

The District is funded by public dollars collected via an ad valorem tax levy. The District has a duty to its taxpayers to spend its funds in a responsible manner that considers the relative benefits, per dollar, of its actions. The benefits of effective water resource management are difficult to quantify in dollars (e.g., increased wildlife habitat or recreational use).

Specific administrative matters identified in the public engagement process include:

- Meeting educational needs with limited resources
- Workload and how to get it done: staff, volunteers, contractors; balancing the work
- Lack of funding
- More detailed communication with cities about monthly District meeting agendas

The District seeks to address these and other administrative challenges through its administration strategies described in Section 3.2.1.

2.3.2 Data Collection

Data collection is an important role critical to the pursuit of District goals. Effective and efficient watershed management requires decisions that are informed and supported by sound science. Accurate monitoring data allows the District to identify potential water resource management issues (e.g., lake water quality) and track changes over time. Additionally, research, modeling, and feasibility studies allow the District to identify factors contributing to water resource management issues and develop targeted solutions. This process requires continued data collection, as well as accurate and unbiased interpretation of that data using best professional judgement.

Staff Josh Maxwell monitoring the carp population on Lotus Lake

The public engagement process identified a broad range of matters related to data collection. Key data collection issues include:

- Additional studies addressing emerging issues (e.g., impacts of climate change, groundwater-surface water connectivity, groundwater sustainability)
- Developing methods to track/evaluate performance of projects
- Coordinating with other agencies to develop and share data
- Understanding the condition of natural resources through resource assessments and inventories:
    - Wetlands
    - Groundwater
    - Lakes
    - Creeks

The District seeks to address these and other data collection challenges through its data collection strategies described in Section 3.2.2.

2.3.3 Education and Outreach

Public education and outreach plays an important role in protecting water resources. Education and outreach provide opportunities for the District to raise awareness of its role in managing water resources and increase public confidence in its expertise. The District and cities also use education and outreach to raise awareness of the impact that individuals, businesses, and organizations can have on the watershed, both positive and negative. Education and outreach provide opportunities for the District to develop watershed stewards who demonstrate and promote watershed best management practices.

The District received almost 200 comments regarding education and outreach through the District's initial public engagement activities. Due to the significant amount of comments, the District performed additional engagement activities specifically addressing education and outreach. Common themes identified through the public input process include:

- Raising awareness of our water resources
- Engaging the public in district activities
- Increasing water stewardship
- Building capacity through volunteer programs and other engagement programs.

Below are some highlights of some of the topics that have been identified in the initial public input process:

- Building awareness of watershed best management practices/harmful practices
- Increasing knowledge of wetlands, ecosystems, and invasive species
- Increasing knowledge of groundwater resources and groundwater sustainability
- Balancing water resources protection with recreational access and opportunities
- Building capacity for residents to practice and promote good watershed stewardship
- Providing cost-share opportunities for residents, home and lake associations, and others to implement best management practices
- Increasing communication between the District and residents regarding District activities.

In our additional engagement activities, education and outreach topics fell into three broad categories:

- How does water work?
- Local watershed information
- What can I do?

Watershed outreach map showing where participants came from.

District staff also identified subtopics such as invasive species, pollution, water quality trends and resource access. The most frequent subtopic was metrics, which was defined as the way water quality or project successes are measured.

The District seeks to address these and other education and outreach opportunities through its education and outreach strategies described in Section 3.2.3 and the District's Education and Outreach Plan (see Appendix B).

2.3.4 Planning

Effective watershed management requires planning to ensure that District projects, programs, and actions achieve the greatest possible benefit. Thoughtful evaluation and prioritization of projects and activities are necessary to deliver targeted benefits from limited resources. Transparent and defensible project prioritization methods are also critical for building partnerships and stakeholder trust.

Achieving long-term benefits requires consideration for possible future political, environmental, and social conditions that may affect project performance, stakeholder support, or participation. District actions must be compatible with the plans of the city in which they are located (e.g., land use, redevelopment). Similarly, projects must be designed to function under future climate conditions (e.g., changes in precipitation, groundwater levels).

The public engagement process identified nearly 150 comments addressing planning issues and opportunities. Major themes related to planning include:

- Developing a transparent, fair, and objective project prioritization methodology
- Addressing/planning for climate change in District actions, programs, and projects
- Expanding and leveraging partnerships to achieve goals
- Evaluating past performance to inform future planning

The District seeks to address these and other planning challenges through its planning strategies described in Section 3.2.4 and the District's project prioritization methodology (Section 4.0).

In addition, the District conducted community resilience workshops focusing on our changing climate in early 2017. Through the workshops, the following climate hazards were identified as top concerns:

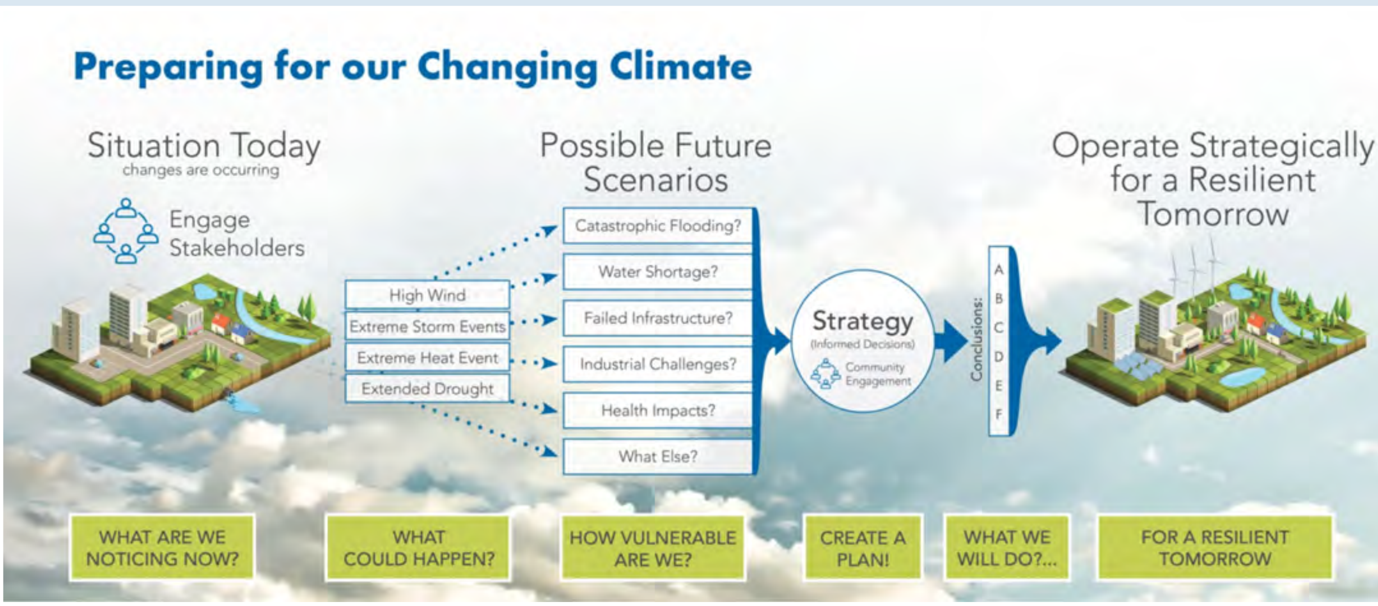
- Extreme precipitation
- Drought
- Extreme heat
- Warmer Winters

Participants identified recommendations to help curb climate impacts to society, the environment, and the built infrastructure. The District will use these recommendations and incorporate them into District programs and projects. The factsheet on the following pages summarize the Districts resilience workshops.

RPBCWD IS PREPARING!

Making Adaptation Plans for Minnesota's Changing Climate

Riley Purgatory Bluff Creek Watershed District participated in a workshop series to identify opportunities to build resilience related to local climate change. Climate change is one of the greatest challenges facing society today. In Minnesota, there is a risk due to increases in extreme heat, extreme rainfall, higher summertime dew points, warmer winters, and the intensity of severe storms. Outcomes from the workshop are being used to inform recommendations in the Riley Purgatory Bluff Creek Watershed District Ten Year Plan.



The Climate Adaptation Planning Process *The workshop series walked RPBCWD participants through the first three stages of climate planning, shown above. The workshop began the process of brainstorming strategies to address RPBCWD's climate concerns to be incorporated into the District's Ten Year Plan. Implementation and operation of solutions to follow.*

WORKSHOP SPONSORS

Minnesota Pollution Control Agency

Riley Purgatory Bluff Creek Watershed District

9 Mile Creek Watershed District

Freshwater Society

Metropolitan Council

BARR

RPBCWD's Top Climate Hazards

Climate hazards are natural events or patterns related to climate change that can cause harm to people, infrastructure, and the environment. Workshop participants identified the following four hazards as the ones of most concern in Riley Purgatory Bluff Creek Watershed District:

Extreme Precipitation
An increase in large storm events is documented in Minnesota. Riley Purgatory Bluff Creek Watershed District experienced this issue in June of 2014. Duluth's staggering 2012 extreme precipitation event demonstrated the serious impacts of such storms.

Drought
Climatologists point out that within Minnesota's normal range of weather extremes is the drought of the dustbowl days in the 1930s. Although there is no recent trend for drought (except for 2012), Riley Purgatory Bluff Creek Watershed District can expect drought to occur again. Long-term predictions of greater than ten years show an increased likelihood of drought.

Extreme Heat
Although not currently experiencing abnormal heat events, Riley Purgatory Bluff Creek Watershed District is experiencing greater summer humidity, which pushes up the heat index and makes it harder to cool off. Extreme heat is predicted for the not-too-distant future.

Warmer Winters
Riley Purgatory Bluff Creek Watershed District is currently experiencing an increase in winter nighttime low temperatures. Consequences include better survival of invasive species and the loss of winter recreational activities as snow and ice season shortens.

Climate Impacts & Recommendations for RPBCWD

Participants of the workshops focused on three sectors of the community and impacts from locally changing climate:

1 **Impacts to Society**
2 **Impacts to the Environment**
3 **Impacts to Built Infrastructure**

Participants listed solutions to these impacts and set priorities. The top ranked priorities for actions to bolster resilience are listed below.

SOCIETY

1

Primary areas of concern for people in Riley Purgatory Bluff Creek Watershed District include impacts to vulnerable populations such as the elderly, disadvantaged children, and the disabled in times of emergency. Also of importance is maintaining access routes to nursing homes and hospitals during emergency events. A dwindling drinking water supply may become an issue during times of drought.

Source: Milwaukee Community Journal

WORKSHOP RECOMMENDATIONS

Protecting RPBCWD's People:

- Continue to work with cities to alert them of potential flooding of streets during extreme storm events — Be certain that routes for emergency vehicles (especially to hospitals) remain open.
- Establish an education program to make citizens aware of the causes of aquifer drawdown and how to prevent future drinking water shortages — Create education and incentive programs that encourage the storage and reuse of stormwater. Work where possible to promote state regulations that allow for the use of grey water within and outside of buildings.
- Translate EMS emergency response instructions into different languages spoken within the District — Work with organizations such as the non-profit PROP to access and educate vulnerable populations on District and climate related issues.

ENVIRONMENT

2

Primary impacts of concern to the environment in Riley Purgatory Bluff Creek Watershed District include aquifer drawdown with increased water demand as the population grows and during dry periods. It is suggested that implementing rainwater gardens across the District along with other forms of green infrastructure (such as a robust urban tree canopy) will allow for water to soak into the ground and recharge the aquifer, while trees will help keep the city cool during hot summers. Invasive plant and animal species such as buckthorn, curly-leaf pondweed, and zebra mussels are a concern because of their complete takeover of their environment and elimination of biodiversity. Another concern includes warming lake temperatures.

WORKSHOP RECOMMENDATIONS

Protecting RPBCWD's Natural Environment:

- Educate citizens about the issue of local aquifer draw-down — Encourage potable water conservation, especially through the reduction of lawn irrigation. Consider implementing stormwater and grey water reuse systems where they make sense.
- Educate constituents on the impacts of warming lakes through warmer winter minimum temperatures — Discuss impacts on water quality, recreation, and fish habitat. Consider mitigation progams.
- Conduct a study to identify slopes along the Minnesota River valley that are vulnerable to failure — Create an action plan to protect people, structures, and infrastructure in high risk areas.
- Continue to conduct public education on problematic invasive plant and animal species — Partner with environmental agencies and cities to control the most destructive species.

3

INFRASTRUCTURE

Primary impacts of concern to the built infrastructure in Riley Purgatory Bluff Creek Watershed District include providing protection to homes in areas of high risk from landslide and flooding. There is also a concern of future damage to culverts at critical road crossings during extreme weather events, as well as interest in addressing erosion within Riley creek.

Source: Spielel On Line

WORKSHOP RECOMMENDATIONS

Protecting RPBCWD's Built Infrastructure:

- Repair erosion damage at points within Riley creek where stormsewers enter the channel — Also, continue to promote the use of BMPs such as pavement reduction, implementation of rainwater gardens and stormwater reuse systems to reduce the volume of water flowing into the creek via stormsewers.
- Conduct a study to identify culverts at greatest risk of damage during extreme storm events — Work with cities to replace the most vulnerable culverts in the District.
- Recognize that aging stormwater ponds are losing storage capacity because of sediment accumulation — Continue to identify those ponds that have lost the greatest amount of stormwater storage and assist in the revitalization of these ponds.
- Conduct a study in conjunction with local municipalities of those slopes vulnerable to landslides due to saturated soils — Assist them in protecting homes along the slopes.
- Continue to work with home owners in areas expected to flood in the future to help them prepare for potential extreme weather situation

Moving Forward

Riley Purgatory Bluff Creek Watershed District is in the planning process to adapt to Minnesota's changing climate and the multiple impacts that the community will experience. Proactive planning is the economically efficient route to climate adaptation, rather than reacting to the impacts of heat, storms, ice, and warm winters as they occur.

The purpose of the workshops was to build relationships across the community, create a shared knowledge base, and harvest potential strategies. They were intended to be the first of many community conversations to make RPBCWD resilient in the face of climate change. This planning effort is being used to inform Riley Purgatory Bluff Creek Watershed District's Ten Year Plan, which is in the works.

2.3.5 Regulation

The District is one of several government entities with water resource management responsibilities and regulatory authority within the watershed (Figure 1-3). In accordance with Minnesota Statutes section 103D.341, the District has adopted rules, first adopted in 1973 and last revised in 2014, to ensure that land-disturbing activities do not degrade water quality, increase risk of flooding, or otherwise negatively affect water resources. Consistent enforcement and periodic evaluation of District rules is critical to protect valuable resources while not placing unnecessary burdens on developers, residents, and cities.

Temporary and permanent erosion control measures are essential to reducing pollution in runoff

Overlapping permitting and stormwater management authorities may allow for specialization of resources and expertise, but can also create the potential for redundant and less efficient processes. Communication between the District and other units of government, especially its cities, is necessary to identify areas where efficiency may be increased as well as areas where additional effort is needed to prevent concerns from going unaddressed.

Responses to the Plan update notification letter and public engagement workshops yielded several comments related to regulation issues and opportunities. Key regulation comments identified include:

- Promoting and enforcing buffer requirements
- Protecting high quality wetlands
- Documenting and complying with stormwater maintenance requirements
- Coordinating the development review and approval process between the District and cities

The District seeks to address these and other regulation challenges through its regulation strategies described in Section 3.2.5 and the District’s rules and permitting program (Section 9.4).

2.3.6 Water Resource

Comments identified through the District's public engagement strategy addressing specific water quality and water quantity matters (e.g., flooding) are generally categorized as "water resource" issues and are described in greater detail in the following sections.

2.3.6.1 Water Quality

Improving and protecting water quality is a primary focus of the District. The District received approximately 130 comments related to water quality. Water quality comments are further subdivided into concerns addressing:

- Pollution
- Habitat
- Erosion

These topics are described in greater detail in the following sections, along with common comments received during the public engagement process.

Pollution

Pollutants are discharged to surface waters via either point sources or non-point sources. Point sources discharge pollutants to receiving surface waters at a specific point from a specific identifiable source. Non-point source pollution cannot be traced to a single source or pipe. Instead, pollutants are carried from land to water in stormwater or snowmelt runoff, in seepage through the soil, and in atmospheric transport.

For most waterbodies, non-point source runoff—especially stormwater runoff—is a major contributor of pollutants. Pollutants may include phosphorus, sediment, chlorides, oil, grease, chemicals (including hydrocarbons), nutrients, metals, litter, and pathogens, which can severely reduce water quality.

For example, in lakes, ponds, and wetlands, phosphorus is typically the pollutant of major concern. Land use changes resulting in increased imperviousness (e.g., urbanization) or land disturbance (e.g., urbanization, construction, or agricultural practices) result in increased amounts of phosphorus carried in stormwater runoff. In addition to watershed (stormwater runoff) sources, other possibly significant sources of phosphorus include atmospheric deposition, internal loading (e.g., release from anoxic sediments, algae die-off, aquatic plant die-back, and fish-disturbed sediment), and non-functioning subsurface sewage treatment systems (SSTS).

As phosphorus loads increase, it is likely that water quality degradation will accelerate, resulting in unpleasant consequences such as profuse algae growth or algal blooms. Algal blooms, overabundant aquatic plants, and nuisance/exotic species, such as Eurasian watermilfoil, purple loosestrife, and curlyleaf pondweed, will flourish and interfere with ecological function as well as recreational and aesthetic uses of waterbodies. Phosphorus loadings must often be reduced to control or reverse water quality degradation.

Comments related to pollutants provided during the District's public engagement process include:

- Reducing the use and environmental impact of chlorides (e.g., road salt)
- Concern over loading of nutrients to creeks, lakes, and wetlands from stormwater runoff
- Retrofitting of stormwater infrastructure and using redevelopment opportunities to improve water quality

Stormwater discharging from Lake Susan Park Pond into Riley Creek

The District seeks to address these and other pollution challenges through its water quality strategies described in Section 3.2.6.2.

Habitat

Diverse wetland systems, shoreland areas, and natural spaces are critical components of a healthy hydrologic system and positively affect soil systems, groundwater and surface water quality and quantity, wildlife, fisheries, aesthetics, and recreation. Wetlands and shoreland areas provide valuable habitat for many types of wildlife including waterfowl, songbirds, raptors, mammals, fish, and many species of amphibians. Maintaining and improving wildlife viability requires that water resources and land management activities consider the habitat benefits of affected areas.

Wetlands and shoreland areas are important for protecting and maintaining downstream water quality and the ecological integrity of the communities that inhabit these areas. Overloading wetlands beyond their natural capacity with sediment, nutrients, or other pollutants can diminish their effectiveness in providing water quality benefits. The benefits of wetlands and shoreland may also be compromised by hydrologic alterations, the presence or absence of vegetated buffers, exotic and invasive species, habitat loss, and erosion and sedimentation.

The effectiveness of wetland communities for wildlife habitat, and for human appreciation, is greatly increased when they are physically or functionally connected with other native communities. Development of land and other human activities can affect the hydrology, pollutant loading, and connectivity of wetlands and shoreland areas. Numerous wetlands within the District have already been affected by hydrologic alterations, both direct and indirect.

Comments related to habitat provided during the District's public engagement process include:

- Establishing and maintaining vegetated buffers
- Managing aquatic invasive plants
- Establishing healthy fisheries and managing invasive fish species
- Preserving and restoring connectivity between natural areas and greenspace

Rapid AIS response by hand-pulling watermilfoil from Staring Lake

The District seeks to address these and other habitat challenges through its water quality strategies described in Section 3.2.6.2.

Erosion

Sediment is a major contributor to water pollution. Stormwater runoff from streets, parking lots, and other impervious surfaces carries suspended sediment consisting of fine particles of soil, dust, and dirt. Abundant amounts of suspended sediment are carried by stormwater runoff from actively eroding areas. Although erosion and sedimentation are natural processes, they are often accelerated by human activities, especially during construction activities. The increased stormwater runoff rates and volumes cause increased soil erosion, which releases significant amounts of sediment that may enter water resources. Erosion also results in channelization of stormwater flow, increasing the rate of stormwater runoff and further accelerating erosion. Erosion in developed areas may increase risk to structures due to slope failures.

Regardless of its source, erosion and sediment deposition decreases water depth, degrades water quality, smothers fish and wildlife habitat, and degrades aesthetics. Sediment deposition can also wholly or partially block culverts, manholes, storm sewers, etc., causing flooding. Sediment deposition in detention ponds and wetlands also reduces the storage volume capacity, resulting in higher flood levels and/or reducing the amount of water quality treatment provided. As erosion and sedimentation increase, the stormwater management systems (e.g., ponds, pipes) require more frequent maintenance, repair, and/or modification to ensure they will function as designed.

Comments related to erosion provided during the District's public engagement process include:

- Understanding the impact of shallow groundwater and development on bluff and steep slope stability
- Stabilizing streambanks and restoring channel meandering
- Reducing sediment loading to creeks, lakes, and wetlands

Measuring severe bank erosion along Bluff Creek

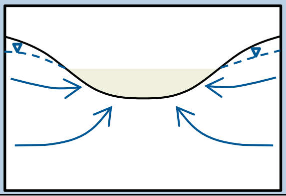
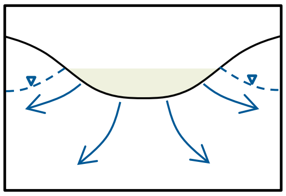
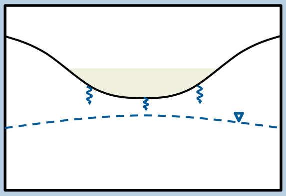
The District seeks to address these and other erosion challenges through its water quality strategies described in Section 3.2.6.2.

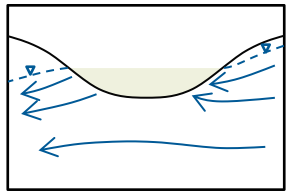
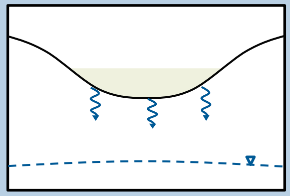
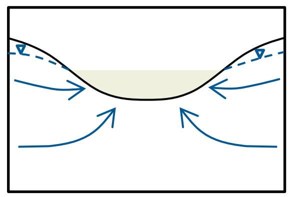
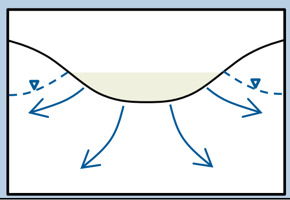
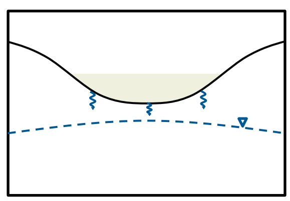
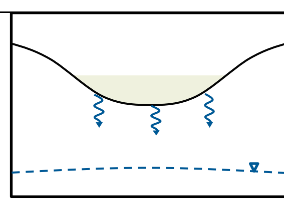
2.3.6.2 Groundwater

Maintaining clean, safe groundwater supplies is critical to human and environmental health and to the economic and social vitality of communities. Cities in the District rely on groundwater for municipal drinking water. Groundwater can be contaminated by commercial and industrial waste disposal, landfills, leaking underground storage tanks, subsurface sewage treatment systems (SSTS), mining operations, accidental spills, feedlots, and fertilizer/pesticide applications.

Surface water resources and groundwater resources are interdependent (Table 2-1). There is significant temporal and spatial variability in these relationships, and these relationships are extremely difficult to quantify. The interaction of groundwater and surface water can have negative consequences on either resource. Contaminated groundwater discharged to surface waters may have a direct impact on surface water quality and/or habitat. Declines in groundwater levels, which can take tens to thousands of years to recharge, may result in decreased baseflow to streams, which can in turn result in decreased water quality and ecosystem function. Decreased baseflow is especially problematic for streams supporting fish populations (e.g., trout streams), as decreased baseflow may result in higher stream temperatures. Lower water levels in lakes may limit recreational use, reduce habitat areas, and result in increased growth of aquatic plants including invasive species (via an increased littoral zone).

Table 2-1 Groundwater/surface water interaction classes

Type	Description		Qualifiers
Discharge lake/wetland	Mostly receives groundwater inflow		Connected to groundwater, surface water elevation below regional water table
Recharge lake/wetland or Indeterminate	Connected to groundwater. Mostly loses water as seepage to groundwater		Groundwater connection is indeterminate, regional water table lower than surface water elevation. Uncertainty in regional water table make it difficult to distinguish between features that are connected and those that are disconnected to groundwater.
	Disconnected to groundwater. Water table slightly below lake bottom. Fluctuations in the water table can affect the flow dynamics out of lake.		

Type	Description		Qualifiers
Flow-through lake/wetland	Groundwater flow both into and out of lake/ wetland		Connected to groundwater, surface water elevation above or equal to regional water table
Perched lake/ wetland with deep water table	Water table deep below feature. Loss of water into the unsaturated zone. Change in water table has no effect on feature		Disconnected from groundwater
Gaining Stream	Groundwater flow into stream		Connected to groundwater, surface water elevation below regional water table
Losing Stream or Indeterminate	Mostly loses water to aquifer system		Groundwater connection is indeterminate, regional water table lower than surface water elevation. Uncertainty in regional water table makes it difficult to distinguish between features that are connected and those that are disconnected from groundwater.
	Water table slightly below stream bottom. Loss of water to the unsaturated zone. Fluctuations in the water table can affect the flow dynamics out of the stream.		
Perched Stream with deep water table	Water table deep below stream bottom. Loses water to the unsaturated zone. Change in water table has no effect on stream.		Disconnected from groundwater

Prevention of groundwater contamination through best management practices is critical. Once contaminated, groundwater may remain contaminated for long periods of time. Groundwater clean-up is expensive and technically complex, even when feasible. Increased public awareness of the importance of drinking water protection to the public's general health and well-being is critical to promote practices that protect the quantity and quality of groundwater. Appropriate application of infiltration practices must consider potential negative consequences in areas with vulnerable groundwater resources.

Comments related to groundwater provided during the District's public engagement process include:

- Understanding and mapping groundwater-surface water interaction, including groundwater impacts on creek baseflow
- Protecting groundwater resources from contamination from chloride, nutrients, and other pollutants
- Implementing practices to promote groundwater conservation (e.g., infiltration, water reuse, reduce irrigation/sprinkling)

The District seeks to address these and other groundwater challenges through its groundwater strategies described in Section 3.2.6.3.

2.3.6.3 Water Quantity

Managing the risk of flooding is a primary focus of the District. In a natural, undeveloped setting, the ground is often pervious, which means that water (including stormwater runoff) can infiltrate into the soil. Land development dramatically changes how stormwater runoff moves in the local watershed, as ground surfaces become covered with impervious materials (e.g., asphalt and concrete) that prevent infiltration of water into the soil. As a result, the rate and volume of stormwater runoff from the site increases. If the land drains to basins, the additional volume of runoff can increase the water level and flood level of the basin. If the land drains to a stream, the additional runoff volume can cause the stream to flow full for longer durations, which increases the potential for erosion and flooding. Further, the reduced amount of infiltration means less water is being recharged into the groundwater system, which can result in decreased baseflows in creeks and streams and, potentially, a loss to the long-term sustainability of groundwater drinking supplies.

Although both high-water levels (flooding) and low-water levels are of concern to watershed residents and public officials/staff, more concern and attention is usually paid to flooding because it is a greater threat to public health and safety and can result in significant economic losses. Flooding may cause other damages that are harder to quantify, including the following:

- Flooding of roads so they are impassable to emergency vehicles and residents
- Shoreline erosion
- Destruction of riparian habitats and vegetation such as grass, shrubs, trees, etc.
- Unavailability of recreational facilities for use by the public (e.g., inundation of shoreline) and/or restricted recreational use of waterbodies, trails, and golf courses

Street flooding in the District during an August 2016 rainfall event

- More strain on budgets and personnel for repairing flood-damaged facilities and controlling public use of facilities during flooding events
- Alterations to the mix and diversity of wildlife species as a result of inundation of habitats

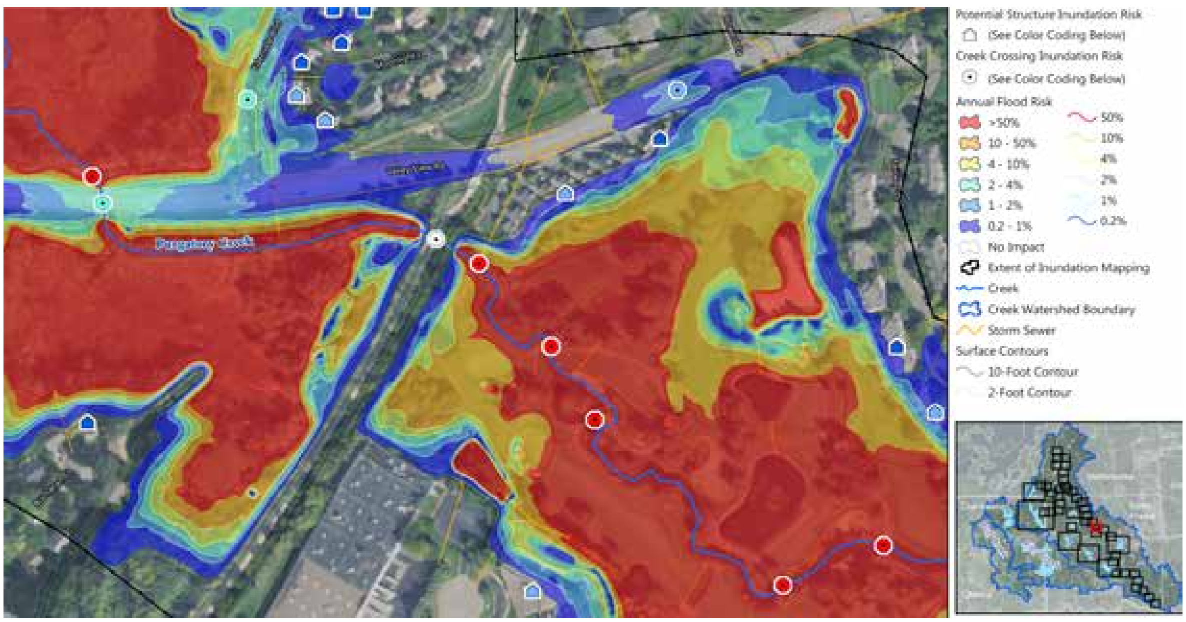
As development and redevelopment occur within the watershed, appropriate rate and volume controls are necessary to avoid creating future flooding issues or exacerbating existing flooding issues. The negative impacts of flooding may be further minimized by thoughtful management of the floodplain (i.e., the area inundated during or after a storm event of particular frequency). This management may be achieved through regulation, education, and other activities. Understanding the hydrologic response of the watershed to large precipitation events is critical to estimating inundated areas and evaluating strategies to reduce flood risk or damages.

The District received numerous comments regarding water quantity and flooding. These comments identified the following issues:

- Addressing flooding due to increasing precipitation (Atlas 14 and the impact of climate change)

- Understanding baseflow and the potential impacts from hydrologic alteration, climate change, and groundwater.
- Loading of nutrients to creeks, lakes, and wetlands from stormwater runoff
- Protecting and updating public infrastructure
- Increasing upstream storage opportunities to reduce flood risk

The District seeks to address these and other water quantity challenges through its water quantity strategies described in Section 3.2.6.



District's risk mapping highlights potential areas with different probabilities of flooding in any given year in order to continue addressing water quantity challenges.

2.4 Issue Prioritization and Incorporation into Goals and Strategies

Following the six issue identification workshops and summary of the collected comments, District staff presented the results of the ongoing public engagement strategy to the TAC, CAC, and Board of Managers at three separate workshops. At the workshops, each group identified priority or significant issues through a qualitative analysis. District staff considered the results from the issue prioritization workshops, along with the results of the prior public engagement activities in developing draft goals and strategies to address priority issues. Public input considered in this process included responses to the Plan notification letter, results of the online survey, and coded comments provided during the District's six stakeholder engagement workshops. Draft goals and strategies were provided to the TAC, CAC, and Board of Managers for review and comment in three additional workshops. The final District goals and strategies are included in Section 3.0 of this plan. All strategies included in this Plan may be linked back to the issue(s) addressed by that strategy and to the stakeholder comment(s) that originally identified those issues as a priority for the District to address in the next 10 years.

Stakeholder Meeting (see Section [illegible])	Comment, question, or general issue	Resource Type (if applicable)	Issue Category (see Section [illegible])	Issue Subcategory (if applicable)	Applicable District Strategies (see Section 4.0)		
					Strategy 1	Strategy 2 (if applicable)	Strategy 3 (if applicable)
Purgatory	Storm water ponds testing: which are monitored?	Wetlands	Education & Outreach	Awareness	EO S4	DC S2	
Board	Protect cranberry bogs and wild rice	Wetlands	Education & Outreach	Stewardship	EO S7		
Board	promote sustainable landscape and land use to conserve groundwater: capture, retain and let water infiltrate where it falls (recharge). Drought-tolerant plants use less groundwater	Groundwater	Water Resources	Groundwater	Ground S1	WQuan S2	
Purgatory	We are not in favor of the delisting of Red Rock; Bakers, Saltenmeo, Kitrells, Richardson, Lien	Lakes	Education & Outreach	Public Engagement	EO S6		
Board	Water use restrictions: lawn watering and drip irrigation	Groundwater	Water Resources	Groundwater	Ground S1		
Board	Shoreline protection and improvement	Lakes	Education & Outreach	Stewardship	EO S7		
Riley	Training professionals on impacts of everyday activities: lawn mowing, etc.; speaking with city maintenance	Other	Education & Outreach	Awareness	EO S4	EO S1	EO S8
Riley	Climate change considerations: how to implement into Planning and management	Other	Planning	Climate Change	Plan S2		
Riley	No-net loss of aquifers: how do we do this?	Groundwater	Water Resources	Groundwater	Ground S1	WQuan S3	
Board	Draft plan such that we can take advantage of new funding opportunities as they		Planning	Prioritization	Plan S6	Plan S10	
TAC	Inventory of existing wetlands: woodland wetlands	Wetlands	Data Collection	Inventory	DC S1		
TAC	Partnerships; engage volunteers and enforce rules	Other	Education & Outreach	Building Capacity	EO S8		
CAC	who is monitoring wells?	Groundwater	Education & Outreach	Awareness	EO S4	Reg S1	Ground S2

Sample of matrix illustrating how stakeholder comments identified from the various engagement components are linked to District strategies.

3.0 Goals and Strategies

This section identifies the Vision and Mission of the Riley Purgatory Bluff Creek Watershed District (RPBCWD or District). The District will adopt the following goals related to accomplishing the District's Vision, and identified specific strategies to achieve these goals. The District established these goals and strategies through a consensus-based process that considered the results of the District's public engagement process (see Section 2.2). The resulting goals and strategies are connected to the comments received during the public engagement process in Appendix C.

3.1 District Mission and Vision

Mission:

Protect. Manage. Restore. Water Resources

Vision:

The Riley-Purgatory-Bluff Creek Watershed District will protect, manage, and restore water resources under its jurisdiction. The District views all the following elements as essential to achieving its mission:

- Effective administration and judicious use of public resources
- Data collection and analysis to ensure decisions are based on sound science
- Planning to achieve District goals in a strategic and equitable manner
- Education and outreach to promote watershed stewardship
- Regulation to protect District natural resources from degradation
- Projects and programs addressing both surface water and groundwater quality and quantity, and related habitat

3.2 Goals and Strategies

The District has established the following goals as targets to achieve the District's Mission. The District developed these goals with consideration of the information gathered as part of the District's public engagement process (see Section 2.2). The goals aid in defining the purposes of the District. To achieve these goals, the District identified strategies that guide present and future management decisions.

1. Operate in a manner that uses District resources and capacity efficiently and effectively while advancing the District's vision and goals. (Admin 1)

2. Collect data and use the best available science to recommend and support management decisions. (DC 1)

3. Design, maintain, and implement Education and Outreach programs to educate the community and engage them in the work of protecting, managing, and restoring water resources. (EO 1)

4. Plan and conduct the District's implementation program to most effectively accomplish its vision with consideration for all stakeholders and resources. (Plan 1)

5. Include sustainability and the impacts of climate change in District projects, programs, and planning. (Plan 2)

6. Implement the District's regulatory program to protect water resources from further degradation, enhancing resources when possible. (Reg 1)

7. Support Carver and Hennepin County to operate effectively as Ditch Authorities. (Reg 2)

8. Protect, manage, and restore water quality of District lakes and creeks to maintain designated uses. (WQual 1)

9. Preserve and enhance the quantity, as well as the functions and values of District wetlands. (WQual 2)

10. Preserve and enhance habitat important to fish, waterfowl, and other wildlife.(WQual 3)

11. Promote the sustainable management of groundwater resources. (Ground 1)

12. Protect and enhance the ecological function of District floodplains to minimize adverse impacts. (WQuan 1)

13. Limit the impact of stormwater runoff on receiving waterbodies. (WQuan 2)

To achieve these goals the District will pursue the following strategies, grouped by goal and topic area. The strategies identified in the following sections were defined with consideration of the results of the public engagement process (see Section 2.0) and to address all issue areas identified through that process.

3.2.1 Administration

3.2.1.1 Administration goal (Admin 1)

Admin 1. Operate in a manner that uses District resources and capacity efficiently and effectively while advancing the District's vision and goals.

3.2.1.2 Administration strategies

Admin S1. The District will develop an annual work plan and budget, including periodic re-assessment of projects and priorities.

Admin S2. The District will periodically assess its capacity and resources and maintain staff necessary to implement the District's projects and programs.

Admin S3. The District will annually review its progress towards accomplishing the District's vision, goals, and planned implementation items. The District will publish the assessment as part of its annual report.

Admin S4. The District will review local water management plans for consistency with this 10-year plan. The District will work with cities to ensure that city local plans, ordinances, and planning documents are consistent with District policies.

Admin S5. The District will work with cities to ensure city regulatory programs provide water-resource protection equivalent to or better than District requirements, or work with cities to defer exercise of regulatory authority to the District.

3.2.2 Data Collection

3.2.2.1 Data Collection goal

DC 1 Collect data and use the best available science to recommend and support management decisions.

3.2.2.2 Data Collection strategies

DC S1. The District will create a wetland inventory based on available data and perform field assessments as needed.

DC S2. The District will develop and implement a Monitoring Plan. Collected data may include, but is not limited to: water chemistry, fisheries, macroinvertebrates, water levels, vegetation, planktons, shoreline and streambank inventories, flow data, and climatic data.

DC S3. The District maintains the flexibility to modify its monitoring and data collection programs as necessary to capture the most relevant information. The District will periodically review and update its Monitoring Plan to address emerging contaminants of concern, improved analytical methods, or other developing issues.

DC S4. The District will collect data to assess the potential impacts of climate change on District projects, programs, and resources.

DC S5. The District will monitor District-managed resources for the presence of aquatic invasive species.

DC S6. The District will use data to evaluate the performance of and recommend District programs and capital improvement projects.

DC S7. The District will analyze data to help inform management decisions.

DC S8. The District will coordinate its monitoring efforts with other entities to promote efficiency, increase data availability, and to identify and fill data gaps.

3.2.3 Education and Outreach

3.2.3.1 Education and Outreach goal

EO 1 Design, maintain, and implement Education and Outreach programs to educate the community and engage them in the work of protecting, managing, and restoring water resources. (EO 1)

3.2.3.2 Education and Outreach strategies

EO S1. The District will regularly review its Education and Outreach Plan and update it, as necessary (see Appendix B).

EO S2. The District will use both formative and summative data to evaluate the success of its education and outreach program and adjust its program to improve effectiveness.

EO S3. The District will tailor its education and outreach strategies to present complex and/or technical issues in a manner that is appropriate for each audience.

EO S4. The District will use its education and outreach program to raise awareness of watershed management issues and best practices (e.g., aquatic invasive species, conservation).

EO S5. The District will build awareness of our water resources by highlighting recreational opportunities and access.

EO S6. The District will seek opportunities to engage the public in its projects and programs through diverse methods outlined in the education and outreach plan, including but not limited to: electronic communications, social media, website, informational signage, demonstration projects, tours, speaker's bureau, and open houses.

EO S7. The District will provide resources to increase stewardship within the community.

EO S8. The District will build community capacity by working with schools, lake associations, non-profits, volunteers, or other stakeholders to develop a network of watershed champions.

EO S9. The District will continue to implement its cost-share program to provide incentive for residents, business, institutions and local governmental units to implement watershed best management practices.

3.2.4 Planning

3.2.4.1 Planning goals

Plan 1. Plan and conduct the District's implementation program to most effectively accomplish its vision with consideration for all stakeholders and resources.

Plan 2. Consider sustainability and the impacts of climate change in District projects, programs, and planning.

3.2.4.2 Planning strategies

Plan S1. The District will use an adaptive management approach to protect, manage, and restore District-managed resources (see Section 9.1).

Staff member Jordan facilitating a conversation on building community resilience with local residents and Manager Forster and Manager Bisek

Plan S2. The District will consider the potential impact of climate change when developing and implementing District projects and programs.

Plan S3. The District will consider sustainability in the design and implementation of its projects and programs.

Plan S4. The District will annually review its 10-year implementation program (Table 9-1) and update the program as necessary, with consideration for the prioritization criteria outlined in Section 4.0.

Plan S5. The District will evaluate the success of implemented projects and programs every two years.

Plan S6. The District will implement projects that address a District-managed resource. The District will prioritize planned projects based on methodology included in Section 4.0 of this Plan, which is based on the following factors:

- Targeting District goals
- Sustainability
- Volume management
- Pollutant management
- Habitat restoration
- Shoreline/streambank restoration and stabilization
- Watershed benefits
- Partnership opportunities
- Public education and access

Plan S7. The District will seek to incorporate ecological, economic, and social benefits into its projects as opportunities allow.

Plan S8. The District will continue to perform resource assessments and feasibility studies (e.g., Use Attainability Analysis) to evaluate options to protect, manage, and restore District-managed resources.

Plan S9. The District will seek to partner with cities, state agencies, and other entities to implement projects and programs to meet District goals.

Plan S10. The District will pursue grants, cost-sharing, and other opportunities to leverage District financial resources.

Plan S11. The District will develop and implement a cost-share or grant program to assist local governmental units to fund emergency repair of damaged infrastructure to protect and restore water resources (e.g., severe storm events).

3.2.5 Regulation

3.2.5.1 Regulation goals

Reg 1. Implement the District's regulatory program to protect water resources from further degradation, enhancing resources where possible.

Reg 2. Support Carver and Hennepin County to operate effectively as Ditch Authorities.

3.2.5.2 Regulation strategies

Reg S1. The District will implement its regulatory program by reviewing proposed land-disturbing activity and ensuring, through issuance of permits, compliance with applicable District rules, policies, and standards.

Reg S2. The District will periodically review its rules and update them as necessary. The District will update its rules in accordance with applicable Minnesota Statutes and with involvement of cities, state agencies, and other stakeholders.

Reg S3. The District will periodically review the implementation of its regulatory program for opportunities to improve the process.

Reg S4. The District will coordinate with appropriate cities and appropriate governmental bodies in the project/development review process.

3.2.6 Water Resources

The District has adopted specific goals and strategies to protect, manage, and restore the water resources within its jurisdiction. These strategies are subdivided into the topic areas of:

- Water quality
- Water quantity
- Groundwater

3.2.6.1 Water Quality Goals

WQual 1. Protect, manage, and restore water quality of District lakes and creeks to maintain or achieve designated uses.

WQual 2. Preserve and enhance the quantity, as well as the function and value, of District wetlands.

WQual 3. Preserve and enhance habitat important to fish, waterfowl, and other wildlife.

3.2.6.2 Water Quality Strategies

Strategies addressing water quality are further subdivided into those that primarily address erosion, habitat, and pollutant loading. All three emerged as part of the public input process.

Erosion

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.

WQual S2. The District will inventory and address areas within the watershed with existing erosion issues and/or areas at high risk for erosion by implementing the District's capital improvement, incentive and regulatory programs.

Habitat

WQual S3. The District encourages cities and developers to seek opportunities to incorporate habitat protection or enhancement into development and redevelopment projects.

WQual S4. The District will implement measures to manage carp populations in District-managed resources.

WQual S5. The District will cooperate with the MDNR to enhance fisheries consistent with the MDNR's ecological classification (Schupp, 1992).

WQual S6. The District will seek opportunities to establish and preserve natural corridors for wildlife habitat and migration.

WQual S7. The District will promote the use of natural materials and bioengineering for the maintenance and restoration of shorelines and streambanks where appropriate.

WQual S8. The District will consider opportunities to incorporate habitat protection, restoration, or improvement elements in District water quality, flood control, and other projects.

WQual S9. The District will partner with other entities to minimize the spread and reduce the adverse ecological impacts of aquatic invasive species.

WQual S10. The District will manage non-native aquatic invasive macrophytes to improve water quality and/or habitat in accordance with an approved lake vegetation management plan or as part of a rapid response control project.

WQual S11. The District recognizes the multiple benefits of vegetated buffers and promotes the use of vegetated buffers around all waterbodies.

Pollution

WQual S12. The District will assist and cooperate with cities, MPCA, MDNR, MnDOT, other watersheds and other stakeholders in implementing projects or other management actions based on the Minnesota Pollution Control Agency's Twin Cities Metro Chloride TMDL.

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.

WQual S14. The District will continue to identify opportunities and actions to protect, restore, and enhance District resources.

WQual S15. The District will cooperate with other entities to investigate treatment effectiveness of emerging pollutant removal practices.

WQual S16. The District will work with the state agencies and local governmental units to identify emerging pollutants of concern.

WQual S17. The District will cooperate with member cities, the MPCA and other stakeholders in the development of total maximum daily load (TMDL) and watershed restoration and protection strategies (WRAPS) studies.

WQual S18. The District will work with local government units to minimize pollution risk to groundwater.

3.2.6.3 Groundwater Goals

Ground 1. Promote the sustainable management of groundwater resources.

3.2.6.4 Groundwater Strategies

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) and reduce consumption.

Ground S2. The District will develop, or cooperate with the two watershed counties (which have statutory authority to develop groundwater-management plans) and others to develop, a groundwater action plan in an effort to gain a better understanding of groundwater-surface water interaction and develop management strategies that consider the protection of both resources. The role of the District may include:

- Collaboration with local and state agencies to identify and fill data gaps.
- Coordination with appropriate local government units and state agencies to develop a groundwater budget for the watershed.
- Coordination with appropriate local government units and state agencies to develop and utilize tools to assess surface water impacts and groundwater impacts of groundwater use (e.g., refinement of the Metro groundwater model, collaboration with cities on Wellhead Protection Plans, synchronization of the surface water models with groundwater models).

Ground S3. The District will work to increase understanding of the interaction between groundwater resources and surface waters within the District and consider those interactions in future management decisions.

3.2.6.5 Water Quantity Goals

WQuan 1. Protect and enhance the ecological function of District floodplains to minimize adverse impacts.

WQuan 2. Limit the impact of stormwater runoff on receiving waterbodies.

3.2.6.6 Water Quantity Strategies

WQuan S1. The District will preserve and enhance the natural function of the floodplain and maintain floodplain storage volume.

WQuan S2. The District will promote strategies that minimize baseflow impacts.

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.

WQuan S4. The District will maintain a hydrologic model using the most recent applicable National Weather Service reference data and use the model to define the District's 100-year floodplain.

WQuan S5. The District will use models and other available tools to design projects resilient to predicted climate change impacts.

WQuan S6. The District will seek to alter stormwater hydrographs through practices that reduce peak discharge rates and overall flow volume.

WQuan S7. The District will promote/encourage cities and developers to implement Low Impact Development (LID) practices and will work with cities to reduce regulatory barriers to LID practices.

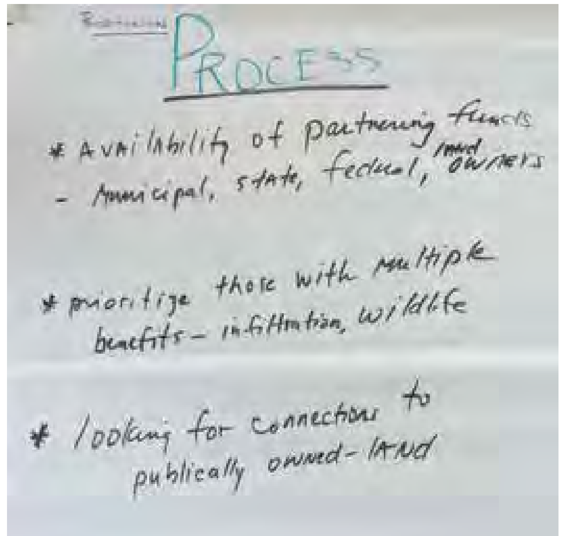
WQuan S8. The District will develop and implement actions to reduce flood risk within the District.

WQuan S9. The District will work with cities and other stakeholders to encourage conservation practices (e.g., infiltration basins, floodplain storage, water reuse) to protect creeks, lakes and wetlands.

WQuan S10. The District will investigate alternatives to infiltration practices to promote volume reduction in areas not conducive to standard infiltration BMPs.

4.0 Project Prioritization Process

During the initial stages of its Watershed Management Plan (Plan) development, the District solicited stakeholder input on watershed management issues through a public engagement process. The results of the public engagement process identified "project prioritization" as an issue of high importance to stakeholders.



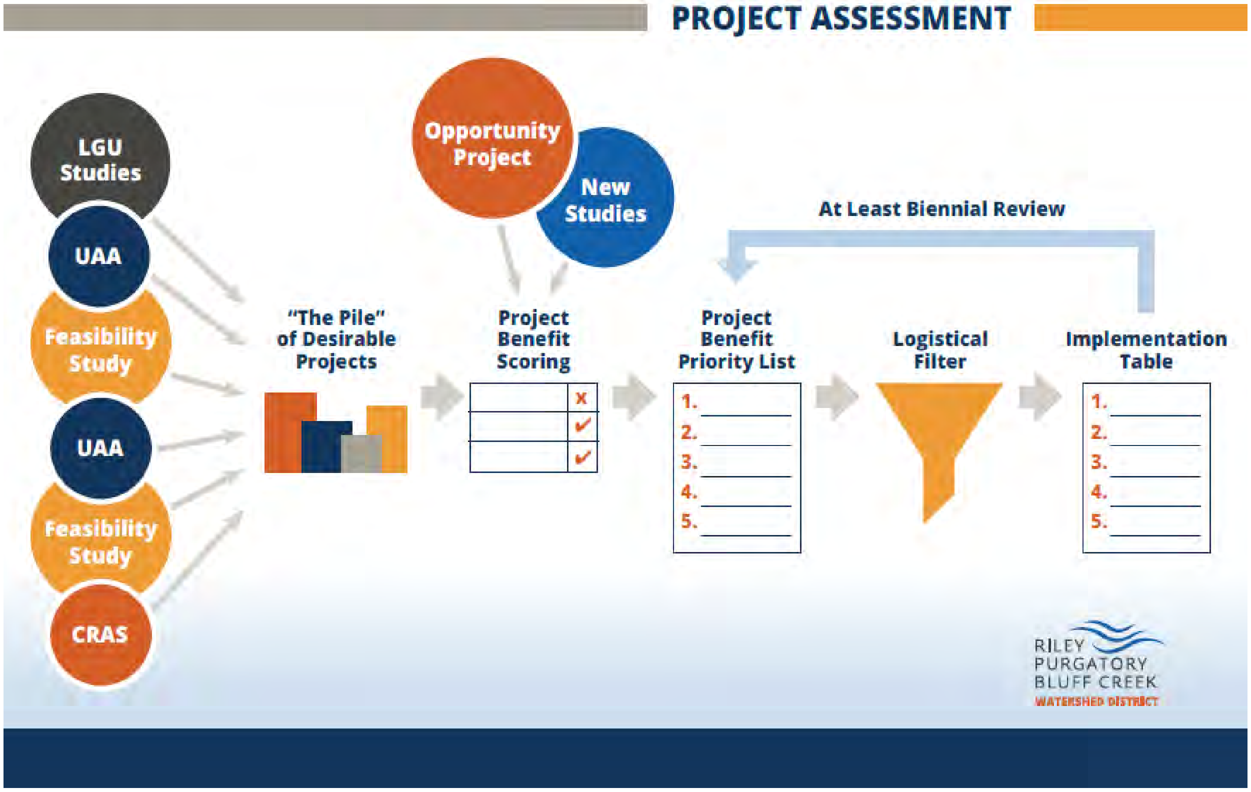
Comments received at public meetings highlighted the difficulty in developing a clear and equitable method for project prioritization.

To address this concern, the District developed a proposed project prioritization method to allow a quantitative comparison of proposed projects of diverse types and benefits. This section summarizes the proposed method for scoring projects based on multiple benefits and prioritizing those projects with consideration for logistical factors. This method is applicable to District projects; District programs and ongoing operations (e.g., education program) are not subject to this prioritization method. The methodology was adjusted and enhanced during the planning process in response to comments received from the Citizen Advisory Committee, Technical Advisory Committee, and the Board of Managers. The process is summarized in Figure 4-1.

With its 2018 Plan, the District has proposed a project prioritization process that quantitatively considers project benefits and feasibility constraints. Projects identified in District studies, partner studies, and identified by cities are included in this process. Projects are scored according to nine benefit categories and a total benefit (see Section 4.1). Projects are sorted by major watershed, upstream to downstream, and ranked from greatest benefit to least benefit in the project benefit priority lists (see major watershed sections for Bluff Creek (Section 6.0), Purgatory Creek (Section 7.0), and Riley Creek (Section 8.0). Projects with benefit scores greater than a District-identified minimum benefit score (currently 30 points) are prioritized in an implementation table (Table 9-1) with consideration for logistical factors (see Section 9.2.1) affecting the feasibility of project completion. The project benefit priority lists are living documents updated as new projects are identified and existing proposed projects are modified. The

District recognizes that projects with total benefit scores below 30 may be added to the implementation ranking under special circumstances, including but not limited to those described in Section 4.1.10.1.

Figure 4-1 Capital Project Assessment Process



4.1 Scoring of Projects

The prioritization method considers nine factors relating to potential project benefits. These factors include:

1. District goals
2. Sustainability
3. Volume management
4. Pollutant management
5. Habitat restoration
6. Shoreline/streambank restoration and stabilization
7. Watershed benefits
8. Partnership opportunities
9. Public access and education

A numeric score is assigned to each factor based on a quantitative or semi-quantitative analysis of a project's potential to achieve that benefit. Possible scores range from 1 to 7 (derived from the scoring system used in the District's Creek Restoration Action Strategy, or CRAS, process), with the exception of the District goals score, which can range from 1 to 6, reflecting the 6 District water resource goals included in the Plan (see below). The total project score is the sum of the individual 9 factor scores. Scoring for each of the nine factors listed above is detailed in the following sections.

4.1.1 District Goals Metric

A project is assigned a score from 1 to 6 based on how many of the District's six water resource goals are addressed by the project (note: the District will not pursue projects that fail to meet at least one District water resource goal). The District's six water resource goals include:

- Protect, manage, and restore water quality of District lakes and creeks to maintain designated uses.
- Preserve and enhance the quantity, as well as the function and value of District wetlands.
- Preserve and enhance habitat important to fish, waterfowl, and other wildlife.
- Promote the sustainable management of groundwater resources.
- Protect and enhance the ecological function of District floodplains to minimize adverse impacts.
- Limit the impact of stormwater runoff on receiving waterbodies.

A project receives a point for a water resource goal only if the project is specifically intended to address that goal and the extent to which the project addresses that goal can be quantified. For example, projects that reduce pollutant loading to a waterbody may indirectly improve aquatic habitat, but will not receive a point for enhancing habitat unless the pathway to the benefit is defined and the benefit is quantified.

Table 4-1 District Goals Metric Scoring Criteria

District Goal Score	Description
1	Addresses 1 RPBCWD Water Resources Goal
2	Addresses 2 RPBCWD Water Resources Goals
3	Addresses 3 RPBCWD Water Resources Goals
4	Addresses 4 RPBCWD Water Resources Goals
5	Addresses 5 RPBCWD Water Resources Goals
6	Addresses 6 RPBCWD Water Resources Goals

4.1.2 Sustainability Metric

A project is assigned a sustainability score of 1, 3, 5, or 7 based on a sustainability index calculated using a modified Envision™ sustainability rating system. The Envision™ rating system is a project assessment and guidance tool for sustainable infrastructure design developed by the Harvard Graduate School of Design, the American Society of Civil Engineers (ASCE), the American Public Works Association (APWA) and the American Council of Engineering Companies (ACEC). The Envision™ rating system defines sustainability as "a set of environmental, economic and social conditions in which all of society has the capacity and opportunity to maintain and improve its quality of life indefinitely without degrading the quantity, quality or the availability of natural resources and ecosystems" (Infrastructure, 2012). The Envision™ rating system assigns points based on the degree to which a project achieves criteria associated with specific sustainability credits. These credits are divided into the following five categories:

- Quality of life
- Leadership
- Resource allocation
- Natural world
- Climate and risk

The Envision™ rating system was designed to be applicable to a broad range of infrastructure projects. The District has modified the Envision™ rating system to make the criteria and credits more applicable to the activities of a watershed management organization and reduce the level of effort needed to score projects. These modifications include:

1. Criteria for credits were modified into yes/no questions (1 point for yes, 0 points for no)
2. Criteria language was modified to more closely align with District goals and strategies
3. Some additional criteria questions were added to account for District goals and strategies (most within the natural world category)

The first modification was made for two reasons: (1) to simplify the scoring process, and (2) to reflect the level of project definition that can be reasonably expected at the feasibility level, when it is anticipated that most projects will be scored. The second and third modifications adapt the Envision framework more specifically to the vision, mission, and goals of the District. The credits were not modified from the original Envision framework. However, the criteria language was revised to more closely align with specific goals and strategies developed by the District. For some credits, the criteria include a single question with language that is either: 1) based on Envision language and revised to most accurately represent the application of the Envision credit to RPBCWD projects, or 2) based on language from the District goals and strategies rephrased as a yes/no question. For some credits, additional criteria were added to reflect increased focus of the District on the resource or practice associated with that credit. For example, the original Envision framework includes a single credit for "manage stormwater." Four criteria were used to reflect the District's multiple stormwater management objectives.

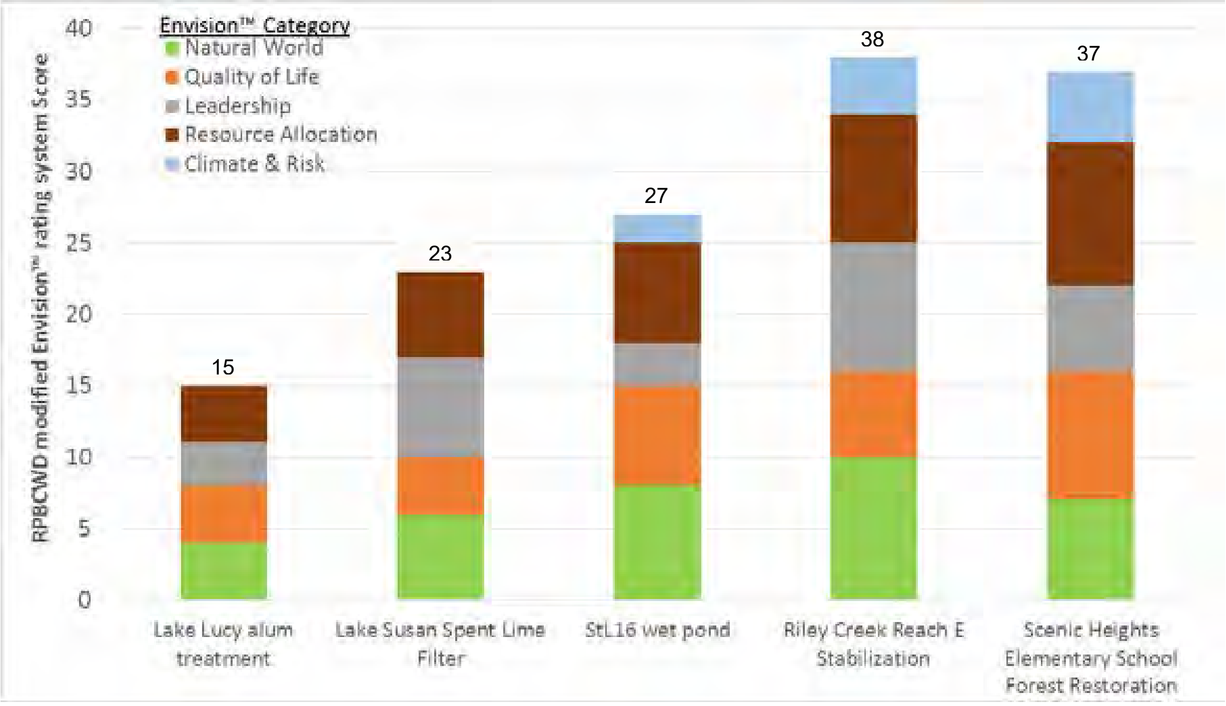
A list of the Envision credits and criteria questions developed for each credit are presented in a table included in Appendix D. Most of the credits with multiple criteria questions are included within the natural world category. The criteria questions are phrased such that a "yes" is a positive response (i.e., a benefit); a "yes" answer earns 1 point. Zero points are earned for a "no" answer. In total, there are 56 credits and 81 possible points to be earned, distributed among the categories list in Table 4-2.

Table 4-2 Modified Envision Rating System Credits

Category	Credits	Possible Points
Quality of life	12	18
Leadership	9	10
Resource allocation	13	15
Natural world	15	30
Climate and risk	7	8
Total	**56**	**81**

During the initial sustainability scoring of several projects it became evident that project types (e.g., wet detention pond, streambank restoration, internal nutrient load control, etc.) would generally score within a few points of each other (i.e., a wet pond in one portion of the watershed would have a similar score at a different location in the watershed). The figure below shows the five projects that were scored using the modified Envision™ rating system.

Figure 4-2 Summary of the Five Project Types that were Scored Using the Modified Envision™ Rating System



The sustainability score was normalized based on a range of modified Envision™ rating system score for the following two reasons: 1) similar project type would produce a similar score regardless of location and 2) the Citizen Advisory Committee, Technical Advisory Committee and Board comments about the level of effort needed to process each project through the modified Envision™ rating system. The modified Envision™ rating system score for each project is classified as Low, Medium, High, or Exceptional and assigned a score of sustainability score of 1, 3, 5, or 7 as shown in Table 4-3.

Table 4-3 Sustainability Metric Scoring Criteria

Sustainability Score	Modified Envision™ Rating System Score	Sustainability Index
1	0-10	Low
3	11-20	Medium
5	21-30	High
7	>30	Exceptional

4.1.3 Volume Reduction Metric

A project is assigned a volume reduction score of 1, 3, 5, or 7 based on the amount of runoff from impervious area that is abstracted on site. Abstraction includes, but is not limited to, infiltration, water reuse, and evaporative uses. Projects without impervious area or volume abstraction are assigned a minimum volume score of 1. Scores are correlated to the abstracted volume as shown in Table 4-4:

Table 4-4 Volume Reduction Metric Scoring Criteria

Volume Score	Abstracted Volume[1]	Volume Index
1	No Abstraction	Low
3	Up to 0.55” Abstraction	Medium
5	0.55” to 1.1” Abstraction	High
7	>1.1” Abstraction	Exceptional

[1] Abstraction volume as estimated from impervious surface in tributary watershed. Conversion of impervious surface to pervious area would be scored based on the amount of impervious reduction (25-50% reduction =3, 50-75% reduction = 5, >75%=7)

4.1.4 Pollutant Management

A project is assigned a pollutant management score of 1, 3, 5, or 7 according to the project’s relative effectiveness in reducing pollutant loading to downstream resources. Pollutant reduction is quantified as the percentage of the pollutant reduction or protection goal for a given resource. Target load reductions are defined in District resource management plans (e.g., UAAs). For projects addressing multiple pollutants and/or resources, the maximum percent reduction among all pollutants and resources will be considered. Projects without a pollutant reduction benefit will receive a minimum score of 1. Table 4-5 correlates a scores to the pollutant reduction.

Table 4-5 Pollutant Management Metric Scoring Criteria

Pollutant Score	Percent of Pollutant Reduction Goal Attained by Project	Pollutant Index
1	<5%	Low
3	5-10%	Medium
5	11-30%	High
7	>30%	Exceptional

4.1.5 Habitat Restoration Metric

A project is assigned a habitat restoration score of 1, 3, 5, or 7 according to the extent that a project will improve habitat. Projects with no habitat benefit receive a minimum score of 1. Projects likely to achieve habitat benefits as a secondary project benefit receive a score of 3. Projects that include replacement of existing habitat with improved habitat receive a score of 5. Projects which include habitat creation or enhancement as the primary purpose of the project receive a score of 7. Projects including restoration of stream reaches will be evaluated using the Minnesota Pollution Control Agency's (MPCA's) Minnesota Stream Habitat Assessment (MSHA) methodology (detailed in Appendix A of the District's CRAS study). The MSHA process creates a score based on a variety of stream habitat characteristics, including both in-stream and riparian features. The lower the MSHA score, the more degraded the habitat, resulting in greater potential benefit that could be gained from a restoration project. Where MSHA scores are available, the habitat restoration score will be based on the MSHA score as in Table 4-6.

Table 4-6 Habitat Restoration Metric Scoring Criteria

Habitat Score	Benefit Description	MSHA Score (for CRAS projects)	Habitat Quality
1	No habitat benefit	76-100	Excellent
3	Little habitat benefit – side benefit	51-75	Good
5	Replace existing habitat with improved habitat	26-50	Fair
7	Primary purposes is habitat restoration	1-25	Poor

4.1.6 Shoreline/Streambank Restoration and Stabilization Metric

Streams naturally migrate through the landscape, transporting sediment from upstream to downstream. Stable streams are often referred to as being in "dynamic equilibrium" with their respective watersheds. Even with the best efforts to manage stormwater and runoff, development alters hydrology, which disrupts the dynamic equilibrium between the stream and its watershed. Moderate and severe disruptions can cause significant channel and bank instability, contributing to water quality degradation and the amount of sediment and phosphorus entering into the District's wetlands, lakes, creeks, and eventually to the Minnesota River.

The severity of channel erosion and stability was assessed using the Modified Pfankuch Channel Stability Rating Procedure (Pfankuch, 1975). Stream reaches were divided into sub-reaches, as appropriate, and scored using the Pfankuch assessment, which is based on evaluating the upper banks, lower banks, and bed of the stream considering the stream type as identified by the Rosgen Classification System (Rosgen, 1994). A higher Pfankuch score represents a more degraded, less stable stream. Ranges of Pfankuch scores for each stream type were associated with CRAS scoring categories, as shown in below.

A project is assigned a shoreline/streambank restoration and stabilization score of 1, 3, 5, or 7 based on the length of streambank or shoreline restored and level of existing degradation. This metric is applied to projects with a designed restoration component (versus indirect benefits). Projects without a designed shoreline or streambank restoration component are assigned the minimum score of 1. This score is applied to shoreline and streambank projects only if the pollutant management score is not estimated (as both metrics address sediment loading to District resources).

A project is scored according to the existing level of shoreline or streambank degradation, as identified in the District's CRAS study or TMDL study, if applicable. If the applicable reach or shoreline has not been evaluated in a CRAS or TMDL study, the project is scored according to the length of shoreline restored and/or stabilized. Scores are assigned as outlined in Table 4-7.

Table 4-7 Shoreline Restoration and Streambank Stabilization Metric Scoring Criteria

Shoreline Score	Length Improved	TMDL Description	CRAS Description	Rosgen Stream Type					
				B-5	C-4/C-5	E-5	E-6	F-4	F-6
1	<100 feet	Stable	Very stable	58-57	70-79	50-62	40-51	85-97	80-87
3	100-499 feet	Minor	Moderately stable	58-68	80-90	63-75	52-63	98-110	88-95
5	500-1000 feet	Moderate	Moderately unstable	69-88	91-110	76-96	64-86	110-125	96-110
7	>1000 feet	Severe	Unstable	89+	111+	97+	87+	126+	111+

The specific streambank or shoreline restoration design does not factor into the project's score. All streambank and shoreline stabilization projects are subject to best management design practices and subject to District policies and rules prioritizing natural materials and techniques over hard armoring methods (e.g., riprap).

4.1.7 Watershed Benefits Metric

The District recognizes that some projects have notable benefits that extend beyond the nearest downstream resource and across the watershed. For example, a stabilization project completed at a headwater location on a stream may provide greater benefit by directly or indirectly improving or preserving the downstream reaches of a stream.

Each project is assigned a score of 1, 3, 5, or 7 based on the percent of the watershed downstream of a project, as described in Table 4-8. A higher score in this category corresponds to sites closer to the headwaters of the watershed, which may have greater positive effects for the entire watershed if improved. The watershed benefit score is calculated based entirely on location and does not consider the magnitude of intended project benefit (e.g., amount of pollutant reduction).

Table 4-8 Watershed Benefits Metric Scoring Criteria

Watershed Score	Percent of watershed downstream of project	Description
1	<25%	Limited watershed benefits
3	25-49%	Low to moderate watershed benefits
5	50-75%	Moderate to high watershed benefits
7	>75%	Significant watershed benefits, headwater site location

4.1.8 Partnership Opportunities Metric

The ability to partner with local groups and agencies within the District is important because it distributes costs, builds working relationships between different groups, and allows additional resources for larger and more comprehensive projects to be implemented and effectively managed. Projects are awarded a score of 1, 3, 5, or 7 based on the number of partners as shown in in Table 4-9. A project receives the maximum score of 7 if one or more of the partners is a financial contributor to the project.

Table 4-9 Partnership Opportunities Metric Scoring Criteria

Partnership Score	Description
1	No partnership
3	Single partner
5	Multiple partners
7	One or more partners with financial support

4.1.9 Public Access and Education Metric

Spreading awareness of District projects and their benefits to residents and users of the watershed is a key component of the District's Plan. The ability to create conversations and engage the public about how the District is improving water resources has the potential to increase water resource stewardship and implementation of best management practices within the community.

Similarly, the District seeks to promote opportunities for residents to access and enjoy the natural resources in the watershed. Interaction with these resources fosters higher quality of life while reinforcing public awareness and support for their protection, restoration, and management. During the public engagement process the stakeholders were asked to describe how they use the lakes, creeks, ponds and wetlands in the community or surrounding communities. Just over 80% of respondents identified wildlife watching and recreation adjacent to waterbodies as the most popular uses. Other recreational activities such as canoeing, swimming, and fishing were each selected by more than half of the survey respondents.

The potential for project sites to be accessed by the public and serve as educational resources to the public (through use of signage and interpretive materials), increase overall awareness of District efforts. Promoting recreational access to resources is another consideration in prioritizing District projects. Projects are awarded a public access and education score of 1, 3, 5, or 7 as shown in Table 4-10.

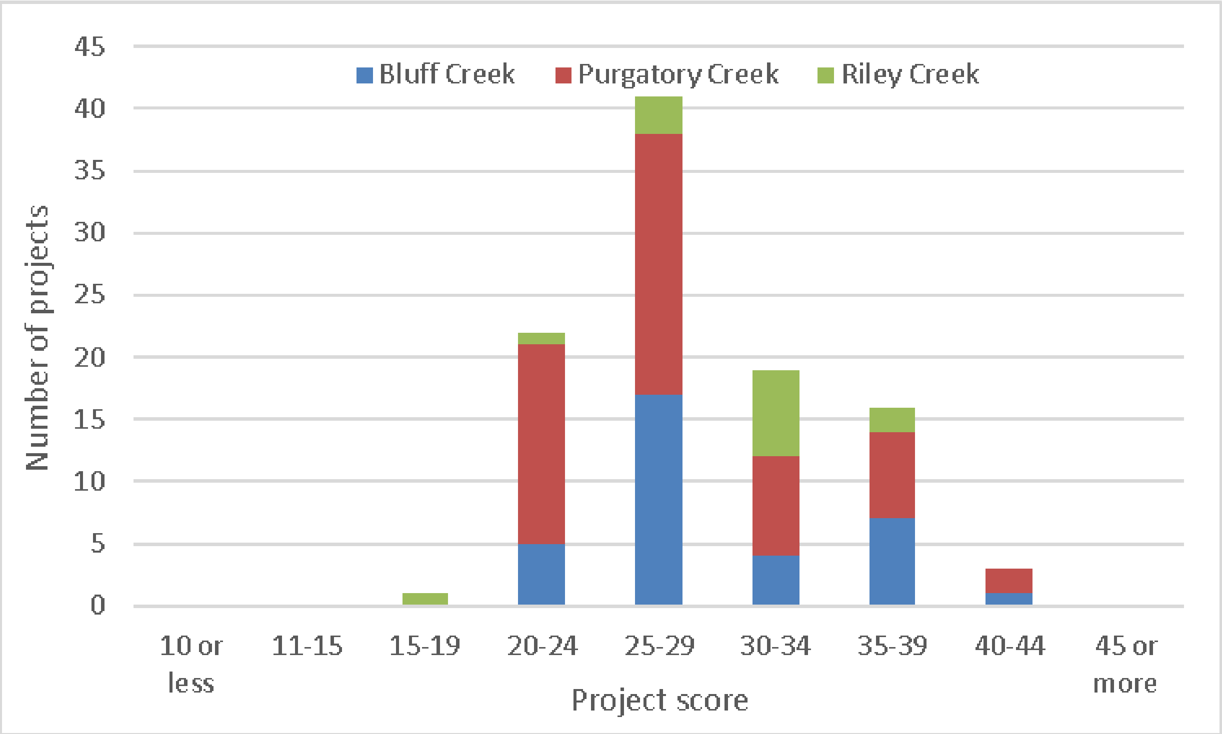
Table 4-10 Public Access and Education Metric Scoring Criteria

Public Access/Education Score	Description
1	Project is located entirely on private property and access would be limited almost exclusively to surrounding private residents
3	Project is accessible by private residents with part of the area accessible to the public
5	Project is located in a park or other public land but is not easily accessible
7	Project is located on public land that is highly visible and accessible (e.g., adjacent to trails, beach, or boat landing)

4.1.10 Total Benefit Score

A project's total benefit score is the sum of the scores for each of the nine benefit categories (note that streambank and shoreline restoration projects receive a score for pollutant reduction OR shoreline restoration, but not both). Possible scores range from 8 (least desirable) to 55 (most desirable). Preliminary scores for proposed District projects range from 18 to 43, with an average project score of 29, and a median project score of 28. A histogram of project scores, subdivided by major watershed, is shown in Figure 4-3.

Figure 4-3 Histogram of Project Score by Major Watershed



4.1.10.1 Ranking and Sorting Projects by Benefit Score

Projects are separated into three lists according to their major watershed (Bluff Creek, Purgatory Creek, and Riley Creek), sorted from upstream to downstream based on the watershed benefit index and ranked in decreasing order by total benefit score. The resulting lists are referred to as project benefit priority lists. Projects with scores above 30 are carried forward to the next step in the prioritization process: implementation ranking. Projects with total benefit scores below 30 were reconsidered as needed to achieve the logistical considerations and remain on the District's project list for future consideration or re-evaluation. Projects with total benefit scores below 30 may be added to the implementation ranking under special circumstances, including but not limited to:

- Coordination with an imminent cooperator/project partner (e.g., redevelopment project)
- Outside funding that significantly reduces the District project costs

- Significantly increased environmental and/or public health risks if no action is taken
- Project sequencing strategies prior to internal load reduction measures

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 first. Therefore, when developing the Capital Improvements Program (see Section 9.2), the District considered additional logistical factors affecting project feasibility to determine an appropriate schedule for implementing the projects with greatest benefit in the most efficient manner possible (see Section 9.2.1). The District will update and re-sort the project priority lists as new projects are identified and evaluated as part of District studies, TMDLs, WRAPS, City implementation plans, and other sources. The District will not re-evaluate the scores of proposed projects already scored unless changes are made in the scope of the project.

5.0 Land and Water Resource Inventory

This section of the Riley Purgatory Bluff Creek Watershed District (RPBCWD or District) Watershed Management Plan (Plan) summarizes the land and water resources located within the District. It contains information on climate and precipitation, topography, soils, geology and groundwater, surface water resources, resources, water quality, water quantity, wetlands, pollutant sources, and natural areas and unique features. This important information describes the condition of the watershed and it affects decisions about infrastructure, development, and ecological preservation. Lake and creek specific resource inventories can be found by creek watershed in Section 6.0 (Bluff Creek watershed), Section 7.0 (Purgatory Creek watershed), and Section 8.0 (Riley Creek watershed).

5.1 Climate and Precipitation

The climate of the Twin Cities metropolitan area is a humid continental climate, characterized by moderate precipitation (normally sufficient for crops), wide daily temperature variations, and large seasonal variations in temperature (warm humid summers, and cold winters with moderate snowfall). Average total annual precipitation measured at the Minneapolis-St. Paul International Airport (MSP) is 30.6 inches (1981-2010). Snowfall averages 54.4 inches annually at the MSP station (1981-2010). The District uses precipitation data recorded at the MSP station as well as data from Chanhassen, Flying Cloud Airport, and private observers in Eden Prairie and Chanhassen. Additional precipitation gages are operated by the Metropolitan Council. Rain gage #19 has the most complete coverage of the watershed. It has a long term rainfall record from 1891 to present.

The amount, rate, and type of precipitation are important in determining flood levels and stormwater runoff rates, all of which impact water resources. Average weather imposes little strain on the typical drainage system. Extremes of precipitation and snowmelt are important for design of stormwater management and flood control systems. The National Oceanic and Atmospheric Administration (NOAA) has data on extreme precipitation events that can be used to aid in the design of stormwater management and flood control systems (see Section 5.1.1).

Additional climate information can be obtained from a number of sources, such as the following sources:

- For climate information about the Twin Cities metropolitan area: http://www.dnr.state.mn.us/climate/twin_cities/index.html
- Local data available from the Midwestern Regional Climate Center (MRCC): http://mrcc.isws.illinois.edu/
- For a wide range of climate information: https://www.climate.gov/maps-data
- For other Minnesota climate information: http://www.dnr.state.mn.us/climate/index.html

5.1.1 Precipitation-Frequency Data (Atlas 14)

NOAA published Atlas 14, Volume 8, in 2013. Atlas 14 is the primary source of information regarding rainfall in the region. Atlas 14 provides estimates of precipitation depth (i.e., total rainfall in inches) and intensity (i.e., depth of rainfall over a specified period) for durations from 5 minutes up to 60 days. Atlas 14 supersedes publications Technical Paper 40 (TP-40) and Technical Paper 49 (TP-49) issued by the National Weather Bureau (now the National Weather Service) in 1961 and 1964. Improvements in Atlas 14 precipitation estimates include denser data networks, longer (and more recent) periods of record, application of regional frequency analysis, and new techniques in spatial interpolation and mapping. Comparison of precipitation depths between TP-40 and Atlas 14 indicates increased precipitation depths for more extreme (i.e., less frequent) events.

Snowmelt and rainstorms occurring during snowmelt in early spring are significant in this region. The volumes of runoff generated, although they occur over a long period, can have significant impacts where the contributing drainage area to a lake or pond is large and the outlet is small. Runoff from spring snowmelt is not provided in Atlas 14. The Natural Resources Conservation Service (NRCS) Technical Reference 60 (TR-60) presents maps of regional runoff volume over extended durations (NRCS, 2005). Table 5-1 lists selected rainfall and snowmelt runoff events relevant in the RPBCWD.

Table 5-1 Selected Rainfall and Snowmelt Runoff Events

Type	Event Frequency	Duration	Depth (inches)
Rainfall[1]	2-year	24 hour	2.87
	5-year	24 hour	3.58
	10-year	24 hour	4.27
	25-year	24 hour	5.37
	50-year	24 hour	6.33
	100-year	24 hour	7.41
	10-year	10 day	6.89
	100-year	10 day	10.3
Snowmelt[2]	10-year	10 day	--
	25-year	10 day	5.8
	50-year	10 day	6.5
	100-year	10 day	7.2
Source: [1] NOAA Atlas 14 – Volume 8. Station: Centroid of RPBCWD. [2] Snowmelt depth reported as liquid water; based on values from TR-60 Figure 2.1.			

5.1.2 Climate Trends and Future Precipitation

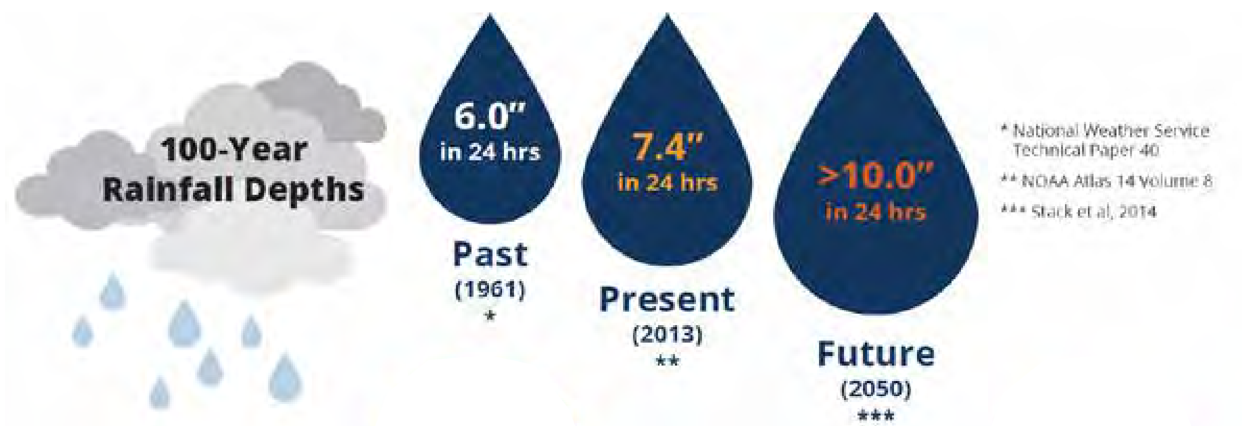
Even with wide variations in climate conditions, climatologists have found four significant recent climate trends in the Upper Midwest (Seeley, 2006):

- Warmer winters—decline in severity and frequency of severe cold
- Higher minimum temperatures
- Higher dew points
- Changes in precipitation trends – more rainfall is coming from heavy thunderstorm events and increased snowfall

According to NOAA's 2013 assessment of climate trends for the Midwest (NOAA, 2013), annual and summer precipitation amounts in the Midwest are trending upward, as is the frequency of high intensity storms. Higher intensity precipitation events typically produce more runoff than lower intensity events with similar total precipitation amounts; higher rainfall intensities are more likely to overwhelm the capacity of the land surface to infiltrate and attenuate runoff. Precipitation records in the Twin Cities area show that the average annual precipitation has increased by roughly 20% (5.5 inches), from 1951 through 2012 (NOAA, 2012).

Recent work completed by Latham Stack and Michael Simpson (NOAA, 2014) provides information required to consider long-term extreme weather trends in the Twin Cities area. The study of long-term extreme weather trends found that precipitation amounts are predicted to increase significantly over what is historically used in floodplain assessments and infrastructure design. A range of estimates for the mid-21st century 100-year 24-hour rainfall event were identified. The lower estimate for the mid-21st century 100-year 24-hour rainfall estimate was approximately 7.3 inches, which is similar to the current mean 100-year rainfall depth published in Atlas 14 (7.4 inches). The middle estimate is 10.2 inches, which is similar to the upper limits of the Atlas 14 90-percent confidence limits. Upper estimates of mid-21st century 100-year 24-hour rainfall exceed the 90-percent confidence limits of Atlas 14.

Increasing precipitation amounts place greater stress on natural resources and stormwater infrastructure, and increase flood risk. The District has and will continue to consider potential climate changes in its evaluation and management of flood risk (see Section 5.9.2).



NOAA determined the rainfall depth associated with a 100-year storm, which has a 1% chance of occurring in any given year, has increased from 6.0 inches to 7.4 inches as more rainfall data are collect. Research suggests that by mid-century this depth could increase to over 10 inches.

5.2 Topography

Detailed topography of the District is available through the Minnesota Department of Natural Resources' 2011 LiDAR data (MDNR, 2011). Topography within the District includes very flat to moderately rolling topography with some areas of steep slopes. Elevations vary from a maximum of approximately 1,080 feet in the headwaters of the

Riley Creek watershed to a minimum of approximately 690 feet at the Minnesota River. Figure 5-1 shows surface elevation based on the LiDAR data.

The District's topography may generally be divided into three geographic categories.

The most northern portion of the District, north of Trunk Highway 7 in the Purgatory Creek watershed, is relatively flat with poorly defined drainage patterns. Most of the drainage in this area is a result of agricultural drain systems installed in the 1920s. In 1977, the City of Minnetonka undertook a project that improved the drainage facilities in the Trunk Highway 7 and Trunk Highway 101 area.

The eastern and central portions of the District, including the downstream areas of the Riley Creek and Purgatory Creek watersheds, are characterized by gently rolling upland areas with well-defined drainage patterns and floodplain areas. Much of the floodplain through this portion of the District is marsh and wetland. Most of the District-managed lakes are located within the central portion of the District.

The southern and western portions of the District, including nearly all of the Bluff Creek watershed, are dominated by a part of the northern bluff of the Minnesota River valley. Riley Creek, Purgatory Creek, and Bluff Creek have eroded deep channels as they flow from the top of the bluff, at elevations ranging from 820 to 950 to the Minnesota River floodplain at an elevation of 700.

WATERSHED TOPOGRAPHY

FIGURE 5-1

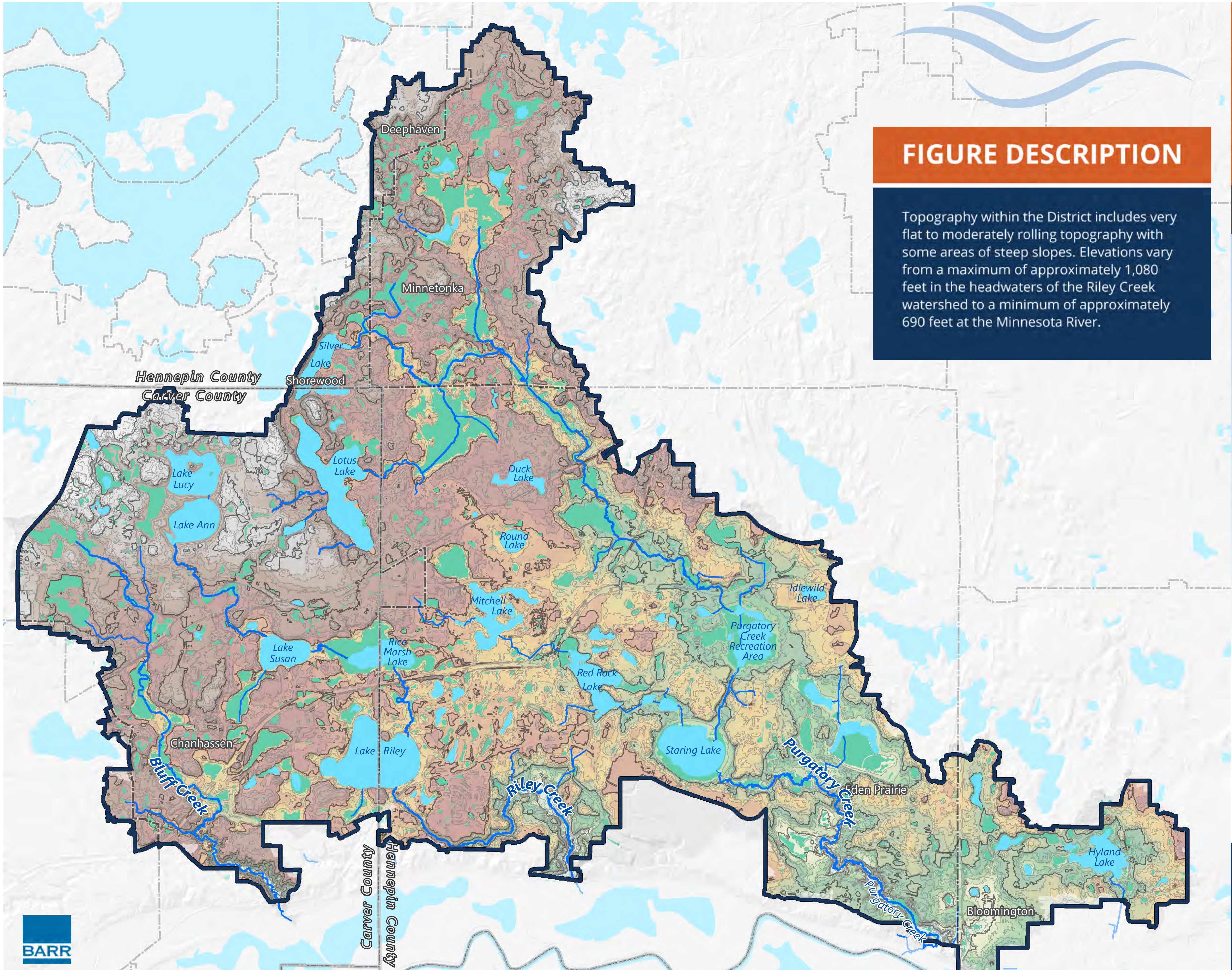


FIGURE DESCRIPTION

Topography within the District includes very flat to moderately rolling topography with some areas of steep slopes. Elevations vary from a maximum of approximately 1,080 feet in the headwaters of the Riley Creek watershed to a minimum of approximately 690 feet at the Minnesota River.

Surface Elevation (MnDNR LiDAR, 2011)
- 50 Foot Contour
- 10 Foot Contour

Surface Elevation
- High: 1,120 Feet
- Low: 700 Feet

- Streams/Creeks
- Lake/Pond
- Wetlands
- District Legal Boundary
- Municipalities

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RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

Barr Footer: ArcGIS 10.6, 2018-06-27 13:05 File: I:\Client\RPBC_WD\Work_Orders\2016_TO16_Plan_Update\Maps\Reports\Plan_2017\Section_5\Fig 5-01 Watershed Topography.mxd User: EMA

5.3 Land Use

Land use can be a significant factor in stormwater management, as increased impervious area results in increased rate and volume of stormwater runoff from precipitation. The Metropolitan Council maintains spatial datasets for existing (2010) and estimated future (2030) land use for the Twin Cities Metropolitan Area. Most of the land in the RPBCWD is now fully developed. Figure 5-2 shows the land use within the RPBCWD as of 2010. Single family residential land use is the major land use within the District, occupying approximately 45% of the land area. Park, recreational, or preserve land uses occupy 14% of the watershed. Approximately 12% of the watershed was classified as undeveloped in 2010 (note that the "undeveloped" land use designation may include undevelopable land such as wetlands. Most of the undeveloped land is within the Bluff Creek and Purgatory Creek watersheds).

Estimated future land use shown in Figure 5-3 illustrates fully developed conditions in the watershed. Because the watershed is mostly developed, future changes in land use are increasingly likely to occur in the form of redevelopment. Knowledge of estimated future land use is useful to identify areas where redevelopment might offer opportunities for additional stormwater treatment or retrofits of existing stormwater infrastructure. The comprehensive plans for cities within the RPBCWD contain more information about these future redevelopment areas.

Anticipated changes in land use throughout the District are summarized in Table 5-2. Significant changes include:

- Development of remaining undeveloped spaces
- Loss of nearly all remaining agricultural land use from the Bluff Creek and Riley Creek watersheds
- Increased commercial and office land use in the Bluff Creek, Purgatory Creek, and Riley Creek watersheds
- Creation of additional park, recreational, and conservation land uses
- Increased residential land use, primarily in the Bluff Creek and Riley Creek watersheds

Table 5-2 Land Use Changes within the RPBCWD

Land Use[1]	2010 Land Use[2]		2030 Land Use[2]		Change
	Acres	%	Acres	%	Acres
Airport	530	1.7%	598	2.0%	69
Agricultural	671	2.2%	3	0.0%	-668
Commercial/Office	1,161	3.8%	2,323	7.6%	1,162
Golf Course	771	2.5%	479	1.6%	-292
Industrial	840	2.7%	676	2.2%	-164
Institutional	977	3.2%	398	1.3%	-580
Mixed Use	32	0.1%	183	0.6%	151
Open Water	2,000	6.5%	1,974	6.5%	-25
Park, Recreational, or Conservation	4,227	13.8%	5,258	17.2%	1,030
Multifamily Residential	566	1.9%	397	1.3%	-169
Single Family Residential	14,020	45.9%	17,152	56.1%	3,132
Right-of-Way	981	3.2%	1,134	3.7%	153
Undeveloped	3,799	12.4%	0	0.0%	-3,799
Total	30,575	100%	30,575	100%	0

[1] Land use classifications differ from 2010 and 2030 datasets. Similar land uses have been grouped for comparison purposes

[2] Data from Metropolitan Council

METROPOLITAN COUNCIL LAND USE (2010)

FIGURE 5-2

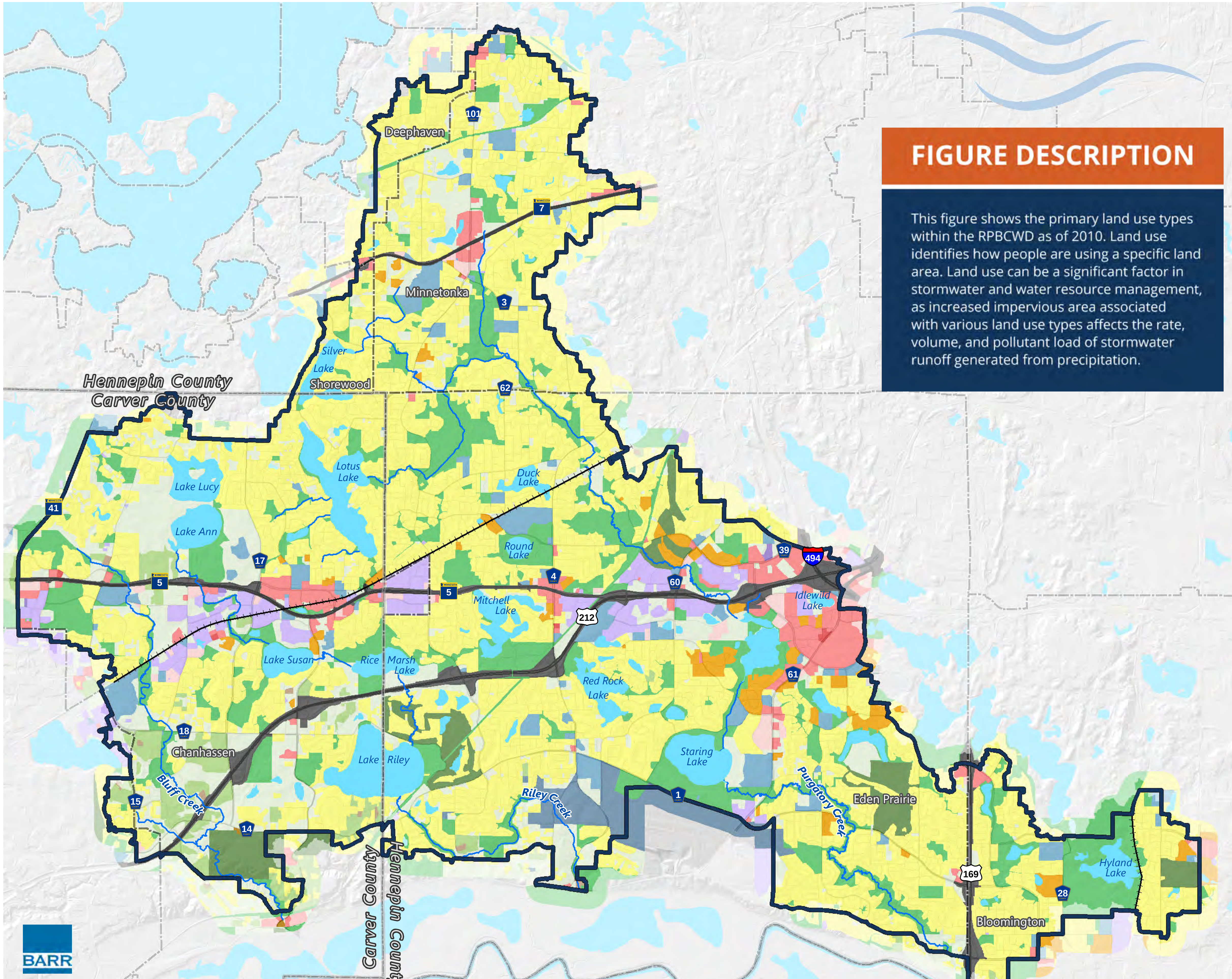

FIGURE DESCRIPTION

This figure shows the primary land use types within the RPBCWD as of 2010. Land use identifies how people are using a specific land area. Land use can be a significant factor in stormwater and water resource management, as increased impervious area associated with various land use types affects the rate, volume, and pollutant load of stormwater runoff generated from precipitation.

District Legal Boundary

2010 Land Use (MetCouncil)

- Farmstead
- Single Family
- Multifamily
- Retail and Other Commercial
- Office
- Mixed Use Residential
- Mixed Use Industrial
- Mixed Use Commercial
- Industrial and Utility
- Institutional
- Park, Recreational or Preserve
- Golf Course
- Major Highway
- Airport
- Agricultural
- Undeveloped
- Water

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RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

METROPOLITAN COUNCIL LAND USE (2030)

FIGURE 5-3

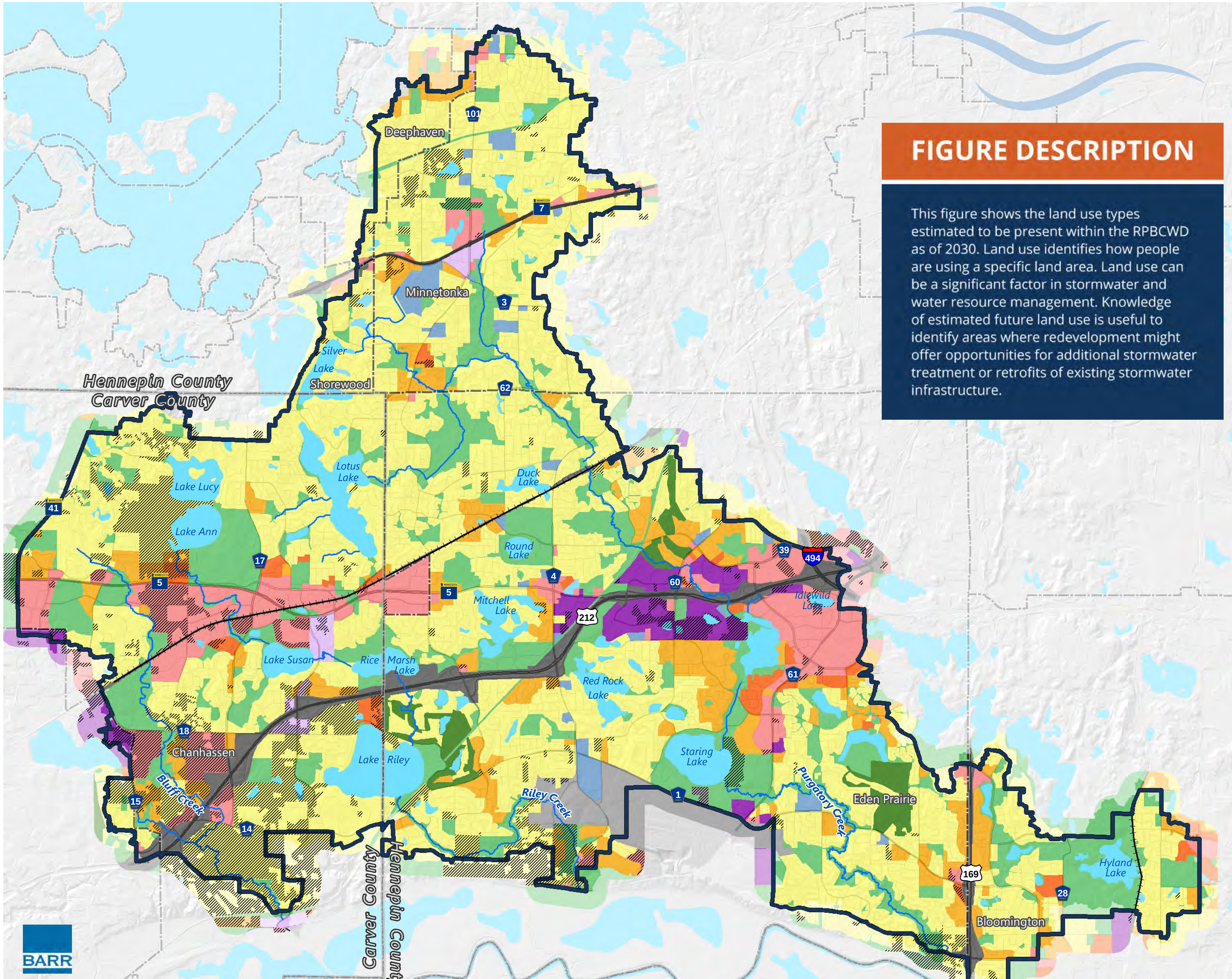

FIGURE DESCRIPTION

This figure shows the land use types estimated to be present within the RPBCWD as of 2030. Land use identifies how people are using a specific land area. Land use can be a significant factor in stormwater and water resource management. Knowledge of estimated future land use is useful to identify areas where redevelopment might offer opportunities for additional stormwater treatment or retrofits of existing stormwater infrastructure.

- District Legal Boundary
- Future Land Use Change

Future 2030 Land Use (MetCouncil, 2017)

- Residential - Low Density
- Residential - Medium Density
- Residential - High Density
- Mixed Use
- Commerical/Office Space
- Industrial
- Institutional/Religious
- Park, Recreational or Conservation
- Golf Course
- Open Water or Wetland
- Airport
- Transportation Right-of-Way

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RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

5.4 Soils

The distribution of soil types in the District is the direct result of glacial action. The soils of the area consist primarily of till and outwash materials deposited by Late Wisconsinan glaciations and more recent organic, lacustrine, and alluvial deposits. This advance, known as the Grantsburg Sublobe of the Des Moines Lobe, is primarily responsible for the topography and surficial geology of the watershed and deposited grey drift over the area approximately 10,000 years ago. Near the surface, this material appears brown because of the oxidation; however, in deeper reaches it has a distinctive grey coloring. The moraine areas are typified by rolling hills and depressions usually filled lakes and marshes.

During the period when the glacier receded, there were numerous areas where blocks of ice were left in place while adjacent ice melted or was carried away. In these areas, the presence of ice blocks prevented the deposition of tills and outwash soils. Later, after the deposition of materials had ended, the ice blocks melted, leaving depressions in the landscape. These depressions filled with water, resulting in the lakes and basins which prevail throughout the District.

Soil boring information in the area indicates that the subsurface soils are intermixed and are spatially heterogeneous. Many soil borings indicate layers of sand beneath the grey till which indicates the area had been subjected to outwash conditions prior to the last deposition of till over the surface. Surface soil composition may impact water resources by affecting infiltration capacity, runoff rates, and erosion potential (see Section 5.4.1).

Additional soils information for the District is available in the soil surveys for Hennepin County and Carver County published by the NRCS and available from the NRCS website at: https://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=MN

The NCRS regularly updates soils data and maintains an online soils data viewing tool at: https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

5.4.1 Hydrologic Soil Groups and Infiltration

Soil composition, slope, and land management practices determine the impact of soils on water resource issues. Infiltration capacities of soils affect the amount of direct runoff resulting from rainfall. Higher infiltration rates result in lower potential for runoff from the land, as more precipitation is able to enter the soil. Conversely, soils with low infiltration rates produce high runoff volumes and high peak discharge rates, as most or all of the rainfall moves as overland flow.

The NRCS has established four general hydrologic soil groups based on infiltration rate:

- Group A Low runoff potential—high infiltration rate
- Group B Moderate infiltration rate
- Group C Slow infiltration rate
- Group D High runoff potential—very slow infiltration rate

Soils may also be classified as types A/D, B/D, and C/D, with the first letter describing the soil infiltration rate in drained conditions and the "D" identifying very low infiltration rates under saturated, or undrained, conditions. Combined with land use, the hydrologic soil grouping symbols (A-D) may be used to estimate the amount of runoff that will occur over a given area for a particular rainfall amount. The most current soils data for the RPBCWD watershed are based on the Soil Survey Geographic dataset (SSURGO) from the NRCS and are presented in Figure 5-4.

Of the total watershed area, Type A soils occupy 19 percent, Type B occupy 25 percent, Type C occupy 23 percent, and Type C/D soils occupy 21 percent. The remaining area is made up of A/D and B/D soils. Generally, the sandy Type A soils are more prevalent in the south and southeastern portions of the watershed. The finer-grained Type B, C, and C/D soils are widely found in the western half of the district in the Bluff and Riley Creek watersheds, but also along the more upstream reaches of Purgatory Creek. Approximately 10 percent of the District is classified as "Not Rated/Not Available" in the SSURGO dataset. This classification is typically assigned to areas where development has altered the existing soil or data were unavailable prior to development; hydrologic soil groups or infiltration rates are typically not determined after development.

Overall, infiltration rates within the district are moderately low, owing to the prevalence of type C and D soils. However, the hydrologic soil groups map (Figure 5-4) provide only general guidance about the infiltration capacity of the soils throughout the watershed. Soils should be inspected on a site-by-site basis as projects are considered.

HYDROLOGIC SOIL GROUPS

FIGURE 5-4

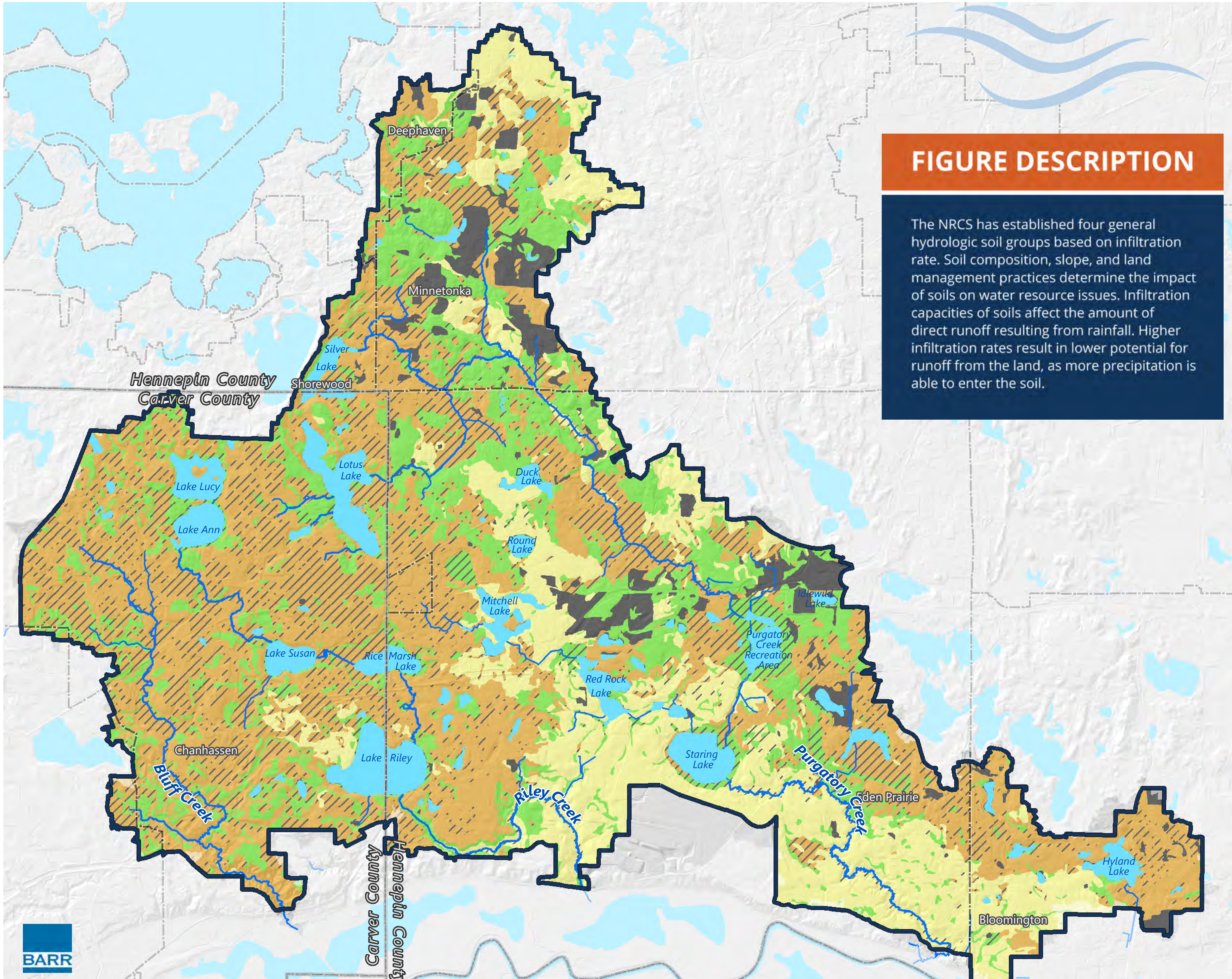

FIGURE DESCRIPTION

The NRCS has established four general hydrologic soil groups based on infiltration rate. Soil composition, slope, and land management practices determine the impact of soils on water resource issues. Infiltration capacities of soils affect the amount of direct runoff resulting from rainfall. Higher infiltration rates result in lower potential for runoff from the land, as more precipitation is able to enter the soil.

NRCS Hydrologic Soil Groups (HSG)

- A - Low Runoff Potential, High Infiltration Rates (gravel or sands)
- A/D*
- B - Moderate Infiltration Rates (sandy loams and loamy sands)
- B/D*
- C - Slow Infiltration Rates (loams, silts, clay loam, etc.)
- C/D*
- Urban Soils - Areas disturbed by development when NRCS conducted survey
- Streams/Creeks
- Lake/Pond
- District Legal Boundary
- Municipalities

** Dual HSG designation indicates infiltration rate in drained and undrained condition.*

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RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

5.5 Geology

The geology of the RPBCWD includes a layer of unconsolidated Quaternary deposits (glacial drift) underlain by multiple layers of bedrock. The glacial drift varies in thickness from between 100- to 150-feet in some areas to over 400 feet in the southeast part of the District, but is between 150- and 250-feet thick throughout most of the district.

The glacial drift is underlain primarily by St. Peter Sandstone in the northern part of the district (i.e., Minnetonka). The Prairie du Chien group (dolomite) underlies most of the rest of the district. The southeastern portion of the District is bisected by two buried erosional valleys below the City of Bloomington. These areas have the thickest overburden and are underlain by Jordan Sandstone and the St. Lawrence and Franconia formations.

More detailed information about the surficial and bedrock geology in the District is available in the Geologic Atlas of Hennepin County (Minnesota Geological Survey (MGS, 1989)) and the Geologic Atlas of Carver County (MGS, 2009). County geologic atlas data is available from the MDNR at:
http://www.dnr.state.mn.us/waters/groundwater_section/mapping/status_list.html

5.6 Groundwater Resources

Nearly all of the residents within the District obtain their drinking water from groundwater. The groundwater system in the District is comprised of the glacial drift water table (i.e., surficial aquifers) and the underlying bedrock aquifers that are partially in an artesian condition, meaning that water in the bedrock is maintained under pressure by confining upper layers.

Did you know?
The Freshwater Society recently published The Water Underground, Stretching Supplies (Jennings, 2017), the second in a three-part series on Minnesota groundwater.

Groundwater flows from high pressure areas to a low pressure areas. For example, in the Duck Lake area of Eden Prairie, the glacial drift water table is at an elevation of approximately 870 and the Jordon pressure is at approximately elevation 840. This indicates that, in the absence of a confining layer, a groundwater flow from the glacial drift to the Jordon Sandstone exists. This situation is reversed along the southern boundary of the District, where the opposite pressure gradient creates flow from the

Jordan aquifer to the glacial drift in this area. In many places along the southern boundary of the District, the Jordan Formation is a source of water to Riley, Purgatory, and Bluff Creeks. The interrelationship between surface water and groundwater resources requires that each resource must be managed with consideration for the other.

5.6.1 Surficial Aquifers (Quaternary Aquifers)

Surficial aquifers (also known as glacial drift aquifers or quaternary aquifers) are water-bearing layers of sediment, usually sand and gravel, which lie close to the ground surface. Many private domestic wells in the watershed draw water from these aquifers. Since the surficial aquifers are more susceptible to pollution, they are generally not used for municipal or public supply wells. In some locations in the RPBCWD, the aquifer could provide sufficient water yield for some non-potable industrial uses. The depth of the water table varies across the watershed, but is on the order of tens of feet. The glacial drift aquifer system includes a buried drift aquifer that is hydrologically separated from the water table aquifer in the western part of the District.

Recharge to the surficial aquifers is primarily through the downward percolation of local precipitation. The ponds, lakes, and wetlands scattered throughout the watershed may also recharge the groundwater, depending on the gradient between the waterbody and local water table. Some of these waterbodies are landlocked and their only outlet is to the groundwater; some landlocked lakes may be perched above the regional level of the shallow groundwater in the watershed. Some surficial aquifers may also be recharged during periods of high stream stage. Surficial aquifers may discharge to local lakes, creeks, or to the underlying bedrock. The nature of surface water and groundwater interactions for specific waterbodies must be evaluated on a case-by-case basis.

Information about quaternary aquifer water table elevation and aquifer yields is available from the Hennepin and Carver County geologic atlas data available from the MDNR at:
http://www.dnr.state.mn.us/waters/groundwater_section/mapping/status_list.html

5.6.2 Bedrock Aquifers

There are four major bedrock aquifers below the District (in order of increasing depth): (1) St. Peter Sandstone, (2) Prairie du Chien-Jordan, (3) Wonewoc Sandstone (formerly Ironton-Galesville Sandstone), and (4) Mt. Simon-Hinckley Sandstone. The Prairie du

Chien-Jordan aquifer is high-yielding, more easily tapped than deeper aquifers, has very good water quality, and is continuous throughout most of the area. This is the most heavily used aquifer within the District.

The potentiometric water level (i.e., the water level if unconfined) in the Prairie du Chien-Jordan aquifer varies from about 750 feet to 850 feet above mean sea level within the RPBCWD ((MGS, 1989) and (MGS, 2009)). The aquifer is recharged in areas where thin permeable drift overlies the limestone layers. Some recharge of this aquifer occurs locally from percolation through the overlying glacial deposits or St. Peter sandstone. However, hydrogeologic characteristics suggest this recharge would be a minimal contribution to the aquifer flow. Regional recharge of the Prairie du Chien-Jordan aquifer occurs to the south of the Minneapolis-St. Paul metropolitan area. Groundwater movement in the aquifer is generally from northwest to southeast. The pressure levels in the Prairie du Chien-Jordan aquifer indicate that, in the absence of a confining layer, a groundwater flow from the glacial drift to the Prairie du Chien-Jordan aquifer exists. The MDNR closely reviews permits for groundwater withdrawals from the Prairie du Chien-Jordan aquifer to ensure that the withdrawals will not cause drawdown effects on nearby water resources of regional significance.

The regional aquifer with the highest water quality is the Mt. Simon-Hinckley aquifer, but it is more expensive to use than the Prairie du Chien-Jordan because of its greater depth. Minnesota statutes limit appropriations from the Mt. Simon-Hinckley aquifer to potable water uses, where there are no feasible or practical alternatives, and where a water conservation plan is incorporated with the appropriations permit. The potentiometric water level of the Mt. Simon-Hinckley ranges from about 650 to 750 feet above mean sea level within the RPBCWD. Recharge of the Mt. Simon-Hinckley takes place north of the District, where the bedrock is closer to the surface, and occurs by percolation through the overlying drift and bedrock. The pattern of flow in the Mt. Simon-Hinckley aquifer differs greatly from the pattern in the overlying Prairie du Chien-Jordan aquifer. Groundwater movement in the aquifer below the District is generally to the northeast towards a cone of depression located northeast of the District and formed by major pumping centers such as public water utilities and private industrial users. In general, the Mt. Simon-Hinckley aquifer has little or no hydraulic connection with the surficial groundwater system or major streams.

More information about bedrock aquifer water table elevation and aquifer yields is available from the Hennepin and Carver County geologic atlas data available from the MDNR at:
http://www.dnr.state.mn.us/waters/groundwater_section/mapping/status_list.html

5.6.3 Wellhead Protection Areas

The Minnesota Department of Health (MDH) is responsible for the protection of groundwater quality and aims to prevent contaminants from entering the recharge zones of public water supply wells through its wellhead protection program. As part of the MDH wellhead protection program the MDH published guidance to limit potential for groundwater contamination and requires cities that obtain drinking water from groundwater to develop well-head protection plans (WHPPs). Each of the communities within the RPBCWD that obtains its municipal water supply from groundwater has an MDH-approved wellhead protection plan (WHPP). Figure 5-5 shows the delineated wellhead protection areas within the RPBCWD.

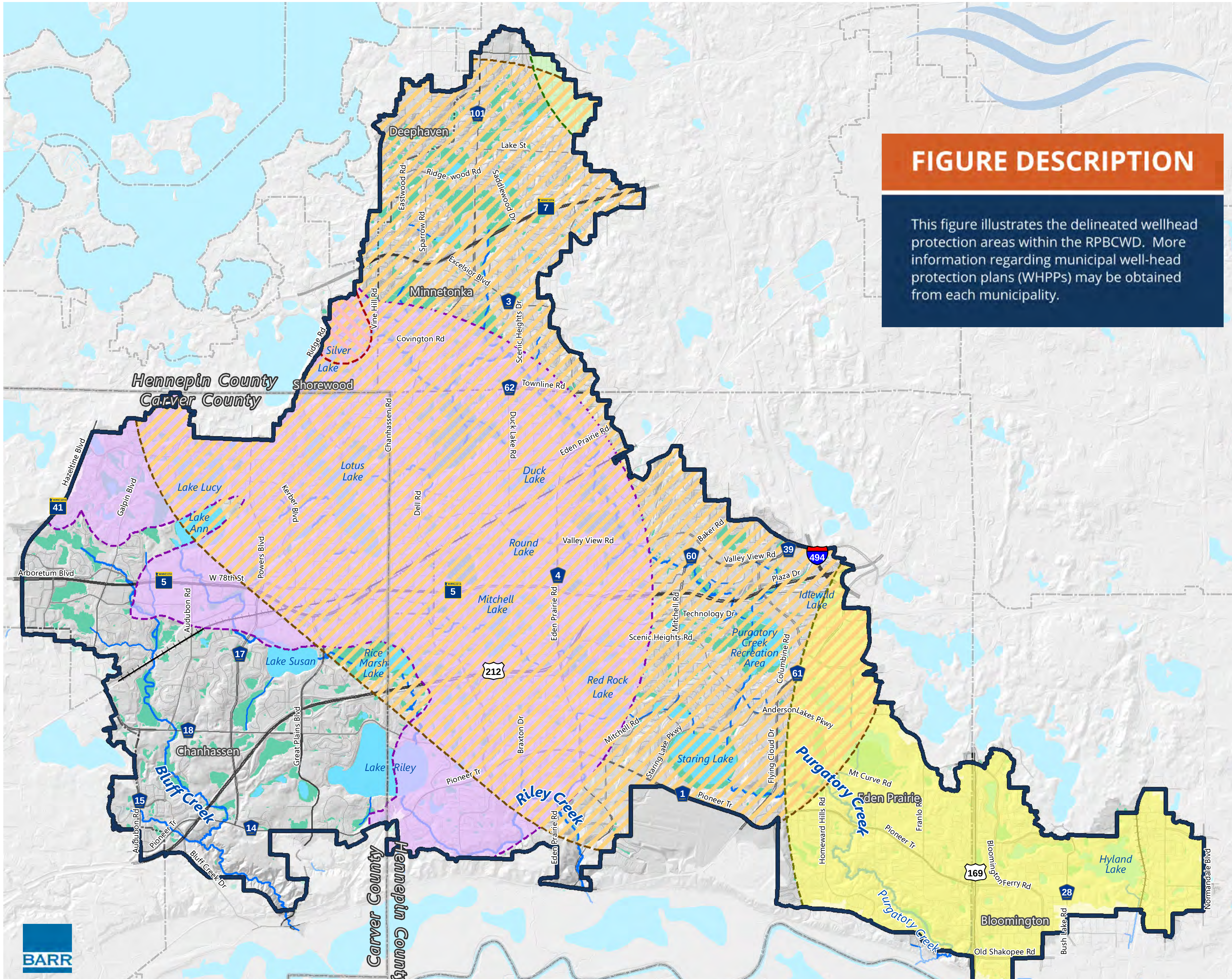
Protecting groundwater quality has become complicated by the increased use of infiltration as a means to improve surface water quality and promote sustainable groundwater supplies. More information regarding municipal WHPPs may be obtained from each municipality. Figure 5-5 shows the delineated wellhead protection areas within the RPBCWD. This diagram illustrates that the WHP areas cover the entire District and that the most of the WHP areas for each city is overlapping.

WELLHEAD PROTECTION AREAS

FIGURE 5-5

FIGURE DESCRIPTION

This figure illustrates the delineated wellhead protection areas within the RPBCWD. More information regarding municipal well-head protection plans (WHPPs) may be obtained from each municipality.



Wellhead Protection Area
- Bloomington
- Shorewood
- Hopkins
- Eden Prairie
- Chanhassen
- Minnetonka
- Streams/Creeks
- Lake/Pond
- Wetlands
- District Legal Boundary
- Municipalities

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RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

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Barr Footer: ArcGIS 10.6, 2018-06-27 13:09 File: I:\Client\RPBC_WD\Work_Orders\2016\TO16_Plan_Update\Maps\Reports\Plan_2017\Section_5\Fig 5-05 Wellhead Protection Areas.mxd User: EMA

5.6.4 County Groundwater Management

5.6.4.1 Carver County Groundwater Plan

Carver County developed a 2016-2025 groundwater management plan (Carver County, 2016) with goals to protect groundwater quality, groundwater supply, and groundwater dependent natural resources to meet current needs without compromising future availability of groundwater resources. The Carver County Groundwater Plan focuses on four key roles: planning, education, cost share, and research and monitoring. Primary objectives included in the plan include:

- Coordinate groundwater quality data resources
- Monitor groundwater quality
- Prevent adverse health impacts
- Coordinate groundwater quantity data resources
- Monitor groundwater quantity, and participate in sub-regional workgroups
- Preserve water supplies and groundwater dependent natural resources
- Increase the County's understanding of groundwater and surface water interactions
- Increase public awareness about groundwater dependent natural resources

District staff participated as a stakeholder in the development of the Carver County Groundwater Plan. The District will continue to cooperate with Carver County, as opportunities allow, to achieve shared groundwater goals. The Carver County Groundwater Plan is available from the Carver County website at: www.co.carver.mn.us/departments/public-services/planning-water-management/planning/plans/groundwater-plan

5.6.5 Hennepin County Plan

Hennepin County addresses groundwater management in the Hennepin County Natural Resources Strategic Plan 2015-2020 (Hennepin County, 2016). An objective of the Hennepin County plan is to protect groundwater resources through strategies including:

- **Support planning and education efforts to protect groundwater resources** - To effectively protect and improve groundwater resources, the county will support cooperative planning efforts that will evaluate existing data, identify additional data needs, and assess the susceptibility of our surface and groundwater resources to current and projected levels of groundwater withdrawal, contamination and other threats.

- **Advocate for the cleanup of contaminated sites with the potential to significantly impact groundwater resources** – The County will evaluate the locations of contaminated sites with the goal of identifying contaminated sites that may pose significant risks to groundwater resources. The county will work with state regulatory agency staff (e.g., MPCA, Minnesota Department of Health), municipalities, and landowners to advocate for the cleanup of sites that pose a high risk to the environment and/or human health.

- **Seal abandoned wells to reduce the potential for groundwater contamination** – The county will continue to provide cost-share grants to landowners, using a combination of county and state funding as available, to seal high-priority abandoned wells that are located within municipal wellhead protection areas or have other environmental factors that increase the potential for contamination.

The District will cooperate with Hennepin County as it implements different parts of its plan and use it to guide watershed management with respect to impact upon groundwater. The Hennepin County Natural Resources Strategic Plan 2015-2020 is available from the Hennepin County website at: www.hennepin.us/naturalresources

5.7 Surface Waters and Drainage Patterns

The drainage system throughout the District is defined and subdivided according to the three major creeks: Bluff Creek, Purgatory Creek, and Riley Creek. Also present in the watershed are numerous wetlands, lakes, ponds and conveyance systems which all eventually drain to the Minnesota River. A subwatershed represents an area of land that drains directly to a common waterbody (or series of connected waterbodies). The major subwatersheds identified in Figure 5-6 are further broken down into minor subwatersheds (not shown) for specific management purposes (e.g., establishing 100-year flood levels, estimating pollutant loading).

Waterbodies and drainage patterns within each of the major subwatersheds are discussed in greater detail within the watershed sections for Bluff Creek (Section 6.0), Purgatory Creek (Section 7.0), and Riley Creek (Section 8.0). Many of the waterbodies within the District also fall under the regulatory jurisdiction of other agencies with their own classification systems and management roles.

5.7.1 Judicial and County Ditches

Judicial ditches and county ditches are public drainage systems. They are established under Chapter 103E of Minnesota Statutes and are under the jurisdiction of the county. Per Minnesota Statutes section 383B.61, cities or watershed management organizations (WMOs) within Hennepin County may petition the county to transfer authority over public ditches to the city or WMO.

Historically there were five county ditches and two judicial ditches in the District. The location of each ditch is shown on Figure 5-7. The original function of public ditches was to provide drainage for agricultural lands. The seven county and judicial ditches within the watershed were divided into three general systems. Judicial Ditch 2 and County Ditches 38 and 42 formed one system at the source of the main stem of Purgatory Creek within the city of Minnetonka. This ditch system begins immediately north of the Minneapolis and St. Louis Railroad right-of-way and extends to the headwall structure in Purgatory Creek located approximately 500 feet south of Hennepin County Road 3. A second system comprised of Judicial Ditch 3 and County Ditch 43 was located immediately south of Trunk Highway 5 in the city of Eden Prairie. Judicial Ditch 3 historically formed the main channel of Purgatory Creek between Trunk Highway 5 and Staring Lake. With the completion of the Purgatory Creek Park project in the early 2000's the portion upstream from the Purgatory Creek park outlet structure was abandoned. The third ditch system, comprised of County Ditch 36 and County Ditch 37, is located in the Neill Lake area in the city of Eden Prairie. A small portion of this system forms a part of the main channel of Purgatory Creek.

There are no county or judicial ditches in the Riley Creek or Bluff Creek Watersheds. Some of the systems shown as public ditches are no longer in existence, but the public ditch designation has not been removed.

5.7.2 Public Waters (Minnesota Department of Natural Resources)

Figure 5-7 shows the MDNR public waters within District. The MDNR designates certain water resources as public waters to indicate those lakes, wetlands, and watercourses over which the MDNR has regulatory jurisdiction. By statute, the definition of public waters includes both “public waters” and “public waters wetlands.” The collection of public waters and public waters wetlands designated by the MDNR is generally referred to as the public waters inventory, or PWI.

Public waters are all waterbasins and watercourses that meet the criteria set forth in Minnesota Statutes section 103G.005, subdivision 15 that are identified on public water inventory maps and lists authorized by Minnesota Statutes section 103G.201. Public waters wetlands include all type 3, type 4, and type 5 wetlands, as defined in U.S. Fish and Wildlife Service Circular No. 39, 1971 edition, that are 10 acres or more in size in unincorporated areas or 2.5 acres or more in size in incorporated areas (see Minnesota Statutes section 103G.005, subdivisions 15a and 17b.)

RPBCWD MAJOR SUBWATERSHEDS

FIGURE 5-6

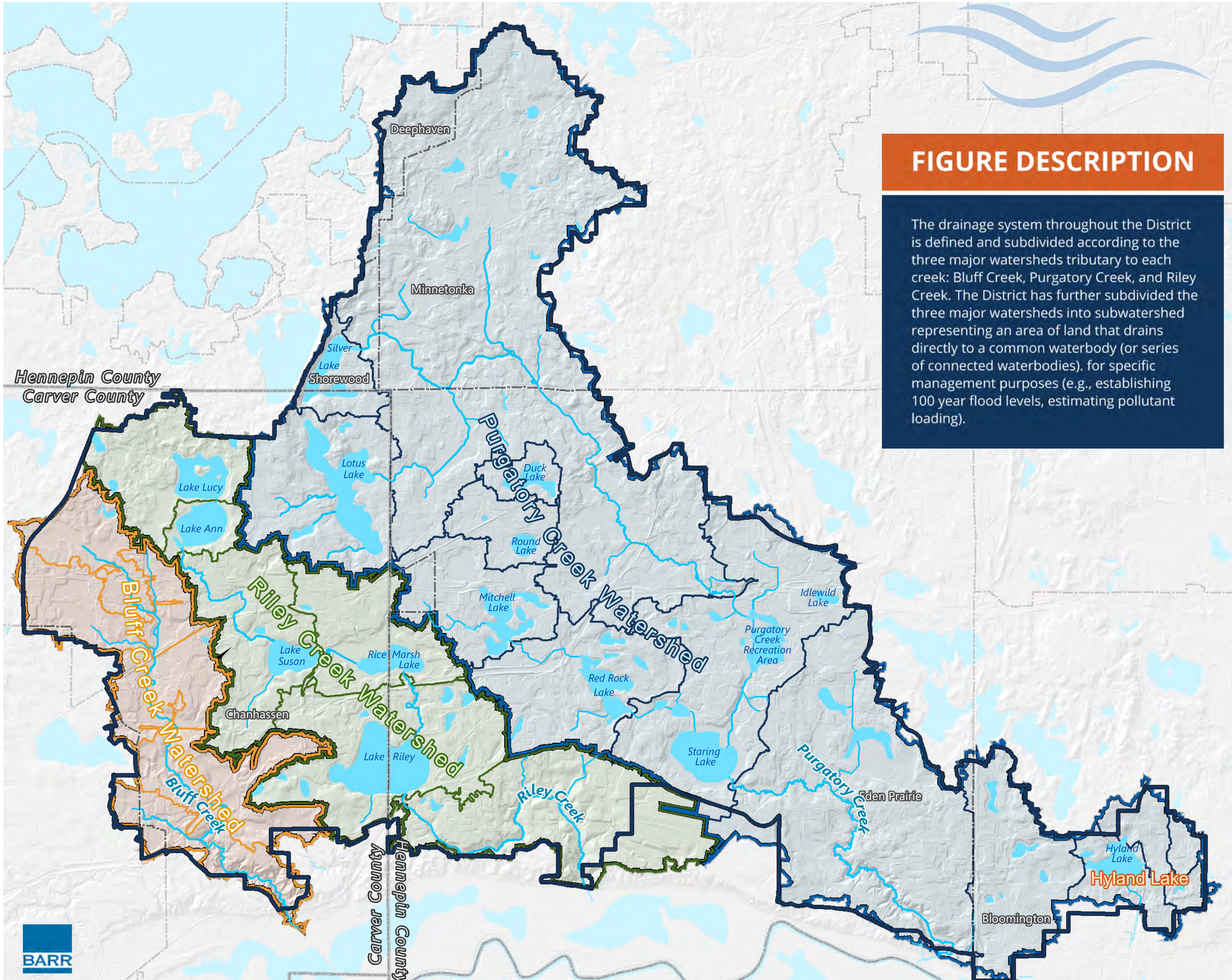

FIGURE DESCRIPTION

The drainage system throughout the District is defined and subdivided according to the three major watersheds tributary to each creek: Bluff Creek, Purgatory Creek, and Riley Creek. The District has further subdivided the three major watersheds into subwatershed representing an area of land that drains directly to a common waterbody (or series of connected waterbodies). for specific management purposes (e.g., establishing 100 year flood levels, estimating pollutant loading).

Major Watersheds

- Bluff Creek
- Riley Creek
- Purgatory Creek
- Streams/Creeks
- Lake/Pond
- District Legal Boundary
- Municipalities

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RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Barr Footer: ArcGIS 10.6, 2018-06-27 13:11 File: I:\Client\RPBC_WD\Work_Orders\2016\TO16_Plan_Update\Maps\Reports\Plan_2017\Section_5\Fig 5-06 RPBCWD Major Subwatersheds.mxd User: EMA

MDNR PUBLIC WATERS AND PUBLIC DITCHES

FIGURE 5-7

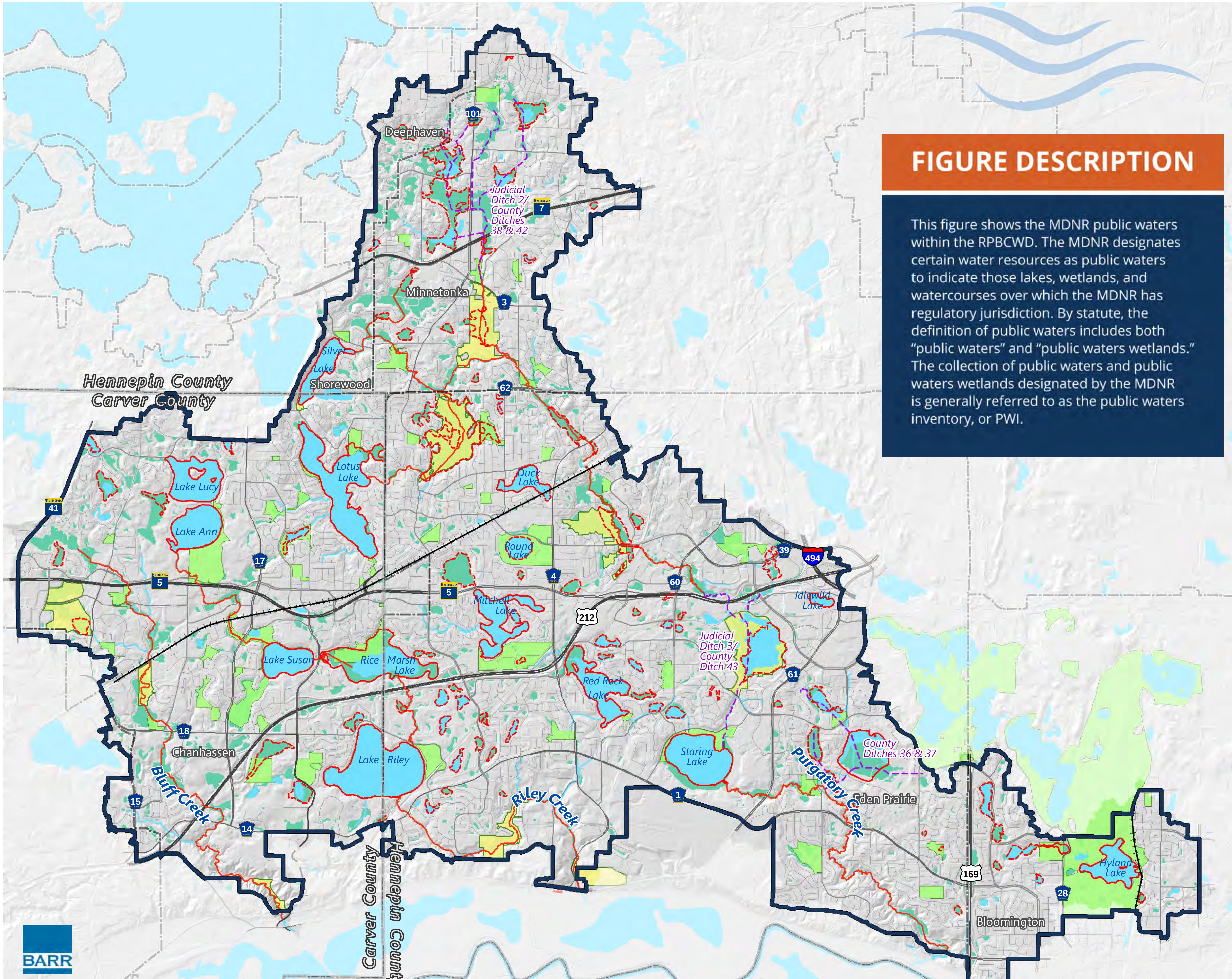

FIGURE DESCRIPTION

This figure shows the MDNR public waters within the RPBCWD. The MDNR designates certain water resources as public waters to indicate those lakes, wetlands, and watercourses over which the MDNR has regulatory jurisdiction. By statute, the definition of public waters includes both "public waters" and "public waters wetlands." The collection of public waters and public waters wetlands designated by the MDNR is generally referred to as the public waters inventory, or PWI.

MDNR Public Waters Inventory

- Public Water: Basin
- Public Water: Wetland
- Public Water: Intermittent or Perennial Stream
- Judicial/County Ditch
- Park/Playground
- Preserve/Recreation Area
- Streams/Creeks
- Lake/Pond
- Wetlands
- District Legal Boundary
- Municipalities

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The MDNR uses county-scale maps to show the general location of the public waters and public waters wetlands under its regulatory jurisdiction. These maps are commonly known as public waters inventory (PWI) maps. PWI maps also show public waters watercourses and ditches. The regulatory boundary of these waters and wetlands is called the ordinary high water level (OHWL). A MDNR permit is required for work within designated public waters. PWI maps are available on a county-by-county basis. Additionally, county-by-county lists of these waters are available in tabular form. The MDNR also maintains a web-based mapping tool for viewing PWI maps. The PWI maps and lists are available on the MDNR's website:
http://www.MDNR.state.mn.us/waters/watermgmt_section/pwi/maps.html

5.8 Water Quality

The lakes, ponds, streams, and wetlands of the RPBCWD watershed are important community assets. These resources supply aesthetic and recreational benefits, in addition to providing wildlife and fisheries habitat and refuge. The District recognizes the need for good water quality in the waterbodies in its jurisdiction, including groundwater, and has taken steps to protect and improve these resources. These steps include adopting water quality management goals and strategies, collecting water quality data, participating in developing TMDLs, developing an implementation program to meet District water quality goals, establishing water quality performance standards, and reviewing proposed projects for conformance with District rules.

Stormwater runoff carries with it a number of contaminants affecting water quality. The principal pollutants found in runoff include nutrients, sediments, organic materials, pathogens, hydrocarbons, metals, pesticides, chlorides, trash and debris.

Table 5-3 summarizes the source of these pollutants and their impacts. Of these pollutants, the RPBCWD recognizes that phosphorus and suspended sediment are particularly detrimental to the ecological health and recreational use of lakes and streams. The District has established rules intended to minimize the impact of development and redevelopment activity on water quality.

Table 5-3 Pollutants Commonly Found in Stormwater Runoff

Stormwater Pollutant	Examples of Sources	Related Impacts
Nutrients: Nitrogen, Phosphorus	Decomposing grass clippings, leaves and other organics, animal waste, fertilizers, failing septic systems, atmospheric deposition	Algal growth, reduced clarity, other problems associated with eutrophication (oxygen deficit, release of nutrients and metals from sediments)
Sediments: Suspended and Deposited	Construction sites, other disturbed and/or non-vegetated lands, eroding streambanks and shorelines, road sanding	Increased turbidity, reduced clarity, lower dissolved oxygen, deposition of sediments, smothering of aquatic habitat including spawning sites, sediment and benthic toxicity
Organic Materials	Leaves, grass clippings	Oxygen deficit in receiving waterbody, fish kill, release of nutrients.
Pathogens: Bacteria, Viruses	Domestic and wild animal waste, failing septic systems	Human health risks via drinking water supplies, contaminated swimming beaches
Hydrocarbons: Oil and Grease, PAHs (Naphthalenes, Pyrenes)	Tar-based pavement sealant, industrial processes; automobile wear, emissions & fluid leaks; waste oil.	Toxicity of water column and sediment, bioaccumulation in aquatic species and through food chain
Metals: Lead, Copper, Cadmium, Zinc, Mercury, Chromium, Aluminum, others	Industrial processes, normal wear of auto brake linings and tires, automobile emissions & fluid leaks, metal roofs	Toxicity of water column and sediment, bioaccumulation in aquatic species and through the food chain, fish kill
Pesticides: PCBs, Synthetic Chemicals	Pesticides (herbicides, insecticides, fungicides, rodenticides, etc.), industrial processes	Toxicity of water column and sediment, bioaccumulation in aquatic species and through the food chain, fish kill
Chlorides	Road salting and uncovered salt storage	Toxicity of water column and sediment
Polycyclic Aromatic Hydrocarbons (PAH's)	Tar based pavement sealant	Carcinogenic to humans
Trash and Debris	Litter washed through storm drain networks	Degradation of the beauty of surface waters, threat to wildlife
Based on *Minnesota Urban Small Sites BMP Manual* (Barr Engineering Co., 2001).		

5.8.1 Water Quality Monitoring

A thorough understanding the water quality condition of its waterbodies is critical to developing and carrying out an implementation program that will achieve the District's water quality goals. To that end, the District performs regular water quality monitoring of the lakes and creeks within its jurisdiction.

5.8.1.1 Lake Water Quality Monitoring

Through partnerships with the cities of Chanhassen and Eden Prairie, Three Rivers Park District, the University of Minnesota (UMN), and the Metropolitan Council, the RPBCWD monitors several lakes within the District. Historically, this has included:

Purgatory Creek Watershed	Riley Creek Watershed	Bluff Creek Watershed
· Silver Lake · Lotus Lake · Duck Lake · Round Lake · Mitchell Lake · Red Rock Lake · Staring Lake · Hyland Lake	· Lake Lucy · Lake Ann · Lake Susan · Rice Marsh Lake · Lake Riley	There are no lakes in the Bluff Creek watershed.

District lake monitoring includes assessment of chemical water quality (e.g., total phosphorus, nitrogen chlorophyll a, transparency, pH, dissolved oxygen, conductivity), and water clarity (Secchi disc transparency). Regular lake sampling is conducted on each lake approximately every two weeks throughout the growing season (June-September). Beginning in 2013, the District began taking monthly samples from the Riley Chain of Lakes and stormwater ponds draining into Purgatory Creek during winter/early spring months (January-April) to monitor chloride levels. Lake water quality monitoring locations are shown in Figure 5-8.

In addition to chemical water quality, lake levels are continuously recorded from ice out to ice in. Lake water samples are also collected and analyzed in early summer for the presence of zebra mussel veligers. Additionally, during every sampling event, boat launch areas and zebra mussel monitoring plates are scanned for adult zebra mussels. Zooplankton samples are also collected on lakes to assess the overall health of the population as it applies to the fishery and water quality. Plant surveys are also conducted to assess overall health of the plant community and to search for invasive plants.

The District evaluates lake water quality data for statistically significant trends and compares the data against applicable Minnesota Pollution Control Agency (MPCA) eutrophication water quality standards (see Section 5.8.2). Lake monitoring methods and data collected by the District is published in annual reports available from the District website at: www.rpbcwd.org.

RPBCWD MONITORING LOCATIONS

FIGURE 5-8

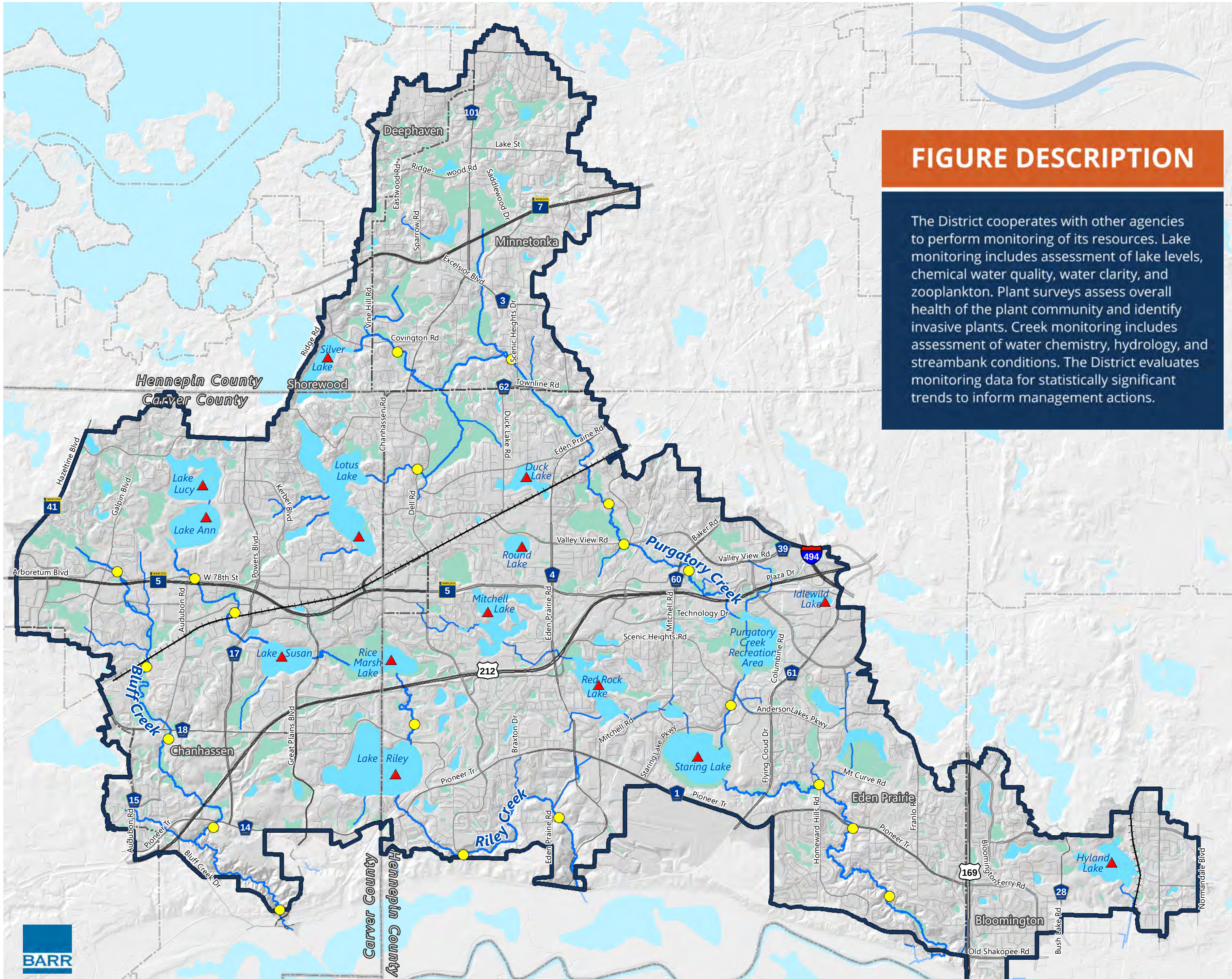

FIGURE DESCRIPTION

The District cooperates with other agencies to perform monitoring of its resources. Lake monitoring includes assessment of lake levels, chemical water quality, water clarity, and zooplankton. Plant surveys assess overall health of the plant community and identify invasive plants. Creek monitoring includes assessment of water chemistry, hydrology, and streambank conditions. The District evaluates monitoring data for statistically significant trends to inform management actions.

Monitoring Location*

- Creek
- Lake
- Streams/Creeks
- Lake/Pond
- Wetlands
- District Legal Boundary
- Municipalities

* Project specific monitoring is also conducted at project locations as needed.

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RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

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5.8.1.2 Creek Water Quality Monitoring

The District works with the Metropolitan Council to monitor the water quality and condition of Bluff Creek, Purgatory Creek, and Riley Creek. The District collects water quality samples as several locations on each creek approximately twice per month from April through September. Stream flow and velocity are also measured during each monitoring event. The Metropolitan Council also has continuous monitoring stations near the outlet of each creek as part of its long-term watershed outlet monitoring program (WOMP) which identifies pollutant loads.

In addition to water quality monitoring, creek walks are also conducted to gather more information about the current stream conditions in the District. This information is included in the District's Creek Restoration Action Strategy (CRAS), which was developed by the District to identify and prioritize future stream restoration sites. Bank pin data is also collected near each of the water quality monitoring sites to measure generalized sedimentation and erosion rates across all three streams.

The District evaluates stream water quality data for statistically significant trends and compares the data against applicable Minnesota Pollution Control Agency (MPCA) eutrophication water quality standards (see Section 5.8.2). Stream monitoring methods and data collected by the District is published in annual reports available from the District website at: www.rpbcwd.org.

5.8.2 Water Quality Standards and Impaired Waters

The federal Clean Water Act (CWA) requires states to adopt water quality standards to protect the nation's waters. In Minnesota, the MPCA developed eutrophication criteria for lakes and streams to establish water quality goals and determine appropriate uses of the lakes and streams, as outlined in the guidance document *Guidance Manual for Assessing the Quality of Minnesota Surface Waters for Determination of Impairment: 305(b) Report and 303(d) List* (MPCA, 2016).

Standards for lakes vary by MPCA ecoregion and whether the MPCA classifies a lake as "shallow" or "deep." The MPCA defines "shallow" lakes as having a maximum depth of 15 feet or less or having at least 80% of the lake area shallow enough to support aquatic plants. The MPCA's listing of waterbodies on the impaired waters 303(d) list depends upon their classification of a waterbody as a wetland, shallow lake, or deep lake. Generally, the MPCA does not list waterbodies classified as wetlands as impaired for biological indicators. Eutrophication-related water quality standards applicable to RPBCWD waterbodies are presented in Table 5-4.

The MPCA also established water quality standards for parameters in addition to those presented in Table 5-4; these standards are published in Minnesota Rules chapter 7050 and are applicable to District lakes, ponds, and streams. Standards for several parameters included in Minnesota Rules chapter 7050 vary according to the MPCA-determined designated use of the waterbody (e.g., drinking water, industrial use).

In compliance with Section 303(d) of the CWA, the MPCA identifies and establishes priority rankings for waters that do not meet the water quality standards. The list of impaired waters, sometimes called the 303(d) list, is updated by the MPCA every 2 years.

Several waterbodies within the District have been listed on the MPCA impaired waters (303(d)) list for a variety of impairments. Waterbodies on the impaired waters list are required to have an assessment completed that addresses the causes and sources of the impairment. This process is known as a total maximum daily load (TMDL) analysis. The TMDL analysis include target goals for water quality improvement. A Watershed Restoration and Protection Strategy (WRAPS) is currently underway and is expected to be completed in 2018. The WRAPS includes information from the TMDL. The study monitors, analyses the data and develops strategies to restore and protect the water resources. The study also identifies partners who would be responsible in restoration efforts.

Bluff Creek, Riley Creek, and six lakes within the RPBCWD are included on the MPCA's 2016 impaired waters 303(d) list. The MPCA's draft 2018 impaired waters 303(d) list will include new impairments a Purgatory Creek below Staring Lake and, Rice Marsh Lake and additional impairments for Lotus Lake, Lake Riley, and Riley Creek. The Minnesota River, located immediately downstream of the District, is also impaired. Locations of impaired waters are shown in Figure 5-9.

Table 5-5 summarizes the impaired waters within and immediately downstream of the RPBCWD. Waterbody specific water quality data, impairments and TMDLs are discussed in greater detail in the major watershed sections for Bluff Creek (Section 6.0), Purgatory Creek (Section 7.0), and Riley Creek (Section 8.0). Current impaired waters listings are available from the MPCA website: www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impaired-waters-and-tmdls/impaired-waters-list.html

Table 5-4 MPCA Water Quality Standards

Water Quality Parameter	Water Quality Standard by MPCA Waterbody Type [1]		
	Shallow Lakes[2]	Deep Lakes[2]	Stream
Total Phosphorus (summer average, µg/L)	60	40	100
Chlorophyll *a* (summer average, µg/L)	20	14	18
Secchi Disc Transparency (summer average, m)	1.4	1.0	NA
Total Suspended Solids (mg/L)	NA	NA	30
Daily Dissolved Oxygen Flux (mg/L)	NA	NA	3.5
Biological Oxygen Demand (5 day) (mg/L)	NA	NA	2
Escherichia coli (# per 100 mL)	126 [3]	126 [3]	126 [3]
Chloride (mg/L)	230	230	230

[1] MPCA standards included in Minn. Rules 7050. Revisions to Minn. Rules 7050 will supersede this table. Note that Minn. Rules 7050.0220 includes standards for additional parameters that are enforced by the MPCA.

[2] Shallow lakes have a maximum depth less than 15 feet or littoral area greater than 80% of the total lake surface area.

[3] 126 organisms per 100 mL as a geometric mean of not less than five samples within any month, nor shall more than 10% of all samples within a month exceed 1,260 organisms per 100 mL.

Table 5-5 Impaired Waters Within and Immediately Downstream of the RPBCWD

Waterbody	Impaired Use	Pollutant or Stressor	Year Listed	TMDL Study Target Start	TMDL Study Target Completion	TMDL Study Approved
Bluff Creek[1]	Aquatic Life	Turbidity	2002	--	--	2013
	Aquatic Life	Fish Bioassessments	2004	--	--	2013
Purgatory Creek[4]	Aquatic Life[4]	Aquatic Macroinvertebrate Bioassessments	2018		2019	
	Aquatic Recreation[4]	Escherichia coli	2018		2019	
Riley Creek	Aquatic Life	Turbidity	2002	2014	2019	--
	Aquatic Life[4]	Aquatic Macroinvertebrate Bioassessments	2018		2019	
	Aquatic Life[4]	Fishes Bioassessments	2018		2019	
	Aquatic Recreation[4]	Escherichia coli	2018		2019	
Lotus Lake	Aquatic Recreation	Nutrients/Eutrophication[6]	2002	2014	2019	--
	Aquatic Consumption	Mercury in Fish Tissue	2002	--	--	2007[2]
	Aquatic Life[4]	Fishes Bioassessments	2018		2019	
Silver Lake	Aquatic Recreation	Nutrients/Eutrophication[6]	2016	2014	2019	--

Waterbody	Impaired Use	Pollutant or Stressor	Year Listed	TMDL Study Target Start	TMDL Study Target Completion	TMDL Study Approved
Round Lake	Aquatic Consumption	Mercury in Fish Tissue	2002	--	--	2008[2]
Mitchell Lake[3]	Aquatic Recreation	Nutrients/Eutrophication[6]	2002	2014	2019	Delisted[3]
Red Rock Lake[3]	Aquatic Recreation	Nutrients/Eutrophication[6]	2002	--	--	Delisted[3]
	Aquatic Consumption	Mercury in Fish Tissue	2002	--	--	2008[2]
Hyland Lake	Aquatic Recreation	Nutrients/Eutrophication[6]	2008	2014	2019	--
Lake Lucy	Aquatic Consumption	Mercury in Fish Tissue	2002	--	--	2007[2]
Lake Ann	Aquatic Consumption	Mercury in Fish Tissue	2002	--	--	2007[2]
Lake Susan	Aquatic Recreation	Nutrients/Eutrophication[6]	2010	2014	2019	--
	Aquatic Consumption	Mercury in Fish Tissue	1998	--	--	2008[2]
Rice Marsh Lake[4]	Aquatic Recreation[4]	Nutrients/Eutrophication[6]	2018[4]	--	2019[4]	--
Lake Riley	Aquatic Recreation	Nutrients/Eutrophication[6]	2002	2014	2019	--
	Aquatic Consumption	Mercury in Fish Tissue[5]	2002	2002	2020	--
	Aquatic Life[4]	Fishes Bioassessments	2018		2019	
Staring Lake	Aquatic Recreation	Nutrients/Eutrophication[6]	2002	2014	2019	--
	Aquatic Consumption	Mercury in Fish Tissue[5]	1998	1998	2025	--
Minnesota River	Aquatic Life	Nutrients/Eutrophication	2016	2014	2019	--
	Aquatic Life	Turbidity	1996	2014	2019	--
	Aquatic Consumption	PCB in Fish Tissue	1998	1998	2025	--
	Aquatic Consumption	Mercury in Water Column	1998	--	--	2008[2]
	Aquatic Consumption	Mercury in Fish Tissue	1998	--	--	2008[2]

[1] Bluff Creek is a "high risk stream" for chloride impairment per the MPCA's 2014 Metro Chloride Assessment, but is not listed as impaired for chloride.

[2] Covered under the statewide mercury TMDL, approved in 2007.

[3] Red Rock Lake was delisted for aquatic recreation due to nutrients/eutrophication in 2016. Mitchell Lake was delisted for aquatic recreation due to nutrients/eutrophication in 2018.

[4] Included on the MPCA's Draft 2018 impaired waters list.

[5] Mercury impairments for Lake Riley and Staring Lake are not covered by the statewide mercury TMDL due to mercury in fish tissue exceeding a threshold value of 0.57 mg/kg.

[6] Lake specific water quality data, impairments, and TMDLs are presented in greater detail in the major watershed sections for Purgatory Creek (Section 7.0) and Riley Creek (Section 8.0). Information used to determine the impairments is available from the MPCA. (www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impaired-waters-and-tmdls/impaired-waters-list.html).

IMPAIRED WATERS

FIGURE 5-9

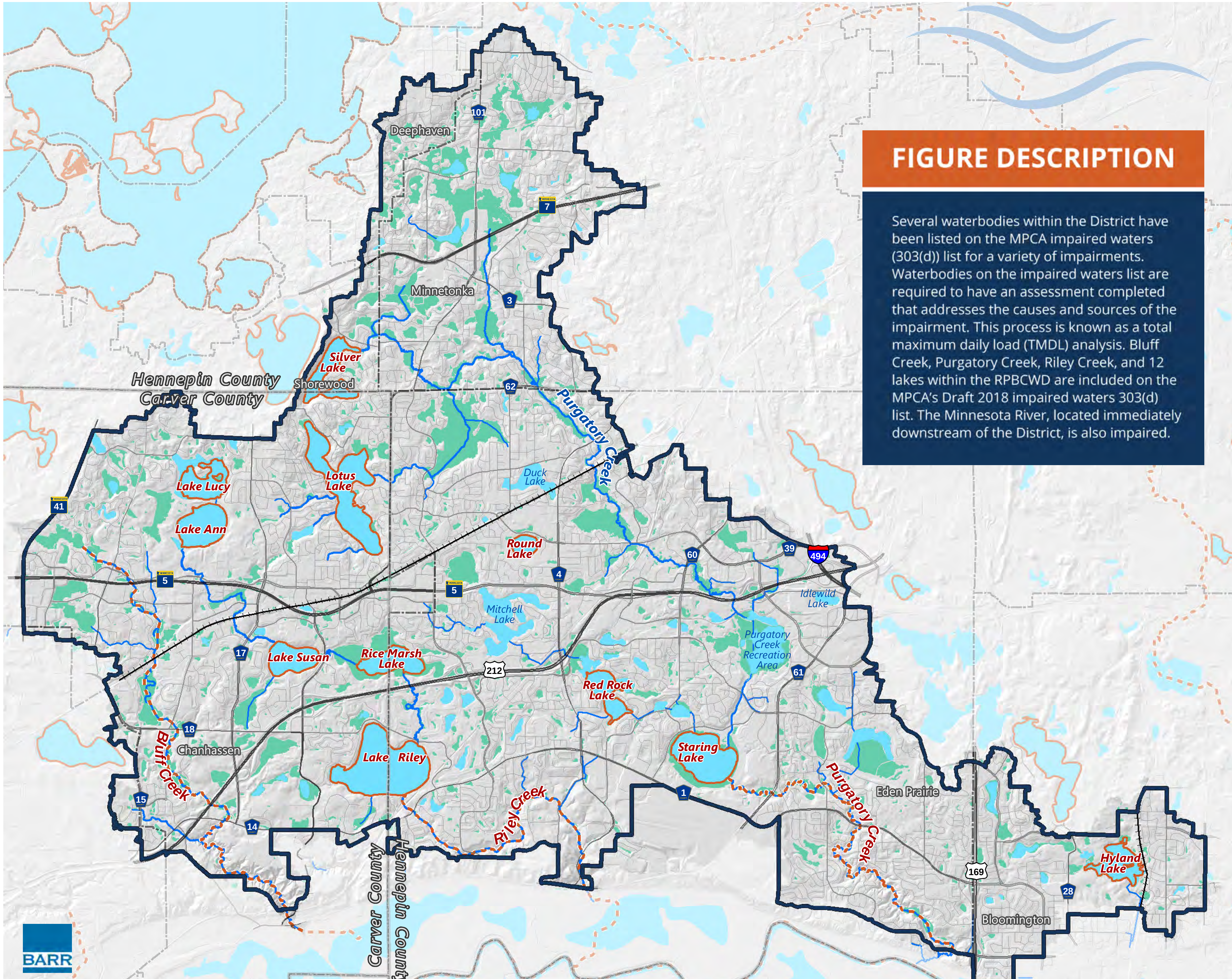

FIGURE DESCRIPTION

Several waterbodies within the District have been listed on the MPCA impaired waters (303(d)) list for a variety of impairments. Waterbodies on the impaired waters list are required to have an assessment completed that addresses the causes and sources of the impairment. This process is known as a total maximum daily load (TMDL) analysis. Bluff Creek, Purgatory Creek, Riley Creek, and 12 lakes within the RPBCWD are included on the MPCA's Draft 2018 impaired waters 303(d) list. The Minnesota River, located immediately downstream of the District, is also impaired.

MPCA 2018 Draft Impaired Waters

- Impaired Lakes
- Impaired Streams
- Streams/Creeks
- Lake/Pond
- Wetlands
- District Legal Boundary
- Municipalities

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RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

5.9 Water Quantity and Floodplains

Since its creation in 1969, the District has addressed water quantity and flood risk issues through capital projects, studies, education, and rules, as well as through cooperative actions with its cities. The District's permitting program address issues such as minimum building elevations and stormwater runoff rate control to prevent or minimize the impact of flooding issues in the future.

The District has cooperated with developers and local municipalities to construct projects to address flooding issues. Many of these projects incorporate secondary benefits for water quality, habitat improvement, or other uses. The District also cooperates with developers and cities to incorporate flood risk reduction elements into projects intended to achieve other primary goals.

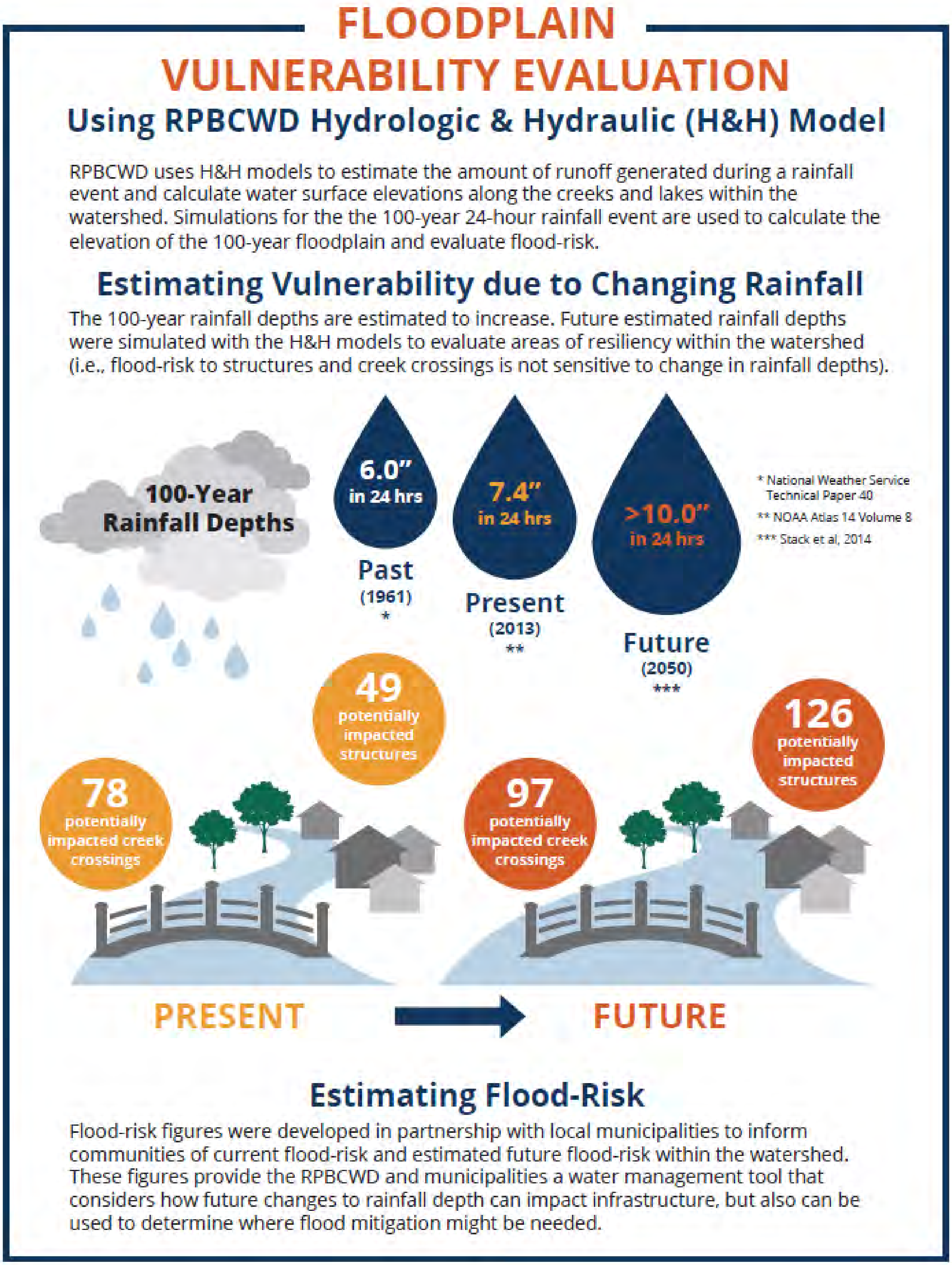
5.9.1 District Floodplains and Flood Risk Mapping

The District establishes 100-year flood levels for all District-managed waterbodies based on hydrologic and hydraulic modeling using Atlas 14 precipitation data (see Section 5.9.2). Model results are used to estimate areas inundated during storm events of varying frequencies (e.g., 100-year floodplain), as well as the cumulative risk of flooding within a 30-year period. The most recent District analysis is published in the *Engineer's Report 100-Year Floodplain Vulnerability Evaluation* (Climate Adaptation) (Barr Engineering Co., 2016) and summarized in Figure 5-10; current inundation mapping is available from the District website at: www.rpbcwd.org.

The District's rules and permitting program (see Section 9.4) references the District floodplain. The District rules define minimum building elevations relative to the District-established 100-year flood levels and require a District permit for activities located within the 100-year floodplain.

Note that the District 100-year water surface elevations published on the District website, or subsequent studies may differ from base flood elevations determined by the Federal Emergency Management Agency (FEMA) for individual waterbodies (in part due to the flood insurance study (FIS) within the District having been adopted prior to the publication of Atlas 14).

Figure 5-10 Floodplain Vulnerability Evaluation



5.9.1.1 FEMA-established Floodplains

The Federal Emergency Management Agency (FEMA) performs flood insurance studies (FIS) and develops floodplain maps to determine areas prone to flooding during the 100-year storm events. The water level corresponding to the 100-year storm event is referred to as the Base Flood Elevation (or BFE) and is the basis for the FEMA-mapped floodplain extent. Each of the cities within the RPBCWD has a FIS. The FIS, together with a city's floodplain ordinance, allow the city to take part in the national flood insurance program (NFIP). Homeowners within FEMA-designated floodplains are required to purchase flood insurance. In some cases, homes within FEMA-designated floodplains on the FEMA floodplain maps may actually not be in the floodplain. To waive the mandatory flood insurance requirements for their homes, residents must remove their homes from the FEMA-designated floodplain by obtaining a Letter of Map Amendment (LOMA). Note that these programs are implemented independently of the District and are described herein for informational purposes.

Additional flooding information is also available from the Flood Insurance Studies (FIS) for the cities within the RPBCWD. FEMA-established floodplains are available from FEMA at: msc.fema.gov/portal.

5.9.2 Water Quantity Modeling

Water quantity modeling is necessary to establish flood levels and determine floodplain extents, design hydraulic structures adequate to meet their intended functions, evaluate hydraulic impacts of projects proposed by the District and other entities, and assess vulnerability to future climate scenarios.

The District maintains a hydrologic and hydraulic model. The hydrologic portion of the model is used to transform rainfall into watershed runoff while the hydraulic components of the model route the watershed runoff downstream through a conveyance system. The District most recently updated the model from 2015-2016. Updates to the model included:

- Incorporating rainfall depths published in Atlas 14 (see Section 5.1.1).
- Evaluating conditions under potential future rainfall amounts
- Updating spatial inputs with most recent data (e.g., topography, soil data)
- Incorporating municipal storm sewer data and projects permitted by the District

The updated model allows the district to identify areas at risk of flooding, including areas not previously identified. The updated model may also be used to assess areas at greatest risk for flooding under future conditions. The model results allow the district to more effectively prioritize infrastructure improvement projects to address these flood-prone areas.

The District completed its most recent modeling effort with considerable cooperation from the District's Technical Advisory Committee (TAC). Continued cooperation and input from city staff is needed to maximize the accuracy of District models and produce results that are beneficial to both District and municipal flood risk reduction efforts.

District hydrologic and hydraulic modeling documentation, including maps of inundation areas, is available from the District website at: www.rpbcwd.org.

5.10 Wetland Resources

Wetland in the Purgatory creek watershed

Wetlands in the RPBCWD are important community and ecological assets. These resources provide significant wildlife habitat and refuge, while also supplying aesthetic, recreational, and water quality treatment benefits. The RPBCWD includes many wetlands; some wetland areas within the watershed were drained or filled as cities developed (prior to the establishment of regulations protecting wetlands). Presently, wetlands are protected by the Wetland Conservation Act (WCA). While the District currently 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.

The extent of wetlands inventoried within the watershed varies by city. Nationally, the U.S. Fish and Wildlife Service (USFWS) is responsible for mapping wetlands across the country, including those in Minnesota. Using the National Aerial Photography Program (NAPP) in conjunction with limited field verification, the USFWS identifies and delineates wetlands, produces detailed maps on the characteristics and extent of wetlands, and maintains a national wetlands database as part of the National Wetland Inventory (NWI). The NWI is periodically updated based on available imagery.

Figure 5-11 shows the location of all NWI wetlands within the RPBCWD, including a cranberry bog. There may be additional wetlands (especially those smaller than 0.5 acre) in the watershed that are not included in the NWI. In order to better manage the resources within its jurisdiction, the District plans to complete a District wetland inventory (see Section 9.11).

5.11 Stormwater Systems

Various units of government and private entities have jurisdiction over different parts of the stormwater system network within the RPBCWD. These stormwater systems includes pipes, ponds, lakes, wetlands, ditches, streams, swales, and other drainageways.

The Minnesota Department of Transportation (MnDOT) is responsible for maintaining the stormwater systems within their rights-of-way, such as interstate highways (i.e., I-494), U.S. highways (i.e., Highway 169 and Highway 212), and state highways (i.e., Highway 5 and Highway 7). Carver and Hennepin counties are responsible for maintaining at least part of the stormwater systems within their rights-of-way, such as county roads and county state aid highways.

The cities within the District have jurisdiction over the lateral (also called primary) stormwater systems (i.e., street gutters, pipes, and ditches) and are responsible for system maintenance and improvements. All of the cities within the District are owners and operator of stormwater systems that require each city to obtain a National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit. Each city's MS4 permit and associated Storm Water Pollution Prevention Program (SWPPP) detail the city's stormwater system maintenance procedures and best management practices.

Owners of private stormwater systems are responsible for maintaining their facilities, unless that responsibility is transferred by agreement. The RPBCWD does not own and operate stormwater facilities requiring an MS4 permit.

NATIONAL WETLANDS INVENTORY

FIGURE 5-11

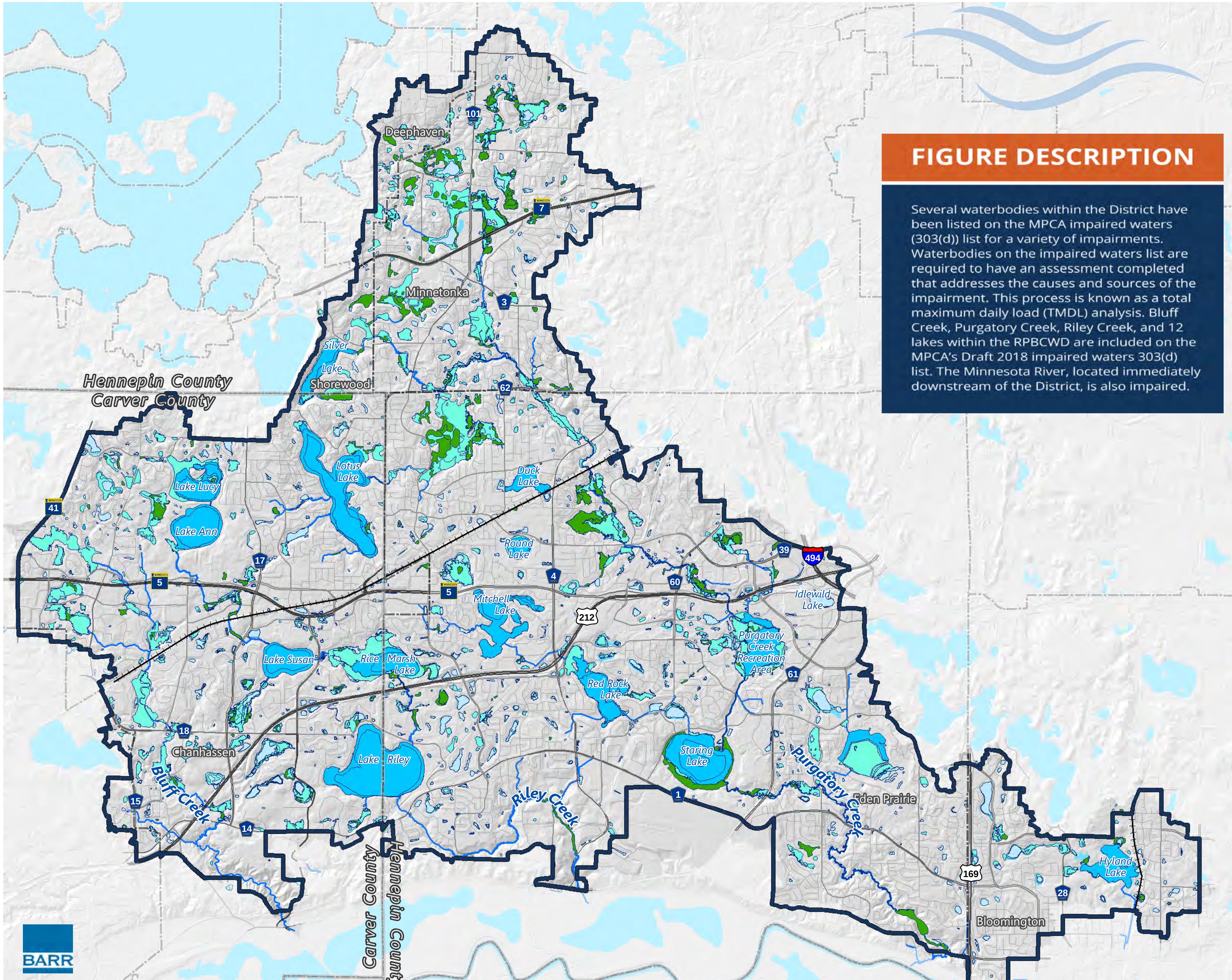


FIGURE DESCRIPTION

Several waterbodies within the District have been listed on the MPCA impaired waters (303(d)) list for a variety of impairments. Waterbodies on the impaired waters list are required to have an assessment completed that addresses the causes and sources of the impairment. This process is known as a total maximum daily load (TMDL) analysis. Bluff Creek, Purgatory Creek, Riley Creek, and 12 lakes within the RPBCWD are included on the MPCA's Draft 2018 impaired waters 303(d) list. The Minnesota River, located immediately downstream of the District, is also impaired.

National Wetlands Inventory

- Freshwater Emergent Wetland
- Freshwater Forested/ Shrub Wetland
- Freshwater Pond
- Lake
- Riverine
- Streams/Creeks
- Lake/Pond
- District Legal Boundary
- Municipalities

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RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

5.12 Pollutant Sources

There are many potential sources of water pollution in the RPBCWD. There are many permitted sites, hazardous waste generators, and contaminated sites within the District. The MPCA maintains a database of these sites, which includes permitted sites (air, industrial stormwater, construction stormwater, wastewater discharge), hazardous waste generating sites, leak sites, petroleum brownfields, tank sites, unpermitted dump sites, and sites enrolled in the Voluntary Investigation and Cleanup (VIC) program. This information is available online through the MPCA's What's In My Neighborhood program and is shown in Figure 5-12. The presence of potentially contaminated or hazardous waste sites should be considered as sites are redeveloped and BMPs are implemented. The presence of soil contamination at many of these sites, if not removed, may limit or prevent infiltration as a stormwater management option.

In contrast to sites with known hazards, non-point source pollution cannot be traced to a single source or pipe. Instead, pollutants are carried from land to water in stormwater or snowmelt runoff, in seepage through the soil, and in atmospheric transport. Discharge from stormwater pipes is considered a non-point source discharge as the pollutants coming from the pipe are generated across the watershed contributing to the pipe, not at a single location. Point sources frequently discharge continuously throughout the year, while non-point sources discharge in response to precipitation or snowmelt events. For most waterbodies, non-point source runoff, especially stormwater runoff, is the major contributor of pollutants.

Table 5-3 summarizes the principal pollutants found in stormwater runoff and provides example sources and possible impacts of each pollutant.

Some areas within the RPBCWD are served by subsurface sewage treatment systems (SSTS). Non-functioning SSTS may be a non-point source of pollutants. Improperly sited, installed, or maintained systems may achieve inadequate treatment of sewage. In addition to the public health risks of untreated or inadequately treated sewage (e.g., contamination of wells), sewage contains the nutrient phosphorus, which if discharged into waterbodies can cause excessive algae and aquatic plant growth leading to degradation in water quality. The MPCA implements an SSTS regulatory program to manage the environmental and public health impacts of SSTS.

POLLUTANT SOURCES (MPCA WHAT'S IN MY NEIGHBORHOOD)

FIGURE 5-12

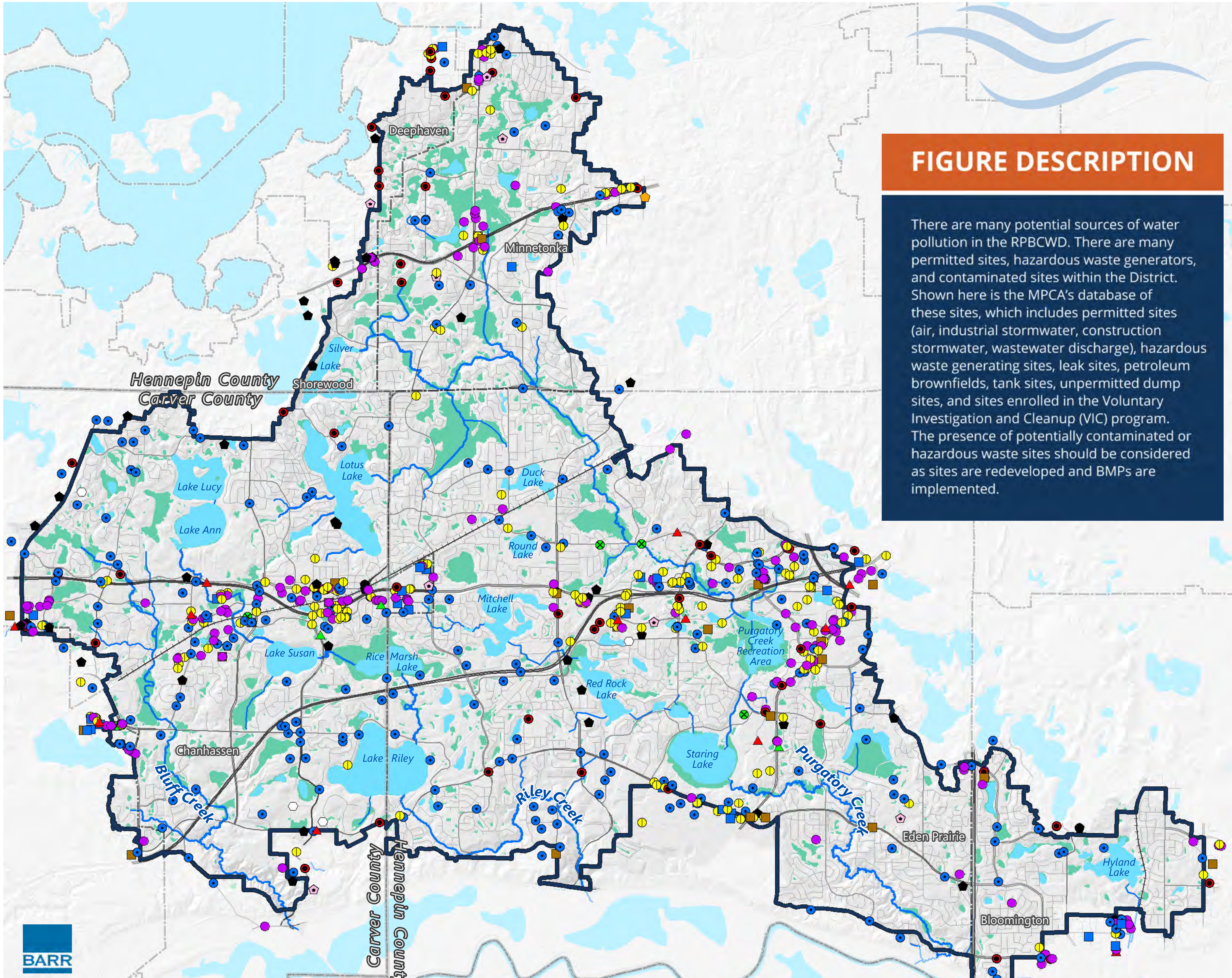

FIGURE DESCRIPTION

There are many potential sources of water pollution in the RPBCWD. There are many permitted sites, hazardous waste generators, and contaminated sites within the District. Shown here is the MPCA's database of these sites, which includes permitted sites (air, industrial stormwater, construction stormwater, wastewater discharge), hazardous waste generating sites, leak sites, petroleum brownfields, tank sites, unpermitted dump sites, and sites enrolled in the Voluntary Investigation and Cleanup (VIC) program. The presence of potentially contaminated or hazardous waste sites should be considered as sites are redeveloped and BMPs are implemented.

Pollutant Sources (MPCA, 2017)

- Air Quality
- Site Assessment
- Brownfield/Superfund Site
- Feedlots
- Hazardous Waste
- Solid Waste
- Petroleum Leak
- Underground Tanks
- Aboveground Tanks
- Construction Stormwater
- Industrial Stormwater
- Wastewater
- Multiple Activities (some combination of above)
- Streams/Creeks
- District Legal Boundary
- Municipalities

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RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

As part of their MS4 responsibilities, cities maintain illicit discharge detection and elimination (IDDE) programs to minimize discharge of prohibited materials to stormwater systems, reducing the risk of water pollution.

More information about potential pollutant sources is available from the MPCA website: http://www.pca.state.mn.us/index.php/data/wimn-whats-in-my-neighborhood/whats-in-my-neighborhood.html

5.13 Natural Areas and Unique Features

The MDNR, through the Minnesota Biological Survey (MBS) (MDNR, MBS Site Biodiversity Significance Ranks, 2018) and Natural Heritage and Non-game Research Program (NHNRP) (MDNR, Natural Heritage and Nongame Research Program, 2018), collects and maintains data on unique animals, plant communities, and functional landscapes. This includes information about state-designated natural and scientific areas containing rare and endangered species. More information about these programs is available from the MDNR Ecological Resources website at: www.dnr.state.mn.us/eco/index.html.

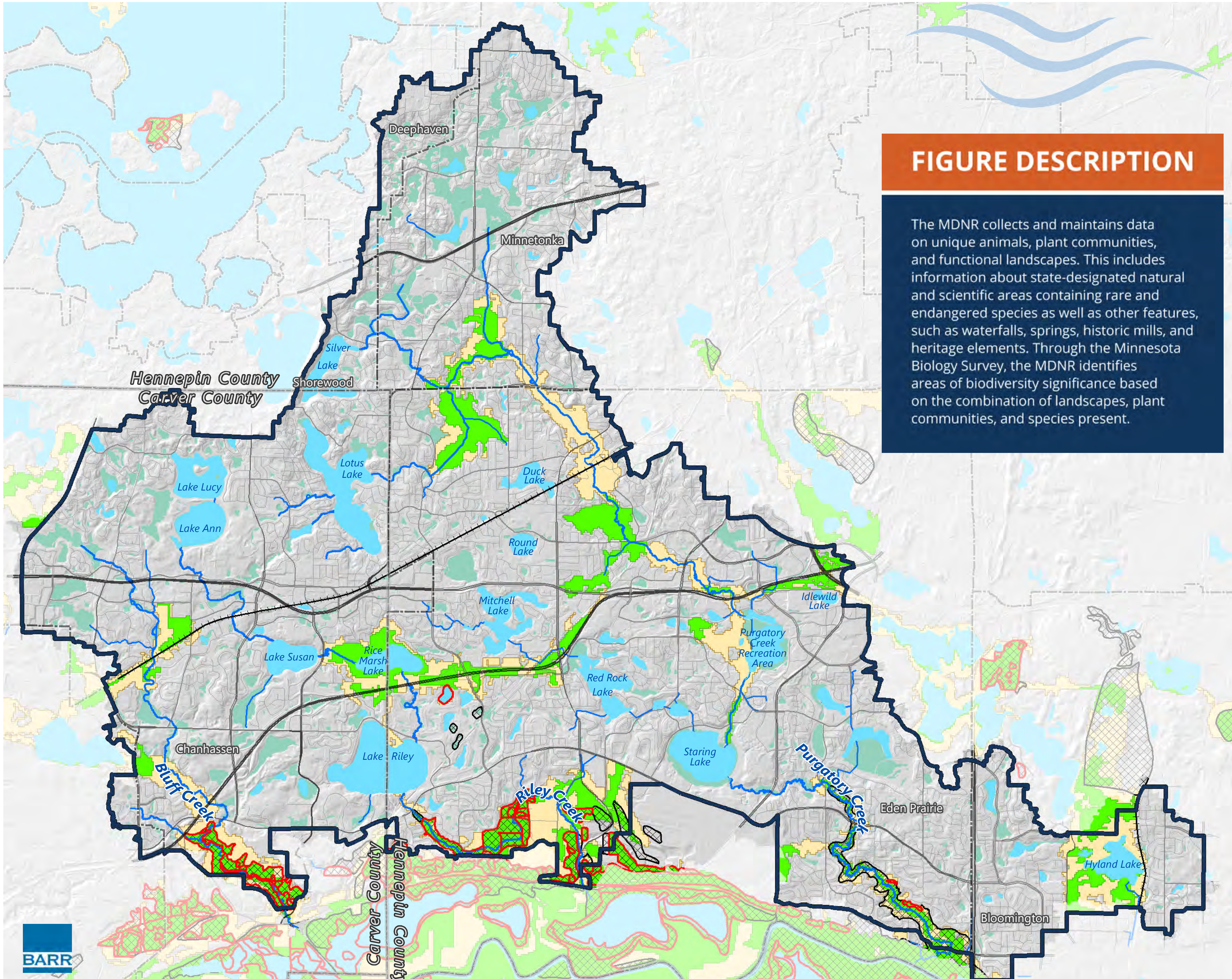
The MBS *Natural Communities and Rare Species of Carver, Hennepin, and Scott Counties, Minnesota* (MBS, 1998) identifies pre-settlement vegetation. Prior to settlement, the RPBCWD was covered predominantly by oak forest interrupted by wet prairie and marsh. Small areas of upland deciduous forest covered the far western part of the watershed, while river bottom forest occupied the south boundary of the watershed along the Minnesota River. Areas of maple-basswood forest and oak forest remain adjacent to the lower reaches of Bluff Creek and Riley Creek. The MBS identifies scientific natural areas and classifies areas as having “outstanding,” “high,” ”moderate,” or “low” biodiversity significance based on the combination of landscapes, plant communities, and species present. Although there are no MDNR designated scientific and natural areas (SNA’s) withn the District Boudary, areas of biodiversity significance within the District are shown on Figure 5-13.

A calcareous seepage fen in Chanhassen, known as Seminary Fen, is the nearest MDNR designated SNA to the District. Located near the southwest border of the District (south of Bluff Creek Drive), Seminary Fen is a rare wetland type created by groundwater that comes to the surface along the limestone bluffs of the Minnesota River. Many rare plants and valuable wildlife habitat are found in and around fens. This type of fen is protected under the Wetland Conservation Act (WCA). Seminary Fen is identified as an outstanding resource value water (pursuant to Minnesota Rules 7050.0335) and thus subject to additional water quality protections. Even though this fen is not located within the District, any project that has the potential to impact this sensitive and natural resource must address impacts through the preparation of a Fen Management Plan.

Under the Minnesota WCA, impacts to calcareous seepage fens are regulated by the Department of Natural Resources. According to the WCA, calcareous fens may not be filled, drained, or otherwise degraded, wholly or partially, by any activity, unless the commissioner of natural resources, under an approved management plan, decides some alteration is necessary (Minn. Stat. § 103G.223).

The MDNR purchased over 100 acres of the 600-acre Seminary Fen wetlands complex in 2008 and is developing a stewardship plan for long-term management and preservation of the fen. The Lower Minnesota River Watershed District also implements strategies, including a volunteer program, to help preserve the Seminary Fen. Potential detrimental impacts may include such actions as upslope development that alters the qualities of surface water entering the fen and groundwater appropriations that would affect the hydrology of the fen including its recharge area. The District will cooperate with the Lower Minnesota River Watershed District in the development of a special protection plan for this fen, should that District determine one to be necessary.

There is a unique cranberry bog within the District. The District, in conjunction with the MDNR and the United States Army Corps of Engineers, developed a monitoring program to assess, avoid and mitigate impacts upon this bog.



MDNR AREAS OF BIOLOGICAL SIGNIFICANCE AND CONSERVATION CORRIDORS

FIGURE 5-13

FIGURE DESCRIPTION

The MDNR collects and maintains data on unique animals, plant communities, and functional landscapes. This includes information about state-designated natural and scientific areas containing rare and endangered species as well as other features, such as waterfalls, springs, historic mills, and heritage elements. Through the Minnesota Biology Survey, the MDNR identifies areas of biodiversity significance based on the combination of landscapes, plant communities, and species present.

- Cranberry Bog
- Native Plant Community (DNR)
- Site of Biodiversity Significance (DNR)
- Regionally Significant Ecological Area (DNR, 2008)
- Regional Ecological Corridor (DNR, 2008)
- Streams/Creeks
- Lake/Pond
- District Legal Boundary
- Municipalities

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RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

5.14 Water-Based Recreational Areas

There are many parks, trails, and water recreation areas within the RPBCWD accessible to the public. Many of the lakes within the watershed include adjacent parks swimming beaches, fishing piers, and/or public boat access. Such features are important for establishing and maintaining high quality of life within the District and provide economic, public health, and environmental benefits. Public access to outdoor recreation areas may also foster connections between residents and natural resources and promote good stewardship of these resources.

Parks, trails, and water based recreation areas located within the District are shown in Figure 5-14. Most of these features are maintained by the respective cities in which they are located. Water based recreational features are summarized by waterbody in Table 5-6.

Table 5-6 Water Based Recreational Areas in the RPBCWD

Watershed	Waterbody	Public Access	Swimming Beach	Boat Access	Fishing Pier
Purgatory Creek	Silver Lake	NA	No	No	No
	Lotus Lake	Carver Beach; South Lotus Lake Park	Yes (2)	Yes	No
	Duck Lake	From Duck Lake Trail	No	Yes	No
	Round Lake	Round Lake Park	Yes	Yes	Yes
	Mitchell Lake	Miller Park	No	Yes	Yes
	Red Rock Lake	Red Rock Lake Park	No	Yes	No
	Staring Lake	Staring Lake Park	No	Yes	Yes
	Hyland Lake	Hyland Lake Part Preserve	Yes	Yes	Yes
Riley Creek	Lake Lucy	NA	No	Carry-in	No
	Lake Ann	Lake Ann Park	Yes (2)	Yes	Yes
	Rice Marsh Lake	NA	No	Carry-in	No
	Lake Susan	Lake Susan Park	Yes	Yes	Yes
	Lake Riley	Lake Riley Park	Yes	Yes	Yes

PARKS, TRAILS, AND WATER-BASED RECREATIONAL AREAS

FIGURE 5-14

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

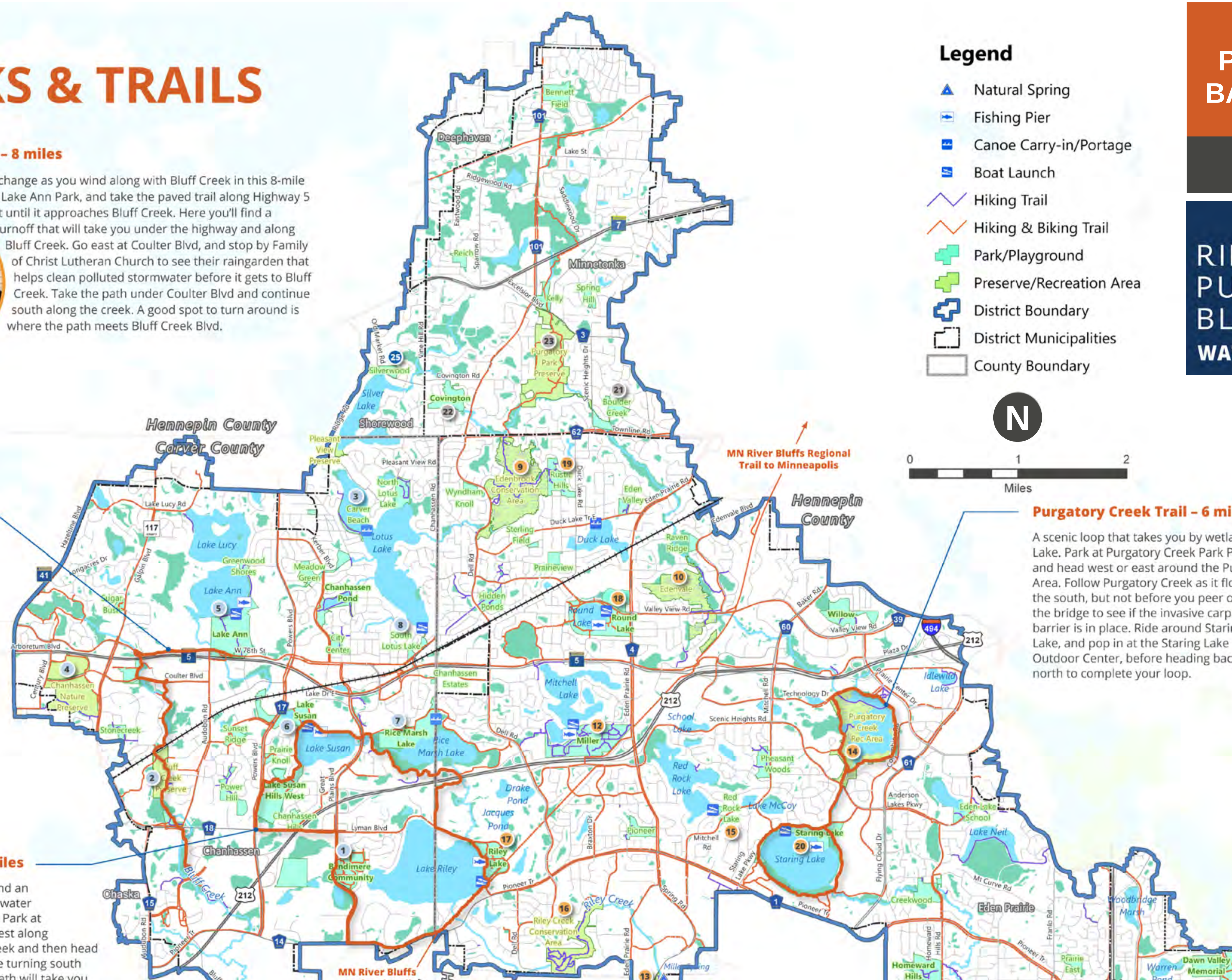
PARKS & TRAILS

Bluff Creek Trail – 8 miles

Watch the landscape change as you wind along with Bluff Creek in this 8-mile out-and-back. Park at Lake Ann Park, and take the paved trail along Highway 5 west until it approaches Bluff Creek. Here you'll find a turnoff that will take you under the highway and along Bluff Creek. Go east at Coulter Blvd, and stop by Family of Christ Lutheran Church to see their raingarden that helps clean polluted stormwater before it gets to Bluff Creek. Take the path under Coulter Blvd and continue south along the creek. A good spot to turn around is where the path meets Bluff Creek Blvd.

Riley Creek Trail – 8 miles

See three lakes, one creek, and an innovative project to protect water quality, all in one 8-mile ride. Park at Lake Susan Park and head west along the trail. You'll cross Riley Creek and then head along Rice Marsh Lake before turning south toward Lake Riley. A gravel path will take you down to Pioneer Trail. Start heading north at Great Plains Blvd. From there, either head back up to Lake Susan, or go west at Lyman Blvd, north on Powers Blvd, and then left on Lake Susan Hills Drive. You'll find access to a trail here which will take you past the Lake Susan Spent Lime Treatment System, and eventually back to Lake Susan Park.



Purgatory Creek Trail – 6 miles

A scenic loop that takes you by wetlands, the creek, and Staring Lake. Park at Purgatory Creek Park Pavilion in Eden Prairie, and head west or east around the Purgatory Creek Recreation Area. Follow Purgatory Creek as it flows out of the wetlands in the south, but not before you peer over the bridge to see if the invasive carp barrier is in place. Ride around Staring Lake, and pop in at the Staring Lake Outdoor Center, before heading back north to complete your loop.

Legend

- Natural Spring
- Fishing Pier
- Canoe Carry-in/Portage
- Boat Launch
- Hiking Trail
- Hiking & Biking Trail
- Park/Playground
- Preserve/Recreation Area
- District Boundary
- District Municipalities
- County Boundary

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Key	Park Name
	CHANHASSEN
1	Bandimere Community Park
2	Bluff Creek Preserve
3	Carver Beach Park
4	Chanhassen Nature Preserve
5	Lake Ann Park
6	Lake Susan Park
7	Rice Marsh Lake Park
8	South Lotus Lake Park
	EDEN PRAIRIE
9	Edenbrook Conservation Area
10	Edenvale Conservation Area and Park
11	Homeward Hills Park
12	Miller Park
13	Prairie Bluff Conservation Area
14	Purgatory Creek Recreation Area
15	Red Rock Lake Park
16	Riley Creek Conservation Area
17	Riley Lake Park
18	Round Lake Park
19	Rustic Hills Park
20	Staring Lake Park
	MINNETONKA
21	Boulder Creek Park
22	Covington Park
23	Purgatory Park Preserve
	BLOOMINGTON
24	Hyland Lake Park Preserve
	SHOREWOOD
25	Silverwood Park

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Barr Footer: ArcGIS 10.4.1, 2017-09-11 11:27 File: I:\Client\RPBC_WD\Work_Orders\2016_TO16_Plan_Update\Maps\Reports\Plan_2017\Section_5\Fig 5-14 Parks Trails and Water Based Recreational Areas v2.mxd User: mbs2

6.0 Bluff Creek Watershed

The Bluff Creek watershed is located at the western edge of the District, adjacent to the Riley Creek watershed (see Figure 5-6). The Bluff Creek watershed lies primarily within the city of Chanhassen and also within the city of Chaska. The watershed and creek are summarized in the Bluff Creek Fact Sheet included in this section. Information provided by District water resource fact sheets include (as applicable):

- Watershed physical characteristics
- Lake and creek physical characteristics
- Watershed land use
- Results of water quality and natural resource assessments
- Invasive species
- Water quality impairments

The most current version of the fact sheet is available from the District website at www.rpbcwd.org.

6.1 Bluff Creek Watershed Issues

Table 6-1 summarizes issues identified in the Bluff Creek watershed, organized according to the issue categories described in Section 2.3. These issues were identified through the District's public engagement and issue identification process (see Section 2.0) and through past District monitoring and studies. Recent District studies specific to the Bluff Creek watershed include:

- *Bluff Creek – Creek Restoration Action Strategy* (Barr Engineering Co. & Riley Purgatory Bluff Creek Watershed District, November 2015)
- *Bluff Creek Watershed Total Maximum Daily Load Implementation Plan* (Barr Engineering Co., 2013)
- *Engineer's Report – Bluff Creek Stabilization and Fish Passage Upstream of Trunk Highway 101* (Barr Engineering Co., 2014)
- *Chanhassen High School Infrastructure Alternatives- Reuse System* (Barr Engineering Co., 2016)
- *Bluff Creek Stream Stabilization Assessment – Reach BT3A and B5B* (Barr Engineering Co., 2017)

Table 6-1 Bluff Creek Watershed Stakeholder Identified Issues and Opportunities

Water Resource Issue Category (see Section 2.3.6)	Specific Issues in the Bluff Creek Watershed	Opportunities to Address Issues
Water Quality (Pollution)	· Water quality monitoring · Water quality assessment criteria	· Cost share programs
Water Quality (Habitat)	· Invasive species along Bluff Creek	· Volunteer monitoring and management
Water Quality (Erosion)	· Areas of severe streambank erosion	· Landowner best management practices
Groundwater	· Groundwater-surface water connection · Impact of development on groundwater · Groundwater sustainability	· None identified in workshop
Water Quantity	· Impact of development on streamflow in Bluff Creek	· None identified in workshop
Note: Issues above are based on comments received at the Bluff Creek stakeholder meeting, A complete list of stakeholder comments is included in Appendix A.		

6.2 Bluff Creek Watershed Programs and Projects

Many of the issues present in the Bluff Creek watershed are directly or indirectly addressed through consistent implementation of District-wide programs including the District's permitting and education programs (see Section 9.0). Over the past several years, the District has begun implementing several capital improvement projects within the watershed to address water quality, water quantity, and other issues. Watershed and creek BMPs as well as other management strategies are needed to improve and protect the water resources within the watershed. Proposed projects the District may implement within the Bluff Creek watershed are listed in Table 6-2; additional details on selecting projects are provided in the District's overall implementation program (see Sections 9.1 and 9.2). Proposed projects within the Bluff Creek watershed are shown in Figure 6-1. The BMPs listed in Table 6-2 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.

Table 6-2. Proposed Projects in the Bluff Creek Watershed

Source of Identified Project	City	Major Watershed	Resource	Project	Project Description	Goal Index[1]	Sustainability Index[1]	Volume Management Index[1]	Pollutant Management[1]	Stabilization[1]	Habitat Restoration[1]	Partnership[1]	Education[1]	Watershed Benefit[1]	Total Benefit Score[1]	Planning Level Estimated 30 year Cost[2]	Funding Partner Opportunity
RPBCWD	Chanhassen	Bluff Creek	Bluff Creek	BT3A	Creek Restoration and Stabilization	3	7	1	1	7	5	7	5	7	**43**	$280,000	
RPBCWD	Chanhassen	Bluff Creek	Bluff Creek	BT3	Creek Restoration and Stabilization along SW Branch, excludes BT3A	3	7	1	1	7	5	7	1	7	**39**	$683,000	
RPBCWD	Chanhassen	Bluff Creek	Bluff Creek	B4	Creek Restoration and Stabilization	3	7	1	1	5	5	1	7	7	**37**	$566,000	
RPBCWD	Chanhassen	Bluff Creek	Bluff Creek	B5	Creek Restoration and Stabilization	3	7	1	1	7	7	1	3	7	**37**	$614,000	
RPBCWD	Chanhassen	Bluff Creek	Bluff Creek	BT1	Creek Restoration and Stabilization	3	7	1	1	5	7	1	3	7	**35**	$507,000	
RPBCWD	Eden Prairie	Bluff Creek	Bluff Creek	BT2	Creek Restoration and Stabilization	3	7	1	1	5	3	1	3	7	**31**	$991,000	
RPBCWD	Chanhassen	Bluff Creek	Bluff Creek	B3	Creek Restoration and Stabilization	3	7	1	1	7	7	1	7	5	**39**	$1,475,000	
Chanhassen	Chanhassen	Bluff Creek	Bluff Creek	Wetland Resto.	Wetland Restoration and Flood Mitigation @ 101 and Pioneer Trail	3	7	3	1	1	7	7	3	3	**35**	$350,000	
RPBCWD	Chanhassen	Bluff Creek	Bluff Creek	B2	Creek Stabilization	3	7	1	1	5	5	1	7	3	**33**	$792,000	
Chanhassen	Chanhassen	Bluff Creek	Bluff Creek	Chan HS Ruse	Chanhassen High School Stormwater Reuse	3	5	3	1	1	1	7	7	3	**31**	$384,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	15	Ravine Stabilization & Runoff Controls	3	5	3	1	7	1	3	3	3	**29**	$520,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	18	Ravine Stabilization & Runoff Controls	3	5	3	1	7	1	3	3	3	**29**	$520,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	6	Ravine Stabilization & Runoff Controls	3	5	3	1	7	1	3	3	3	**29**	$300,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	10	Ravine Stabilization & Runoff Controls	3	5	3	1	7	1	3	3	3	**29**	$220,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	7	Ravine Stabilization & Runoff Controls	3	5	3	1	7	1	3	3	3	**29**	$370,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	2	Ravine Stabilization & Runoff Controls	3	5	3	1	7	1	3	3	3	**29**	$400,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	12	Ravine Stabilization & Runoff Controls	3	5	3	1	7	1	3	3	3	**29**	$350,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	1	Bank Repair/Culvert Restoration	3	5	1	1	7	1	3	3	3	**27**	$280,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	14	Slope Stabilization	3	5	1	1	7	1	3	3	3	**27**	$460,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	3	Ravine Stabilization & Runoff Controls	3	5	3	1	5	1	3	3	3	**27**	$240,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	4	Ravine Stabilization & Runoff Controls	3	5	3	1	5	1	3	3	3	**27**	$290,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	20	Bank Stabilization	3	5	1	1	5	1	3	3	3	**25**	$20,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	11	Slope Stabilization	3	5	1	1	5	1	3	3	3	**25**	$290,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	13	Ravine Stabilization	3	5	1	1	5	1	3	3	3	**25**	$20,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	16	Slope Stabilization	3	5	1	1	5	1	3	3	3	**25**	$400,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	17	Ravine Stabilization	3	5	1	1	5	1	3	3	3	**25**	$50,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	19	Ravine Stabilization	3	5	1	1	5	1	3	3	3	**25**	$30,000	

Table 6-2. Proposed Projects in the Bluff Creek Watershed

Source of Identified Project	City	Major Watershed	Resource	Project	Project Description	Goal Index[1]	Sustainability Index[1]	Volume Management Index[1]	Pollutant Management[1]	Stabilization[1]	Habitat Restoration[1]	Partnership[1]	Education[1]	Watershed Benefit[1]	Total Benefit Score[1]	Planning Level Estimated 30 year Cost[2]	Funding Partner Opportunity
MPCA	Chanhassen	Bluff Creek	Bluff Creek	21	Ravine Stabilization	3	5	1	1	3	1	3	3	3	**23**	$20,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	22	Ravine Stabilization	3	5	1	1	3	1	3	3	3	**23**	$20,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	5	Ravine Stabilization	3	5	1	1	3	1	3	3	3	**23**	$30,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	8	Ravine Stabilization	3	5	1	1	3	1	3	3	3	**23**	$20,000	
MPCA	Chanhassen	Bluff Creek	Bluff Creek	9	Ravine Stabilization	3	5	1	1	3	1	3	3	3	**23**	$20,000	
RPBCWD	Chanhassen	Bluff Creek	Bluff Creek	B1	Creek Stabilization	3	7	1	1	7	5	7	1	1	**33**	$2,705,000	

[1]See Section 4 for additional detials about the RPBCWD prioritization methodology and associated descriptions for the variables used to assess multiple project benefits.

[2]Based on 2017 dollars

BLUFF CREEK WATERSHED PROPOSED PROJECTS

FIGURE 6-1

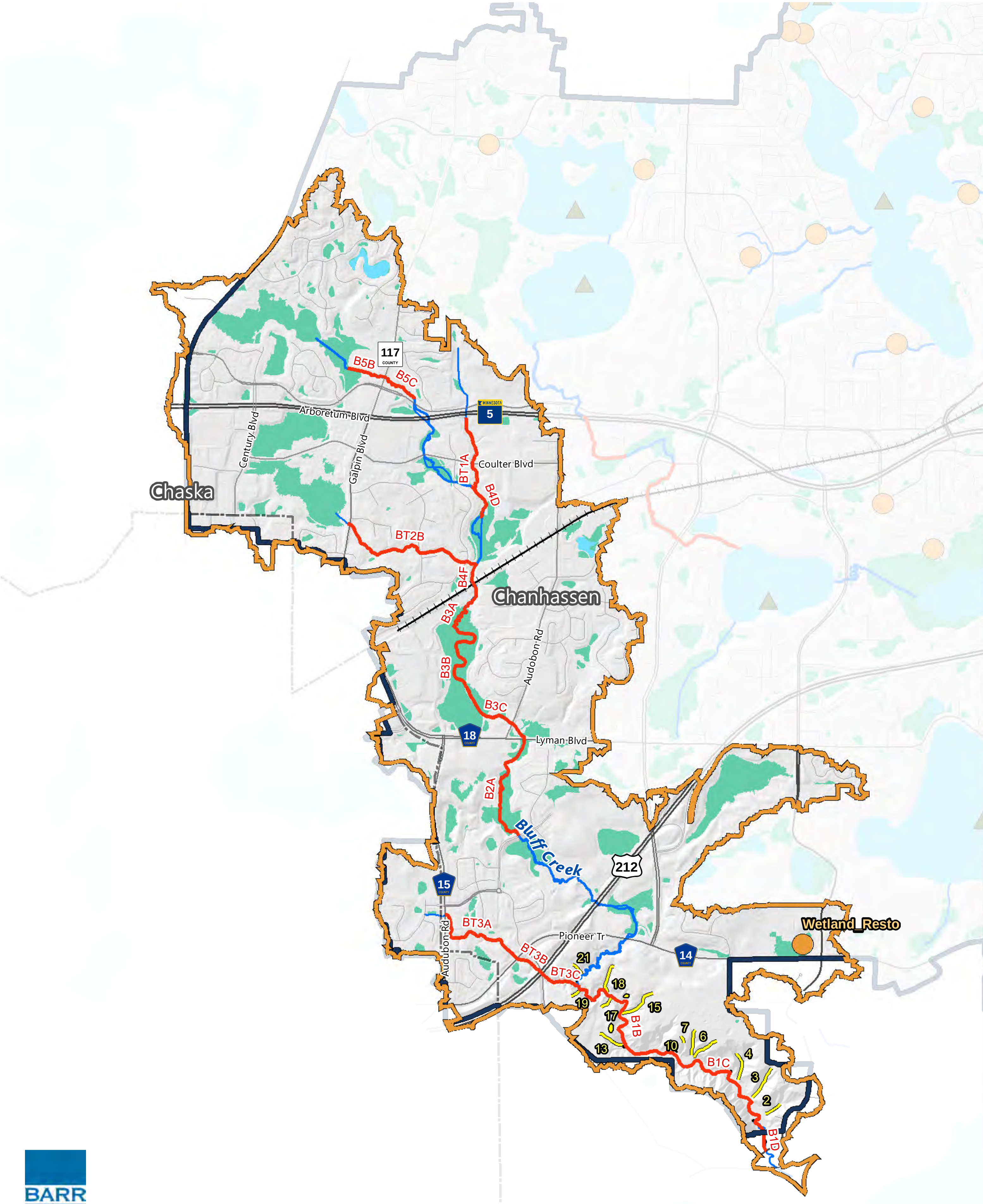


FIGURE DESCRIPTION

Watershed and creek 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 RPBCWD 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 RPBCWD 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 assessement and vegetation management
- Promote cost-share opportunities and enhance education outreach

Recommended Best Managment Practices

- In Lake BMP
- Watershed BMP
- Creek Stabilization
- Ravine Stabilization
- Streams/Creeks
- Lake/Pond
- Wetlands
- Hydrologic Boundary
- District Legal Boundary
- Municipalities

N

3,000 0 3,000

Feet

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

BARR

6.3 Opportunity Projects

The projects identified in Table 6-2 primarily focus on the reduction of phosphorus loading to the resources by implementing BMPs and streambank stabilization to address water quality goal WQual 1 and water quantity goal WQuan 2. Through the public input process, additional goals have been identified as important elements. These goals focus on habitat and ecology, other pollutants, groundwater, and best management practices that infiltrate, conserve groundwater, protect baseflow and reduce stormwater runoff. Other potential management techniques that address these goals can be identified in Table 6-3. These opportunity projects can be identified through additional data collection, future study efforts and innovation.

Table 6-3 Opportunity Projects in the Bluff Creek Watershed

Topic	Sub-topic	Goal	Most Applicable Strategies	Examples of Projects
Habitat & ecology	Habitat protection & establishment	WQual 1. Protect, manage, and restore water quality of District lakes and creeks to maintain designated uses. WQual 2. Preserve and enhance the quantity, as well as the function and value of wetlands. WQual 3. Preserve and enhance habitat important to fish, waterfowl, and other wildlife.	WQual S3. The District encourages cities and developers to seek opportunities to incorporate habitat protection or enhancement into development and redevelopment projects.	Riparian Habitat Restoration Wetland enhancement and restoration Green Corridor Expansion In-stream hydrologic improvements Aquatic plant management Carp management activities Enhance regulatory program
	Buffers & bioengineering		WQual S7. The District will promote the use of natural materials and bioengineering for the maintenance and restoration of shorelines and streambanks where appropriate. WQual S11. The District recognizes the multiple benefits of vegetated buffers and promotes the use of vegetated buffers around all waterbodies.	
	aquatic invasive species		WQual S4. The District will implement measures to manage carp populations in District-managed waterbodies.	
			WQual S9. The District will partner with other entities to minimize the spread and reduce the adverse ecological impacts of aquatic invasive species.	

Topic	Sub-topic	Goal	Most Applicable Strategies	Examples of Projects
Erosion	Erosion & sediment pollution	WQual 1. Protect, manage, and restore water quality of District lakes and creeks to maintain designated uses. WQual 2. Preserve and enhance the quantity, as well as the function and value of wetlands. WQual 3. Preserve and enhance habitat important to fish, waterfowl, and other wildlife.	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. WQual S2. The District will inventory and address areas within the watershed with existing erosion issues and/or areas at high risk for erosion by implementing the District's capital improvement, incentive and regulatory programs	Wetland and streambank protection and restoration (e.g., buffers and stabilization efforts) Rainfall abstraction (e.g., rain gardens, reuse, and permeable pavements) Enhance regulatory program
	Chloride pollution		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.	Municipal cost-share projects
Pollution	Non-point source pollution	WQual 1. Protect, manage, and restore water quality of District lakes and creeks to maintain designated uses. WQual 2. Preserve and enhance the quantity, as well as the function and value of wetlands. WQual 3. Preserve and enhance habitat important to fish, waterfowl, and other wildlife.	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. WQual S14. The District will continue to identify opportunities and actions to protect, restore, and enhance District-managed resources.	Watershed BMPs (e.g., iron enhanced sand, ponds, etc.) Rainfall abstraction (e.g., rain gardens, reuse, and permeable pavements) Enhance regulatory program
	Emerging topics		WQual S15. The District will cooperate with other entities to investigate treatment effectiveness of emerging practices. WQual S16. The District will work with the state agencies and local governmental units to identify emerging pollutants of concern.	Demonstration and pilot-scale water quality treatment projects

Topic	Sub-topic	Goal	Most Applicable Strategies	Examples of Projects
Groundwater	Groundwater conservation	Ground 1. Promote the sustainable management of groundwater resources.	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)	Rainfall abstraction (e.g., rain gardens, reuse, and permeable pavements) Larger scale infiltration practices in targeted locations
	Groundwater-surface water interactions		Ground S3. The District will work to increase the understanding of the interaction between groundwater resources and surface waters within the District and consider those interactions in future management decisions.	
Water Quantity	Baseflow impacts	WQuan 1. Protect and enhance the ecological function of District floodplains to minimize adverse impacts. WQuan 2. Limit the impact of stormwater runoff on receiving waterbodies.	WQuan S2. The District will promote strategies that minimize baseflow impacts.	Larger scale infiltration practices in targeted locations Rainfall abstraction practices (e.g., rain gardens, permeable pavements) LID cost-share projects within municipalities Water reuse projects Stormwater retention and detention (e.g., ponds, filtration) Flood risk mitigation projects Enhance regulatory program
	Infiltration practices		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.	
	Low impact development		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.	
	Conservation practices		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.	
	Flood risk reduction		WQuan S8. The District will develop and implement actions to reduce flood risk within the District	

What's happening

WATERSHED MANAGEMENT PLAN

One of the most important projects the watershed worked on in 2017 was updating its Watershed Managment Plan.

This watershed management plan (also called the 10-Year Plan) guides the District's actions for the next 10 years.

The community played an essential role by participating in a public engagement process. Close to 500 stakeholders engaged in this process, making their voices heard about their values for clean water. The graphic to the right highlights how the community contributed to the planning effort.

The draft plan was relased for public review in late 2017. After comments are addressed, the District will submit a final plan for approval in 2018. Check our website for updates on the process: rpbcwd.org

Thank you! To everyone who shared their thoughts, ideas, hopes and concerns. We truly appreciate you being a part of this process.

YOU CAN HELP

Rainwater runoff, the water that flows across yards, parking lots, and streets into stormdrains, is one of the main causes of pollution in urban areas. You can take simple actions to help protect Bluff Creek.

Keep the curb clean
Sweep up leaves, grass clippings and fertilizer from driveways and streets.

Water with care
Grass requires 1-inch of water per week: about one hour of sprinkling per week if it has not rained.

Salt smart
The salt we use to melt ice can pollute our lakes and creeks. Use salt sparingly and always shovel first.

Reuse the rain
Collect and reuse rainwater with a rain barrel.

Build a raingarden
Raingardens soak up water and filter out pollution. Visit our website for help.

Contact us

and find out how you can get involved

DISTRICT OFFICE
18681 Lake Drive East
Chanhassen, MN
55317

CONTACT INFO
952.607.6512
info@rpbcwd.org
rpbcwd.org

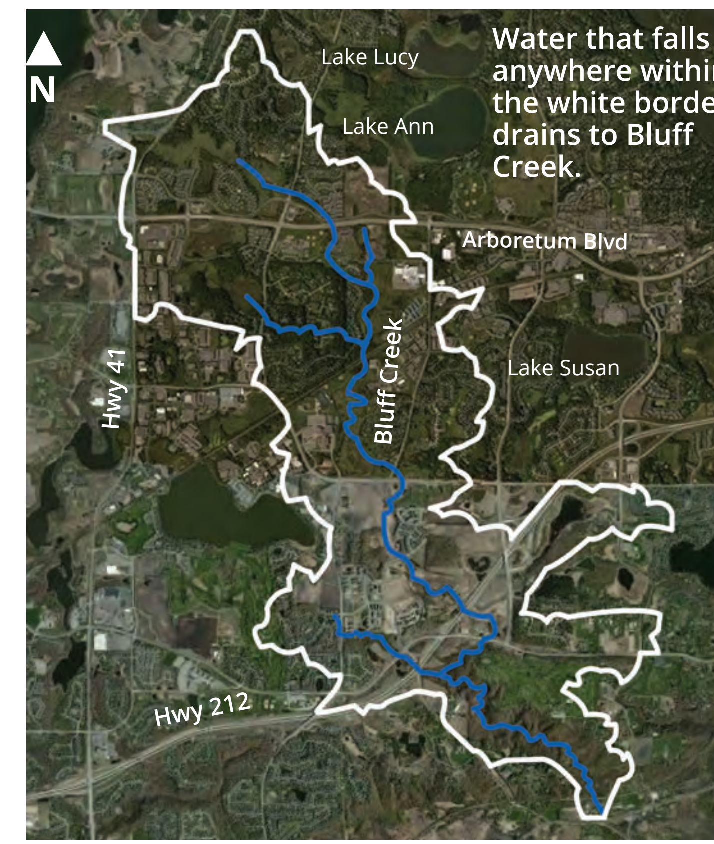
FIND US ON
instagram
facebook
twitter

Bluff Creek

2017

In the photo above, Bluff Creek winds its way south, past Chanhassen High School. Bluff is about seven miles long, and unlike Purgatory and Riley Creeks, does not connect any lakes on its way to the Minnesota River. It does however connect many wetlands and you can explore almost its entire length on trails.

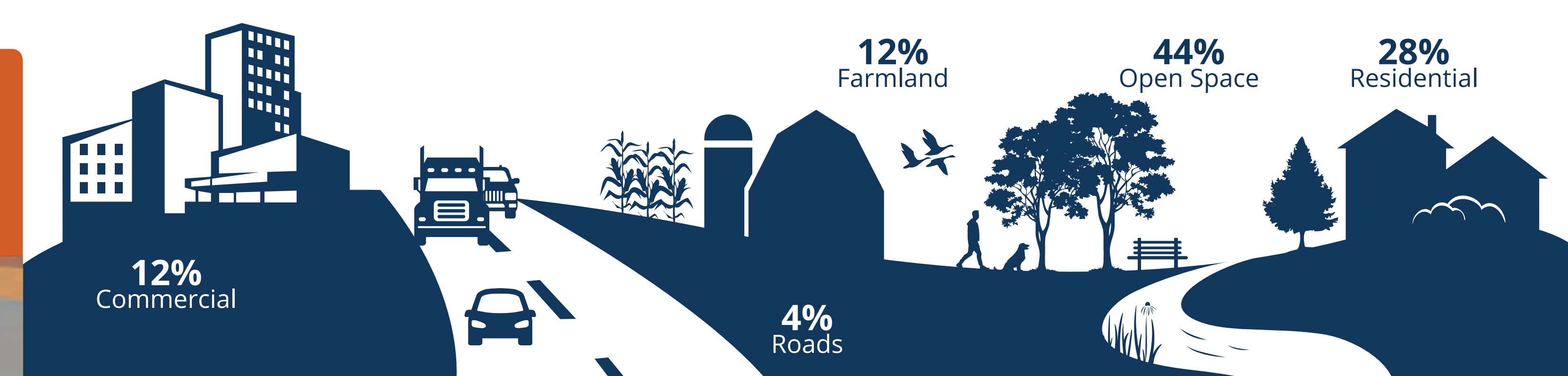
WATERSHED BOUNDARIES



CHARACTERISTICS

Length	6.8 miles
Elevation change	232 ft
Watershed size	5.8 sq miles
# of cities in watershed	2
# of lakes connected	0
# of monitoring sites	5
# of parks	3
Impairment	Turbidity, Fish
Common fish	Brook Stickleback, Northern Fathead Minnow
Invasive species	Reed Canary Grass, Buckthorn

LAND USE in the Bluff Creek Watershed



How healthy is Bluff Creek?

Keeping Bluff Creek healthy requires several tools and strategies. Implementing projects to stabilize the stream banks and restore creek reaches is one important strategy. Cleaning and slowing rainwater runoff before it reaches the creek is another. But before either of these can be done, we need to understand how the creek is doing and where it needs the most help.

The watershed district has been monitoring Bluff Creek since the 1970s. Recently, the district developed a new tool to assess the creek: the Creek Restoration Action Strategy (CRAS). The CRAS uses water quality data, as well as information on erosion and habitat, to rank which creek sections are doing well, and which are doing the poorly. Below, the three major types of data used in the assessment are described. On the next page, a creek map shows the results from 2017.

Water quality

District staff take samples at five sites during summer. They gather data on nutrient levels (phosphorus), algae, sediment, pH, and dissolved oxygen. These data let us know how clean the water is, and whether it is healthy for plants, animals, and people.

Erosion

Every year, staff walk along sections of the creek. They note sites with erosion, the severity, and whether any structures like houses or bridges are in danger. Erosion is also a problem because sediment eroding into the creek is a pollutant.

Habitat

Creeks are important habitat for insects, plants, fish, birds, and other animals. When staff check for erosion, they also assess the habitat. Reaches receive a score based on the quality of habitat they provide, and whether it needs to be restored.

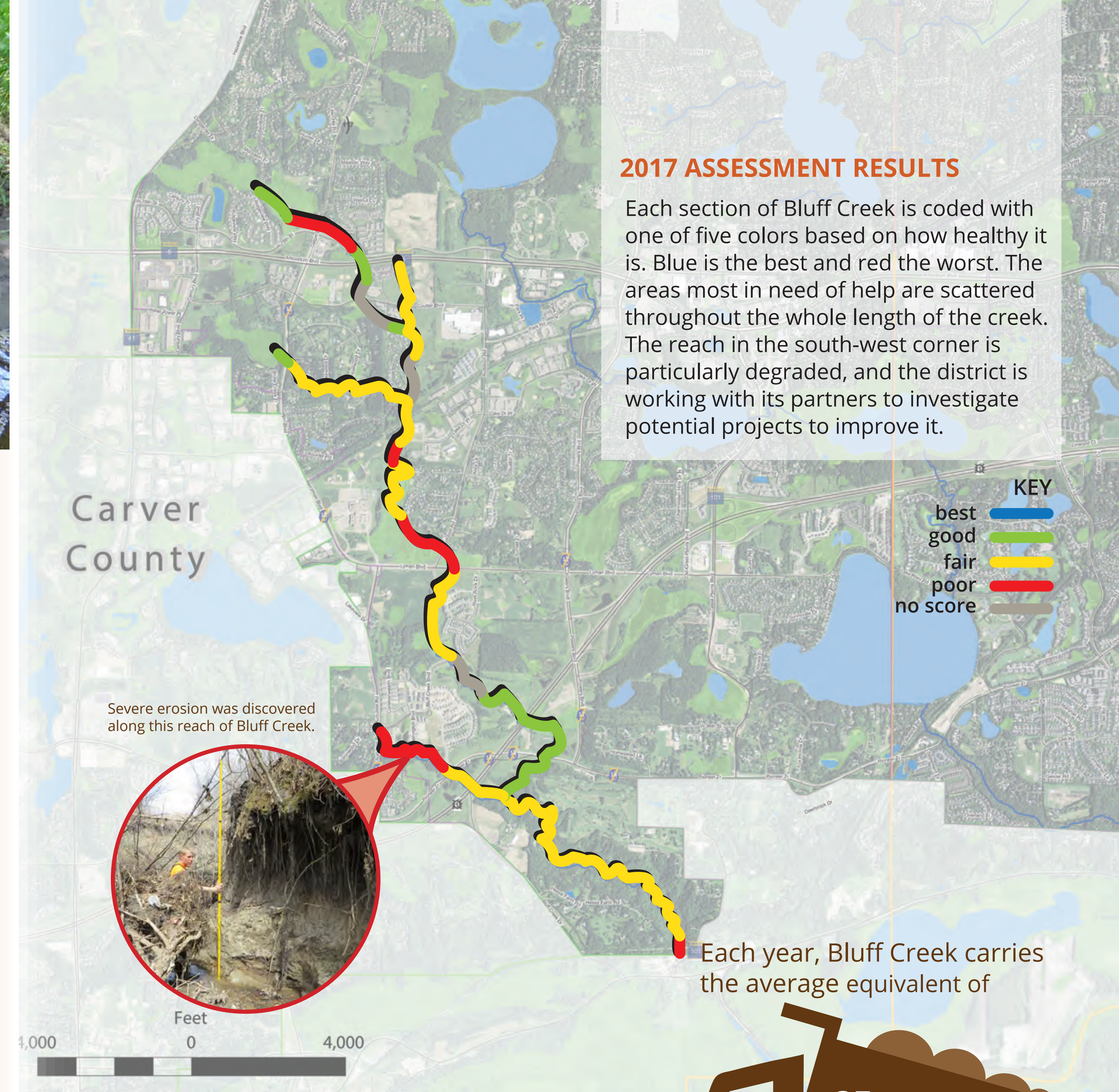
Dive deeper

Interested in learning more? Explore the following reports on our website.

Assessment
RPBCWD & BARR Engineering. 2017. Creek Restoration Action Strategy.

Implementation plan
BARR Engineering. 2013. Bluff Creek Watershed: Total Maximum Daily Load Implementation Plan.

Stormwater ponds
RPBCWD. 2013. Stormwater Pond Project.



2017 ASSESSMENT RESULTS

Each section of Bluff Creek is coded with one of five colors based on how healthy it is. Blue is the best and red the worst. The areas most in need of help are scattered throughout the whole length of the creek. The reach in the south-west corner is particularly degraded, and the district is working with its partners to investigate potential projects to improve it.

Each year, Bluff Creek carries the average equivalent of

of **sediment** into the **Minnesota River Valley**
[Metropolitan Council]

7.0 Purgatory Creek Watershed

The Purgatory Creek watershed is located at the eastern edge of the District, adjacent to the Riley Creek watershed to the west (see Figure 5-6). The Purgatory Creek watershed lies primarily within the cities of Eden Prairie and Minnetonka with portions of the watershed also within the cities of Chanhassen, Deephaven, and Shorewood. For management purposes, the District includes the Hyland Lake watershed in the city of Bloomington within the larger Purgatory Creek watershed. Hyland Lake is a landlocked under normal hydrologic conditions and is not tributary to Purgatory Creek. The Hyland Lake watershed outlets into the Minnesota River through a series of City of Bloomington stormwater management systems.

The watershed, creek, and lakes within the Purgatory Creek and Hyland Lake watersheds are summarized in the following fact sheets included in this section

- Purgatory Creek Fact Sheet
- Duck Lake Fact Sheet
- Hyland Lake Fact Sheet
- Lake Idlewild Fact Sheet
- Lotus Lake Fact Sheet
- Mitchell Lake Fact Sheet
- Red Rock Lake Fact Sheet
- Round Lake Fact Sheet
- Silver Lake Fact Sheet
- Staring Lake Fact Sheet

Information provided in District water resource fact sheets include (as applicable):

- Watershed physical characteristics
- Lake and creek physical characteristics
- Watershed land use
- Results of water quality and natural resource assessments
- Invasive species
- Water quality impairments

The most current version of each fact sheet is available from the District website at www.rpbcwd.org.

7.1 Purgatory Creek Watershed Issues

Table 7-1 summarizes issues identified in the Purgatory Creek watershed, organized according to the issue categories described in Section 2.3. These issues were identified through the District's public engagement and issue identification process (see Section 2.0) and through past District monitoring and studies. Recent District studies specific to the Purgatory Creek watershed include:

- *Lotus, Silver, Duck, Round, Mitchell, Red Rock Use Attainability Analysis Update; Lake Idlewild and Staring Lake Use Attainability Analysis; and Lower Purgatory Creek Stabilization Study* (Barr Engineering Co., 2017)
- *Engineer's Report - Purgatory Creek Stabilization at County Roads 101 and 62* (Barr Engineering Co., 2014)
- *Purgatory Creek Restoration Basic Water Management Project* (CH2M HILL, 2009)
- *Purgatory Creek – Creek Restoration Action Strategy* (Barr Engineering Co. & Riley Purgatory Bluff Creek Watershed District, November 2015)
- *Red Rock Lake Aquatic Plant Management Plan* (Wenck Associates Inc., 2015)
- *Curlyleaf pondweed delineation and assessment for Red Rock Lake* (Blue Water Science, 2015)
- *Alum Application Assessment for Round Lake* (Blue Water Science, 2015)
- *Aquatic Plant Community of Red Rock Lake* (Wenck Associates Inc., 2015)
- *Staring Lake Eurasian Watermilfoil Early Detection and Rapid Response* (Fresh Water Scientific Services, 2015)
- *Mitchell Lake Aquatic Plant Management Plan* (Wenck Associates, Inc., 2014)
- *Aquatic Plant Surveys for Duck Lake* (Blue Water Science, 2013)
- *Aquatic Plant Surveys and Water Quality for Round Lake and Key Tributary Pond* (Blue Water Science, 2014)
- *Aquatic Plant Surveys for Silver Lake* (Blue Water Science, 2013)
- *Aquatic Plant Surveys for Idlewild Lake* (Blue Water Science, 2015)
- *Development and implementation of a sustainable strategy to control carp in Purgatory Creek Chain of Lakes* (Sorensen, Bajer, & Headrick, 2015)
- *Operations and Maintenance Plan for the Purgatory Creek Conservation Area* (Barr Engineering Co., 2014)
- *Aquatic Plant Community of Lakes Ann, Lotus, Lucy, Mitchell, Susan, Riley and Staring within the Riley Purgatory Bluff Creek Watershed: Final Report 2009-2014.* (Jaka & Newman, 2014)

- *Aquatic Plant Community of Lakes Lucy, Mitchell, Susan, Riley and Staring within the Riley Purgatory Bluff Creek Watershed: Annual Report 2015* (Dunne & Newman, 2016)
- *Round Lake Calcium Nitrate Pilot Test* (Ch2M HILL, 2011)
- *Silver Lake Outlet, Flood Potential and MCES Interceptor* (CH2M HILL, 2010)
- *Mitchell Lake Phosphorus Management Study Report* (CH2M HILL, 2010)
- *Measurement of In situ Sediment Oxygen Demand Lake Mitchell, Lotus Lake, and Round Lake, MN* (HydrO2, Inc., 2008)
- *Historical Water Quality and Ecological Change of Three Lakes in the Riley-Purgatory-Bluff Creek Watershed District* (Ramstack & Edlund, 2011)
- *Paleolimnological Analysis of Silver Lake* (Ramstack Hobbs & Edlund, 2015)
- *Purgatory Creek Assessment Erosion site* (Riley Purgatory Bluff Creek Watershed District, 2014)
- *Purgatory Creek Assessment Lotus Lake Branch* (Riley Purgatory Bluff Creek Watershed District, 2014)
- *Purgatory Creek Assessment Silver Lake Branch* (Riley Purgatory Bluff Creek Watershed District, 2014)
- *Mobile P-Alum Dosing Study* (Barr Engineering Co., 2005)

Table 7-1 Purgatory Creek Watershed Stakeholder Identified Issues and Opportunities

Water Resource Issue Category (see Section 2.3.6)	Specific Issues in the Purgatory Creek Watershed	Opportunities to Address Issues
Water Quality (Pollution)	· Lake water quality · Stormwater pond monitoring · Red Rock Lake water quality	· Lake and other local associations · Volunteer opportunities · Cost share
Water Quality (Habitat)	· Invasive species management · Wetland identification · Wetland sediment accumulation	· Focused education about wetlands
Water Quality (Erosion)	· Areas of severe streambank erosion on Purgatory Creek	· None identified in workshop
Groundwater	· Withdrawal by City and private wells · Regulatory roles	· None identified in workshop
Water Quantity	· Allowable land uses adjacent to creek	· None identified in workshop
Note: Issues based on comments received at the Purgatory Creek stakeholder meeting. A complete list of stakeholder comments is included in Appendix A.		

7.2 Purgatory Creek Watershed Programs and Projects

Many of the issues present in the Purgatory Creek watershed are directly or indirectly addressed through consistent implementation of District-wide programs including the District's project review and permitting and education programs (see (see Section 9.0). Over the past several years, the District has implemented several capital improvement projects; watershed, in-lake, and creek BMPs as well as other management strategies, within the watershed to address water quality, water quantity, and other issues.

The District has also identified and prioritized proposed capital projects to address watershed issues over the life of this plan. Proposed projects the District may implement within the Purgatory Creek watershed are listed in Table 7-2; additional details on selecting projects are provided in the District's overall implementation program (see Sections 9.1 and 9.2). Proposed projects within the Purgatory Creek watershed are shown in Figure 7-1.

The BMPs listed in Table 7-2 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.

Table 7-2 Proposed Projects in the Purgatory Creek Watershed

Source of Identified Project	City	Major Watershed	Resource	Project	Project Description	Goal Index[1]	Sustainability Index[1]	Volume Management Index[1]	Pollutant Management[1]	Stabilization[1]	Habitat Restoration[1]	Partnership[1]	Education[1]	Watershed Benefit[1]	Total Benefit Score[1]	Planning Level Estimated 30 year Cost[2]	Funding Partner Opportunity
RPBCWD	Minnetonka	Purgatory Creek	Purgatory Creek	Scenic Heights	Scenic Heights Habitat Restoration	3	7	1	1	3	7	7	7	7	**43**	$300,000	
RPBCWD	Eden Prairie	Purgatory Creek	Purgatory Creek	P7	Creek Restoration and Stabilization	3	7	1	1	5	5	7	5	7	**41**	$247,000	
RPBCWD	Eden Prairie	Purgatory Creek	Purgatory Creek	Staring Lake StL_21	Creek Restoration and Stabilization	3	7	1	1	1	3	7	5	7	**35**	$450,000	
RPBCWD	Chanhassen	Purgatory Creek	Lotus Lake	Lotus Lake LL_6	In-Lake Phosphorus Load Control	2	3	1	7	1	3	3	5	7	**32**	$1,258,000	
RPBCWD	Chanhassen	Purgatory Creek	Silver Lake	Silver Lake SiL_2	Watershed Phosphorus Load Control	2	5	1	5	1	1	7	3	7	**32**	$535,000	
RPBCWD	Shorewood	Purgatory Creek	Silver Lake	Silver Lake SiL_1	Watershed Phosphorus Load Control	3	5	3	7	1	1	3	1	7	**31**	$811,000	
RPBCWD	Chanhassen	Purgatory Creek	Silver Lake	Silver Lake SiL_7	In-Lake Phosphorus Load Control	2	3	1	7	1	3	3	1	7	**28**	$332,000	
RPBCWD	Chanhassen	Purgatory Creek	Silver Lake	Silver Lake SiL_3	Slope Stabilization	3	3	1	5	1	5	1	1	7	**27**	$86,000	
RPBCWD	Chanhassen	Purgatory Creek	Silver Lake	Silver Lake SiL_5	Slope Stabilization	3	3	1	5	1	5	1	1	7	**27**	$80,000	
RPBCWD	Chanhassen	Purgatory Creek	Lotus Lake	Lotus Lake LL_1	Watershed Phosphorus Load Control	2	5	1	1	1	1	3	5	7	**26**	$186,000	
RPBCWD	Chanhassen	Purgatory Creek	Lotus Lake	Lotus Lake LL_3	Watershed Phosphorus Load Control	2	5	1	5	1	1	3	1	7	**26**	$390,000	
RPBCWD	Chanhassen	Purgatory Creek	Lotus Lake	Lotus Lake LL_7	Watershed Phosphorus Load Control	2	5	1	5	1	1	3	1	7	**26**	$586,000	
RPBCWD	Chanhassen	Purgatory Creek	Lotus Lake	Lotus Lake LL_3 & LL_7	Watershed Phosphorus Load Control	2	5	1	5	1	1	3	1	7	**26**	$975,000	
RPBCWD	Chanhassen	Purgatory Creek	Silver Lake	Silver Lake SiL_4	Slope Stabilization - Stabilization of an eroding slope	3	3	1	3	1	5	1	1	7	**25**	$80,000	
RPBCWD	Shorewood	Purgatory Creek	Silver Lake	Silver Lake SiL_6	Slope Stabilization - Stabilization of an eroding slope	3	3	1	3	1	5	1	1	7	**25**	$52,000	
RPBCWD	Chanhassen	Purgatory Creek	Lotus Lake	Lotus Lake LL_8	Watershed Phosphorus Load Control	2	5	1	1	1	1	3	1	7	**22**	$142,000	
RPBCWD	Chanhassen	Purgatory Creek	Lotus Lake	Lotus Lake LL_9	Watershed Phosphorus Load Control	2	5	1	1	1	1	3	1	7	**22**	$556,000	
RPBCWD	Eden Prairie	Purgatory Creek	Duck Lake	Duck Lake DL_3	Watershed Phosphorus Load Control	3	5	3	7	1	3	3	7	5	**37**	$213,000	
RPBCWD	Eden Prairie	Purgatory Creek	Staring Lake	Staring Lake StL_2	Watershed Phosphorus Load Control	3	5	5	1	1	3	3	5	5	**31**	$253,000	
RPBCWD	Eden Prairie	Purgatory Creek	Staring Lake	Staring Lake StL_1	Creek Restoration and Stabilization	3	7	1	1	5	5	1	1	5	**29**	$1,173,000	

Table 7-2 Proposed Projects in the Purgatory Creek Watershed

Source of Identified Project	City	Major Watershed	Resource	Project	Project Description	Goal Index[1]	Sustainability Index[1]	Volume Management Index[1]	Pollutant Management[1]	Stabilization[1]	Habitat Restoration[1]	Partnership[1]	Education[1]	Watershed Benefit[1]	Total Benefit Score[1]	Planning Level Estimated 30 year Cost[2]	Funding Partner Opportunity
RPBCWD	Eden Prairie	Purgatory Creek	Staring Lake	Staring Lake StL_8	Watershed Phosphorus Load Control	2	5	3	1	1	1	3	7	5	**28**	$629,000	
RPBCWD	Eden Prairie	Purgatory Creek	Staring Lake	Staring Lake StL_11	Watershed Phosphorus Load Control	3	3	5	3	1	1	3	3	5	**27**	$5,100,000	
RPBCWD	Eden Prairie	Purgatory Creek	Staring Lake	Staring Lake StL_12	Watershed Phosphorus Load Control	3	3	5	1	1	1	3	1	5	**23**	$270,000	
RPBCWD	Eden Prairie	Purgatory Creek	Staring Lake	Staring Lake StL_3	Watershed Phosphorus Load Control	2	5	1	1	1	1	3	1	5	**20**	$270,000	
RPBCWD	Eden Prairie	Purgatory Creek	Staring Lake	Staring Lake StL_4	Watershed Phosphorus Load Control	2	5	1	1	1	1	3	1	5	**20**	$203,000	
RPBCWD	Eden Prairie	Purgatory Creek	Staring Lake	Staring Lake StL_5	Watershed Phosphorus Load Control	2	5	1	1	1	1	3	1	5	**20**	$926,000	
RPBCWD	Eden Prairie	Purgatory Creek	Staring Lake	Staring Lake StL_7	Watershed Phosphorus Load Control	2	5	1	1	1	1	1	3	5	**20**	$207,000	
RPBCWD	Eden Prairie	Purgatory Creek	Staring Lake	Staring Lake StL_10	Watershed Phosphorus Load Control	2	1	3	1	1	1	3	3	5	**20**	$852,000	
RPBCWD	Eden Prairie	Purgatory Creek	Lake Ildewild	Lake Idlewild LI_4	Watershed Phosphorus Load Control	3	5	5	7	1	3	3	7	3	**37**	$0	
RPBCWD	Eden Prairie	Purgatory Creek	Round Lake	Round Lake RL_1	Watershed Phosphorus Load Control	3	5	3	7	1	3	3	7	3	**35**	$118,000	
RPBCWD	Eden Prairie	Purgatory Creek	Round Lake	Round Lake RL_4	Watershed Phosphorus Load Control	3	5	3	7	1	3	3	7	3	**35**	$362,000	
RPBCWD	Eden Prairie	Purgatory Creek	Staring lake	Staring Lake Outlet	Outlet modifications at Staring Lake	3	5	1	1	3	5	7	7	3	**35**	$400,000	
RPBCWD	Eden Prairie	Purgatory Creek	Round Lake	Round Lake RL_2	Watershed Phosphorus Load Control	3	3	3	7	1	3	3	3	3	**29**	$245,000	
RPBCWD	Eden Prairie	Purgatory Creek	Red Rock Lake	Red Rock Lake RRL_2	Watershed Phosphorus Load Control	3	5	3	7	1	3	3	1	3	**29**	$90,000	
RPBCWD	Eden Prairie	Purgatory Creek	Lake Ildewild	Lake Idlewild LI_2a & LI_2b	Watershed Phosphorus Load Control	3	5	3	7	1	3	3	1	3	**29**	$667,000	
RPBCWD	Eden Prairie	Purgatory Creek	Red Rock Lake	Red Rock Lake RRL_1	Watershed Phosphorus Load Control	2	5	1	7	1	1	3	5	3	**28**	$306,000	
RPBCWD	Eden Prairie	Purgatory Creek	Red Rock Lake	Red Rock Lake RRL_6	Watershed Phosphorus Load Control	2	5	1	7	1	1	3	5	3	**28**	$194,000	
RPBCWD	Eden Prairie	Purgatory Creek	Red Rock Lake	Red Rock Lake RRL_7	Watershed Phosphorus Load Control	2	5	1	7	1	1	3	5	3	**28**	$441,000	
RPBCWD	Eden Prairie	Purgatory Creek	Purgatory Creek	Staring Lake StL_18	In-Lake Phosphorus Load Control	2	3	1	7	1	3	3	5	3	**28**	$812,000	

Table 7-2 Proposed Projects in the Purgatory Creek Watershed

Source of Identified Project	City	Major Watershed	Resource	Project	Project Description	Goal Index[1]	Sustainability Index[1]	Volume Management Index[1]	Pollutant Management[1]	Stabilization[1]	Habitat Restoration[1]	Partnership[1]	Education[1]	Watershed Benefit[1]	Total Benefit Score[1]	Planning Level Estimated 30 year Cost[2]	Funding Partner Opportunity
RPBCWD	Eden Prairie	Purgatory Creek	Purgatory Creek	Staring Lake StL_15a & StL_15b	Watershed Phosphorus Load Control	3	5	5	1	1	3	3	3	3	**27**	$894,000	
RPBCWD	Eden Prairie	Purgatory Creek	Staring Lake	Staring Lake StL_17	Creek Restoration and Stabilization	3	7	1	1	1	3	3	7	3	**29**	$550,000	
RPBCWD	Eden Prairie	Purgatory Creek	Mitchell Lake	Mitchell Lake ML_2	In-Lake Phosphorus Load Control	2	3	1	7	1	3	3	1	3	**24**	$518,000	
RPBCWD	Eden Prairie	Purgatory Creek	Mitchell Lake	Mitchell Lake ML_3	Watershed Phosphorus Load Control	2	5	1	7	1	1	3	1	3	**24**	$579,000	
RPBCWD	Eden Prairie	Purgatory Creek	Red Rock Lake	Red Rock Lake RRL_4	Watershed Phosphorus Load Control	2	5	1	7	1	1	3	1	3	**24**	$980,000	
RPBCWD	Eden Prairie	Purgatory Creek	Mitchell Lake	Mitchell Lake ML_1	Watershed Phosphorus Load Control	2	5	1	5	1	1	3	1	3	**22**	$133,000	
RPBCWD	Eden Prairie	Purgatory Creek	Mitchell Lake	Mitchell Lake ML_4	Watershed Phosphorus Load Control	2	3	3	5	1	1	3	1	3	**22**	$315,000	
RPBCWD	Eden Prairie	Purgatory Creek	Staring Lake	Staring Lake StL_16	Watershed Phosphorus Load Control	2	5	1	1	1	1	3	3	3	**20**	$500,000	
RPBCWD	Eden Prairie	Purgatory Creek	Purgatory Creek	P1	Creek Restoration and Stabilization	3	7	1	1	7	5	7	7	1	**39**	$4,173,000	
RPBCWD	Bloomington	Purgatory Creek	Hyland Lake	Hyland In-Lake	In-Lake Phosphorus Load Control	2	3	1	7	1	3	7	7	1	**32**	$300,000	
RPBCWD	Eden Prairie	Purgatory Creek	Staring Lake	PC_1	Creek Restoration and Stabilization - Restoration and stabilization of 10 locations (725 feet) downstream of Pioneer Trail (Group 1)	3	7	1	7	1	3	3	5	1	**31**	$265,000	
RPBCWD	Eden Prairie	Purgatory Creek	Staring Lake	PC_2	Creek Restoration and Stabilization - Restoration and stabilization of 6 locations (380 feet) downstream of Pioneer Trail (Group 2)	3	7	1	7	1	3	3	5	1	**31**	$185,000	

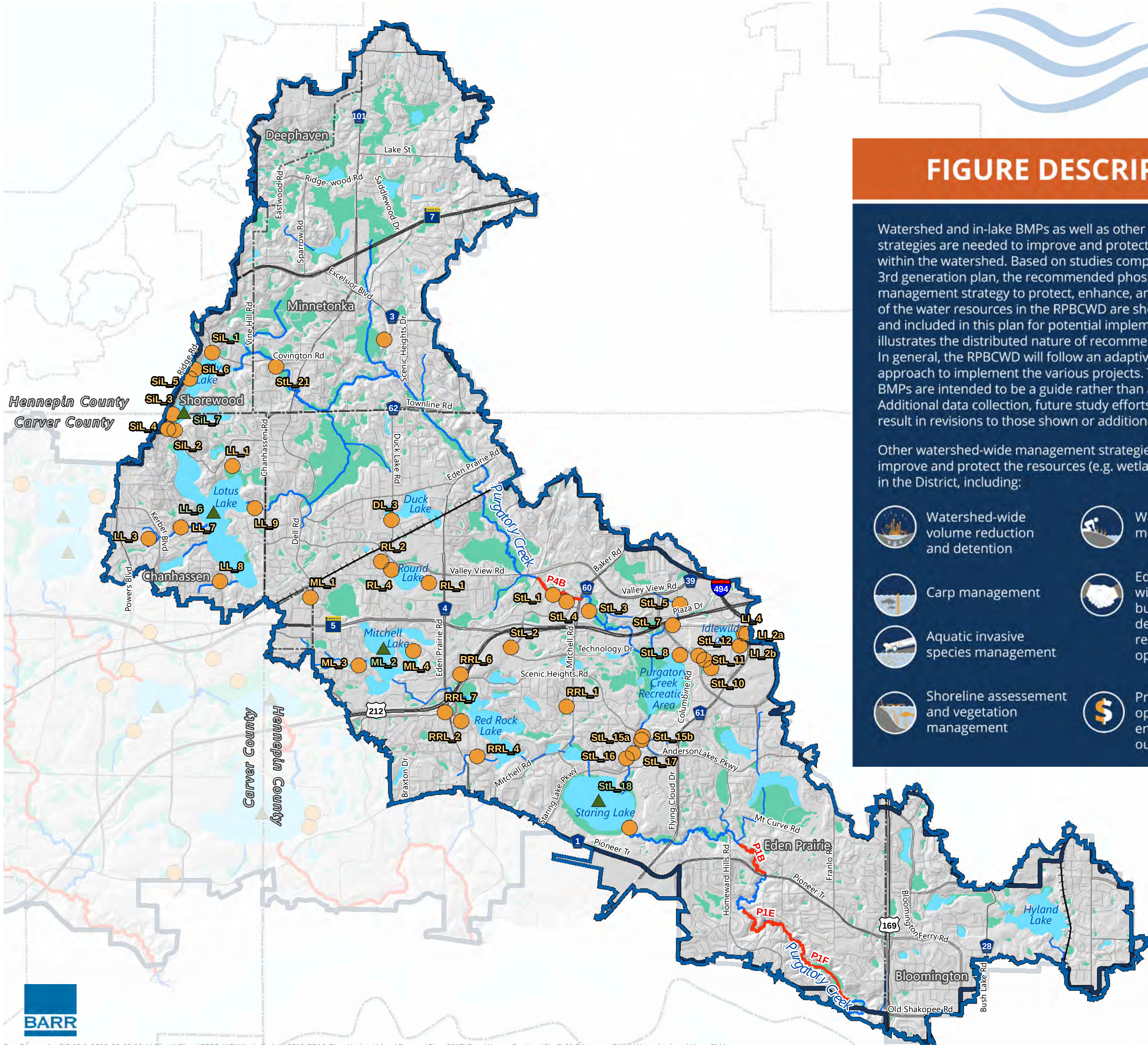
[1]See Section 4 for additional detials about the RPBCWD prioritization methodology and associated descriptions for the variables used to assess multiple project benefits.

[2]Based on 2017 dollars

PURGATORY CREEK WATERSHED

PROPOSED PROJECTS

FIGURE 7-1



Barr Footer: ArcGIS 10.6, 2018-06-28 16:44 File: I:\Client\RPBC_WD\Work_Orders\2016_TO16_Plan_Update\Maps\Reports\Plan_2017\One_Waters_Sections\Fig 7-01 Purgatory Creek Watershed.mxd User: EMA

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

Recommended Best Managment Practices

- In Lake BMP
- Watershed BMP
- Creek Stabilization
- Streams/Creeks
- Lake/Pond
- Wetlands
- Hydrologic Boundary
- District Legal Boundary
- Municipalities

N

0 6,000 12,000
Feet

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

7.3 Opportunity Projects

The projects identified in Table 7-2 primarily focus on the reduction of phosphorus loading to the resources by implementing BMPs and streambank stabilization to address water quality goal WQual 1 and water quantity goal WQuan 2. Through the public input process, additional goals have been identified as important elements. These goals focus on habitat and ecology, other pollutants, groundwater, and best management practices that infiltrate, conserve groundwater, protect baseflow and reduce stormwater runoff. Other potential management techniques that address these goals can be identified in Table 7-3. These opportunity projects could be identified through additional data collection, future study efforts, and innovation.

Table 7-3 Opportunity Projects in the Purgatory Creek Watershed

<table>
<tr><th>Topic</th><th>Sub-topic</th><th>Goal</th><th>Most Applicable Strategies</th><th>Examples of Projects</th></tr>
<tr><td rowspan="4">Habitat & ecology</td><td>Habitat protection & establishment</td><td rowspan="4">WQual 1. Protect, manage, and restore water quality of District lakes and creeks to maintain designated uses.

WQual 2. Preserve and enhance the quantity, as well as the function and value of wetlands.

WQual 3. Preserve and enhance habitat important to fish, waterfowl, and other wildlife.</td><td>WQual S3. The District encourages cities and developers to seek opportunities to incorporate habitat protection or enhancement into development and redevelopment projects.</td><td rowspan="4">Riparian Habitat Restoration

Wetland enhancement and restoration

Green Corridor Expansion

In-stream hydrologic improvements

Aquatic plant management

Carp management activities

Enhance regulatory program</td></tr>
<tr><td>Buffers & bioengineering</td><td>WQual S7. The District will promote the use of natural materials and bioengineering for the maintenance and restoration of shorelines and streambanks where appropriate.

WQual S11. The District recognizes the multiple benefits of vegetated buffers and promotes the use of vegetated buffers around all waterbodies.</td></tr>
<tr><td rowspan="2">aquatic invasive species</td><td>WQual S4. The District will implement measures to manage carp populations in District-managed waterbodies.</td></tr>
<tr><td>WQual S9. The District will partner with other entities to minimize the spread and reduce the adverse ecological impacts of aquatic invasive species.</td></tr>
</table>

Topic	Sub-topic	Goal	Most Applicable Strategies	Examples of Projects
Erosion	Erosion & sediment pollution	WQual 1. Protect, manage, and restore water quality of District lakes and creeks to maintain designated uses. WQual 2. Preserve and enhance the quantity, as well as the function and value of wetlands. WQual 3. Preserve and enhance habitat important to fish, waterfowl, and other wildlife.	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. WQual S2. The District will inventory and address areas within the watershed with existing erosion issues and/or areas at high risk for erosion by implementing the District's capital improvement, incentive and regulatory programs.	Shoreline and streambank protection and restoration (e.g., buffers and stabilization efforts) Rainfall abstraction (e.g., rain gardens, reuse, and permeable pavements) Enhance regulatory program
Pollution	Chloride pollution	WQual 1. Protect, manage, and restore water quality of District lakes and creeks to maintain designated uses. WQual 2. Preserve and enhance the quantity, as well as the function and value of wetlands. WQual 3. Preserve and enhance habitat important to fish, waterfowl, and other wildlife.	WQual S12. The District will assist and cooperate with cities, MPCA, MDNR, MnDOT, other watersheds and stakeholders in implementing projects or other management actions based on the Minnesota Pollution Control Agency's Twin Cities Metro Chloride TMDL.	Municipal cost-share projects
	Non-point source pollution		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. WQual S14. The District will continue to identify opportunities and actions to protect, restore, and enhance District-managed resources.	Watershed BMPs (e.g., iron enhanced sand, ponds, etc.) In-lake water quality treatment projects (e.g., alum treatment) Rainfall abstraction (e.g., rain gardens, reuse, and permeable pavements) Enhance regulatory program
	Emerging topics		WQual S15. The District will cooperate with other entities to investigate treatment effectiveness of emerging practices. WQual S16. The District will work with the state agencies and local governmental units to identify emerging pollutants of concern.	Demonstration and pilot-scale water quality treatment projects

Topic	Sub-topic	Goal	Most Applicable Strategies	Examples of Projects
Groundwater	Groundwater conservation	Ground 1. Promote the sustainable management of groundwater resources.	Ground S1. The District will promote the conservation of groundwater resources through its education and outreach programs and will work with cities to encourage conservation practices (e.g. water reuse)	Rainfall abstraction (e.g., rain gardens, reuse, and permeable pavements) Larger scale infiltration practices in targeted locations
	Groundwater-surface water interactions		Ground S3. The District will work to increase the understanding of the interaction between groundwater resources and surface waters within the District and consider those interactions in future management decisions.	
Water Quantity	Baseflow impacts	WQuan 1. Protect and enhance the ecological function of District floodplains to minimize adverse impacts. WQuan 2. Limit the impact of stormwater runoff on receiving waterbodies.	WQuan S2. The District will promote strategies that minimize baseflow impacts.	Larger scale infiltration practices in targeted locations Rainfall abstraction practices (e.g., rain gardens, permeable pavements) LID cost-share projects within municipalities Water reuse projects Stormwater retention and detention (e.g., ponds, filtration) Flood risk mitigation projects Enhance regulatory program
	Infiltration practices		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.	
	Low impact development		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.	
	Conservation practices		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.	
	Flood risk reduction		WQuan S8. The District will develop and implement actions to reduce flood risk within the District	

What's happening

WATERSHED MANAGEMENT PLAN

One of the most important projects the watershed worked on in 2017 was updating its Watershed Managment Plan.

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The draft plan was relased for public review in late 2017. After comments are addressed, the District will submit a final plan for approval in 2018. Check our website for updates on the process: rpbcwd.org

Thank you! To everyone who shared their thoughts, ideas, hopes and concerns. We truly appreciate you being a part of this process.

YOU CAN HELP

Rainwater runoff, the water that flows across yards, parking lots, and streets into stormdrains, is one of the main causes of pollution in urban areas. You can take simple actions to help protect Purgatory Creek.

Keep the curb clean
Sweep up leaves, grass clippings and fertilizer from driveways and streets.

Water with care
Grass requires 1-inch of water per week: about one hour of sprinkling per week if it has not rained.

Salt smart
The salt we use to melt ice can pollute our lakes and creeks. Use salt sparingly and always shovel first.

Reuse the rain
Collect and reuse rainwater with a rain barrel.

Build a raingarden
Raingardens soak up water and filter out pollution. Visit our website for help.

Contact us
and find out how you can get involved

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Purgatory Creek

2017

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Purgatory Creek has three headwaters: Lotus Lake in Chanhassen, Silver Lake in Shorewood, and wetlands in Minnetonka. After these forks join, the creek flows through the Purgatory Recreation Area and Staring Lake before eventually reaching the Minnesota River.

WATERSHED BOUNDARIES

CHARACTERISTICS

Length	12 miles
Elevation change	178 ft
Watershed size	30 sq miles
# of cities in watershed	4
# of lakes connected	8
# of monitoring sites	10
# of parks	27
Impairment	Not listed
Common fish	Bluegill, White Sucker, Black Crappie, Yellow Perch
Invasive species	Curlyleaf Pondweed, Eurasian Watermilfoil, Common Carp

How healthy is Purgatory Creek?

Keeping Purgatory Creek healthy requires several tools and strategies. Conducting projects to stabilize the stream banks and restore stretches is one important strategy. Cleaning and slowing rainwater runoff before it reaches the creek is another. But before either of these can be done, we need to understand how the creek is doing and where it needs the most help.

The watershed district has been monitoring Purgatory Creek since the 1970s. Recently, the district developed a new tool to assess the creek: the Creek Restoration Action Strategy (CRAS). The CRAS uses water quality data, as well as information on erosion and habitat to rank which creek sections are doing the best and which are doing the poorest. Below, the three major types of data used in the assessment are described. On the next page, a creek map shows the results from 2017.

Water quality

District staff take samples at eight sites during summer. They gather information about nutrient levels (phosphorus), sediment, pH, and dissolved oxygen. These data let us know how clean the water is, and whether it is healthy for plants, animals, and people.

Erosion

Every year, staff walk along sections of the creek. They note sites with erosion, its severity, and whether any structures like houses or bridges are in danger. Erosion is also a problem because the sediment that erodes into the creek is a pollutant.

Habitat

Creeks are important habitat for insects, plants, fish, birds, and other animals. When staff check for erosion, they also assess the habitat. Reaches receive a score based on the quality of habitat they provide, and whether it needs to be restored.

Dive deeper

Interested in learning more? Explore the following reports on our website.

Assessment

BARR Engineering. 2017. Purgatory Creek Watershed Use Attainability Analysis.

RPBCWD & BARR Engineering. 2015. Creek Restoration Action Strategy.

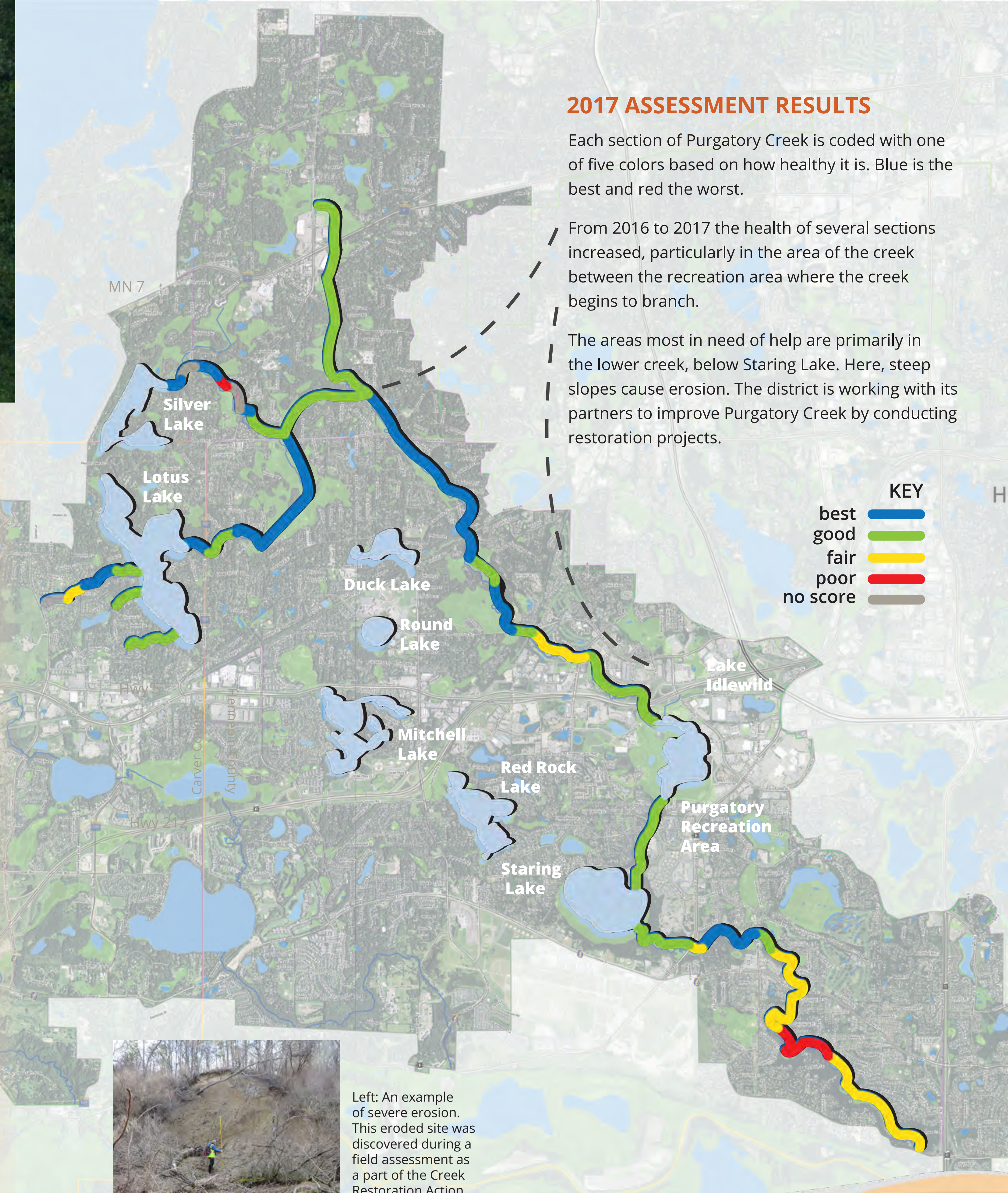
BARR Engineering. 2013. Purgatory Creek Watershed: Total Maximum Daily Load Implementation Plan.

Carp management

Sorensen P, Bajer P and M Headrick. 2015. Development and implementation of a sustainable strategy to control common carp in the Purgatory Creek chain of Lakes. University of Minnesota.

Stormwater ponds

RPBCWD. 2013. Stormwater Pond Project.



2017 ASSESSMENT RESULTS

Each section of Purgatory Creek is coded with one of five colors based on how healthy it is. Blue is the best and red the worst.

From 2016 to 2017 the health of several sections increased, particularly in the area of the creek between the recreation area where the creek begins to branch.

The areas most in need of help are primarily in the lower creek, below Staring Lake. Here, steep slopes cause erosion. The district is working with its partners to improve Purgatory Creek by conducting restoration projects.

Left: An example of severe erosion. This eroded site was discovered during a field assessment as a part of the Creek Restoration Action Strategy.

What's happening

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Thank you! To everyone who shared their thoughts, ideas, hopes and concerns. We truly appreciate you being a part of this process.

DIVE DEEPER

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Aquatic plants

Johnson, J. 2017. 2017 Aquatic Plan Survey: Lake Ann.

Blue Water Science. 2014. Aquatic plant surveys for Duck Lake, Eden Prairie, MN.

Stormwater ponds

RPBCWD. 2013. Stormwater pond project.

Watershed study

BARR Engineering. 2017. Purgatory Creek Watershed Use Attainability Analysis.

Contact us

and find out how you can get involved

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Duck Lake

2017

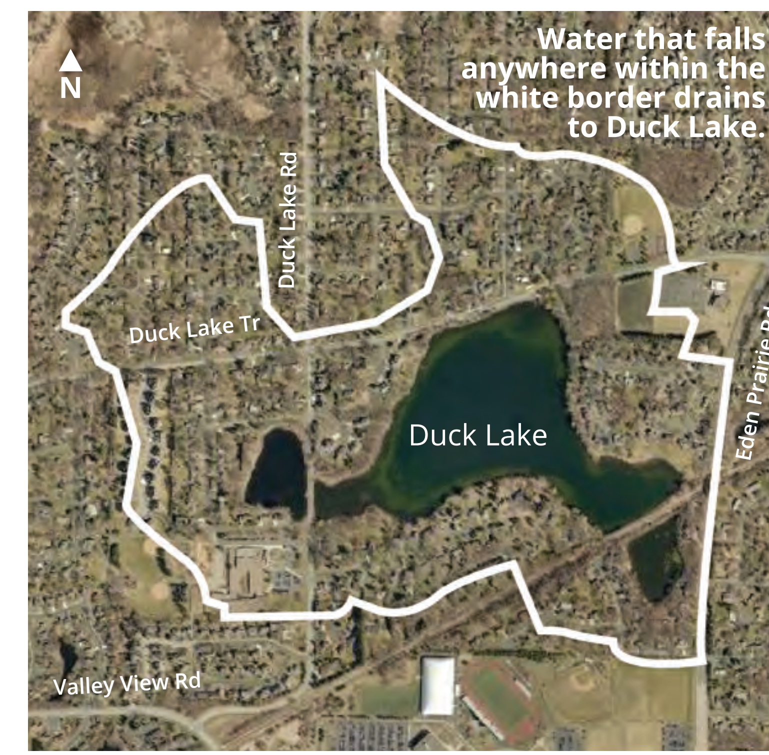
RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Located in Eden Prairie, Duck is one of the district's shallow lakes. Since 2011, it has seen improvement in water quality, and has met the Minnesota Pollution Control Agency's clean water standards several years.

CHARACTERISTICS

Size	41 acres
Volume	131 acre-ft
Average depth	3.4 ft
Max depth	8 ft
Watershed size	233 acres
Land draining directly into	174 acres
MPCA lake classification	Shallow
Impairment listing	Not listed
Trophic status	Eutrophic
Common fish	Bluegill, Black Crappie, Bullhead
Invasive species	Curlyleaf Pondweed, Purple Loosestrife

WATERSHED BOUNDARIES



LAND USE in the Duck Lake Watershed

How healthy is Duck Lake?

2017 saw some of the clearest water since records began on Duck Lake in 1975. Until 2011, Duck Lake had failed to meet the clean water standards set by the Minnesota Pollution Control Agency (MPCA). For the past seven years however, water quality has continued to improve. Continued monitoring will track whether this continues, and help us understand why.

During the growing season (June - September), district staff visit Duck Lake every other week to collect water samples and take measurements. The water samples are sent to a lab where they are tested for several compounds including total phosphorous (TP) and chlorophyll a (Chl-a). Staff also measure how clear the water is using a disk that is lowered into the water until it can no longer be seen. All three of these parameters help indicate whether the water is clean.

Duck is classified as a "Shallow Lake", which means that it is generally less than 15 feet deep and light can reach the bottom in most of the lake. This ample light means that shallow lakes often have a lot of aquatic plants, and are habitat to many types of fish and birds.

Motorized boats are not allowed on shallow Duck Lake, but it is a popular place to kayak and canoe.

Duck Lake on a warm, summer day.

Help keep Duck Lake healthy

Rainwater runoff - the water that flows across yards, parking lots, and streets into stormdrains - is one of the main causes of pollution in urban areas. You can take simple actions to help protect Duck Lake.

Keep the curb clean
Sweep up leaves, grass clippings and fertilizer from driveways and streets.

Water with care
Grass requires 1-inch of water per week: about one hour of sprinkling per week if it has not rained.

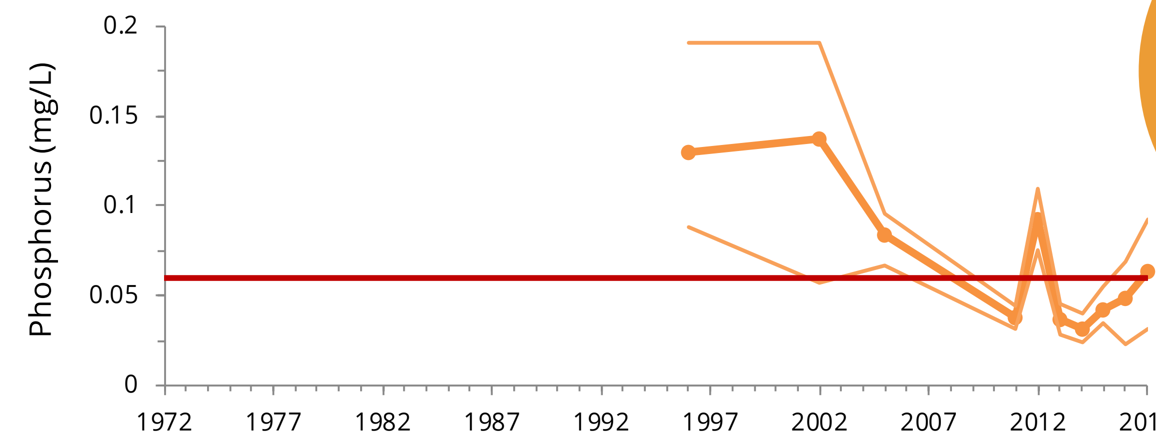
Salt smart
The salt we use to melt ice can pollute our lakes and creeks. Use salt sparingly and always shovel first.

Reuse the rain
Collect and reuse rainwater with a rain barrel.

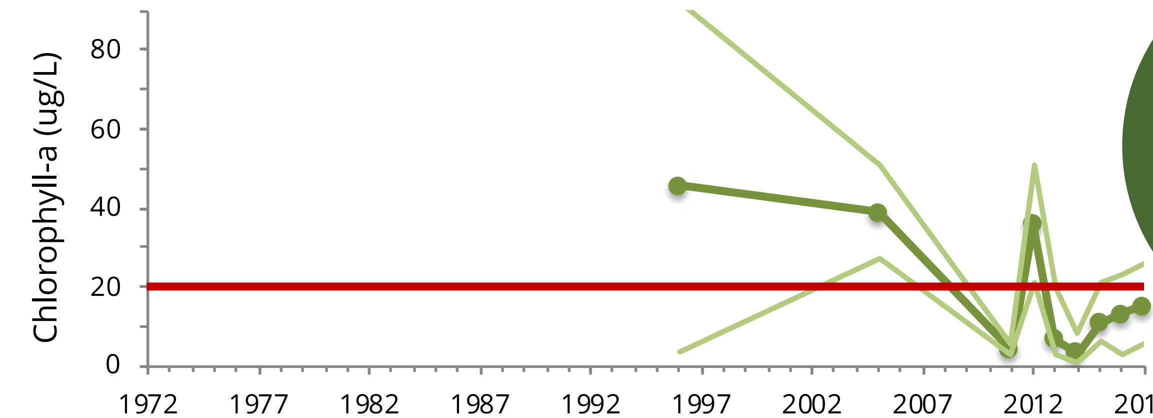
Build a raingarden
Raingardens soak up water and filter out pollution. Visit our website for help.

Water quality graphs 1975 - 2017

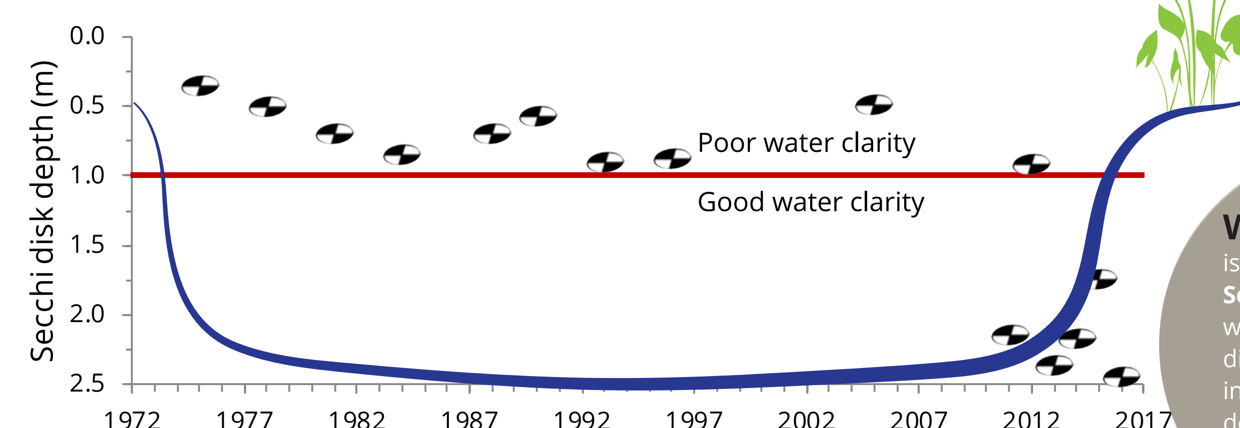
Points are growing season (Jun-Sep) averages. Thin lines are the min and max values for each year.



Phosphorus is a nutrient that plants and algae need for growth. It is often measured as total phosphorus (TP). Too much phosphorous can cause algae blooms.



Chlorophyll a is the main pigment in algae, so measuring chl-a can tell us how much algae there is. Too much chl-a means that there are too many nutrients in the water.



Water clarity is measured using a **Secchi Disk**, a black and white disk the size of a dinner plate. It is lowered into the water, and the depth at which it is no longer visible is recorded.

Summary table

	MPCA standard	1975/1996 - 2016 max	1975/1996 - 2016 min	1975/1996 - 2016 average	2017 max	2017 min	2017 average
TP	<0.06 mg/l	0.191	0.023	0.065	0.092	0.031	**0.064**
Chl-a	<20 ug/l	92.3	1.0	17.0	25.8	5.34	**15.3**
Secchi	>1 m	2.7	0.2	1.5	2.8	2.4	**2.6**

What's happening

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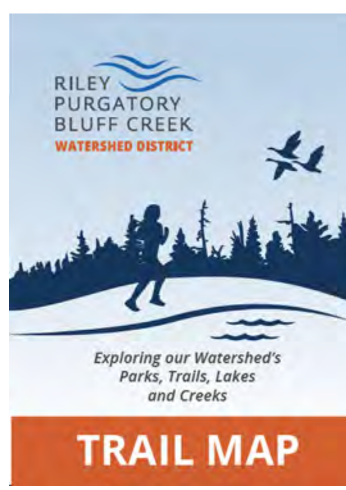
DIVE DEEPER

Interested in learning more? Explore these reports and documents on our website.

Watershed study
BARR Engineering. 2017. Hyland Lake Use Attainability Analysis.

Updated Parks & Trails Map
Explore the watershed through our updated parks and trails map. Want a printed copy? Stop by our office!



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Hyland Lake

2017

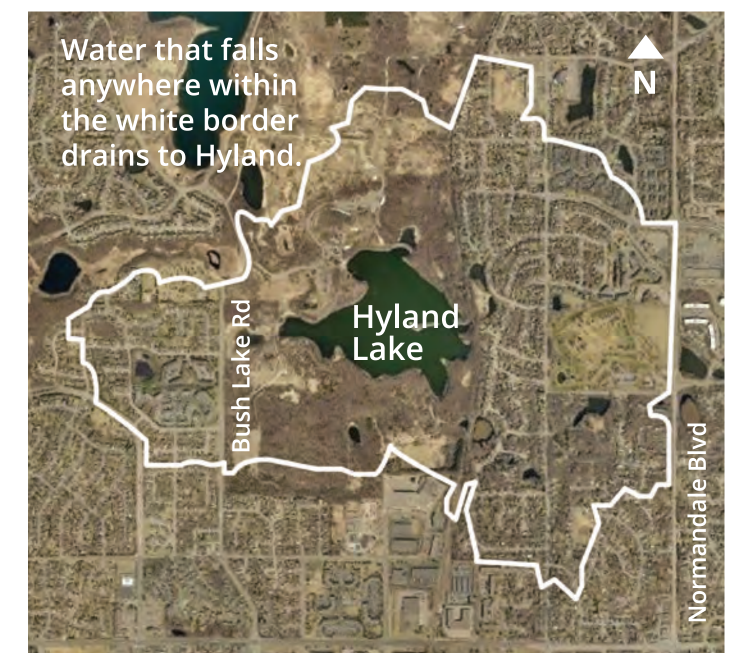
RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Located in Bloomington, Hyland Lake is surrounded by Hyland Lake Park Reserve, a Three Rivers Park District facility. Visitors can paddle the lake in the summer, hike nearby trails, and ski in the winter.

CHARACTERISTICS

Size	84 acres
Volume	780 acre-ft
Average depth	7.5 ft
Max depth	12 ft
Watershed size	922 acres
MPCA lake classification	Shallow
Impairment listing	Nutrients
Trophic status	Hypereutrophic
Common fish	Bluegill, Black Crappie, Walleye, Black Bullhead
Invasive species	Curlyleaf Pondweed

WATERSHED BOUNDARIES



LAND USE in the Hyland Lake Watershed

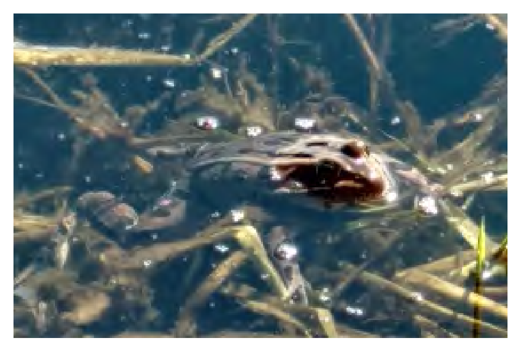
How healthy is Hyland Lake?

After a substantial decrease in 2015, water quality in Hyland Lake has continued to improve through 2017. However, it still failed to meet the clean water standards set by the Minnesota Pollution Control Agency (MPCA). The graphs on the next page show the trends over time. The red line on each graph marks the MPCA standard. The goal is for the average values (the dots) to be below the red line.

During the growing season (June - September), Three Rivers Park District staff visit Hyland Lake every other week to collect water samples and take measurements. The samples are tested for several compounds including total phosphorous (TP) and chlorophyll a (Chl-a). Staff also measure how clear the water is using a disk that is lowered into the water until it can no longer be seen. All three of these parameters help indicate whether the water is clean.

Hyland is classified as a “Shallow Lake”, which means that it is generally less than 15 feet deep and light can reach the bottom in most of the lake. This ample light means that shallow lakes often have a lot of aquatic plants, and are habitat to many types of fish and birds. To be considered healthy by the MPCA, shallow lakes need to be clear enough to see one meter down, and have low TP and Chl-a levels.

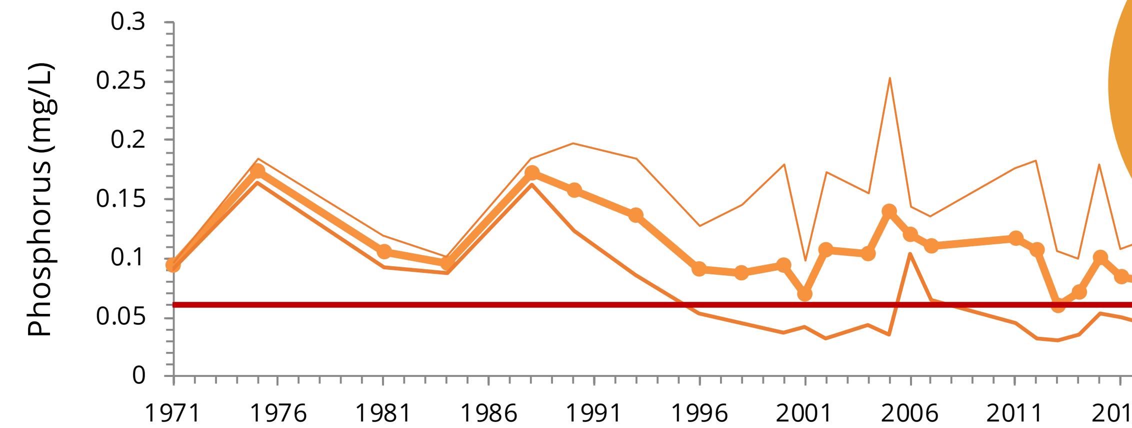
Staff checking a water level sensor on Hyland Lake. The sensor tracks how high the lake gets.



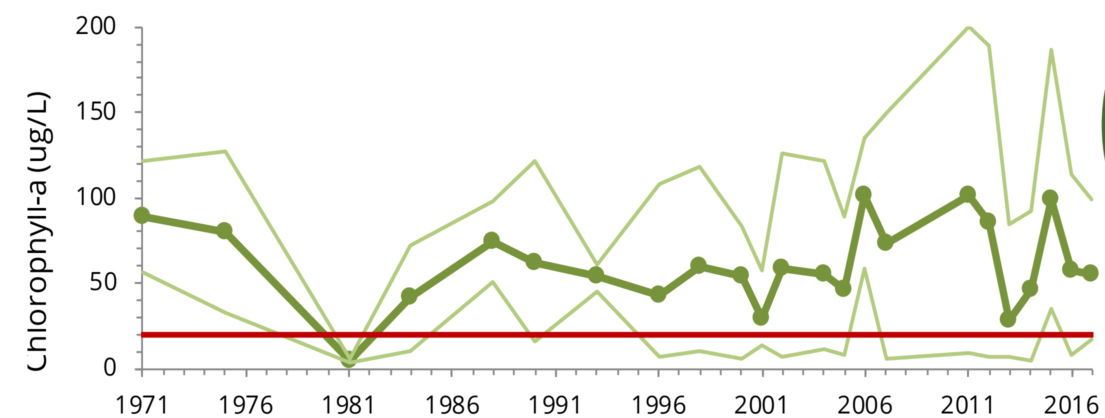
A frog enjoys a dip in shallow Hyland Lake.

Water quality graphs 1971 - 2017

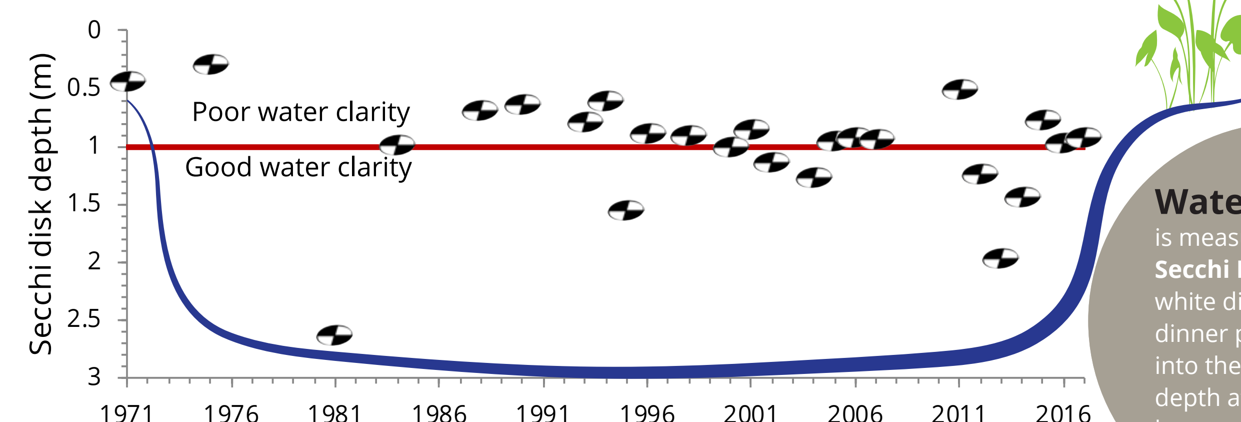
Points are growing season (Jun-Sep) averages. Thin lines are the min and max values for each year.



Phosphorus is a nutrient that plants and algae need for growth. It is often measured as total phosphorus (TP). Too much phosphorous can cause algae blooms.



Chlorophyll a is the main pigment in algae, so measuring chl-a can tell us how much algae there is. Too much chl-a means that there are too many nutrients in the water.



Water clarity is measured using a **Secchi Disk**, a black and white disk the size of a dinner plate. It is lowered into the water, and the depth at which it is no longer visible is recorded.

Summary table

	MPCA standard	1971 - 2016 max	1971 - 2016 min	1971 - 2016 average	2017 max	2017 min	2017 average
TP	<0.06 mg/l	0.252	0.031	0.105	0.115	0.045	**0.082**
Chl-a	<20 ug/l	200	3.5	64.5	99.5	16.5	**55.3**
Secchi	>1 m	3.7	0.2	1.0	2.10	0.41	**0.93**

Rainwater runoff, the water that flows across yards, parking lots, and streets into stormdrains, is one of the main causes of pollution in urban areas. You can take simple actions to help protect Hyland Lake.

Keep the curb clean

Sweep up leaves, grass clippings and fertilizer from driveways and streets.

Water with care

Grass requires 1-inch of water per week: about one hour of sprinkling per week if it has not rained.

Salt smart

The salt we use to melt ice can pollute our lakes and creeks. Use salt sparingly and always shovel first.

Reuse the rain

Collect and reuse rainwater with a rain barrel.

Build a raingarden

Raingardens soak up water and filter out pollution. Visit our website for help.

What's happening

WATERSHED MANAGEMENT PLAN

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DIVE DEEPER

Interested in learning more? Explore the following reports on our website.

Aquatic Plants
Blue Water Science. 2014. Aquatic plant surveys for Idlewild Lake, Eden Prairie, MN.

Stormwater ponds
RPBCWD. 2013. Stormwater pond project.

Watershed study
BARR Engineering. 2017. Purgatory Creek Watershed Use Attainability Analysis.

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Lake Idlewild

2017

Located in Eden Prairie, Idlewild is a part of the Purgatory Creek Watershed. Painted turtles are a common site in this small basin, which is completely surrounded by commercial development.

CHARACTERISTICS

Size	12 acres
Volume	51 acre-ft
Average depth	4 ft
Max depth	8.2 ft
Watershed size	89 acres
MPCA lake classification	Not classified
Impairment listing	Not listed
Trophic status	Hypereutrophic
Common fish	Bluegill, Black Crappie, Black Bullhead, Golden Shiner
Invasive species	None Listed

WATERSHED BOUNDARIES

LAND USE in the Lake Idlewild Watershed

How healthy is Lake Idlewild?

Lake Idlewild was first monitored in 2014. All four years water quality has met, or been near to the clean water standards set by the Minnesota Pollution Control Agency (MPCA). The graphs on the next page show the trends over time. The red line on each graph marks the MPCA standard. The goal is for the average values (dots) to be below that line.

During the growing season (June - September), the city of Eden Prairie or the watershed district visits Lake Idlewild every other week to collect water samples and take measurements. The samples are sent to a lab to be tested for several compounds including total phosphorous (TP) and chlorophyll a (Chl-a). Staff also measures how clear the water is using a disk that is lowered into the water until it can no longer be seen. All three of these parameters help indicate whether the water is clean.

Idlewild was recently reclassified from a “Shallow Lake” to a wetland. However it continues to be monitored for water quality, and using the shallow lake water standards can be a useful bench mark for seeing how the lake health changes over time.

Collecting water samples on Lake Idlewild.

Lake Idlewild on a cool, fall morning.

Rainwater runoff - the water that flows across yards, parking lots, and streets into stormdrains - is one of the main causes of pollution in urban areas. You can take simple actions to help protect Lake Idlewild.

Keep the curb clean

Sweep up leaves, grass clippings and fertilizer from driveways and streets.

Water with care

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Water quality graphs 2014 - 2017

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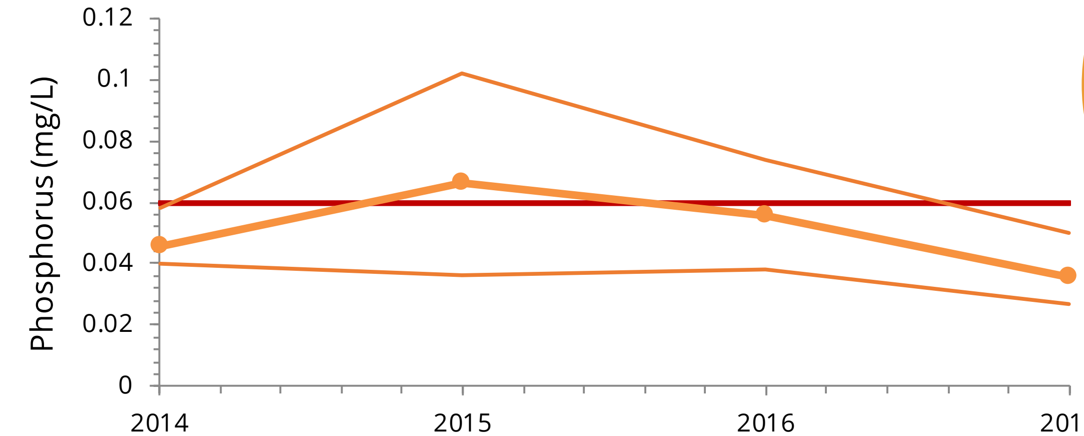

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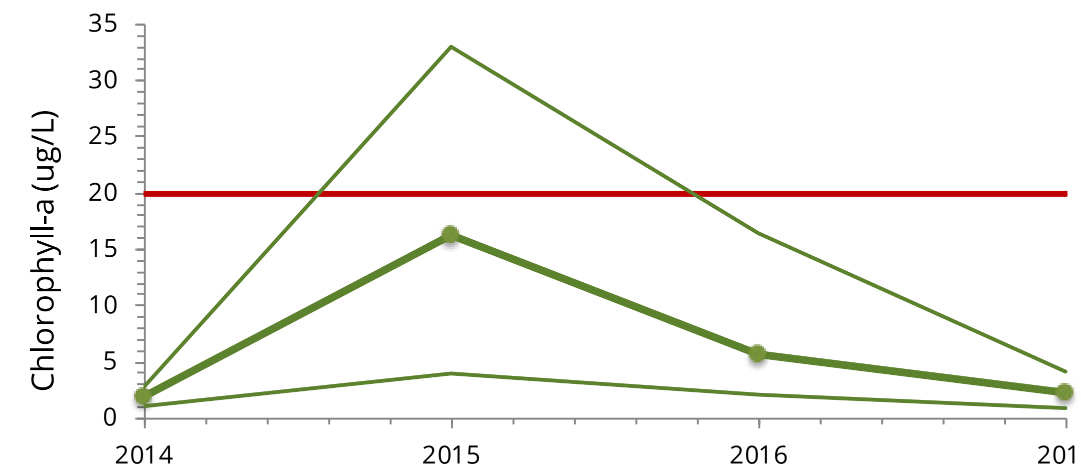
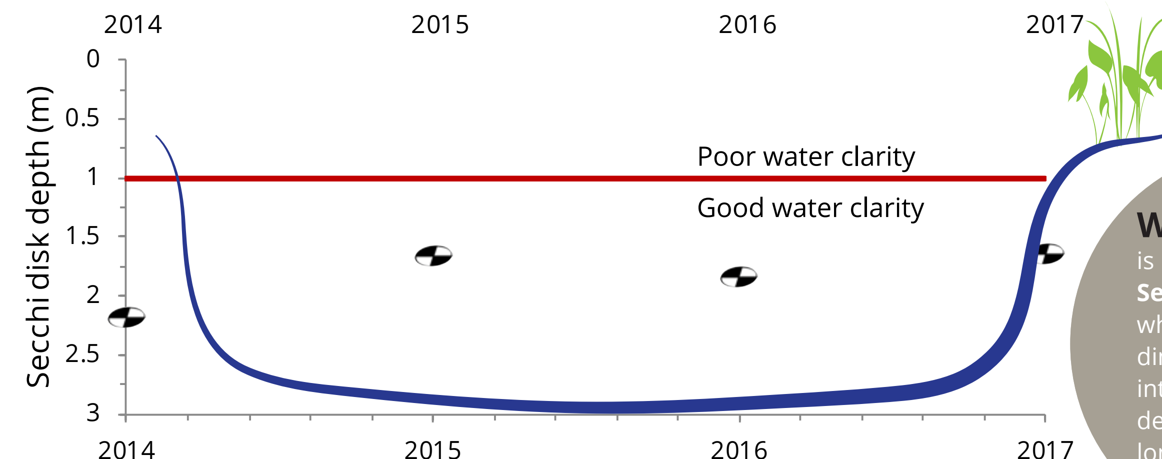


Chlorophyll a is the main pigment in algae, so measuring chl-a can tell us how much algae there is. Too much chl-a means that there are too many nutrients in the water.



Water clarity is measured using a **Secchi Disk**, a black and white disk the size of a dinner plate. It is lowered into the water, and the depth at which it is no longer visible is recorded.

Summary table

	MPCA standard	2014 - 2016 max	2014 - 2016 min	2014 - 2016 average	2017 max	2017 min	2017 average
TP	<0.06 mg/l	0.102	0.036	0.056	0.050	0.027	0.036
Chl-a	<20 ug/l	33	1.1	8.0	4.1	1	2.225
Secchi	>1 m	2.6	1.1	1.9	1.8	1.4	1.6

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DIVE DEEPER

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Aquatic plants

Johnson, J. 2017. 2017 Aquatic Plan Survey: Lotus Lake.

JaKa, J. and Newman, R. 2014. Aquatic Plant Community of Lakes Ann, Lotus, Lucy, Mitchell, Susan, Riley and Staring within the Riley Purgatory Bluff Creek Watershed: Final Report 2009 – 2014. University of Minnesota.

Paleolimnology

Ramstack J. M. and Edlund M. B. 2011. Historical water quality and ecological change of three lakes in the Riley Purgatory Bluff Creek Watershed District, MN.

Carp management

Bajer P.G., Headrick,M., Miller B. D. and Sorensen P. W. 2014. Development and implementation of a sustainable strategy to control common carp in Riley Creek Chain of Lakes. U of M.

Watershed study

BARR Engineering. 2017. Purgatory Creek Watershed Use Attainability Analysis.

Stormwater ponds

RPBCWD. 2013. Stormwater pond project.

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Lotus Lake

2017

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

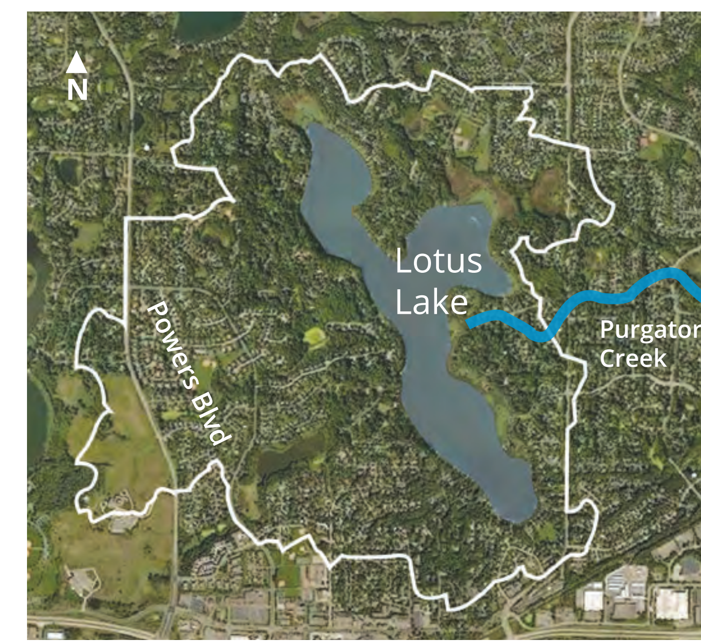
Located in eastern Chanhassen, Lotus Lake is one of three headwaters of Purgatory Creek. Water flows out of Lotus into the south fork of Purgatory Creek which eventually meets up with two other forks.

CHARACTERISTICS

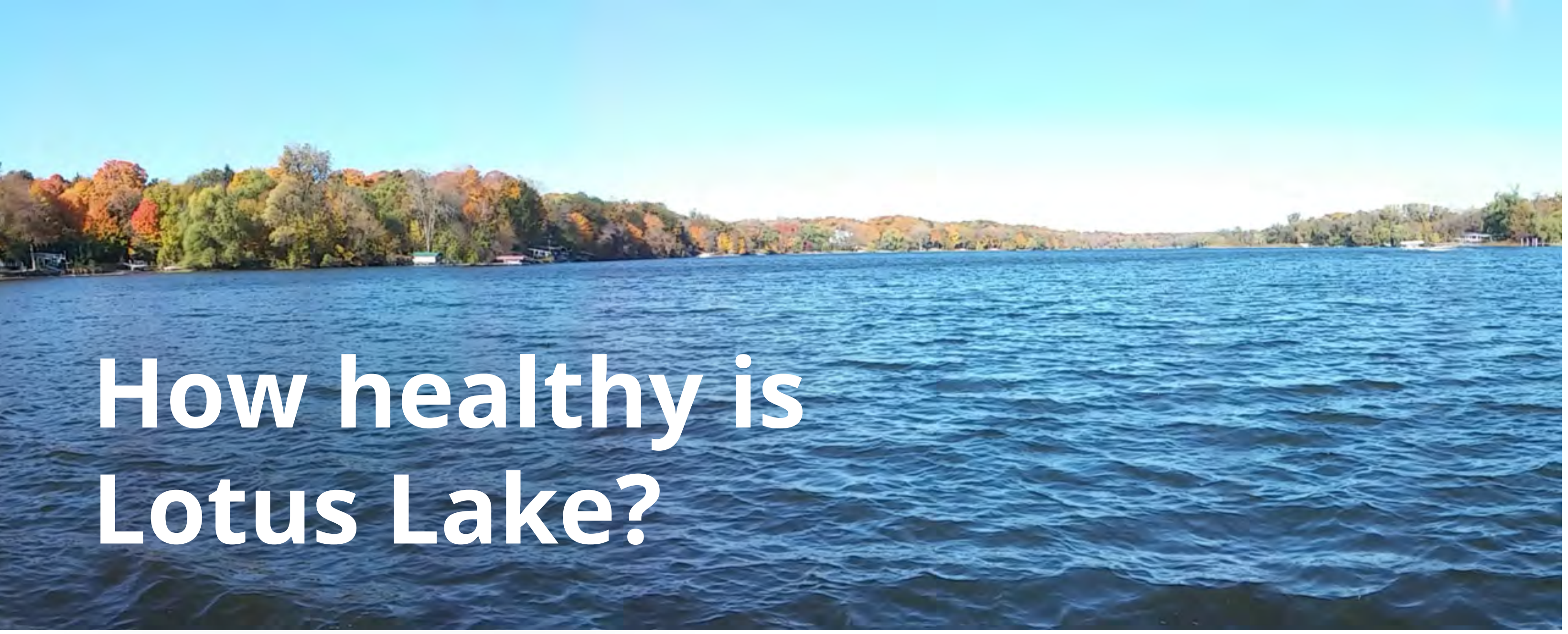
Size	248 acres
Volume	2500 acre-ft
Average depth	16 ft
Max depth	31 ft
Watershed size	1397 acres
Land draining directly into	316 acres
MPCA lake classification	Deep
Impairment listing	Mercury & Nutrients
Trophic status	Hypereutrophic
Common fish	Bluegill, Yellow Perch, Walleye
Invasive species	Eurasian Watermilfoil, Common Carp, Brittle Naiad, Curlyleaf Pondweed

WATERSHED BOUNDARIES

Water that falls anywhere within the white border drains to Lotus Lake.



LAND USE in the Lotus Lake Watershed

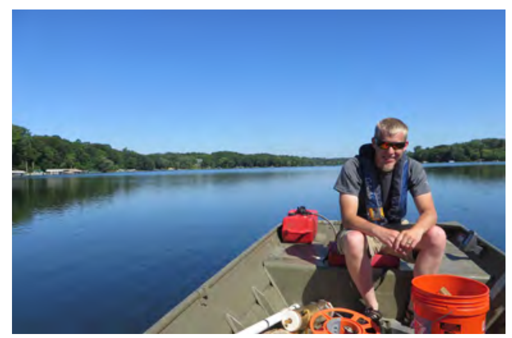


How healthy is Lotus Lake?

Water clarity improved slightly from 2016 to 2017, but Lotus Lake still failed to meet the clean water standards set by the Minnesota Pollution Control Agency (MPCA). The graphs on the next page show the trends over time. The red line on each graph marks the MPCA standard. The goal for each graph is for the average values (the dots) to be below the red line.

During the growing season (June - September), district staff visit Lotus Lake every other week to collect water samples and take measurements. The samples are sent to a lab where they are tested for several compounds including total phosphorous (TP) and chlorophyll a (Chl-a). Staff also measure how clear the water is using a disk that is lowered into the water until it can no longer be seen. All three of these parameters help indicate whether the water is clean.

Lotus is classified as a "Deep Lake", which means that it is over 15 feet deep and light can not reach the bottom in most of the lake. To be considered healthy by the MPCA, deep lakes need to be clear enough to see 1.4 meters down, and have very low TP and Chl-a levels.



Staff collect water samples on Lotus Lake during a beautiful summer day.

A loon enjoys a paddle on Lotus.

In October, the **invasive species Brittle Naiad** was found in Lotus Lake. RPBCWD conducted a **rapid response plan** to treat the lake and plans to reassess the lake in early 2018. We remind our community to **clean, drain,** and **dry** boats and other equipment after each visit to a lake.

Clean all visible aquatic plants, zebra mussels, and any other invasive species before leaving any water access.

Drain water-related equipment by removing drain plugs, and keep them out while transporting.

Dry your boat, trailer, and all equipment for at least 5 days.

Water quality graphs 1972 - 2017

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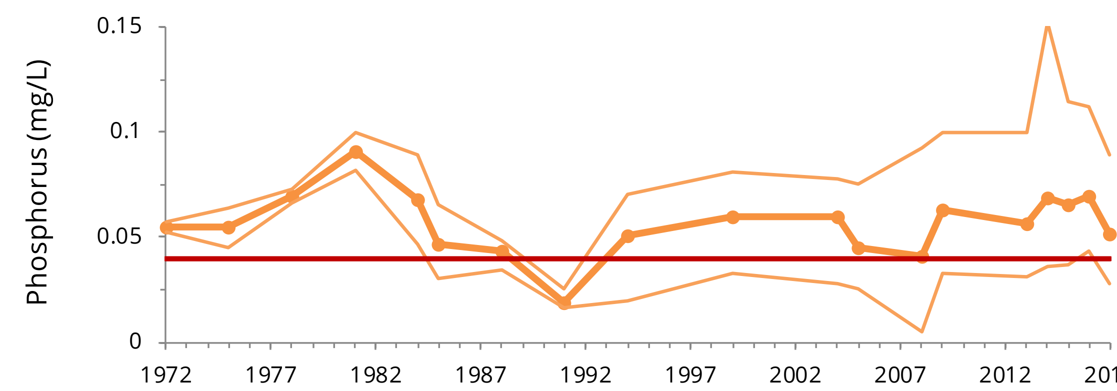

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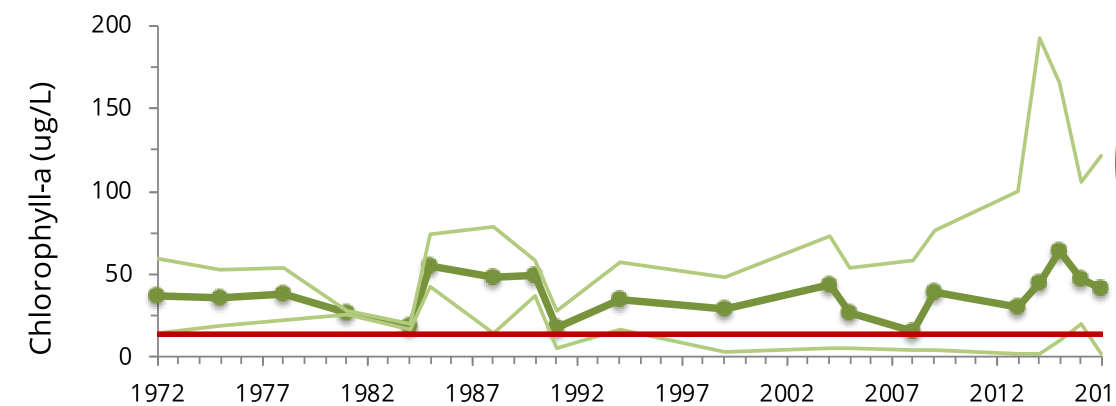

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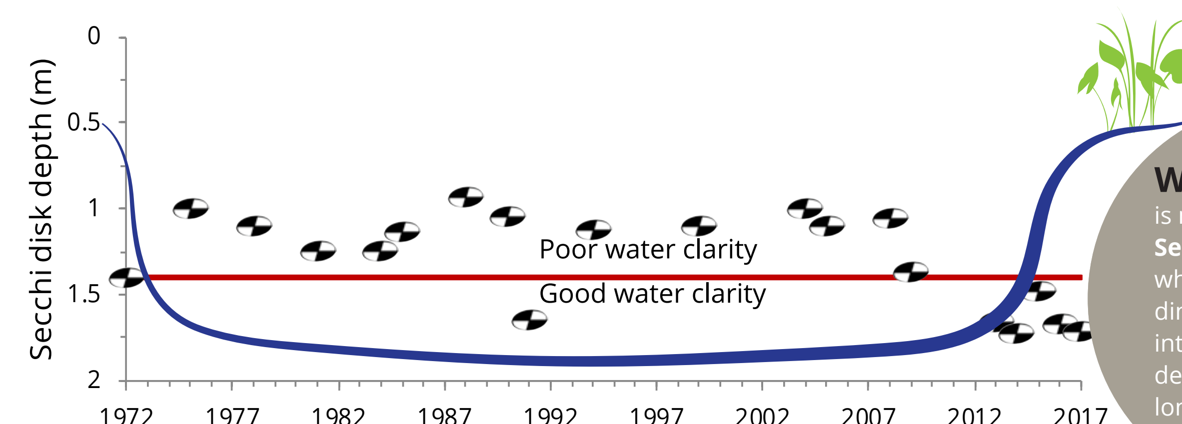

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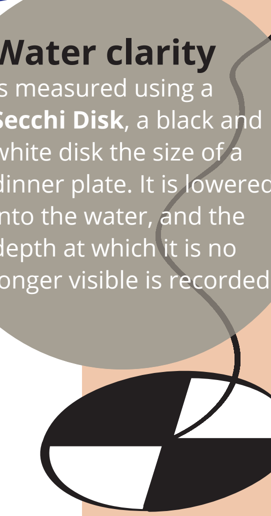

Summary table

	MPCA standard	1972 - 2016 max	1972 - 2016 min	1972 - 2016 average	2017 max	2017 min	2017 average
TP	<0.04 mg/l	0.152	0.005	0.057	0.089	0.03	**0.051**
Chl-a	<14 ug/l	192	2.7	36.4	121	2.67	**41.5**
Secchi	>1.4 m	4.2	0.3	1.3	3.5	0.9	**1.7**

What's happening

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DIVE DEEPER

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Aquatic plants
Dunne, M. and Newman, R. 2017. Aquatic Plant Community of Lakes Lucy, Mitchell, Susan, Riley and Staring: Annual Report for 2016. University of Minnesota.

JaKa, J. and Newman, R. 2014. Aquatic Plant Community of Lakes Ann, Lotus, Lucy, Mitchell, Susan, Riley and Staring: Final Report 2009 – 2014. University of Minnesota.

Stormwater ponds
RPBCWD. 2013. Stormwater pond project.

Paleolimnology
Ramstack J. M. and Edlund M. B. 2011. Historical water quality and ecological change of three lakes in the Riley Purgatory Bluff Creek Watershed District, MN.

Watershed study
Barr Engineering. 2017. Purgatory Creek Watershed Use Attainability Analysis.

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Mitchell Lake

2017

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

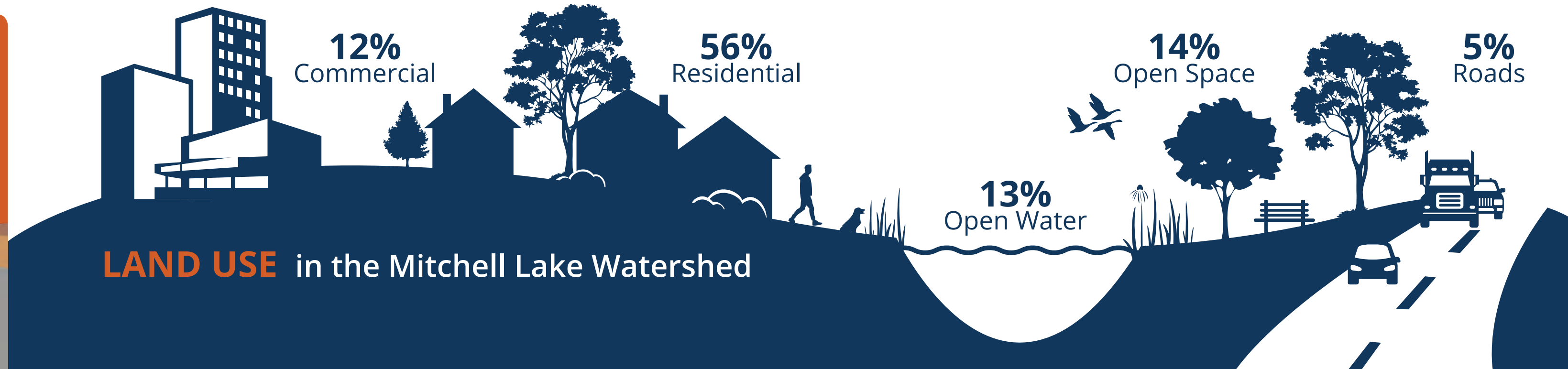
Located in Eden Prairie, Mitchell Lake is a part of the Purgatory Creek chain of lakes. During high water events it outflows through an overflow pipe to Red Rock Lake.

CHARACTERISTICS

Size	124 acres
Volume	729 acre-ft
Average depth	5.3 ft
Max depth	19 ft
Watershed size	937 acres
Land draining directly into	154 acres
MPCA lake classification	Shallow
Impairment listing	Mercury
Trophic status	Hypereutrophic
Common fish	Bluegill, Black Bullhead, Black Crappie, Northern Pike, Pumpkinseed
Invasive species	Curlyleaf Pondweed, Eurasian Watermilfoil, Purple Loosestrife

WATERSHED BOUNDARIES

Water that falls anywhere within the white border drains to Mitchell Lake.



LAND USE in the Mitchell Lake Watershed

How healthy is Mitchell Lake?

After decades of failing to meet the clean water standards set by the Minnesota Pollution Control Agency (MPCA), Mitchell Lake has improved and been at or near standards for the last seven years. Continued water sampling will help monitor whether the trend persists.

The graphs on the next page show the trends over time. The red line on each graph marks the MPCA standard. The goal is for the average values (the dots) to be below the red line.

During the growing season (Jun - Sept), the city of Eden Prairie visits Mitchell Lake to collect water samples and take measurements. The samples are tested for several compounds including total phosphorous (TP) and chlorophyll a (Chl-a). The city also measures how clear the water is using a disk that is lowered into the water until it can not be seen. These tests help indicate if the water is clean.

Mitchell is classified as a “Shallow Lake”, which means that it is generally less than 15 feet deep and light can reach the bottom in most of the lake. This ample light means that shallow lakes often have a lot of aquatic plants, and are habitat to many types of fish and birds. To be considered healthy by the MPCA, shallow lakes need to be clear enough to see one meter down, and have low TP and Chl-a levels.

An osprey looks out on Mitchell Lake, scanning the surface for signs of the fish it relies on for food.

District Staff taking samples to monitor zooplankton, an important food for native fish.

Rainwater runoff, the water that flows across yards, parking lots, and streets into stormdrains, is one of the main causes of pollution in urban areas. You can take simple actions to help protect Mitchell Lake.

Keep the curb clean
Sweep up leaves, grass clippings and fertilizer from driveways and streets.

Water with care
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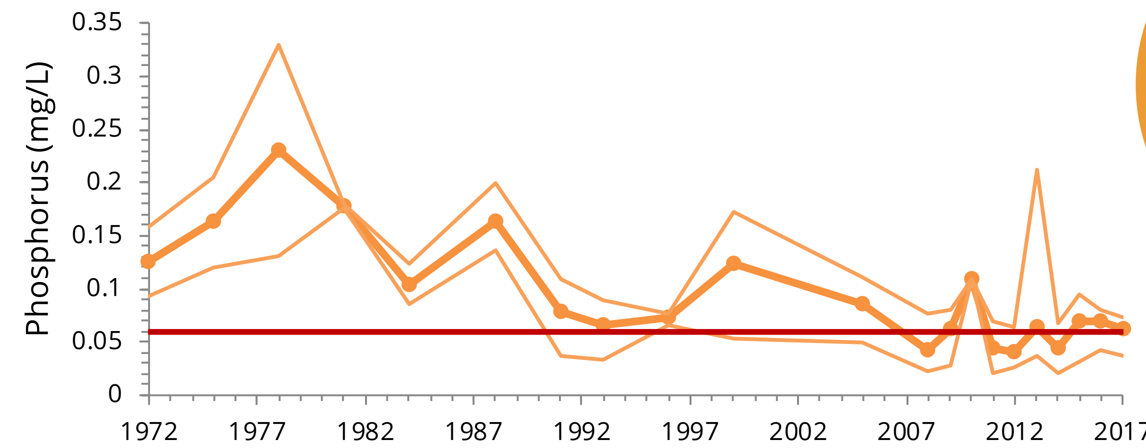

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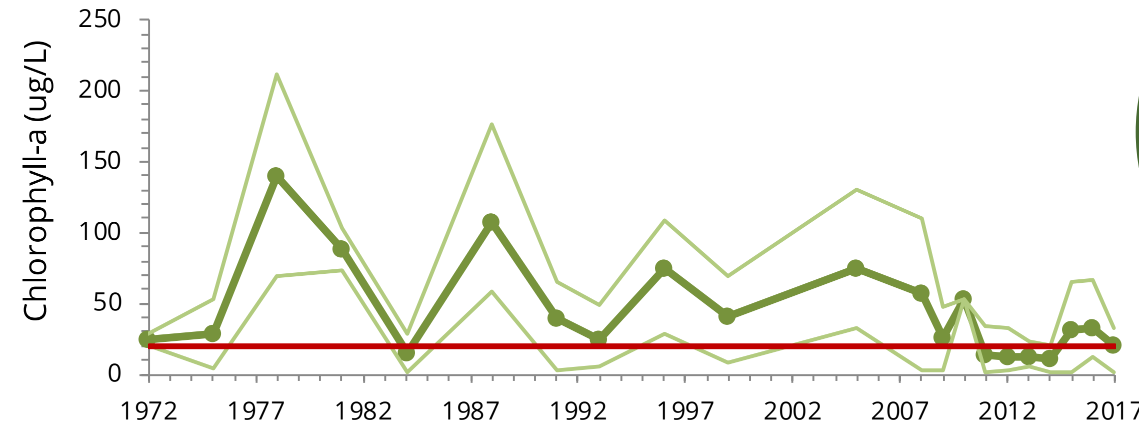

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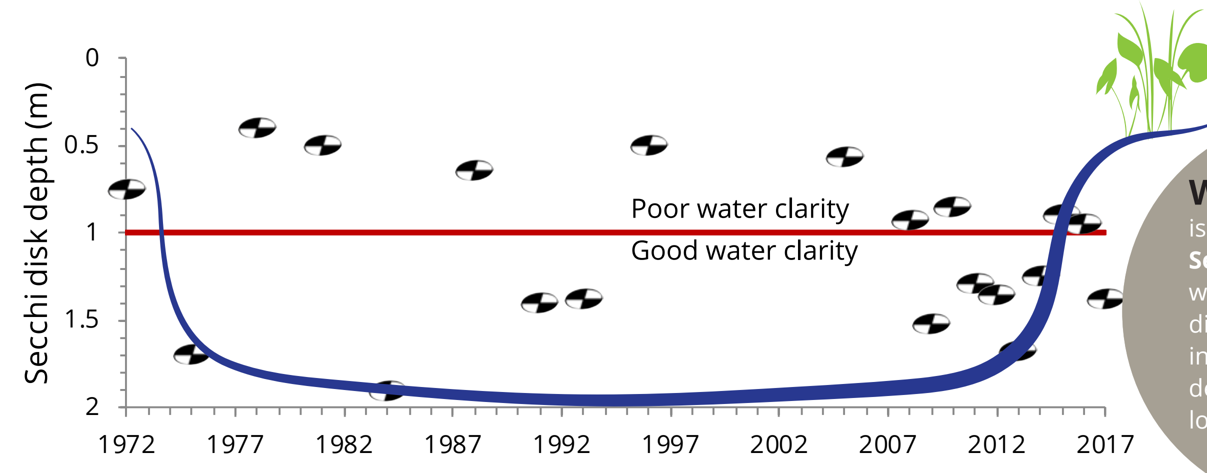

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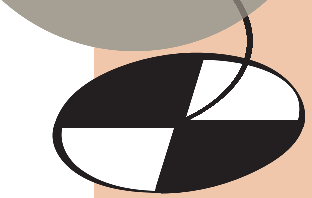

Summary table

	MPCA standard	1972 - 2016			2017		
		max	min	average	max	min	average
TP	<0.06 mg/l	0.33	0.02	0.078	0.073	0.037	**0.063**
Chl-a	<20 ug/l	211	1	36.45	32	1	**20.5**
Secchi	>1 m	4.084	0.3	1.2	3.81	0.67	**1.38**

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Aquatic plants
Freshwater Scientific Services. 2015. Aquatic Plant Community of Red Rock Lake.

Wenck Associates Inc. 2015. Red Rock Lake Plant Management Plan.

Stormwater ponds
RPBCWD. 2013. Stormwater pond project.

Watershed study
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Red Rock Lake

2017

Located in Eden Prairie, Red Rock Lake is a part of the Purgatory Creek chain of lakes. During high water events it outflows through an overflow pipe to Staring Lake.

CHARACTERISTICS

Size	121 acres
Volume	615 acre-ft
Average depth	4.7 ft
Max depth	19 ft
Watershed size	1286 acres
Land draining directly into	332 acres
MPCA lake classification	Shallow
Impairment listing	Mercury
Trophic status	Eutrophic
Common fish	Bluegill, Northern Pike, Pumpkinseed, Yellow Perch
Invasive species	Curlyleaf Pondweed, Eurasian Watermilfoil

WATERSHED BOUNDARIES

Water that falls anywhere within the white border drains to Red Rock Lake.

LAND USE in the Red Rock Lake Watershed

How healthy is Red Rock Lake?

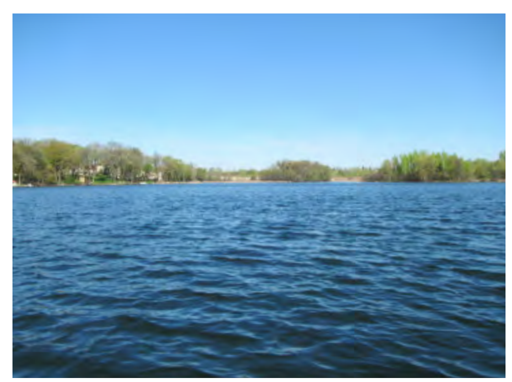
After decades of failing to meet the clean water standards set by the Minnesota Pollution Control Agency (MPCA), Red Rock Lake has improved and been at or near standards for the last seven years. Continued water sampling will help monitor whether the trend persists.

The graphs on the next page show the trends over time. The red line on each graph marks the MPCA standard. The goal is for the average values (the dots) to be below the red line.

During the growing season (Jun - Sept), the city of Eden Prairie visits Red Rock to collect water samples and take measurements. The samples are tested for several compounds including total phosphorous (TP) and chlorophyll a (Chl-a). The city also measures how clear the water is using a disk that is lowered into the water until it can not be seen. These tests help indicate if the water is clean.

Red Rock is classified as a "Shallow Lake", which means that it is generally less than 15 feet deep and light can reach the bottom in most of the lake. This ample light means that shallow lakes often have a lot of aquatic plants, and are habitat to many types of fish and birds. To be considered healthy by the MPCA, shallow lakes need to be clear enough to see one meter down, and have low TP and Chl-a levels.

Water lilies are a common site on the lake.



Red Rock Lake on an early summer morning.

Rainwater runoff, the water that flows across yards, parking lots, and streets into stormdrains, is one of the main causes of pollution in urban areas. You can take simple actions to help protect Red Rock Lake.

Keep the curb clean
Sweep up leaves, grass clippings and fertilizer from driveways and streets.

Water with care
Grass requires 1-inch of water per week: about one hour of sprinkling per week if it has not rained.

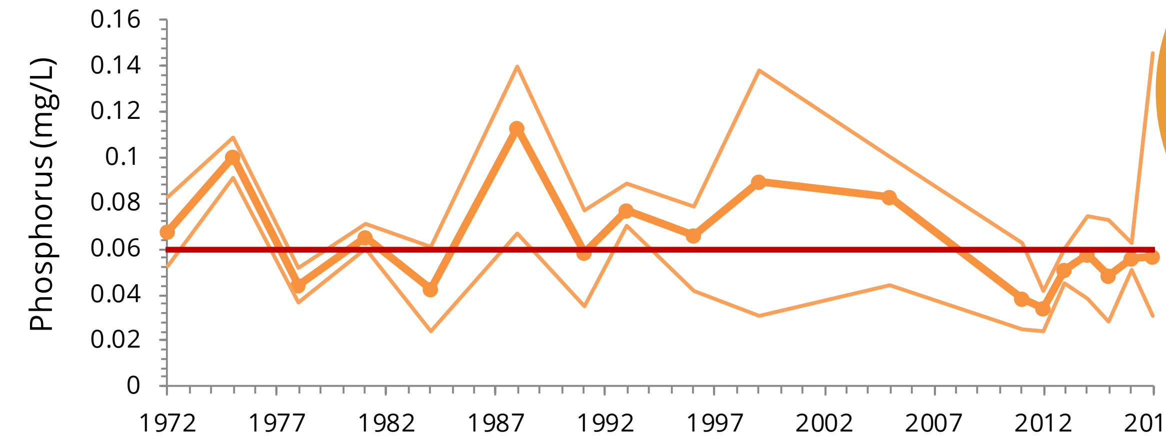
Salt smart
The salt we use to melt ice can pollute our lakes and creeks. Use salt sparingly and always shovel first.

Reuse the rain
Collect and reuse rainwater with a rain barrel.

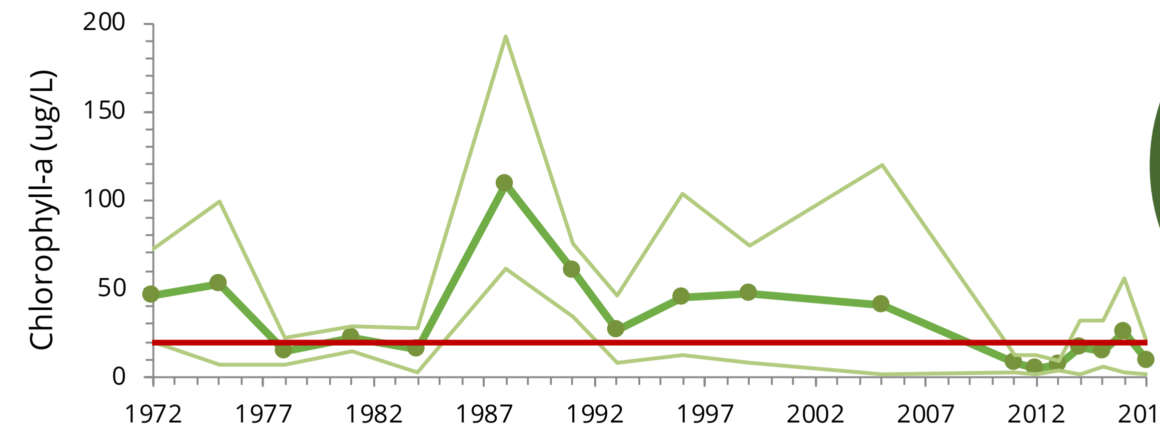
Build a raingarden
Raingardens soak up water and filter out pollution. Visit our website for help.

Water quality graphs 1972 - 2017

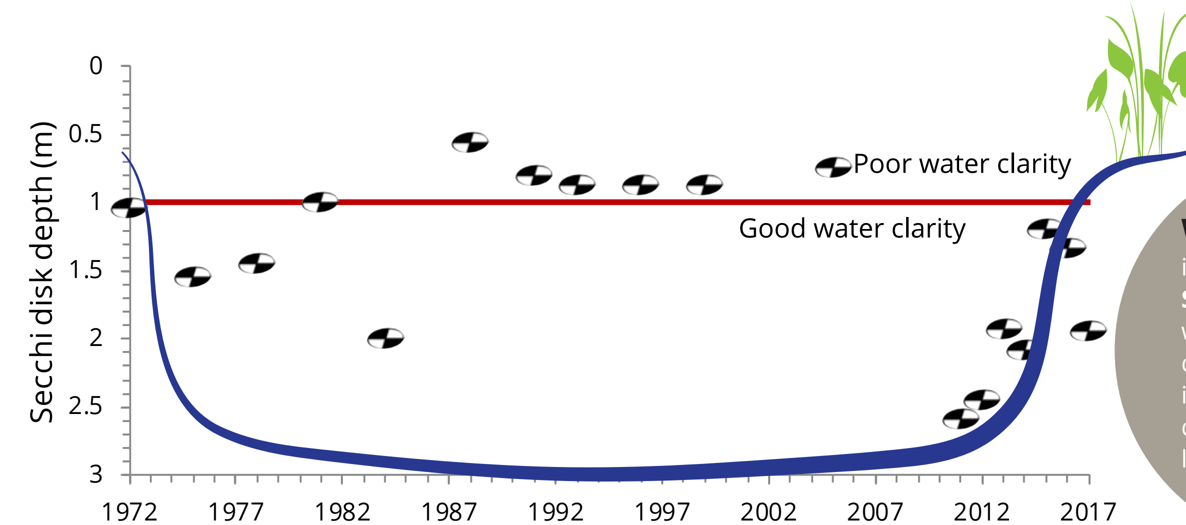
Points are growing season (Jun-Sep) averages. Thin lines are the min and max values for each year.



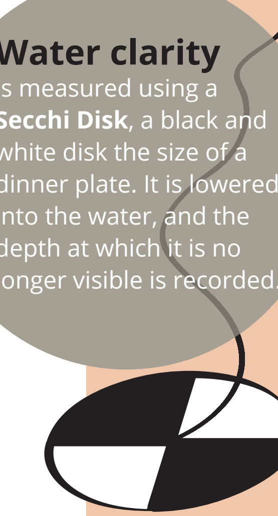
Phosphorus is a nutrient that plants and algae need for growth. It is often measured as total phosphorus (TP). Too much phosphorous can cause algae blooms.



Chlorophyll a is the main pigment in algae, so measuring chl-a can tell us how much algae there is. Too much chl-a means that there are too many nutrients in the water.



Water clarity is measured using a **Secchi Disk**, a black and white disk the size of a dinner plate. It is lowered into the water, and the depth at which it is no longer visible is recorded.



Summary table

	MPCA standard	1972 - 2016 max	1972 - 2016 min	1972 - 2016 average	2017 max	2017 min	2017 average
TP	<0.06 mg/l	0.14	0.024	0.063	0.146	0.03	**0.057**
Chl-a	<20 ug/l	192.2	1.3	29.74	19.2	2.1	**8.85**
Secchi	>1 m	4.9	0.3	1.40	3.26	0.95	**1.95**

What's happening

WATERSHED MANAGEMENT PLAN

One of the most important projects the watershed worked on in 2017 was updating its Watershed Managment Plan.

This watershed management plan (also called the 10-Year Plan) guides the District's actions for the next 10 years.

The community played an essential role by participating in a public engagement process. Close to 500 stakeholders engaged in this process, making their voices heard about their values for clean water. The graphic to the right highlights how the community contributed to the planning effort.

The draft plan was relased for public review in late 2017. After comments are addressed, the District will submit a final plan for approval in 2018. Check our website for updates on the process: rpbcwd.org

Thank you! To everyone who shared their thoughts, ideas, hopes and concerns. We truly appreciate you being a part of this process.

DIVE DEEPER

Interested in learning more? Explore the following reports on our website.

Aquatic plants
Blue Water Science. 2013 Aquatic plant surveys and water quality for Round Lake and two tributary ponds.

Watershed study
Barr Engineering. 2017. Purgatory Creek Watershed Use Attainability Analysis.

Invasive Species
Sorensen, Bajer, & Headrick. 2015. Development of Carp Control in the Purgatory Creek Chain of Lakes.

Alum Fact Sheet
RPBCWD. 2016. Alum Fact Sheet.

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Round Lake
2017

Located in Eden Prairie, Round Lake is a part of the Purgatory Creek Chain of Lakes. With a park and a trail system around the lake, it is a popular recreation spot.

CHARACTERISTICS

Size	30 acres
Volume	327 acre-ft
Average depth	11 ft
Max depth	37 ft
Watershed size	475 acres
Land draining directly into	105 acres
MPCA lake classification	Deep
Impairment listing	Mercury & Perfluorooctane
Trophic status	Eutrophic
Common fish	Bluegill, N. Pike, Yellow Bullhead, Yellow Perch
Invasive species	Curlyleaf Pondweed, Eurasian Watermilfoil, Common Carp

WATERSHED BOUNDARIES

Water that falls anywhere within the white border drains to Round Lake.

LAND USE in the Round Lake Watershed

How healthy is Round Lake?

Round Lake has been monitored for over 40 years. In that time, it has often failed to meet the clean water standards set by the Minnesota Pollution Control Agency (MPCA). However, there have been significant improvements since 2012 when the city of Eden Prairie conducted an alum treatment, and in 2017 it met all standards. Read more about alum on our District website.

During the growing season (June - September), the city of Eden Prairie visits Round Lake every other week to collect water samples and take measurements. The samples are sent to a lab where they are tested for several compounds including total phosphorous (TP) and chlorophyll a (Chl-a). Staff also measure how clear the water is using a disk that is lowered into the water until it can no longer be seen. All three of these parameters help indicate whether the water is clean.

Round is classified as a "Deep Lake", which means that it is over 15 feet deep and light can not reach the bottom in most of the lake. To be considered healthy by the MPCA, deep lakes need to be clear enough to see 1.4 meters down, and have very low TP and Chl-a.

Round Lake Park is a popular spot to visit, play, and explore.

The park trail goes all the way around the lake.

Rainwater runoff, the water that flows across yards, parking lots, and streets into stormdrains, is one of the main causes of pollution in urban areas. You can take simple actions to help protect Round Lake.

Keep the curb clean
Sweep up leaves, grass clippings and fertilizer from driveways and streets.

Water with care
Grass requires 1-inch of water per week: about one hour of sprinkling per week if it has not rained.

Salt smart
The salt we use to melt ice can pollute our lakes and creeks. Use salt sparingly and always shovel first.

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Build a raingarden
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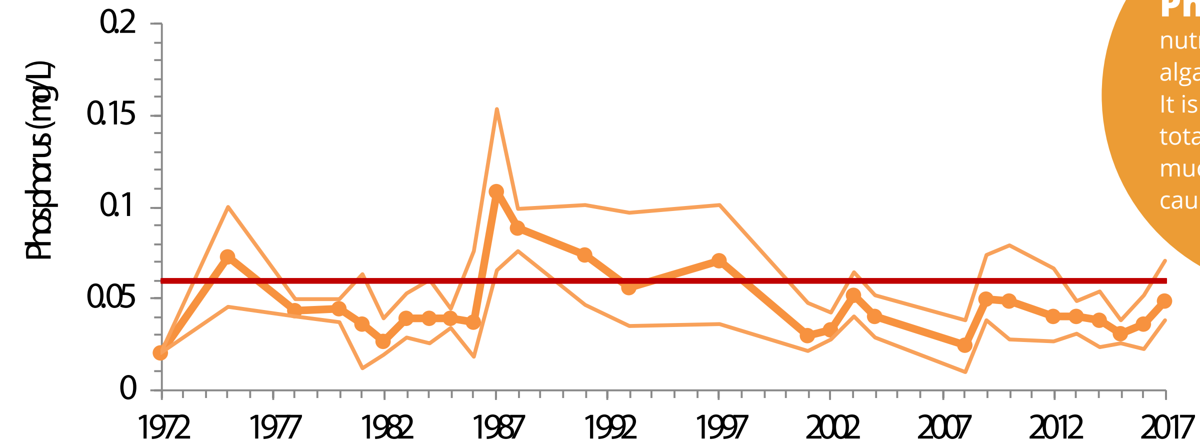
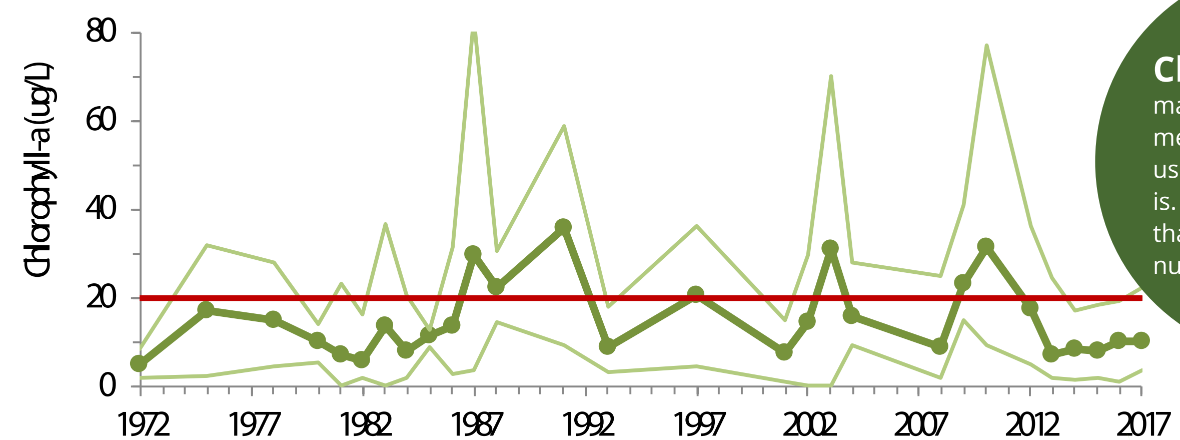
Water quality graphs 1972 - 2017

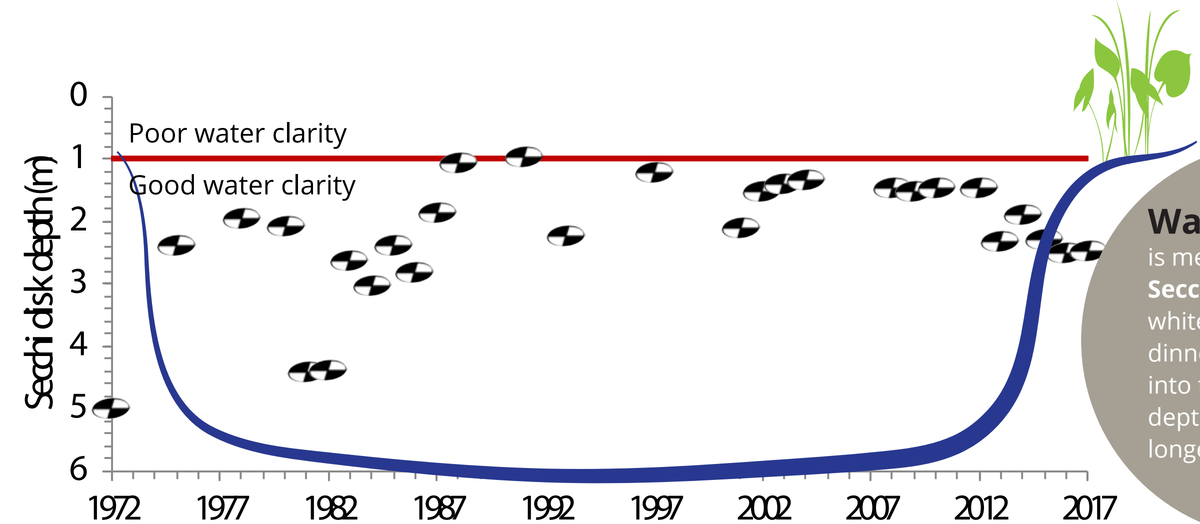
Points are growing season (Jun-Sep) averages. Thin lines are the min and max values for each year.



Phosphorus is a nutrient that plants and algae need for growth. It is often measured as total phosphorus (TP). Too much phosphorous can cause algae blooms.



Chlorophyll a is the main pigment in algae, so measuring chl-a can tell us how much algae there is. Too much chl-a means that there are too many nutrients in the water.



Water clarity is measured using a **Secchi Disk**, a black and white disk the size of a dinner plate. It is lowered into the water, and the depth at which it is no longer visible is recorded.

Summary table

	MPCA standard	1972 - 2016 max	1972 - 2016 min	1972 - 2016 average	2017 max	2017 min	2017 average
TP	<0.04 mg/l	0.154	0.01	0.045	0.07	0.038	**0.048**
Chl-a	<14 ug/l	83	0.2	14.79	22.4	3.6	**10.1**
Secchi	>1.4 m	6.2	0.5	2.2	3.11	1.37	**2.48**

Silver Lake

2017

Located in Shorewood, Silver Lake sits at the edge of the watershed district. It is the only lake in the district that has wild rice, a rare plant to find in metro area lakes!

CHARACTERISTICS

Size	71 acres
Volume	190 acre-ft
Average depth	5 ft
Max depth	14 ft
Watershed size	407 acres
MPCA lake classification	Shallow
Impairment listing	Not Listed
Trophic status	Hypereutrophic
Common fish	Unknown
Invasive species	Curlyleaf Pondweed, Purple Loosestrife

WATERSHED BOUNDARIES

LAND USE in the Silver Lake Watershed

What's happening

WATERSHED MANAGEMENT PLAN

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DIVE DEEPER

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Aquatic plants
Freshwateer Scientific Services. 2017. Aquatic Plant Survey: Silver Lake.

Watershed study
BARR Engineering. 2017. Purgatory Creek Watershed Use Attainability Analysis.

Stormwater ponds
RPBCWD. 2013. Stormwater pond project.

Paleolimnology
Ramstack Hobbs J. M. and M. B. Edlund. 2015. Paleolimnological analysis of Silver Lake, Hennepin County, MN. St. Croix Watershed Research Station.

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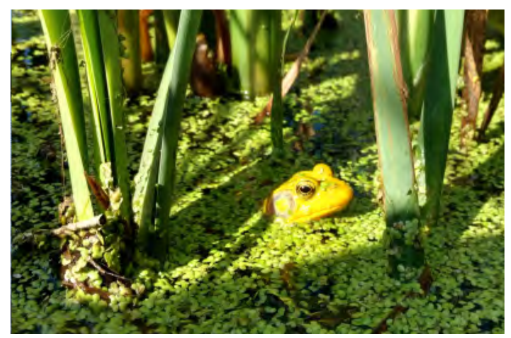
How healthy is Silver Lake?

Water quality in Silver Lake has increased from 2016 to 2017, now meeting two of three clean water standards set by the Minnesota Pollution Control Agency (MPCA). The graphs on the next page show the trends over time. The red line on each graph marks the MPCA standard. The goal is for the averages (the dots) to fall below the red line.

During the growing season (June - September), district staff visit Silver Lake every other week to collect water samples and take measurements. The water samples are sent to a lab where they are tested for several compounds including total phosphorous (TP) and chlorophyll a (Chl-a). Staff also measure how clear the water is using a disk that is lowered into the water until it can no longer be seen.

Silver is classified as a "Shallow Lake", which means that it is generally less than 15 feet deep and light can reach the bottom in most of the lake. To be considered healthy by the MPCA, shallow lakes need to be clear enough to see one meter down, and have low TP and Chl-a levels.



A small frog peeks out through the vegetation in Silver Lake.

Two swans taking off of Silver Lake.

Rainwater runoff, the water that flows across yards, parking lots, and streets into stormdrains, is one of the main causes of pollution in urban areas. You can take simple actions to help protect Silver Lake.

Keep the curb clean

Sweep up leaves, grass clippings and fertilizer from driveways and streets.

Water with care

Grass requires 1-inch of water per week: about one hour of sprinkling per week if it has not rained.

Salt smart

The salt we use to melt ice can pollute our lakes and creeks. Use salt sparingly and always shovel first.

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Build a raingarden

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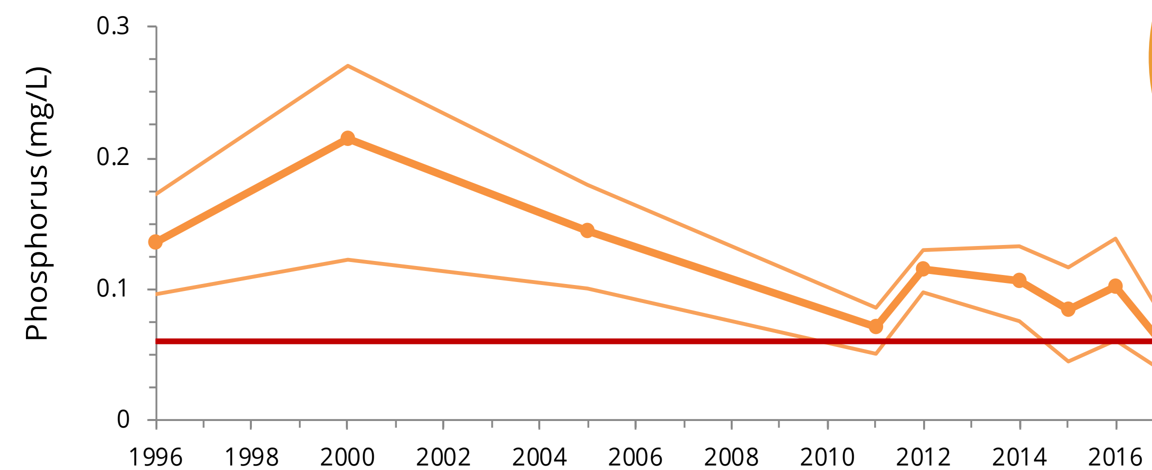
Water quality graphs 1996 - 2017

Points are growing season (Jun-Sep) averages. Thin lines are the min and max values for each year.



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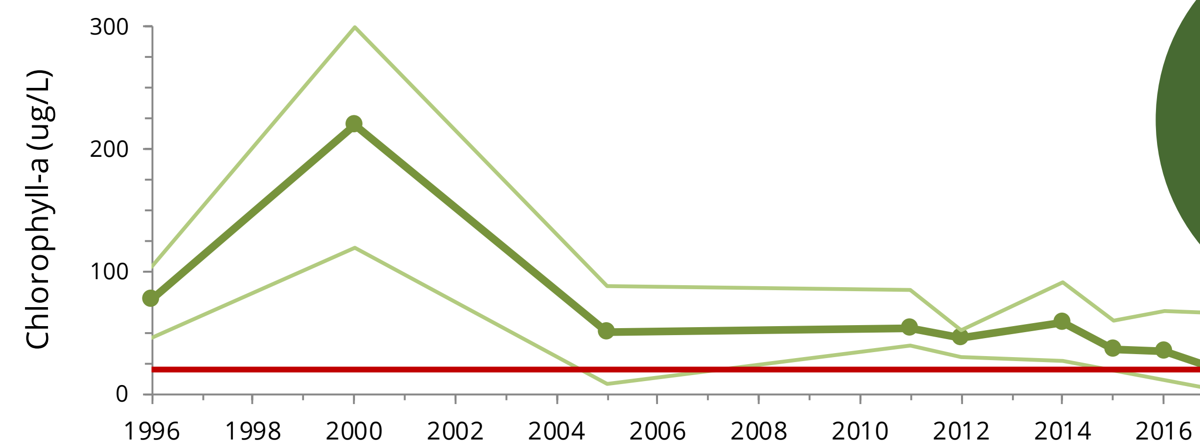
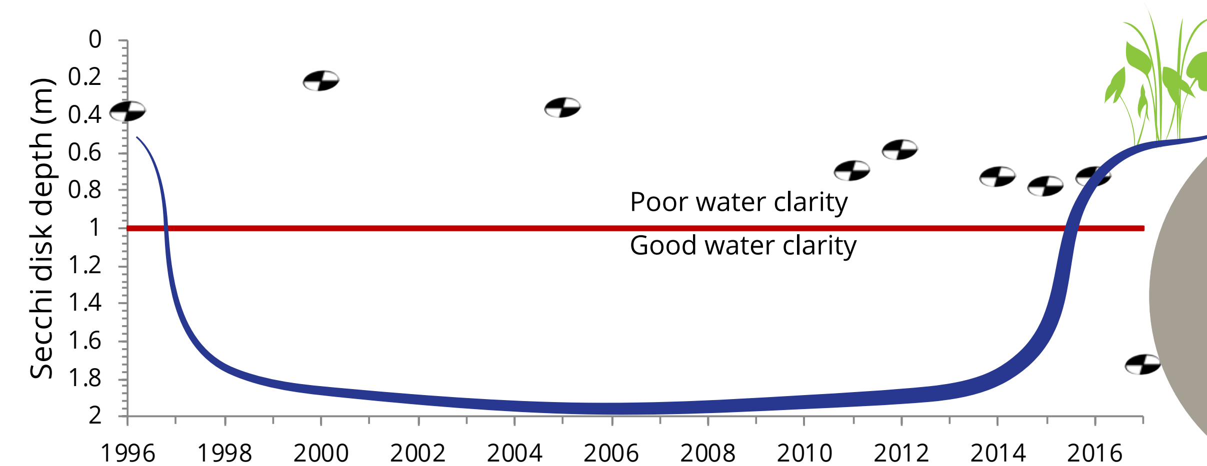


Chlorophyll a is the main pigment in algae, so measuring chl-a can tell us how much algae there is. Too much chl-a means that there are too many nutrients in the water.



Water clarity is measured using a **Secchi Disk**, a black and white disk the size of a dinner plate. It is lowered into the water, and the depth at which it is no longer visible is recorded.

Summary table

	MPCA standard	1996 - 2016			2017		
		max	min	average	max	min	average
TP	<0.06 mg/l	0.27	0.05	0.118	0.078	0.038	**0.058**
Chl-a	<20 ug/l	300	8	68	66.8	4.45	**20.68**
Secchi	>1 m	1.1	0.2	0.6	2.35	1.1	**1.7**

What's happening

WATERSHED MANAGEMENT PLAN

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Thank you! To everyone who shared their thoughts, ideas, hopes and concerns. We truly appreciate you being a part of this process.

DIVE DEEPER

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Aquatic plants

Dunne, M. and Newman, R. 2017. Aquatic Plant Community of Lakes Lucy, Mitchell, Susan, Riley and Staring: Annual Report for 2016. University of Minnesota.

Freshwater Scientific Services. 2015. Staring Lake Eurasian Watermilfoil Early Detection and Rapid Response.

JaKa, J. and Newman, R. 2014. Aquatic Plant Community of Lakes Ann, Lotus, Lucy, Mitchell, Susan, Riley and Staring within the RPBCWD: Final Report 2009 – 2014. University of Minnesota.

Assessments

BARR Engineering. 2017. Purgatory Creek Watershed Use Attainability Analysis.

RPBCWD & BARR Engineering. 2015. Creek Restoration Action Strategy.

Carp management

Sorensen P, Bajer P and M Headrick. 2015. Development and implementation of a sustainable strategy to control common carp in the Purgatory Creek chain of Lakes. University of Minnesota.

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Staring Lake

2017

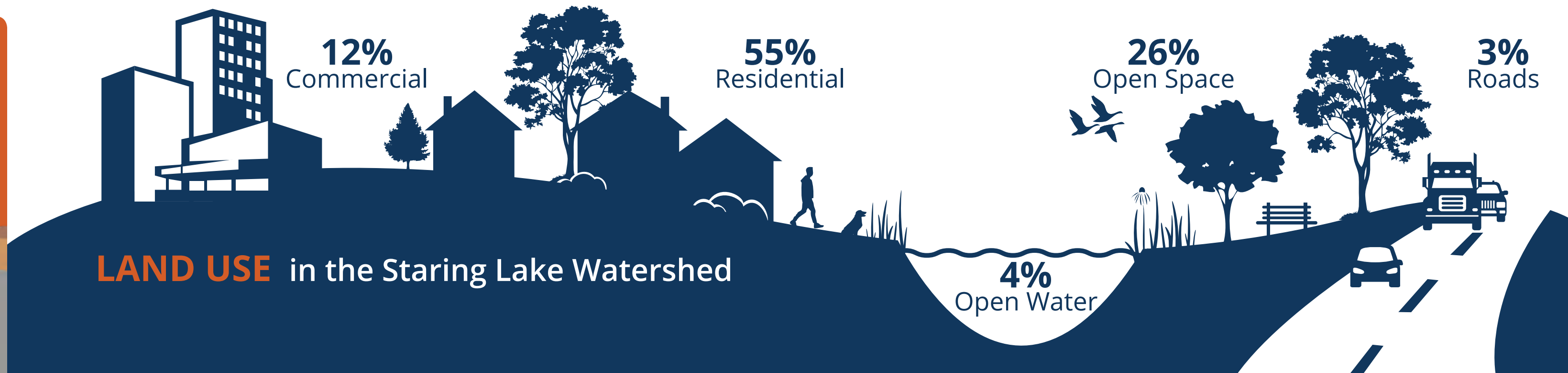
RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Staring Lake is located in Eden Prairie, west of Flying Cloud Drive and north of Pioneer Trail. Staring has a public boat ramp and a fishing pier. The Eden Prairie Outdoor Center is also located on its shores, off of Staring Lake Parkway.

CHARACTERISTICS

Size	166 acres
Volume	1,220 acre-ft
Average depth	7 ft
Max depth	16 ft
Watershed size	10,206 acres
Land draining directly into	314 acres
MPCA lake classification	Shallow
Impairment listing	Mercury & Nutrients
Trophic status	Hypereutrophic
Common fish	Bluegill, Black Crappie, Black Bullhead
Invasive species	Curlyleaf Pondweed, Eurasian Watermilfoil, Common Carp, Brittle Naiad

WATERSHED BOUNDARIES



How healthy is Staring Lake?

Staring Lake water quality improved from 2016 to 2017, currently meeting two of the three clean water standards set by the Minnesota Pollution Control Agency (MPCA). The graphs on the next page show the trends over time. The red line marks the MPCA standard. The goal is for the average values (the dots) to fall below the red line.

During the growing season (June - September), district staff visit Staring Lake every other week to collect water samples and take measurements. The samples are sent to a lab and tested for several compounds including total phosphorous (TP) and chlorophyll a (Chl-a). Staff also measure how clear the water is using a disk that is lowered into the water until it can no longer be seen. All three of these parameters help indicate whether the water is clean.

Staring is classified as a "Shallow Lake", which means that it is generally less than 15 feet deep and light can reach the bottom in most of the lake. This ample light means that shallow lakes often have a lot of aquatic plants, and are habitat to many types of fish and birds. To be considered healthy by the MPCA, shallow lakes need to be clear enough to see one meter down, and have low TP and Chl-a levels.

District staff collecting water samples and taking measurements on Staring Lake.

Curlyleaf pondweed is another invader that the district works to manage. It can form dense mats and competes with native plants.

Rainwater runoff, the water that flows across yards, parking lots, and streets into stormdrains, is one of the main causes of pollution in urban areas. You can take simple actions to help protect Staring Lake.

Keep the curb clean
Sweep up leaves, grass clippings and fertilizer from driveways and streets.

Water with care
Grass requires 1-inch of water per week: about one hour of sprinkling per week if it has not rained.

Salt smart
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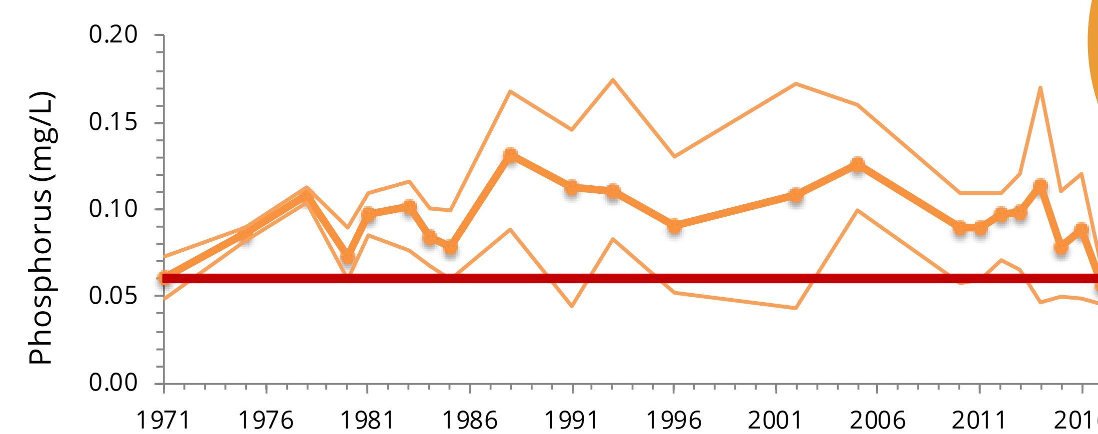

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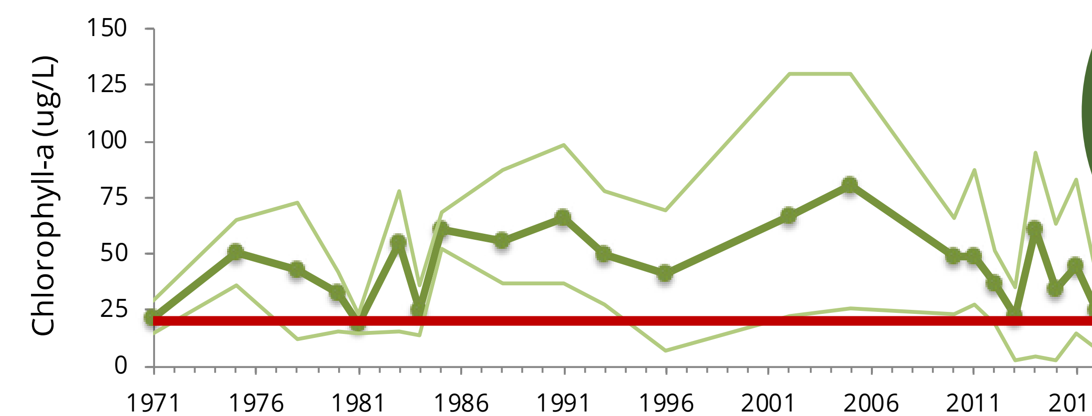

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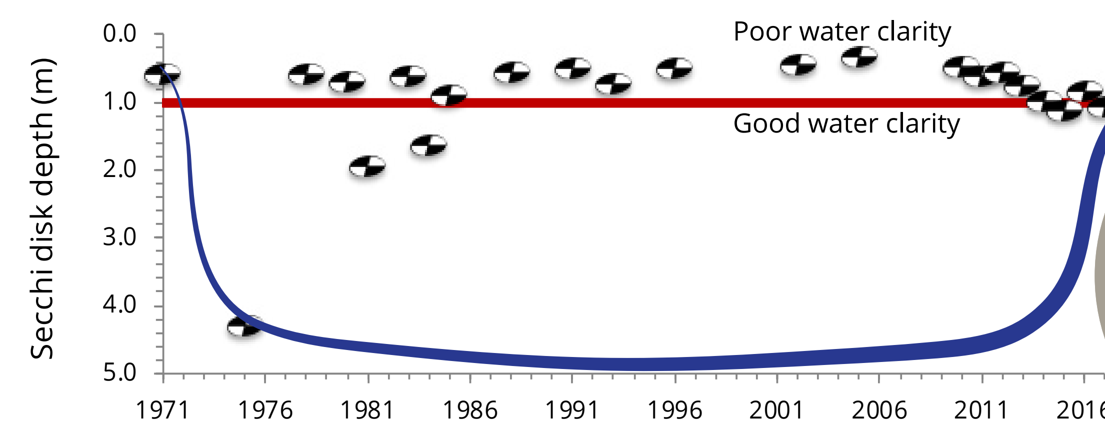

Water clarity is measured using a **Secchi Disk**, a black and white disk the size of a dinner plate. It is lowered into the water, and the depth at which it is no longer visible is recorded.

Summary table

	MPCA standard	1971 - 2016 max	1971 - 2016 min	1971 - 2016 average	2017 max	2017 min	2017 average
TP	<0.06 mg/l	0.175	0.043	0.098	0.065	0.045	0.058
Chl-a	<20 ug/l	130	2.7	47.0	40.0	8.0	**26.4**
Secchi	>1 m	4.3	0.2	0.8	1.9	0.7	**1.0**

8.0 Riley Creek Watershed

The Riley Creek watershed is located in the central part of the District, adjacent to the Bluff Creek watershed to the west and Purgatory Creek watershed to the east (see Figure 5-6). The Riley Creek watershed lies entirely within the cities of Chanhassen and Eden Prairie. The watershed, creek, and lakes within the Riley Creek watershed are summarized in the following fact sheets included in this section:

- Riley Creek Fact Sheet
- Lake Ann Fact Sheet
- Lake Lucy Fact Sheet
- Rice Marsh Lake Fact Sheet
- Lake Riley Fact Sheet
- Lake Susan Fact Sheet

Information provided in District water resource fact sheets include (as applicable):

- Watershed physical characteristics
- Lake and creek physical characteristics
- Watershed land use
- Results of water quality and natural resource assessments
- Invasive species
- Water quality impairments

The most current version of each fact sheet is available from the District website at www.rpbcwd.org.

8.1 Riley Creek Watershed Issues

Table 8-1 summarizes issues identified in the Riley Creek watershed, organized according to the issue categories described in Section 2.3. These issues were identified through the District's public engagement and issue identification process (see Section 2.0) and through past District monitoring and studies. Recent District studies specific to the Riley Creek watershed include:

- *Riley Creek – Creek Restoration Action Strategy* (Barr Engineering Co. & Riley Purgatory Bluff Creek Watershed District, November 2015)

- *Rice Marsh Lake and Lake Riley Use Attainability Analysis Update* (Barr Engineering, January 2016)
- *Lake Lucy Aquatic Plant Management Plan* (Wenck Associates Inc., 2015)
- *Lake Lucy and Lake Ann Use Attainability Analysis Update* (Barr Engineering Co., 2013)
- *Engineer's Report - Lake Lucy Spent Lime Treatment System* (Barr Engineering Co., 2014)
- *Lake Susan Use Attainability Analysis Update* (Wenck Associates Inc., 2013)
- *Engineer's Report - Lake Susan Subwatersheds LS-2.4/LS-2.12 Water Quality Improvement Project* (Barr Engineering Co., 2014)
- *Engineer's Report - Lake Susan Park Pond Watershed Treatment and Stormwater Reuse Enhancements Project* (Barr Engineering Co., 2017)
- *Lake Susan Alum Dosing Cost Estimate* (Wenck Associates Inc,, 2017)
- *Rice Marsh Lake Alum Dosing Cost Estimate* (Wenck Associates Inc., 2017)
- *Lake Riley Alum Dosing Cost Estimate* (Wenck Associates Inc, 2016)
- *Engineer's Report - Lower Riley Creek Stabilization Project - RPBCWD Reach E, Site D3, and LMRWD Reach* (Barr Engineering Co., 2016)
- *Downtown Chanhassen BMP Retrofit Assessment Findings Report* (Barr Engineering Co., 2017)
- *Creek Restoration Action Strategy – Upper Riley Creek Sediment Source Assessment* (Barr Engineering Co., 2017)
- *Historical Water Quality And Ecological Change In Rice Marsh Lake* (Ramstack Hobbs & Edlund, 2014)
- *Stormwater Pond Protocols and Prioritization Report: 2011* (CH2M HILL, 2012)
- *In situ Measurement of Sediment Oxygen Demand Lake Lucy, Lake Susan, Lake Riley, Lake Ann* (HydrO2, Inc., 2009)
- *Aquatic Plant Community of Lakes Ann, Lotus, Lucy, Mitchell, Susan, Riley and Staring within the Riley Purgatory Bluff Creek Watershed: Final Report 2009-2014.* (Jaka & Newman, 2014)
- *Aquatic Plant Community of Lakes Lucy, Mitchell, Susan, Riley and Staring within the Riley Purgatory Bluff Creek Watershed: Annual Report 2015* (Dunne & Newman, 2016)

Table 8-1 Riley Creek Watershed Stakeholder Identified Issues and Opportunities

Water Resource Issue Category (see Section 2.3.6)	Specific Issues in the Riley Creek Watershed	Opportunities to Address Issues
Water Quality (Pollution)	· Water quality impacting public health · Ecological role of algae	· Landowner best practices education · Expanding volunteer network
Water Quality (Habitat)	· Invasive species ecological and public health impacts · Pollutant loading to wetlands	· Invasive species education · Preventative action to reduce future costs
Water Quality (Erosion)	· Creek erosion from development and human activity	· None identified in workshop
Groundwater	· Groundwater-surface water connection	· None identified in workshop
Water Quantity	· Impacts of land development and land use on creek hydrology	· None identified in workshop
Note: Issues based on comments received at the Riley Creek stakeholder meeting. A complete list of stakeholder comments is included in Appendix A.		

8.2 Riley Creek Watershed Programs and Projects

Many of the issues present in the Riley Creek watershed are directly or indirectly addressed through consistent implementation of District-wide programs including the District's project review and permitting and education programs (see Section 9.0). Over the past several years, the District has implemented several capital improvement projects within the watershed to address water quality, water quantity, and other issues. Watershed, in-lake, and creek BMPs as well as other management strategies are needed to improve and protect the water resources within the watershed. Proposed projects the District may implement within the Riley Creek watershed are listed in Table 8-2; additional details on selecting projects are provided in the District's overall implementation program (see Sections 9.1 and 9.2). Proposed projects within the Riley Creek watershed are shown in Figure 8-1. The BMPs listed in Table 8-2 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.

Table 8-2 Proposed Projects in the Riley Creek Watershed

Source of Identified Project	City	Major Watershed	Resource	Project	Project Description	Goal Index[1]	Sustainability Index[1]	Volume Management Index[1]	Pollutant Management[1]	Stabilization[1]	Habitat Restoration[1]	Partnership[1]	Education[1]	Watershed Benefit[1]	Total Benefit Score[1]	Planning Level Estimated 30 year Cost[2]	Funding Partner Opportunity
RPBCWD	Chanhassen	Riley Creek	Riley Creek	R4	Upper Riley Creek Stabilization and restoration	3	7	1	1	7	5	1	7	7	**39**	$1,725,000	
RPBCWD	Chanhassen	Riley Creek	Lake Lucy	LU-A1.10c	Watershed Phosphorus Load Control	2	5	1	7	1	1	7	3	7	**34**	$350,000	
RPBCWD	Chanhassen	Riley Creek	Lake Ann	Ann In-Lake	In-Lake Phosphorus Load Control	2	3	1	7	1	3	3	7	7	**34**	$290,000	
RPBCWD	Chanhassen	Riley Creek	Lake Lucy	LU-A3.4	Watershed Phosphorus Load Control	2	5	1	7	1	1	7	1	7	**32**	$190,000	
RPBCWD	Chanhassen	Riley Creek	Lake Lucy	Lucy In-Lake	In-Lake Phosphorus Load Control	2	3	1	7	1	3	3	1	7	**28**	$320,000	
RPBCWD	Chanhassen	Riley Creek	Riley Creek	URC-Upstream Detention	Upper Riley Creek - Upstream Watershed Detention and Phosphorus Load Reduction	3	5	1	7	1	1	1	1	7	**27**	$910,000	
RPBCWD	Chanhassen	Riley Creek	Lake Susan	Lake Susan Park Pond	Watershed Phosphorus Load Control	2	5	1	5	1	1	7	7	5	**34**	$450,000	
RPBCWD	Chanhassen	Riley Creek	Lake Susan	Susan In-Lake	In-Lake Phosphorus Load Control	2	3	1	7	1	3	3	7	5	**32**	$560,000	
RPBCWD	Chanhassen	Riley Creek	Lake Susan	Susan Spent Lime	Watershed Phosphorus Load Control	2	5	1	5	1	1	5	7	5	**32**	$250,000	
RPBCWD	Chanhassen	Riley Creek	Lake Susan	Target Pond	Watershed Phosphorus Load Control	2	5	1	3	1	1	1	1	5	**20**	$82,000	
RPBCWD	Chanhassen	Riley Creek	Lake Susan	Lake Drive West Pond	Watershed Phosphorus Load Control	2	5	1	1	1	1	1	1	5	**18**	$27,000	
RPBCWD	Eden Prairie	Riley Creek	Riley Creek	R2	Lower Riley Creek Restoration and Stabilization (excluding Reach D3 & E)	3	7	1	1	7	5	7	3	3	**37**	$2,318,000	
RPBCWD	Eden Prairie	Riley Creek	Lake Riley	Riley In-Lake	In-Lake Phosphorus Load Control	2	3	1	7	1	3	3	7	3	**30**	$900,000	
RPBCWD	Chanhassen	Riley Creek	Rice Marsh Lake	Rice Marsh In-Lake	In-Lake Phosphorus Load Control	2	3	1	7	1	3	3	5	3	**28**	$300,000	
RPBCWD	Chanhassen	Riley Creek	Rice Marsh Lake	RM_10	Watershed Phosphorus Load Control	2	5	1	5	1	1	7	3	3	**28**	$386,300	
RPBCWD	Chanhassen	Riley Creek	Rice Marsh Lake	RM_12a	Watershed Phosphorus Load Control	2	5	1	3	1	1	7	5	3	**28**	$295,600	
RPBCWD	Chanhassen	Riley Creek	Riley Creek	R3	Creek Restoration and Stabilization	3	7	1	1	5	5	1	1	3	**27**	$954,000	
RPBCWD	Eden Prairie	Riley Creek	Lake Riley	LR_88 and LR_90	Watershed Phosphorus Load Control	2	5	1	3	1	1	3	5	3	**24**	$835,500	
RPBCWD	Eden Prairie	Riley Creek	Riley Creek	Lower Riley Crk	Lower Riley Creek Restoration and Stabilization (Reach D3 and E)	3	7	1	1	7	5	7	7	1	**39**	$1,515,000	
RPBCWD	Eden Prairie	Riley Creek	Riley Creek	R1	Creek Restoration and Stabilization	3	7	1	1	7	5	3	3	1	**31**	$1,424,000	

[1]See Section 4 for additional detials about the RPBCWD prioritization methodology and associated descriptions for the variables used to assess multiple project benefits.

[2]Based on 2017 dollars

RILEY CREEK WATERSHED PROPOSED PROJECTS

FIGURE 8-1

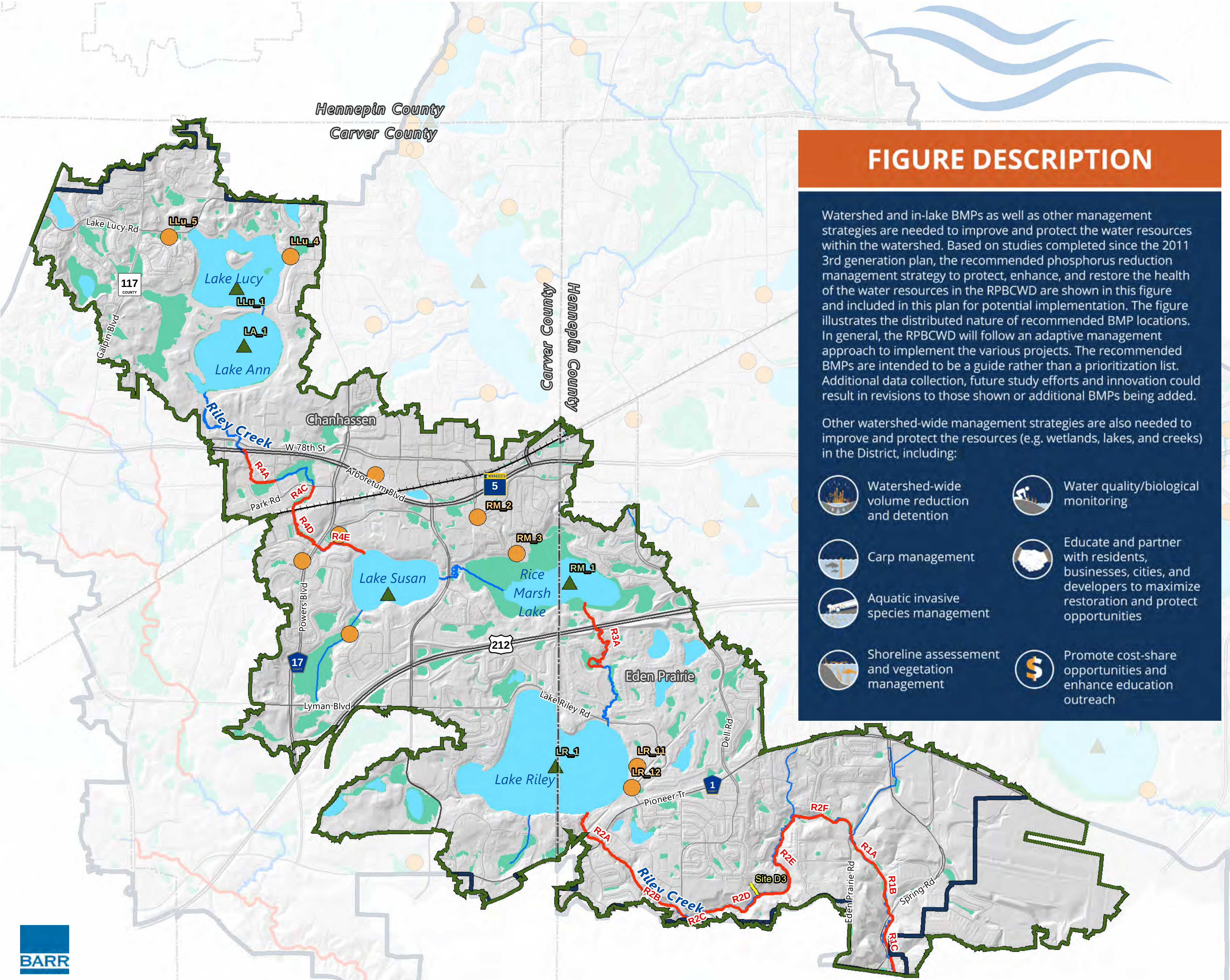

FIGURE DESCRIPTION

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

Recommended Best Managment Practices

- In Lake BMP
- Watershed BMP
- Creek Stabilization
- Ravine Stabilization
- Streams/Creeks
- Lake/Pond
- Wetlands
- Hydrologic Boundary
- District Legal Boundary
- Municipalities

N

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Feet

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Barr Footer: ArcGIS 10.6, 2018-06-28 16:43 File: I:\Client\RPBC_WD\Work_Orders\2016_TO16_Plan_Update\Maps\Reports\Plan_2017\One_Waters_Sections\Fig 8-01 Riley Creek Watershed.mxd User: EMA

8.3 Opportunity Projects

The projects identified in Table 8-2 primarily focus on the reduction of phosphorus loading to the resources by implementing BMPs and streambank stabilization to address water quality goal WQual 1 and water quantity goal WQuan 2. Through the public input process, additional goals have been identified as important elements. These goals focus on habitat and ecology, other pollutants, groundwater, and best management practices that infiltrate, conserve groundwater, protect baseflow and reduce stormwater runoff. In addition, three opportunity projects were identified in the Downtown Chanhassen BMP Retrofit Assessment Findings Report (Barr Engineering Co., 2017) , including a stormwater reuse system for downtown Chanhassen, West Village rain gardens and tree trenches at Chanhassen Cinema. Other potential management techniques that address these goals can be identified in Table 8-3. These opportunity projects could be identified through additional data collection, future study efforts and innovation.

Table 8-3 Opportunity Projects in the Riley Creek Watershed

Topic	Sub-topic	Goal	Most Applicable Strategies	Examples of Projects
Habitat & ecology	Habitat protection & establishment	WQual 1. Protect, manage, and restore water quality of District lakes and creeks to maintain designated uses. WQual 2. Preserve and enhance the quantity, as well as the function and value of wetlands. WQual 3. Preserve and enhance habitat important to fish, waterfowl, and other wildlife.	WQual S3. The District encourages cities and developers to seek opportunities to incorporate habitat protection or enhancement into development and redevelopment projects.	Riparian Habitat Restoration Wetland enhancement and restoration Green Corridor Expansion In-stream hydrologic improvements Aquatic plant management Carp management activities Enhance regulatory program
	Buffers & bioengineering		WQual S7. The District will promote the use of natural materials and bioengineering for the maintenance and restoration of shorelines and streambanks where appropriate. WQual S11. The District recognizes the multiple benefits of vegetated buffers and promotes the use of vegetated buffers around all waterbodies.	
	aquatic invasive species		WQual S4. The District will implement measures to manage carp populations in District-managed waterbodies.	

Topic	Sub-topic	Goal	Most Applicable Strategies	Examples of Projects
			WQual S9. The District will partner with other entities to minimize the spread and reduce the adverse ecological impacts of aquatic invasive species.	
Erosion	Erosion & sediment pollution	WQual 1. Protect, manage, and restore water quality of District lakes and creeks to maintain designated uses. WQual 2. Preserve and enhance the quantity, as well as the function and value of wetlands. WQual 3. Preserve and enhance habitat important to fish, waterfowl, and other wildlife.	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. WQual S2. The District will inventory and address areas within the watershed with existing erosion issues and/or areas at high risk for erosion by implementing the District's capital improvement, incentive and regulatory programs.	Shoreline and streambank protection and restoration (e.g., buffers and stabilization efforts) Rainfall abstraction (e.g., rain gardens, reuse, and permeable pavements) Enhance regulatory program
Pollution	Chloride pollution	WQual 1. Protect, manage, and restore water quality of District lakes and creeks to maintain designated uses. WQual 2. Preserve and enhance the quantity, as well as the function and value of wetlands. WQual 3. Preserve and enhance habitat important to fish, waterfowl, and other wildlife.	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.	Municipal cost-share projects
	Non-point source pollution		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. WQual S14. The District will continue to identify opportunities and actions to protect, restore, and enhance District-managed resources.	Watershed BMPs (e.g., iron enhanced sand, ponds, etc.) In-lake water quality treatment projects (e.g., alum treatment) Rainfall abstraction (e.g., rain gardens, reuse, and permeable pavements) Enhance regulatory program
	Emerging topics		WQual S15. The District will cooperate with other entities to investigate treatment effectiveness of emerging practices.	Demonstration and pilot-scale water quality treatment projects

Topic	Sub-topic	Goal	Most Applicable Strategies	Examples of Projects
			WQual S16. The District will work with the state agencies and local governmental units to identify emerging pollutants of concern.	

Groundwater	Groundwater conservation	Ground 1. Promote the sustainable management of groundwater resources.	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)	Rainfall abstraction (e.g., rain gardens, reuse, and permeable pavements) Larger scale infiltration practices in targeted locations
	Groundwater-surface water interactions		Ground S3. The District will work to increase the understanding of the interaction between groundwater resources and surface waters within the District and consider those interactions in future management decisions.	
Water Quantity	Baseflow impacts	WQuan 1. Protect and enhance the ecological function of District floodplains to minimize adverse impacts. WQuan 2. Limit the impact of stormwater runoff on receiving waterbodies.	WQuan S2. The District will promote strategies that minimize baseflow impacts.	Larger scale infiltration practices in targeted locations Rainfall abstraction practices (e.g., rain gardens, permeable pavements) LID cost-share projects within municipalities Water reuse projects Stormwater retention and detention (e.g., ponds, filtration) Flood risk mitigation projects Enhance regulatory program
	Infiltration practices		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.	
	Low impact development		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.	
	Conservation practices		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.	
	Flood risk reduction		WQuan S8. The District will develop and implement actions to reduce flood risk within the District	

Placeholder for Riley Creek fact sheet page 1

What's happening

WATERSHED MANAGEMENT PLAN

One of the most important projects the watershed worked on in 2017 was updating its Watershed Managment Plan.

This watershed management plan (also called the 10-Year Plan) guides the District's actions for the next 10 years.

The community played an essential role by participating in a public engagement process. Close to 500 stakeholders engaged in this process, making their voices heard about their values for clean water. The graphic to the right highlights how the community contributed to the planning effort.

The draft plan was relased for public review in late 2017. After comments are addressed, the District will submit a final plan for approval in 2018. Check our website for updates on the process: rpbcwd.org

Thank you! To everyone who shared their thoughts, ideas, hopes and concerns. We truly appreciate you being a part of this process.

YOU CAN HELP

Rainwater runoff, the water that flows across yards, parking lots, and streets into stormdrains, is one of the main causes of pollution in urban areas. You can take simple actions to help protect Riley Creek.

Keep the curb clean
Sweep up leaves, grass clippings and fertilizer from driveways and streets.

Water with care
Grass requires 1-inch of water per week: about one hour of sprinkling per week if it has not rained.

Salt smart
The salt we use to melt ice can pollute our lakes and creeks. Use salt sparingly and always shovel first.

Reuse the rain
Collect and reuse rainwater with a rain barrel.

Build a raingarden
Raingardens soak up water and filter out pollution. Visit our website for help.

Contact us
and find out how you can get involved

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Riley Creek

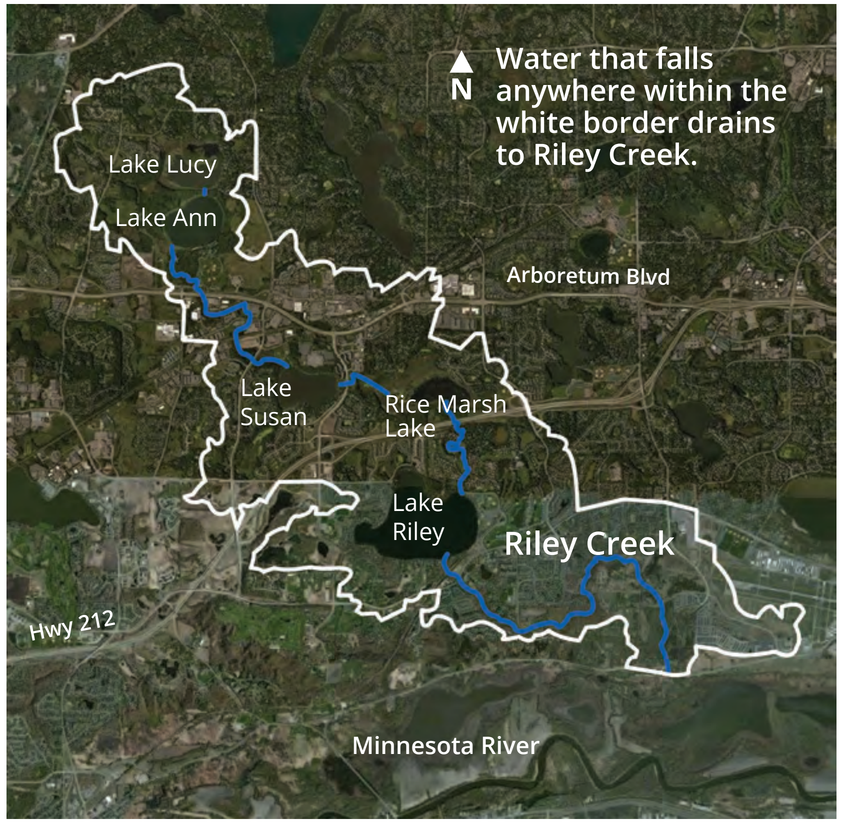
2017

Riley Creek begins at lakes Lucy and Ann in Chanhassen and flows through three, down-stream lakes - Susan, Riley, Rice Marsh - before descending to the Minnesota River Valley. The creek has mild topography in the upper and middle portions of the watershed, but below Lake Riley the banks become steep.

CHARACTERISTICS

Length	9.6 miles
Elevation change	230 ft
Watershed size	10 sq miles
# of cities in watershed	2
# of lakes connected	5
# of monitoring sites	5
# of parks	11
Impairment	Turbidity
Common fish	Green Sunfish, Fathead Minnow, Bluntnose Minnow
Invasive species	Buckthorn, Common Carp

WATERSHED BOUNDARIES



How healthy is Riley Creek?

Keeping Riley Creek healthy requires several tools and strategies. Conducting projects to stabilize the stream banks and restore stretches is one important strategy. Cleaning and slowing rainwater runoff before it reaches the creek is another. But before either of these can be done, we need to understand how the creek is doing and where it needs the most help.

To this end, the watershed district as well as the Metropolitan Council have been monitoring Riley Creek water quality for almost 20 years. Recently, the district developed a new tool to assess the creek: the Creek Restoration Action Strategy (CRAS). The CRAS uses water quality data, as well as information on erosion and habitat to rank which creek sections are doing the best, and which are doing the poorest. Below, the three major types of data used in the assessment are described. On the next page, a creek map shows the results from 2017.

Water quality

District staff take samples at five sites during summer. They gather information about nutrient levels (phosphorus), sediment, pH, and dissolved oxygen. These data let us know how clean the water is, and whether it is healthy for plants, animals, and people.

Erosion

Every year, staff walk along sections of the creek. They note sites with erosion, its severity, and whether any structures like houses or bridges are in danger. Erosion is also a problem because the sediment that erodes into the creek is a pollutant.

Habitat

Creeks are important habitat for insects, plants, fish, birds, and other animals. When staff check for erosion, they also assess the habitat. Reaches receive a score based on the quality of habitat they provide, and whether it needs to be restored.

Dive deeper

Interested in learning more? Explore the following reports on our website.

Stormwater ponds
RPBCWD. 2013. Stormwater pond project.

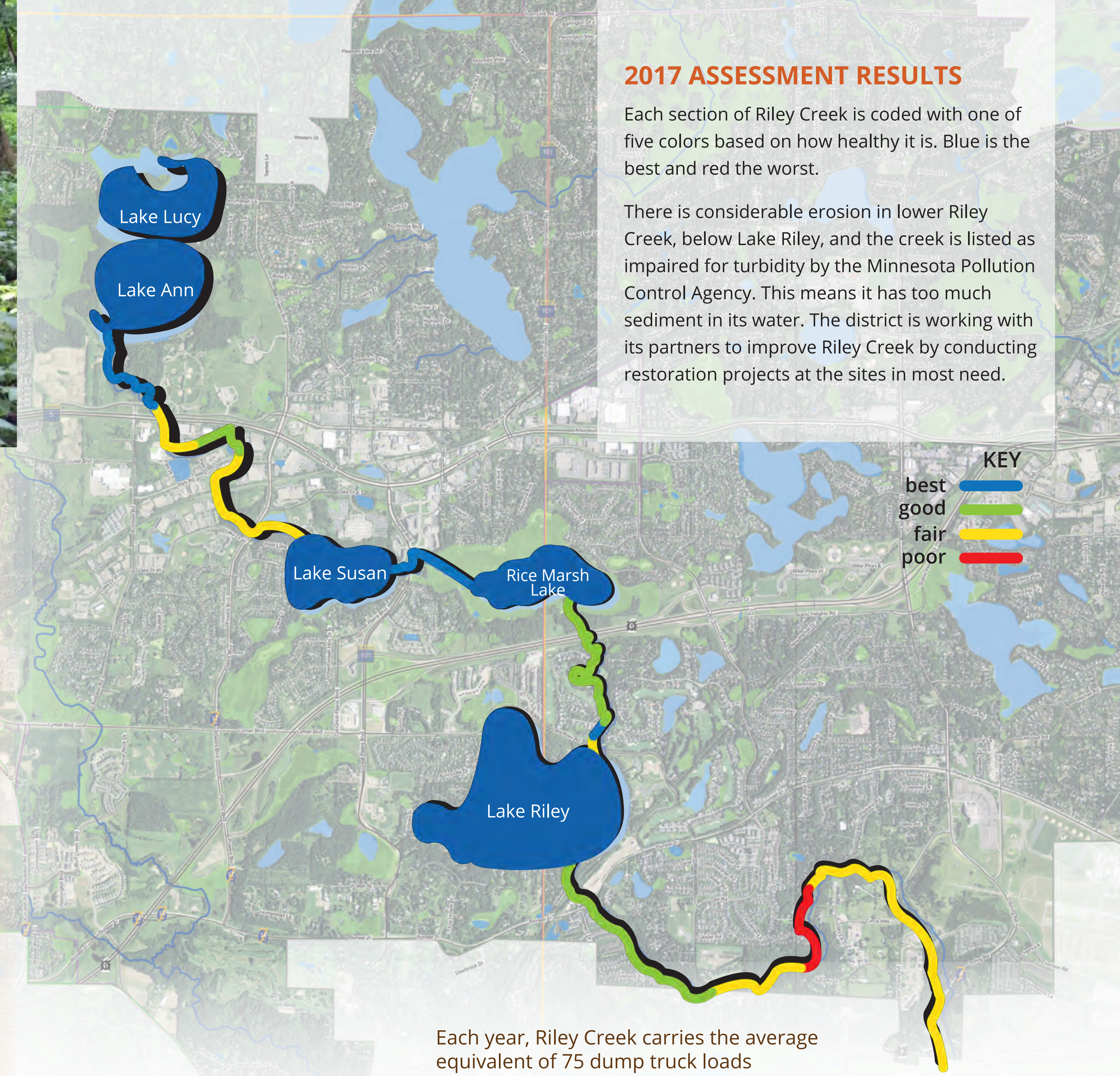
Restoration prioritization
RPBCWD & BARR Engineering. 2017. Creek Restoration Action Strategy.

Carp management
Bajer P.G., Headrick,M., Miller B. D. and Sorensen P. W. 2014. Development and implementation of a sustainable strategy to control common carp in Riley Creek Chain of Lakes. University of Minnesota.

2017 ASSESSMENT RESULTS

Each section of Riley Creek is coded with one of five colors based on how healthy it is. Blue is the best and red the worst.

There is considerable erosion in lower Riley Creek, below Lake Riley, and the creek is listed as impaired for turbidity by the Minnesota Pollution Control Agency. This means it has too much sediment in its water. The district is working with its partners to improve Riley Creek by conducting restoration projects at the sites in most need.



Each year, Riley Creek carries the average equivalent of 75 dump truck loads of **sediment** into the **Minnesota River Valley**

What's happening

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DIVE DEEPER

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Aquatic plants

Johnson, J. 2017. 2017 Aquatic Plan Survey: Lake Ann.

JaKa, J. and Newman, R. 2014. Aquatic Plant Community of Lakes Ann, Lotus, Lucy, Mitchell, Susan, Riley and Staring within the Riley Purgatory Bluff Creek Watershed: Final Report 2009 – 2014. University of Minnesota.

Watershed study

BARR Engineering. 2013. Lake Lucy and Lake Ann: Use Attainability Analysis.

Stormwater ponds

RPBCWD. 2013. Stormwater pond project.

Carp management

Bajer P.G., Headrick,M., Miller B. D. and Sorensen P. W. 2014. Development and implementation of a sustainable strategy to control common carp in Riley Creek Chain of Lakes. University of Minnesota.

Contact us

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Lake Ann

2017

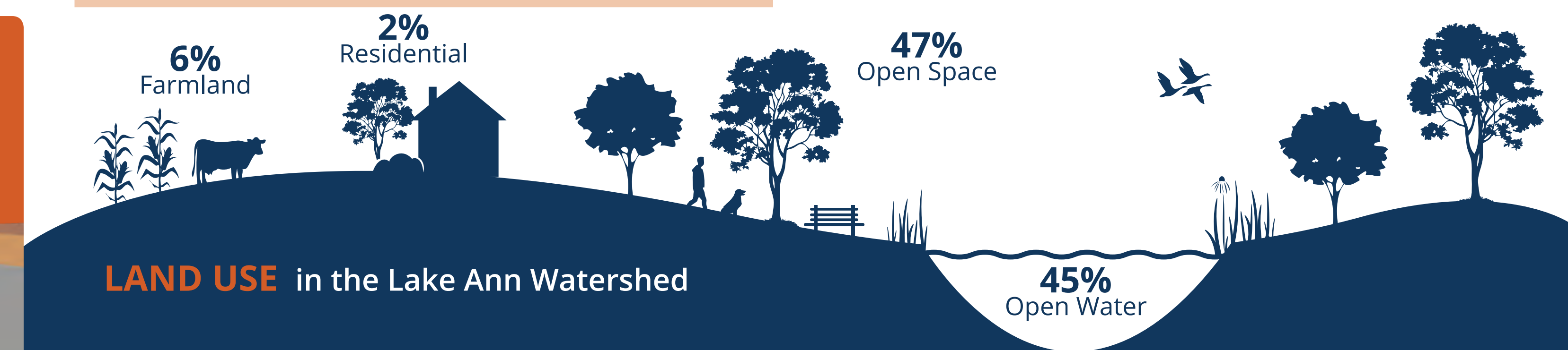
RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Located in Chanhassen, Lake Ann is at the headwaters of Riley Creek. Over the past 40 years, Lake Ann has consistently met Minnesota Pollution Control Agency clean water standards.

CHARACTERISTICS

Size	119 acres
Volume	2005 acre-ft
Average depth	16.8 ft
Max depth	40 ft
Watershed size	250 acres
Land draining directly into	105 acres
MPCA lake classification	Deep
Impairment listing	Mercury
Trophic status	Mesotrophic
Common fish	Bluegill, White Sucker, Black Crappie, Yellow Perch
Invasive species	Curlyleaf Pondweed, Eurasian Watermilfoil, Common Carp, Brittle Naiad

WATERSHED BOUNDARIES



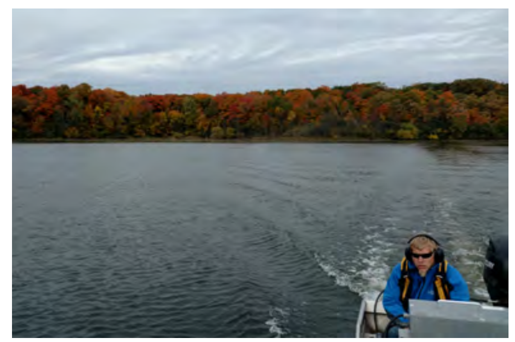
LAND USE in the Lake Ann Watershed

How healthy is Lake Ann?

For the past 40 years, Lake Ann has consistently met the clean water standards set by the Minnesota Pollution Control Agency (MPCA). The graphs on the next page show the trends over time. The red line on each graph marks the MPCA standard. The goal is for the average values (the dots) to be below the red line.

During the growing season (June - September), district staff visit Lake Ann every other week to collect water samples and take measurements. The water samples are sent to a lab where they are tested for several compounds including total phosphorous (TP) and chlorophyll a (Chl-a). Staff also measure how clear the water is using a disk that is lowered into the water until it can no longer be seen. All three of these parameters help indicate whether the water is clean. Find out more about each on the next page.

Ann is classified as a "Deep Lake", which means that it is over 15 feet deep and light can not reach the bottom in most of the lake. To be considered healthy by the MPCA, deep lakes need to be clear enough to see 1.4 meters down, and have very low TP and Chl-a levels. Water quality increased from 2016 to 2017, and remains well below the MPCA standards.



District staff monitoring Lake Ann during the fall.

A common loon taking a dip in Lake Ann.

Help keep Lake Ann healthy

In August, the invasive species **Brittle Naiad** was found in Lake Ann. RPBCWD implemented a **rapid response plan** to treat the lake and plans to reassess the lake in early 2018. We remind our community **clean, drain,** and **dry** boats and other equipment after each visit to a lake.

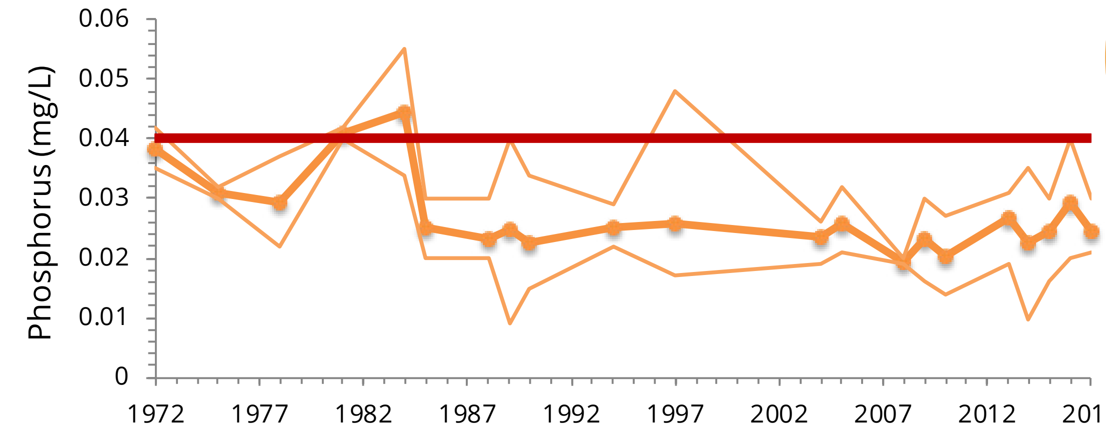
Clean all visible aquatic plants, zebra mussels, and any other invasive species before leaving any water access.

Drain water-related equipment by removing drain plugs, and keep them out while transporting.

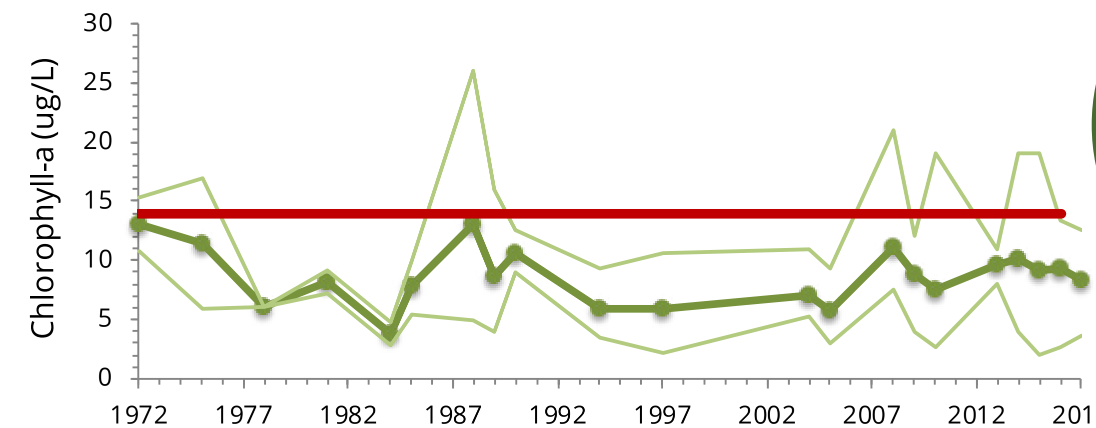
Dry your boat, trailer, and all equipment for at least 5 days.

Water quality graphs 1972 - 2017

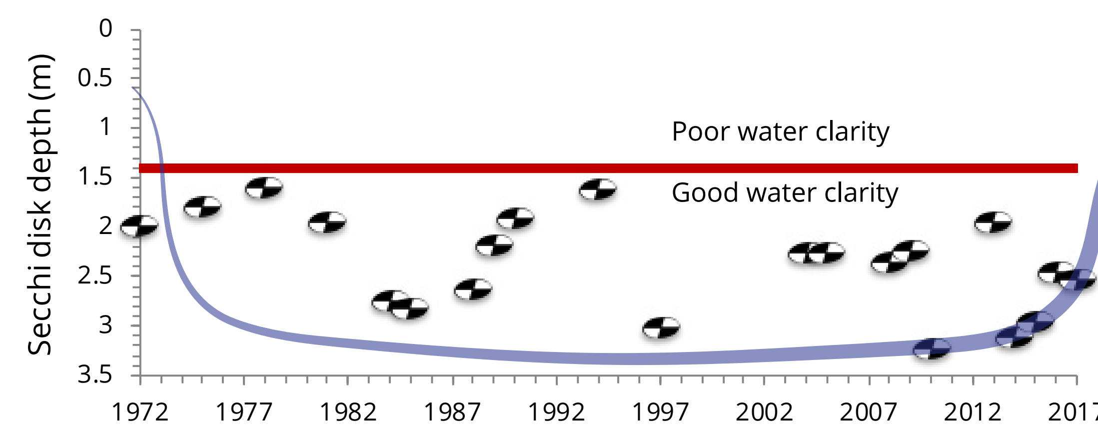
Points are growing season (Jun-Sep) averages. Thin lines are the min and max values for each year.



Phosphorus is a nutrient that plants and algae need to grow. It is often measured as total phosphorus (TP). Too much phosphorous can cause algae blooms.



Chlorophyll-a is the main pigment in algae, so measuring chl-a can tell us how much algae there is. Too much chl-a means that there are too many nutrients in the water.



Water clarity is measured using a **Secchi Disk**, a black and white disk the size of a dinner plate. It is lowered into the water, and the depth at which it is no longer visible is recorded.

Summary table

	MPCA standard	1972 - 2016 max	1972 - 2016 min	1972 - 2016 average	2017 max	2017 min	2017 average
TP	<0.04 mg/l	0.055	0.009	0.026	0.03	0.021	0.024
Chl-a	<14 ug/l	26.0	2.0	8.5	12.5	3.56	**8.4**
Secchi	>1.4 m	6.8	1.0	2.5	3.5	1.8	**2.5**

What's happening

WATERSHED MANAGEMENT PLAN

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Aquatic plants

Dunne, M. and Newman, R. 2017. Aquatic Plant Community of Lakes Lucy, Mitchell, Susan, Riley and Staring: Annual Report for 2016. University of Minnesota.

JaKa, J. and Newman, R. 2014. Aquatic Plant Community of Lakes Ann, Lotus, Lucy, Mitchell, Susan, Riley and Staring within the Riley Purgatory Bluff Creek Watershed: Final Report 2009 – 2014. University of Minnesota.

Wenck Associates Inc. 2015. Lake Lucy Aquatic Plant Management Plan.

Watershed study

BARR Engineering. 2013. Lake Lucy and Lake Ann: Use Attainability Analysis.

Carp management

Bajer P.G., Headrick,M., Miller B. D. and Sorensen P. W. 2014. Development and implementation of a sustainable strategy to control common carp in Riley Creek Chain of Lakes. U of M.

Stormwater ponds

RPBCWD. 2013. Stormwater pond project.

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Lake Lucy

2017

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Lake Lucy is the headwaters to Riley Creek. Water flows out of Lucy to Lake Ann and then into Riley Creek. On its way south to the Minnesota River, Riley Creek passes through Lakes Susan, Rice Marsh, and Riley.

CHARACTERISTICS

Size	88 acres
Volume	558 acre-ft
Average depth	6.5 ft
Max depth	20 ft
Watershed size	997 acres
Land draining directly into	111 acres
MPCA lake classification	Shallow
Impairment listing	Mercury
Trophic status	Eutrophic
Common fish	Bluegill, Northern Pike, Yellow Bullhead
Invasive species	Curlyleaf Pondweed, Eurasian Watermilfoil, Common Carp

WATERSHED BOUNDARIES

Water that falls anywhere within the white border drains to Lake Lucy.

LAND USE in the Lake Lucy Watershed

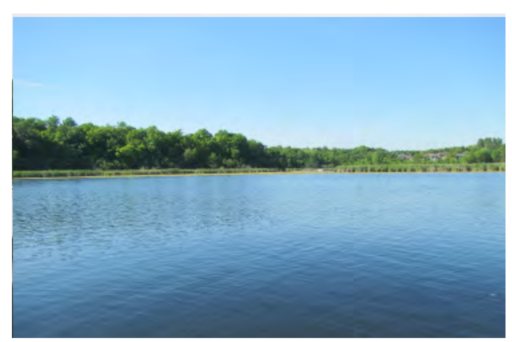
How healthy is Lake Lucy?

Water quality in Lake Lucy increased from 2016 to 2017, and met two of the clean water standards set by the Minnesota Pollution Control Agency (MPCA). The graphs on the next page show the trends over time. The red line on each graph marks the MPCA standard. The goal is for the average values (the dots) to be below the red line.

During the growing season (June - September), district staff visit Lake Lucy every other week to collect water samples and take measurements. The samples are sent to a lab and tested for several compounds including total phosphorous (TP) and chlorophyll a (Chl-a). Staff also measure how clear the water is using a disk that is lowered into the water until it can no longer be seen. These parameters help indicate whether the water is clean.

Lucy is classified as a "Shallow Lake", which means that it is generally less than 15 feet deep and light can reach the bottom in most of the lake. This ample light means that shallow lakes often have a lot of aquatic plants, and are habitat to many types of fish and birds. To be considered healthy by the MPCA, shallow lakes need to be clear enough to see one meter down, and have low TP and Chl-a levels.

A volunteer extracting invasive Common Carp from Lake Lucy.



Lake Lucy on a beautiful summer afternoon.

Rainwater runoff, the water that flows across yards, parking lots, and streets into stormdrains, is one of the main causes of pollution in urban areas. You can take simple actions to help protect Lake Lucy.

Keep the curb clean
Sweep up leaves, grass clippings and fertilizer from driveways and streets.

Water with care
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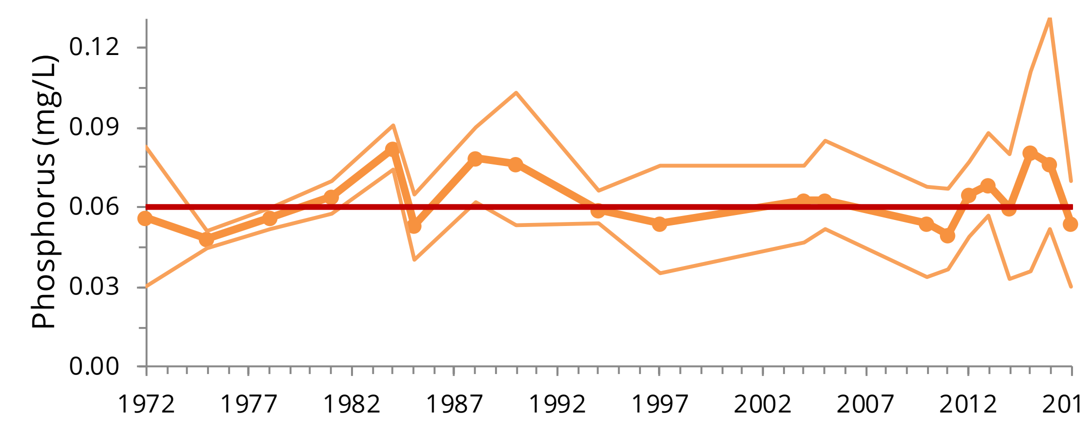
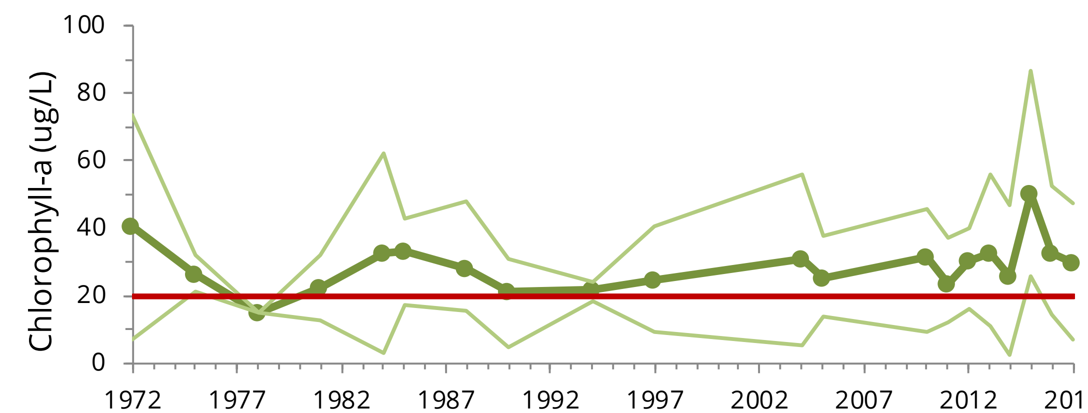
Water quality graphs 1972 - 2017

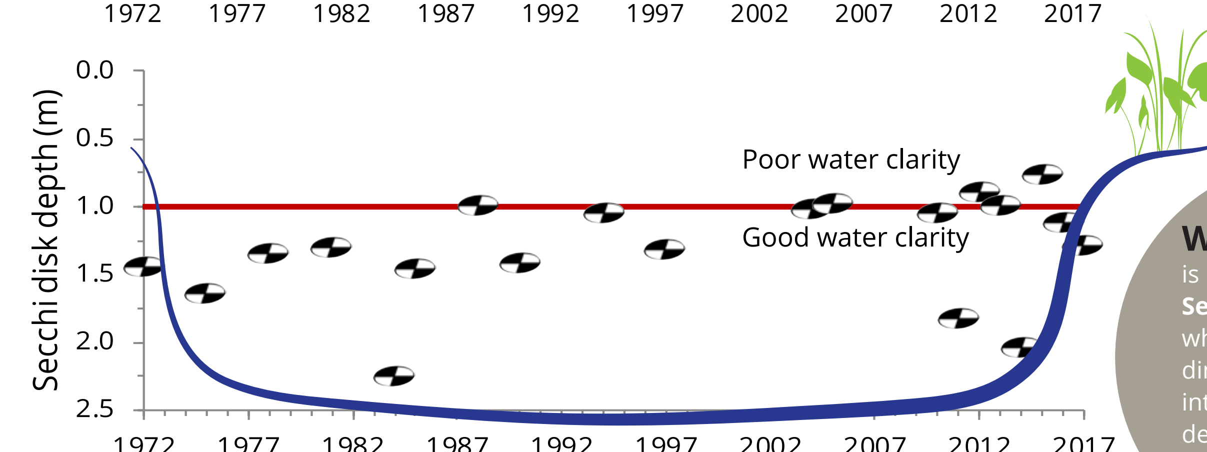
Points are growing season (Jun-Sep) averages. Thin lines are the min and max values for each year.



Phosphorus is a nutrient that plants and algae need for growth. It is often measured as total phosphorus (TP). Too much phosphorous can cause algae blooms.



Chlorophyll a is the main pigment in algae, so measuring chl-a can tell us how much algae there is. Too much chl-a means that there are too many nutrients in the water.



Water clarity is measured using a **Secchi Disk**, a black and white disk the size of a dinner plate. It is lowered into the water, and the depth at which it is no longer visible is recorded.

Summary table

	MPCA standard	1972 - 2016			2017		
		max	min	average	max	min	average
TP	<0.06 mg/l	0.11	0.03	0.064	0.07	0.03	**0.05**
Chl-a	<20 ug/l	87	2.7	29.8	47.2	7.12	**30.01**
Secchi	>1 m	6.9	0.5	1.3	3.15	0.8	**1.3**

What's happening

WATERSHED MANAGEMENT PLAN

One of the most important projects the watershed worked on in 2017 was updating its Watershed Managment Plan.

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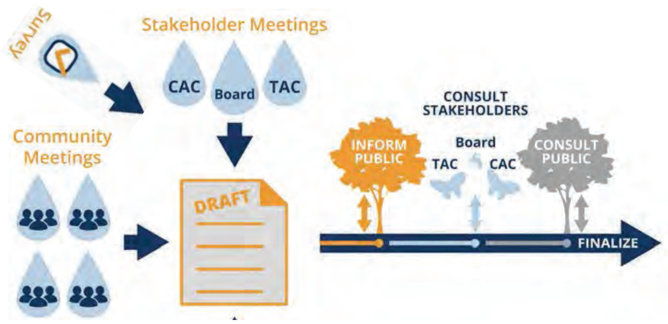

The draft plan was relased for public review in late 2017. After comments are addressed, the District will submit a final plan for approval in 2018. Check our website for updates on the process: rpbcwd.org

Thank you! To everyone who shared their thoughts, ideas, hopes and concerns. We truly appreciate you being a part of this process.

DIVE DEEPER

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Aquatic plants

Johnson, J. 2017. 2017 Aquatic Plan Survey: Rice Marsh Lake

Blue Water Science. 2014. Aquatic plant survey for Rice Marsh Lake, Eden Prairie.

Carp management

Bajer P.G., Headrick,M., Miller B. D. and Sorensen P. W. 2014. Development and implementation of a sustainable strategy to control common carp in Riley Creek Chain of Lakes. University of Minnesota.

Paleolimnology

Ramstack Hobbs J. M. and M.B. Edlund. 2014. Historical water quality and ecological change in Rice Marsh Lake. St. Croix Watershed Research Station.

Stormwater ponds

RPBCWD. 2013. Stormwater pond project.

Watershed study

BARR Engineering. 2016. Rice Marsh Lake and Lake Riley Use Attainability Analysis.

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Rice Marsh Lake

2017

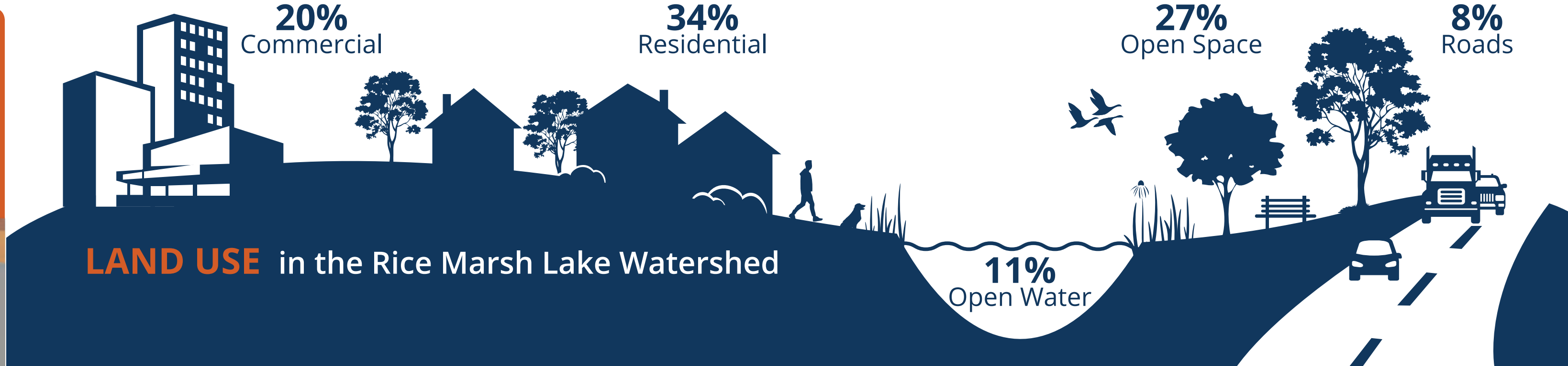
Located in both Eden Prairie and Chanhassen, Rice Marsh Lake is aerated in the winter. This management practice helps keep bluegill sunfish alive so that they can feed on invasive carp eggs in the spring.

CHARACTERISTICS

Size	83 acres
Volume	375 acre-ft
Average depth	5 ft
Max depth	11 ft
Watershed size	966 acres
Land draining directly into	280 acres
MPCA lake classification	Shallow
Impairment listing	Not listed
Trophic status	Hypereutrophic
Common fish	Bluegill, White Sucker, Northern Pike
Invasive species	Curlyleaf Pondweed, Purple Loosestrife. Common Carp

WATERSHED BOUNDARIES

Water that falls anywhere within the white border drains to Rice Marsh Lake.



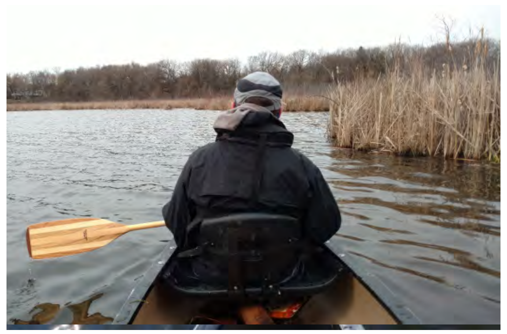
LAND USE in the Rice Marsh Lake Watershed

How healthy is Rice Marsh Lake?

Water quality in Rice Marsh Lake improved from 2016 to 2017 and met all three parameters for clean water standards set by the Minnesota Pollution Control Agency (MPCA). The graphs on the next page show the trends over time. The red line on each graph marks the MPCA standard. The goal is for the average values (the dots) to be below the red line.

During the growing season (June - September), district staff visit Rice Marsh Lake every other week to collect water samples and take measurements. The water samples are sent to a lab where they are tested for several compounds including total phosphorous (TP) and chlorophyll a (Chl-a). Staff also measure how clear the water is using a disk that is lowered into the water until it can no longer be seen. All three of these parameters help indicate whether the water is clean.

Rice Marsh is classified as a "Shallow Lake", which means that it is generally less than 15 feet deep and light can reach the bottom in most of the lake. This ample light means that shallow lakes often have a lot of aquatic plants, and are habitat to many types of fish and birds. To be considered healthy by the MPCA, shallow lakes need to be clear enough to see one meter down, and have low TP and Chl-a levels.



Motorized boats are not allowed on the shallow Rice Marsh Lake, but it is a popular place to kayak and canoe.

Two Canadian Geese resting on Rice Marsh Lake before preparing themselves for flight.

Rainwater runoff, the water that flows across yards, parking lots, and streets into stormdrains, is one of the main causes of pollution in urban areas. You can take simple actions to help protect Rice Marsh Lake.

Keep the curb clean

Sweep up leaves, grass clippings and fertilizer from driveways and streets.

Water with care

Grass requires 1-inch of water per week: about one hour of sprinkling per week if it has not rained.

Salt smart

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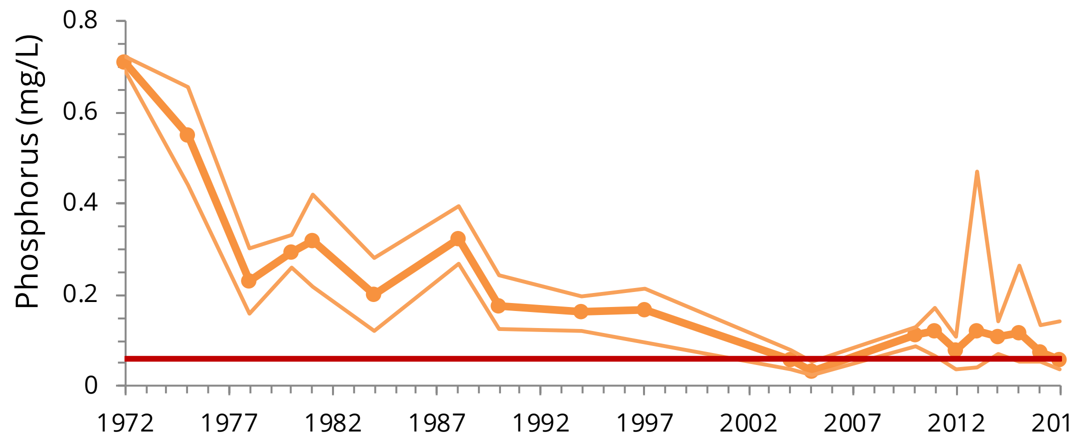
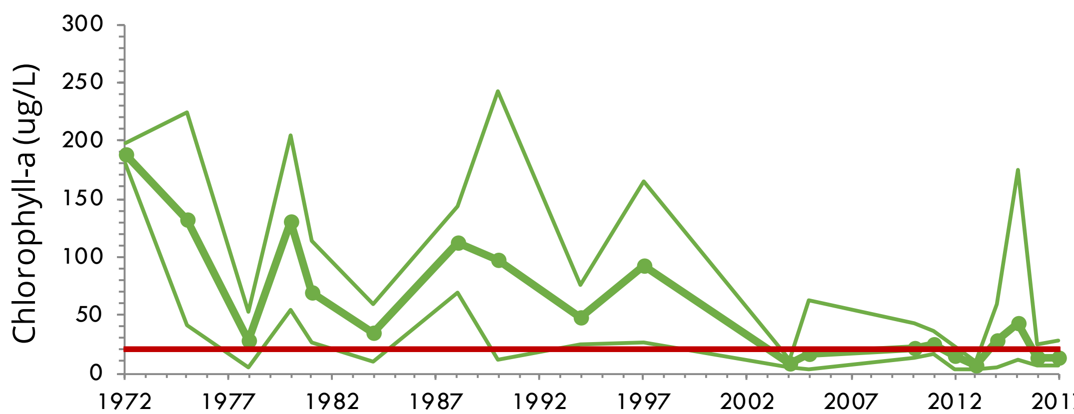
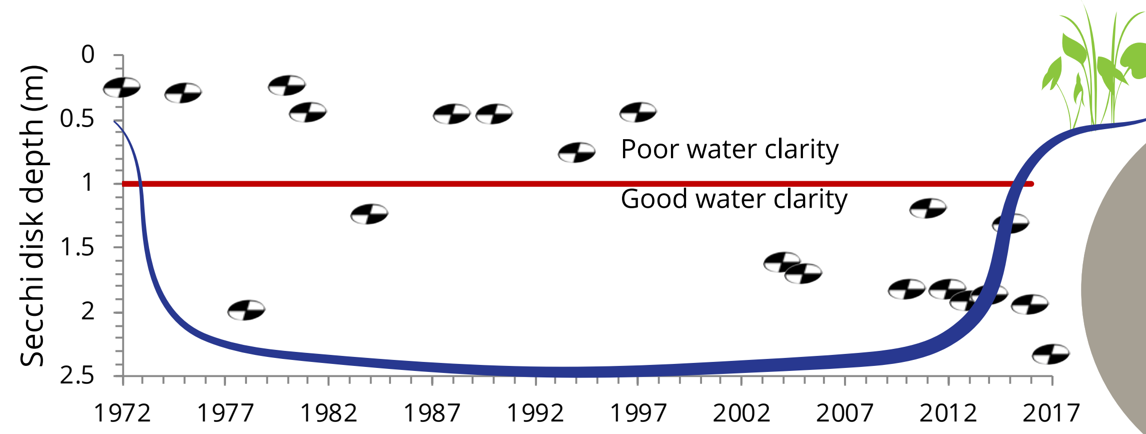


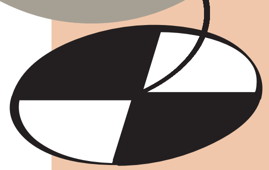
Phosphorus is a nutrient that plants and algae need for growth. It is often measured as total phosphorus (TP). Too much phosphorous can cause algae blooms.



Chlorophyll a is the main pigment in algae, so measuring chl-a can tell us how much algae there is. Too much chl-a means that there are too many nutrients in the water.



Water clarity is measured using a **Secchi Disk**, a black and white disk the size of a dinner plate. It is lowered into the water, and the depth at which it is no longer visible is recorded.



Summary table

	MPCA standard	1972 - 2016			2017		
		max	min	average	max	min	average
TP	<0.06 mg/l	0.72	0.026	0.15	0.144	0.039	**0.059**
Chl-a	<20 ug/l	242.4	2.7	43.1	28.5	6.23	**13.62**
Secchi	>1 m	3.2	0.1	1.36	2.85	1.4	**2.33**

What's happening

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JaKa, J. and Newman, R. 2014. Aquatic Plant Community of Lakes Ann, Lotus, Lucy, Mitchell, Susan, Riley and Staring within the Riley Purgatory Bluff Creek Watershed: Final Report 2009 – 2014. University of Minnesota.

Watershed study

BARR Engineering. 2016. Rice Marsh Lake and Lake Riley Use Attainability Analysis.

Alum Fact Sheet

RPBCWD. 2016. Alum Fact Sheet.

Carp management

Bajer P.G., Headrick,M., Miller B. D. and Sorensen P. W. 2014. Development and implementation of a sustainable strategy to control common carp in Riley Creek Chain of Lakes. University of Minnesota.

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Lake Riley

2017

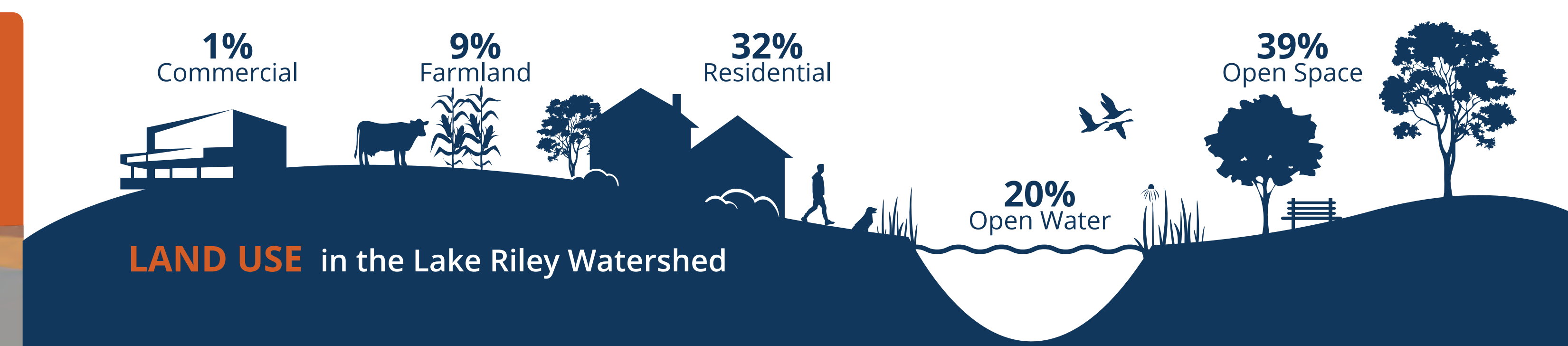
At 297 acres, and with an average depth of 23 ft, Lake Riley is one of the largest lakes in the Riley Purgatory Bluff Creek Watershed District. It is located on the boundary of the cities of Chanhassen and Eden Prairie and is a popular summer recreation stop.

CHARACTERISTICS

Size	297 acres
Volume	6230 acre-ft
Average depth	23 ft
Max depth	49 ft
Watershed size	1776 acres
Land draining directly into	818 acres
MPCA lake classification	Deep
Impairment listing	Mercury & Nutrients
Trophic status	Eutrophic
Common fish	Bluegill, Northern Pike, Yellow Perch, Yellow Bullhead
Invasive species	Curlyleaf Pondweed, Eurasian Watermilfoil, Common Carp

WATERSHED BOUNDARIES

Water that falls anywhere within the white border drains to Lake Riley.



LAND USE in the Lake Riley Watershed

How healthy is Lake Riley?

Water quality in Lake Riley decreased slightly in 2017, but remained below or near the clean water standards set by the Minnesota Pollution Control Agency (MPCA).

During the growing season (June - September), district staff visit Lake Riley every other week to collect water samples and take measurements. The samples are sent to a lab where they are tested for several compounds including total phosphorous (TP) and chlorophyll a (Chl-a). Staff also measure how clear the water is using a disk that is lowered into the water until it can no longer be seen. All three of these test help indicate if the water is clean.

Riley is classified as a "Deep Lake", which means that it is over 15 feet deep and light can not reach the bottom in most of the lake. To be considered healthy by the MPCA, it needs to be clear enough to see 1.4 meters down, and have very low TP and Chl-a levels.

The graphs on the next page show the trends over time. The red line on each graph marks the MPCA standard. The goal for each graph is for the average values (the dots) to be below the red line.

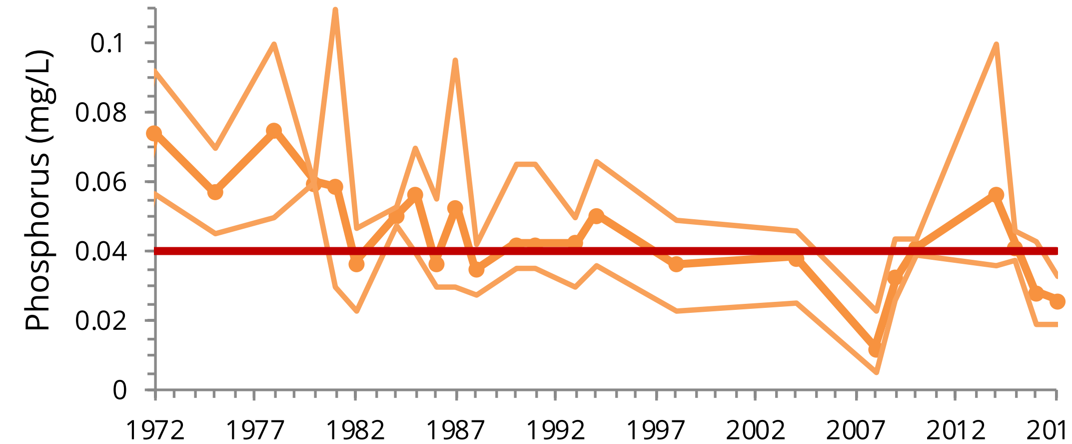
Lake Riley during different times of the year.

Top: Summer, 2017

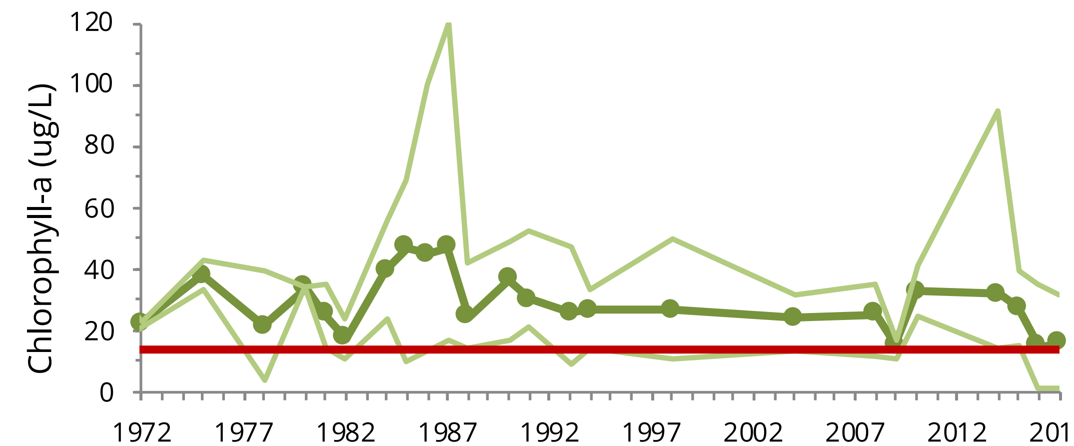
Bottom: Fall, 2017

Water quality graphs 1972 - 2017

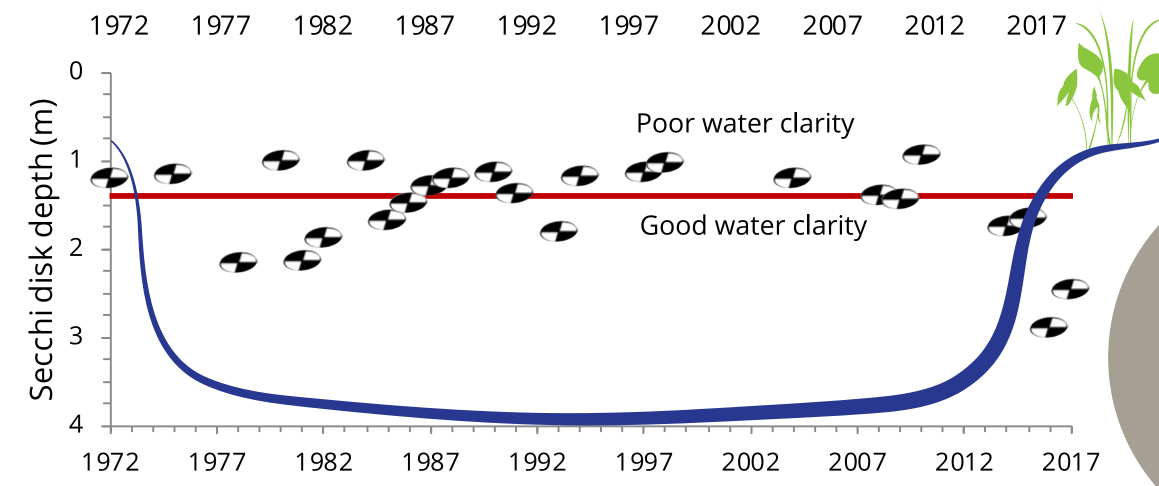
Points are growing season (Jun-Sep) averages. Thin lines are the min and max values for each year.



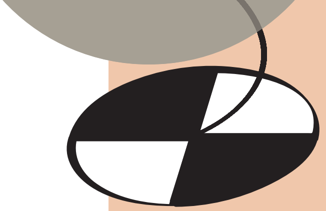
Phosphorus is a nutrient that plants and algae need for growth. It is often measured as total phosphorus (TP). Too much phosphorous can cause algae blooms.



Chlorophyll-a is the main pigment in algae, so measuring chl-a can tell us how much algae there is. Too much chl-a means that there are too many nutrients in the water.



Water clarity is measured using a **Secchi Disk**, a black and white disk the size of a dinner plate. It is lowered into the water, and the depth at which it is no longer visible is recorded.



Summary table

	MPCA standard	1972 - 2016 max	1972 - 2016 min	1972 - 2016 average	2017 max	2017 min	2017 average
TP	<0.04 mg/l	0.11	0.005	0.043	0.033	0.019	0.026
Chl-a	<14 ug/l	120	1.0	28.6	32	1.0	**15.64**
Secchi	>1.4 m	6.0	0.5	1.6	5.25	1.4	**2.5**

Rainwater runoff, the water that flows across yards, parking lots, and streets into stormdrains, is one of the main causes of pollution in urban areas. You can take simple actions to help protect Lake Riley.

Keep the curb clean
Sweep up leaves, grass clippings and fertilizer from driveways and streets.

Water with care
Grass requires 1-inch of water per week: about one hour of sprinkling per week if it has not rained.

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Watershed study

Wenck Associates Inc. 2013. Lake Susan Use Attainability Analysis.

Stormwater ponds

RPBCWD. 2013. Stormwater pond project.

Carp management

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Lake Susan

2017

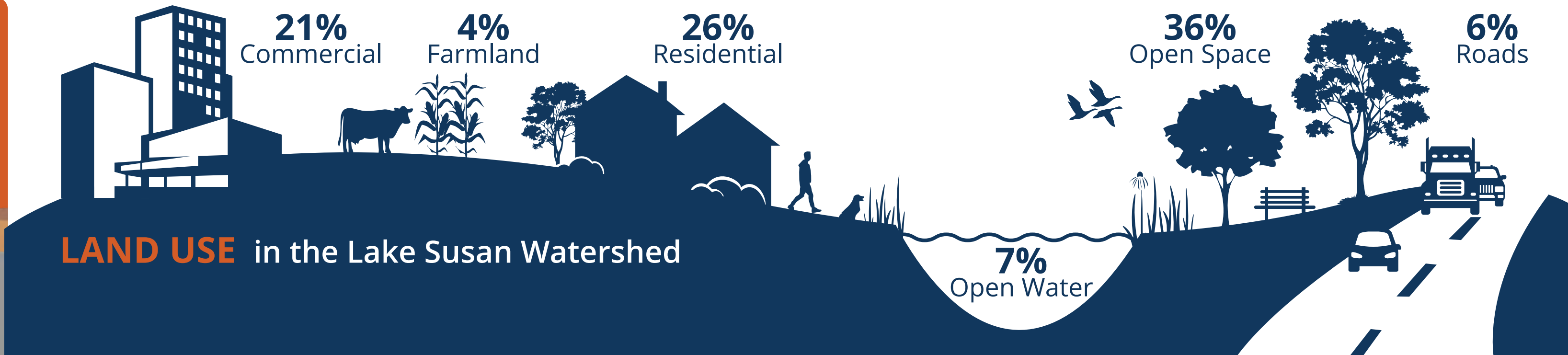
RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Located in Chanhassen, Lake Susan is a part of the Riley Creek Chain of Lakes. It is the third lake that Riley Creek flows through as it makes its way to the Minnesota River.

CHARACTERISTICS

Size	88 acres
Volume	885 acre-ft
Average depth	10 ft
Max depth	17 ft
Watershed size	1281 acres
Land draining directly into	66 acres
MPCA lake classification	Shallow
Impairment listing	Mercury & Nutrients
Trophic status	Eutrophic
Common fish	Bluegill, Black Crappie, Northern Pike, Black Bullhead
Invasive species	Curlyleaf Pondweed, Eurasian Watermilfoil, Common Carp

WATERSHED BOUNDARIES



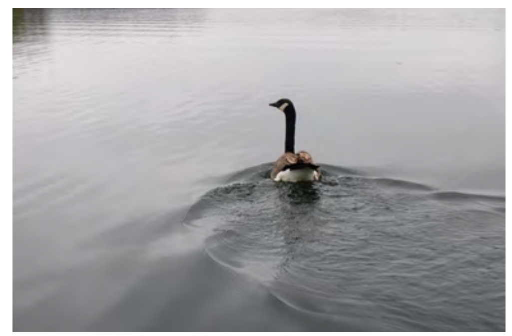
LAND USE in the Lake Susan Watershed

How healthy is Lake Susan?

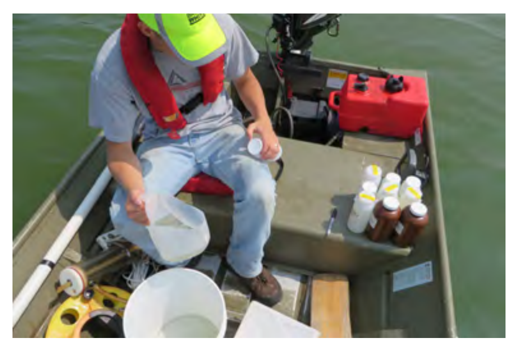
For the past 40 years, Lake Susan water quality has consistently failed to meet the clean water standards set by the Minnesota Pollution Control Agency (MPCA), and 2017 kept with this trend. The graphs on the next page show the trends over time. The red line marks the MPCA standard. The goal is for the average values (the dots) to fall below the red line.

During the growing season (June - September), district staff visit Lake Susan every other week to collect water samples and take measurements. The water samples are sent to a lab where they are tested for several compounds including total phosphorous (TP) and chlorophyll a (Chl-a). Staff also measure how clear the water is using a disk that is lowered into the water until it can no longer be seen. All three of these parameters help indicate whether the water is clean. Find out more about each on the next page.

Susan is classified as a "Shallow Lake", which means that it is generally less than 15 feet deep and light can reach the bottom in most of the lake. To be considered healthy by the MPCA, shallow lakes need to be clear enough to see one meter down, and have low TP and Chl-a levels. These shallow lake standards are listed in the summary table.



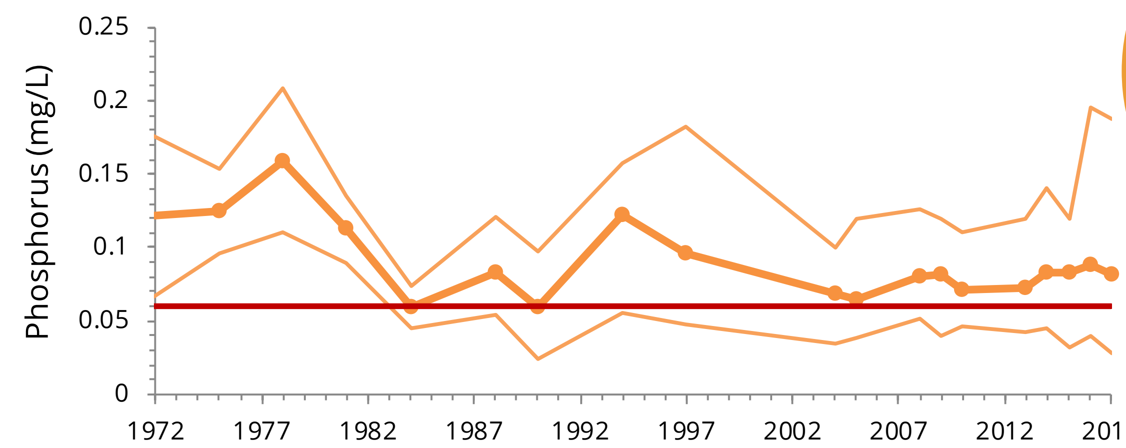
A goose takes a swim in Lake Susan.



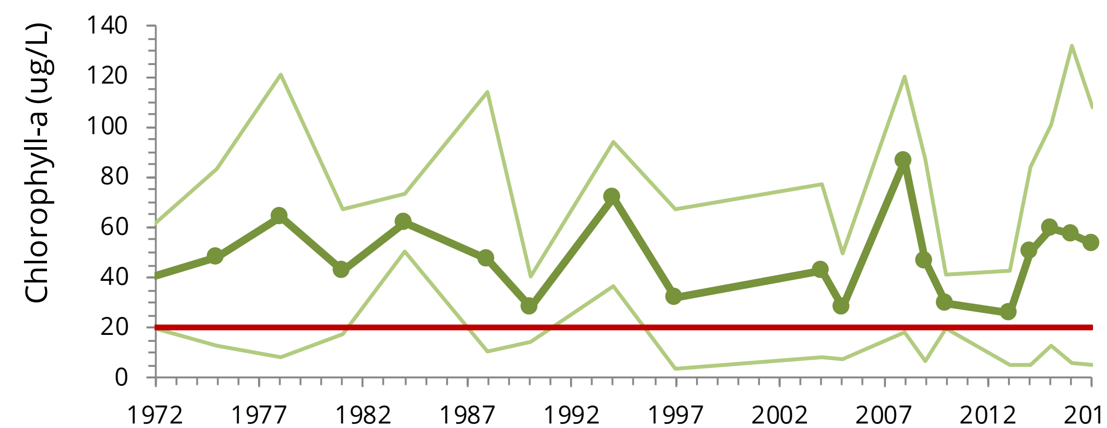
Staff collect water samples on Lake Susan.

Water quality graphs 1972 - 2017

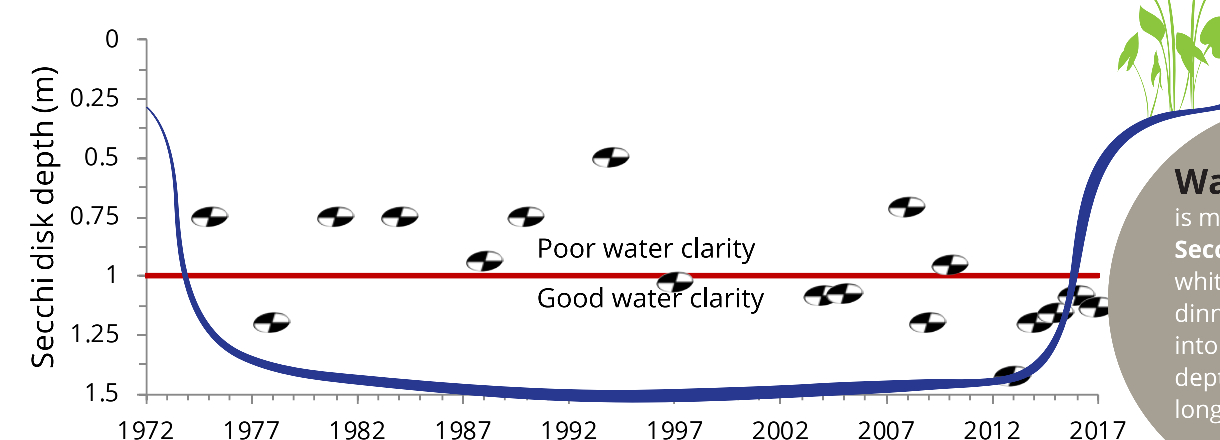
Points are growing season (Jun-Sep) averages. Thin lines are the min and max values for each year.



Phosphorus is a nutrient that plants and algae need for growth. It is often measured as total phosphorus (TP). Too much phosphorous can cause algae blooms.



Chlorophyll a is the main pigment in algae, so measuring chl-a can tell us how much algae there is. Too much chl-a means that there are too many nutrients in the water.



Water clarity is measured using a **Secchi Disk**, a black and white disk the size of a dinner plate. It is lowered into the water, and the depth at which it is no longer visible is recorded.

Summary table

	MPCA standard	1972 - 2016 max	1972 - 2016 min	1972 - 2016 average	2017 max	2017 min	2017 average
TP	<0.06 mg/l	0.208	0.024	0.085	0.187	0.028	0.082
Chl-a	<20 ug/l	132	3.9	46.6	108	5.34	53.48
Secchi	>1 m	3.6	0.3	1	2.85	0.5	1.1

Help keep Lake Susan healthy

Rainwater runoff, the water that flows across yards, parking lots, and streets into stormdrains, is one of the main causes of pollution in urban areas. You can take simple actions to help protect Lake Susan.

Keep the curb clean
Sweep up leaves, grass clippings and fertilizer from driveways and streets.

Water with care
Grass requires 1-inch of water per week: about one hour of sprinkling per week if it has not rained.

Salt smart
The salt we use to melt ice can pollute our lakes and creeks. Use salt sparingly and always shovel first.

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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

- 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	2028		
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 Ruse	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 2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Partner(s)	Partner(s) Additional Funds
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:

1. For more information on the scoring details and multiple benefits see Tables 6-2, 7-2, and 8-2.
2. Estimated levy presented in 2017 dollars. The District levied funds for some multi-year projects before 2018.
3. 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

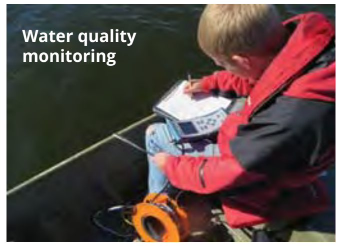
Management & Restoration

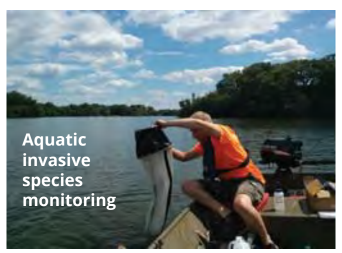
In each of its three watersheds, the Riley Purgatory Bluff Creek Watershed District utilizes a One-Water Management Strategy. Rather than focusing on a single water body at a time, the strategy looks at the watershed as a whole.

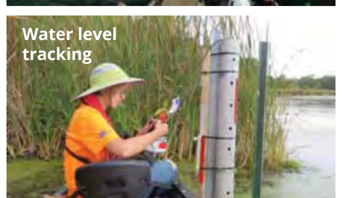
It begins with the 1 collection and 2 interpretation of data to understand current conditions. 3 Solutions to improve water quality are then identified based on the best available science. 4 Finally, projects are prioritized and implemented, working from upstream to downstream and taking advantage of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





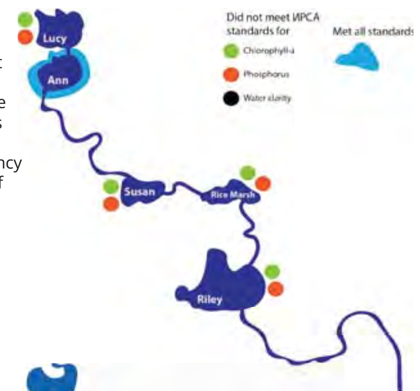


2 Interpretation

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.

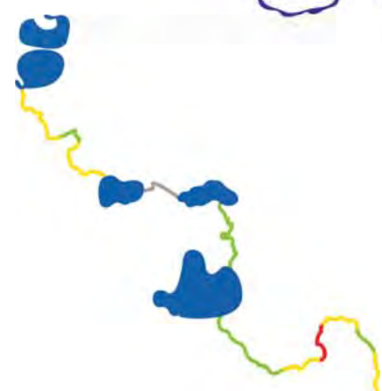
Hydrology & Hydraulics Modeling
Lake and creek water level data are used in modeling the movement of water through the watershed during a rainfall. These models can be used to predict flooding.

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 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, phosphorous 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.

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**

130 lbs of **Total Phosphorous**

from site run-off

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

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Chanhassen MN 55317

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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.

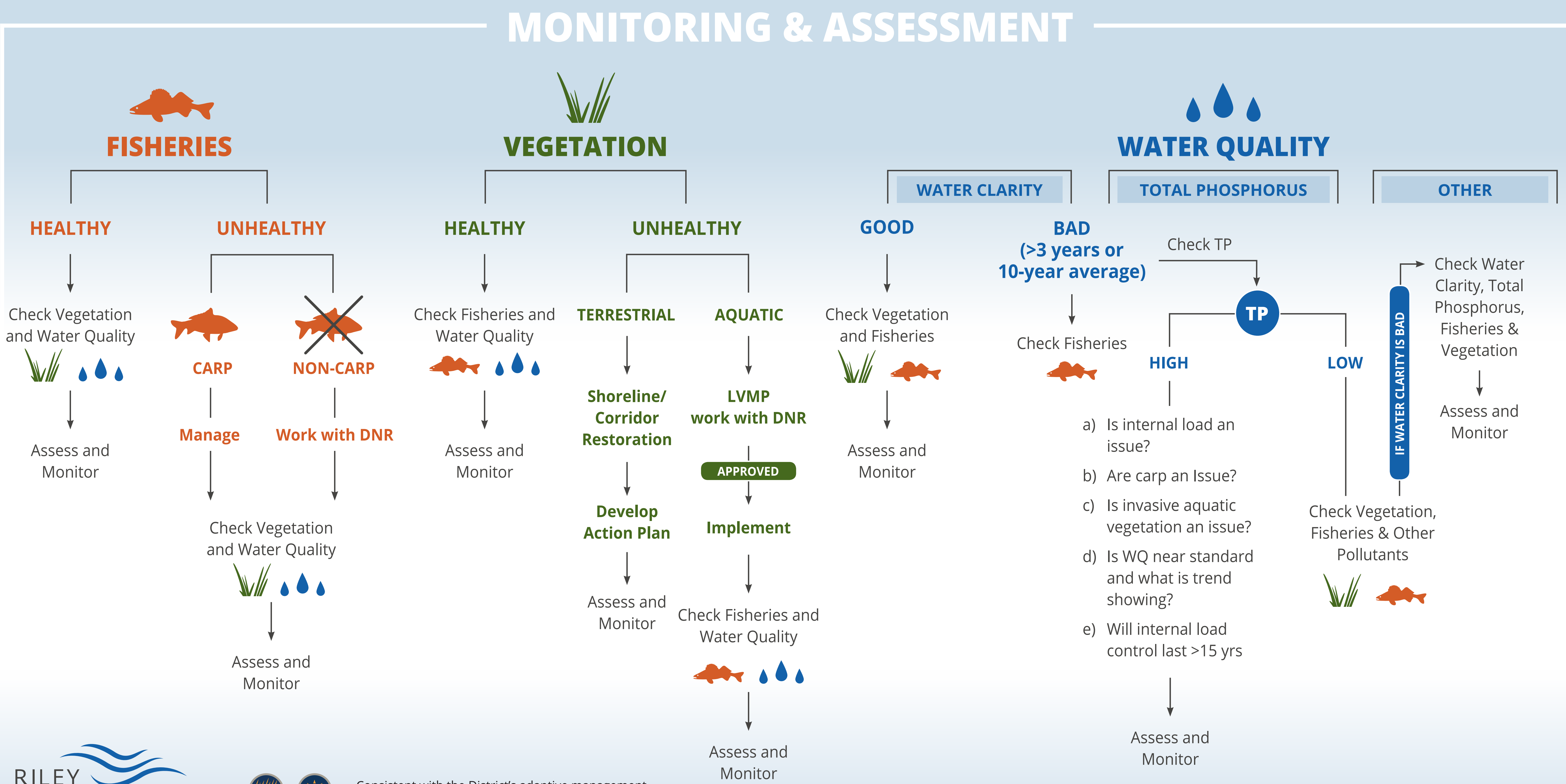
In implementing this Plan, the District will expand its emphasis on the role of ecological indicators in overall lake health, as well as the feedback mechanisms between these indicators (e.g., aquatic plant index of biological integrity (IBI)., fish IBI, lakeshore habitat assessments, etc.). The District's 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



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.

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 coordinating with MDNR, operating the Rice Marsh Lake winter aeration system, conducting fish survey, leading carp seining efforts, etc.

9.1.1.2 Vegetation

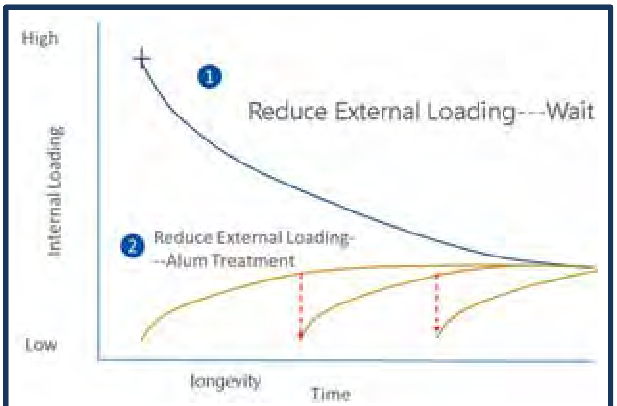
The District will continue to partner with the University of Minnesota to futher the District's understanding on ecological restoration in our lakes. This partnership is beneficial as it helps determine the health of our aquatic plants, which has been identified as key element in lake management. It 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.



Conducting internal phosphorus reduction measures to greatly reduce sediment phosphorus release and recycling while continuing to address external sources of phosphorus load improves the potential to achieve the water quality goals and standards over both the short term and long term (approach 2 shown above). It also has the potential to be more cost-effective than only implementing watershed BMPs.

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

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.

CONTINUE MONITORING

- Assess Temporal Changes
- Preserve High-Quality Areas

Identify Problems & Solutions (Examples)

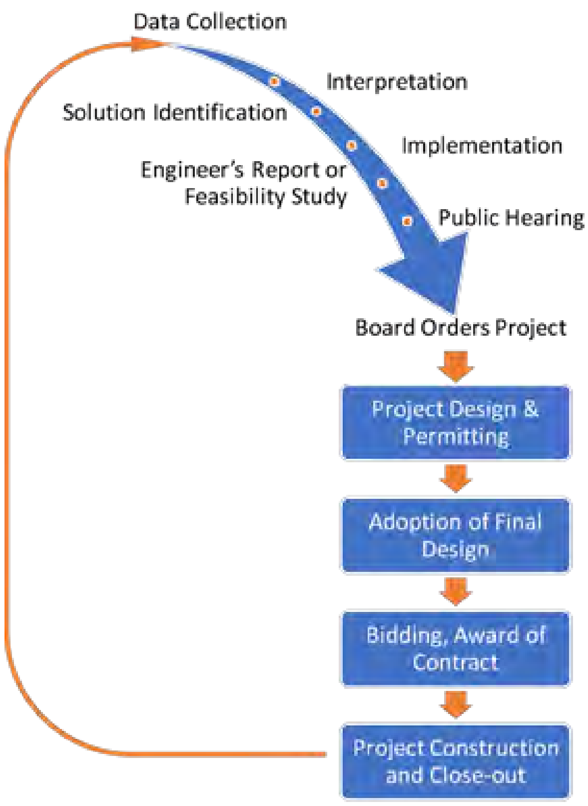
Increased Water Volume	Increase Watershed Storage/Stormwater Ponds
Severe Erosion	Perform Stream Stabilization
Poor Water Quality	Construct Treatment System
Degraded Habitat	Create Wildlife Corridor/Install In-stream Habitat
Failing Infrastructure	Repair/Replace/Improve

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

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

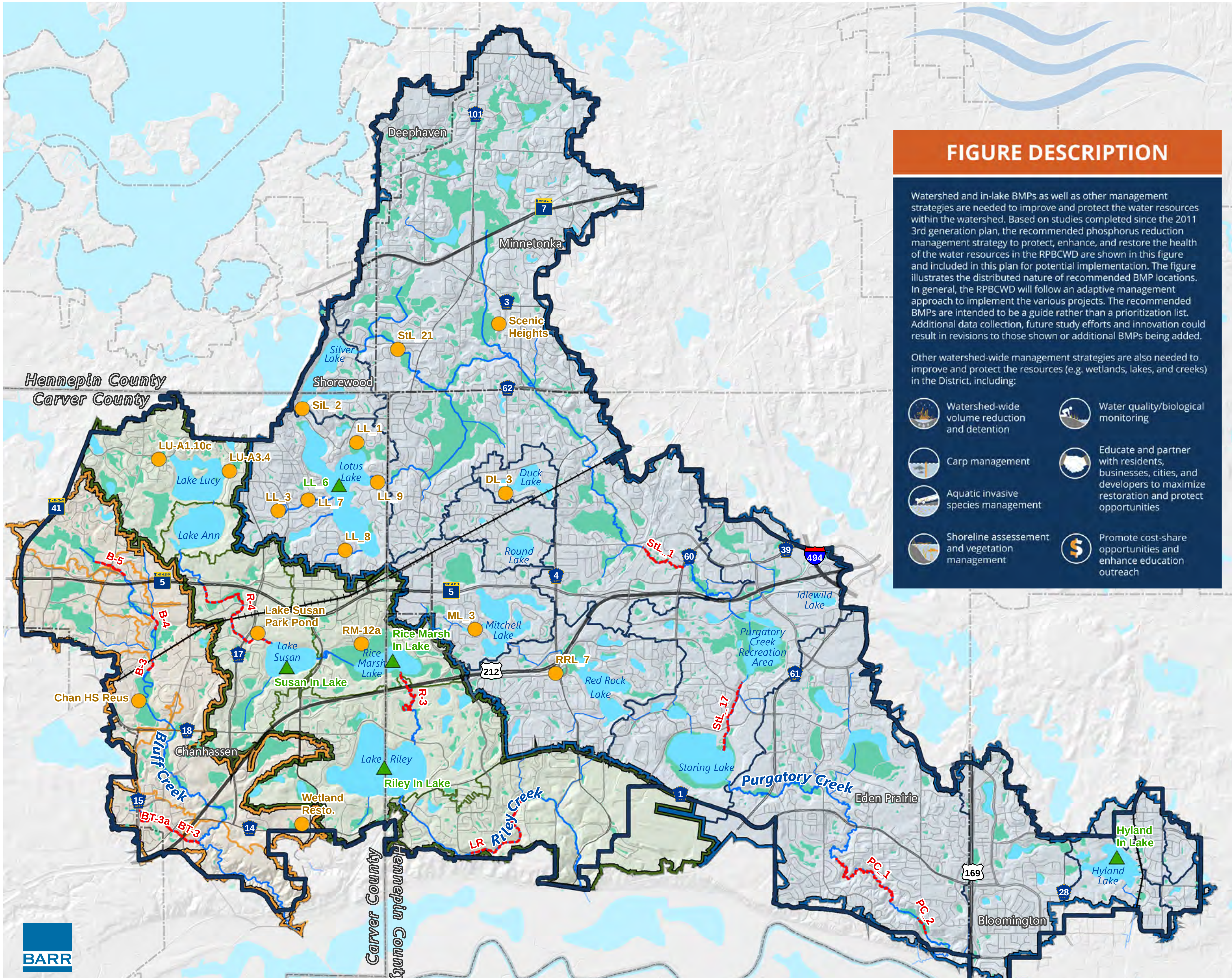


FIGURE DESCRIPTION

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 RPBCWD 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 RPBCWD 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 assessement 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
- Wetlands
- District Legal Boundary
- Municipalities

N

0 1 2
Miles

RILEY PURGATORY BLUFF CREEK **WATERSHED DISTRICT**

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 iInvasive 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 in 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 programing.

- **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)	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. WQual S3. The District encourages cities and developers to seek opportunities to incorporate habitat protection or enhancement into development and redevelopment projects. WQual S6. The District will seek opportunities to establish and preserve natural corridors for wildlife habitat and migration. WQual S7. The District will promote the use of natural materials and bioengineering for the maintenance and restoration of shorelines and streambanks where appropriate. WQual S11. The District recognizes the multiple benefits of vegetated buffers and promotes the use of vegetated buffers around all waterbodies. 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. 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. WQual S15. The District will cooperate with other entities to investigate treatment effectiveness of emerging practices.
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)	WQuan S1. The District will preserve and enhance the natural function of the floodplain and maintain floodplain storage volume. WQuan S2. The District will promote strategies that minimize baseflow impacts. 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. 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. 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.

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.

> **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)

- 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.

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

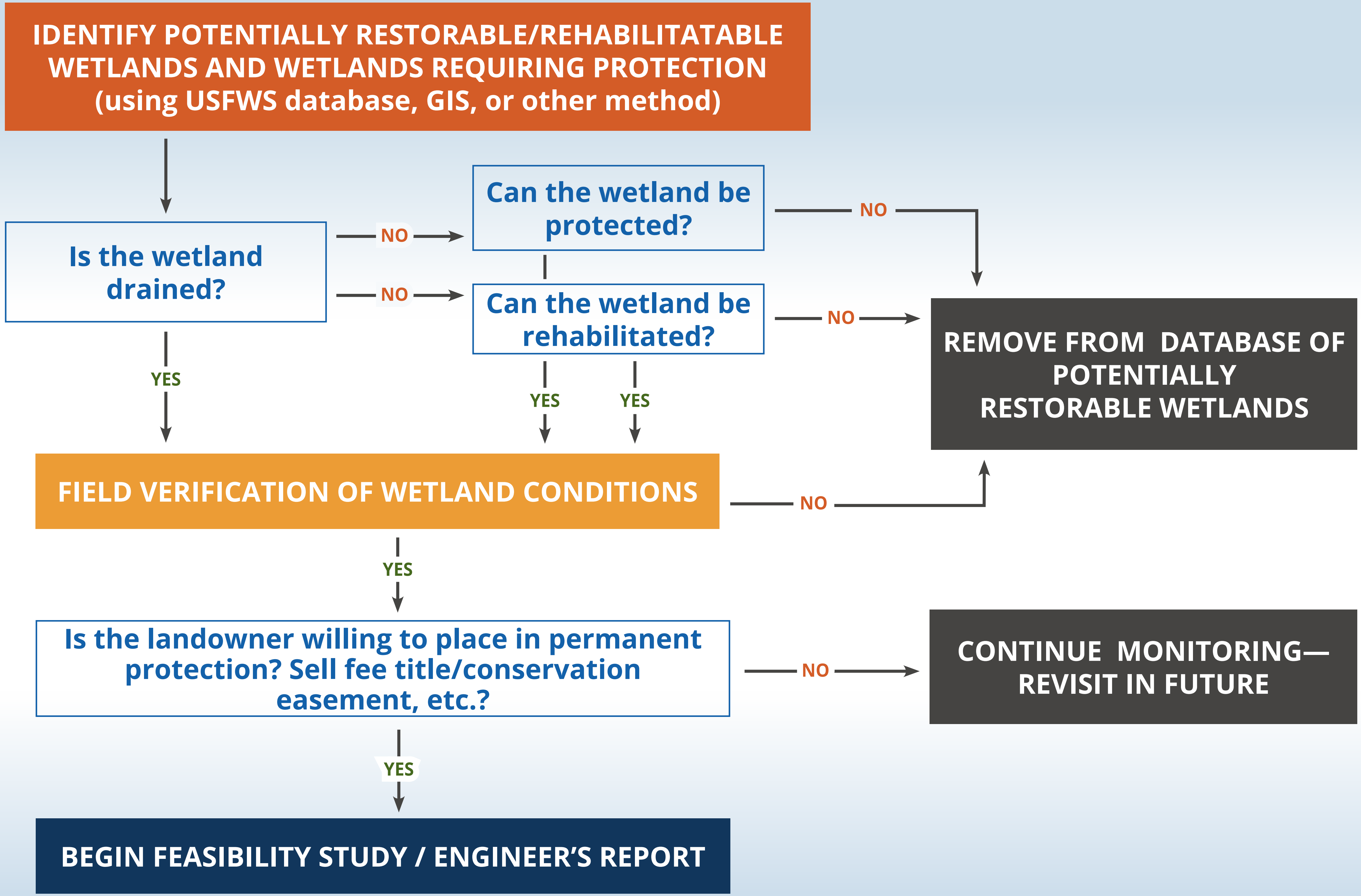
Several of the communities served by the District have developed wetland protection programs. In conjunction with these programs, the Minnesota Routine Assessment Methodology for Evaluating Wetland Functions (MnRAM) was used to assess the quality of wetlands based upon their functions and values. These 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.

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

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://metrocouncil.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

ASSESS ⟷ IDENTIFY GAPS ⟷ MONITOR

MODELING

DETERMINE GROUNDWATER BUDGET WORKING WITH AGENCIES

CREEKS

DIVERSION LIMIT ≥ 10–15% BASE FLOW

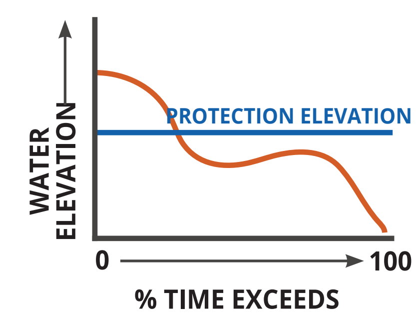
YES → MONITOR & ASSESS

NO → IDENTIFY, PRIORITIZE, AND IMPLEMENT SOLUTIONS

LAKES

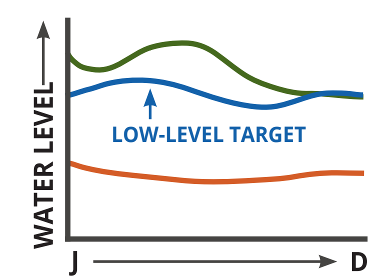
FREQUENT DISCHARGE — YES → DIVERSION LIMIT ≥ 10–15% BASE FLOW

INFREQUENT DISCHARGE



WETLANDS

ACHIEVING TARGET HYDROGRAPH



YES → MONITOR & ASSESS

NO → IDENTIFY, PRIORITIZE, AND IMPLEMENT SOLUTIONS

IDENTIFY, PRIORITIZE, AND IMPLEMENT SOLUTIONS

MONITOR & ASSESS

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.

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.

10.0 Evaluation

In order to most effectively implement the plans described in this section, the District must carry out a comprehensive assessment of its performance on a routine basis. Through this assessment, the District will monitor its technical performance and progress on implementation of its plan. For this reason, the District has created two “scorecards” to monitor its performance over the course of this plan. The first is oriented around BWSR requirements through the “PRAP” program while the second is focused on efforts as directed by this Plan. More information on each scorecard is provided below.

10.1 BWSR Performance Review and Assistance Program (PRAP)

Minnesota Statutes section 103B.102, subdivision 3, requires BWSR to prepare “an analysis of local water management entity performance” each year. To fulfill this mandate, BWSR developed the Performance Review and Assistance Program (PRAP) to track the general performance of all local governmental units involved in local soil and water conservation and management. BWSR developed a list of performance standards for metro watershed districts (see Appendix G for a draft copy of the scorecard). The basic standards are assessed annually by BWSR, while a more detailed review is conducted by BWSR once every five years. This District will monitor all activities on the BWSR scorecard on an annual basis as a means to simplify and facilitate the BWSR five-year review. At minimum, this annual review will cover PRAP “Level I Annual Compliance.” However, the District intends to review and report against the entire PRAP checklist on an annual basis to be prepared for future BWSR staff review.

10.2 District Plan Implementation Report Cards

This Plan creates a framework that provides the basis for all District activities. Accordingly, the District will develop report cards to measure its progress based on the goals and strategies identified in Section 3.0. In addition, the District will assess progress toward implementing the Plan. As part of the assessment, the District plans to provide information relative to project status and timing.

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Appendices

Appendix A Public and Stakeholder Participation

Public Engagement Strategy for the 10-Year Plan Update

TIMELINE OF ACTIONS

Notified cities and agencies that the District was beginning the 10-Year Plan Process (**January 2016**)

- The cities of Eden Prairie and Minnetonka, the Minnesota Department of Natural Resources, the Metropolitan Council, and the Board of Water and Soil Resources submitted letters of comment.[i]

Launched survey and began promotion of public input meetings (**February 2016**)

- **Notified:** Newsletter list-serve, City & Agency Contacts, Lake Associations, Cost-share recipients, Volunteers, Citizens Advisory Committee, Master Water Stewards.
- **Feb 16 -** Press release sent, picked up by Eden Prairie News[ii]
- **Feb 20** – Promoted at Bloomington Home Expo
- **March 12** – Promoted at Shorewood Garden Fair & Izaak Walton League Watershed Summit
- **March 19** – Promoted at Eden Prairie Expo
- **March 31** – Tabled at Carver County Library
- **March 31** – Published an insert in the Sun Sailor (Minnetonka & Bloomington; 10,200 copies) and the Eden Prairie News and Chanhassen Villager (14,500 copies)[iii]
- **April** – Distributed surveys and public input flyer to local library
- **April 10** – Promoted at the Timber Lake Association Meeting
- **April 12** – Tabled at the Chanhassen Recreation Center
- **April 23** – Promoted at the Urban Waters Forum
- **April 25** – Promoted at the Lake Riley Improvement Association Annual Meeting
- **May 3** – Second Press release sent, picked up by Eden Prairie News and Chanhassen Villager[iv]
- **May 3** – Promoted at the Evening with the Watershed
- **May 7** – Promoted at the Arbor Day Walk & Eco Fun Fest at Round Lake Park, Eden Prairie
- **General** – Promoted on social media[v]

Conducted Committee and Staff Workshops[vi]

- **March 21** – Citizens Advisory Committee
- **March 23** – Technical Advisory Committee
- **April 11** – Board & Staff

Conducted Public Input Meetings

- **May 11** – Bluff Creek Watershed
- **May 18** – Riley Creek Watershed

- **May 24** – Purgatory Creek Watershed

Analyzed Input Workshops/Meetings

- **June-July** Transcribed, coded, and summarized data[vii]
- **July 22-29** Solicited participant feedback on coding
- **Aug 3** Incorporated participant feedback into coding[viii]

Analyzed public survey & communicated results to the public

- **July-August** Analyzed and summarized survey data
- **Sept 1** Published data and summary on website & social media; distributed to cities and other partners; placed a summary ad in the Sun Sailor, Sun Current, Eden Prairie News, and Chanhassen Villager.[ix]
- **Sept-ongoing** Distributed summary fliers at events and onsite.

Engaged public in a "Watershed Outreach Workshop", a community conversation about education and outreach

- **Oct 24** Distributed a news release about the event to local papers and cities.[x]
- **Oct-Nov** Invited stakeholders to participate through email, physical letters, social media, and in-person conversations. Groups included: conservation organizations, homeowner's associations, lake associations, city commissions, teachers, students, and the Citizen's Advisory Committee.
- **Nov 10** Placed an ad in the Sun Sailor, Sun Current, Eden Prairie News, and Chanhassen Villager.[xi]
- **Nov 17** Held the event.
- **Nov – December** Summarized data. Solicited participant feedback and incorporated it[xii]
- **Dec 2016 – Feb 2017** Engaged local teachers with a survey to identify resources to support them in teaching on water resource topics.
- **2017 Jan – June 2017** Homogenizing coding of all education related comments from all seven workshops. These data were be used to craft the education and outreach plan.

Preview of the 10-year plan at annual watershed tour (July 31, 2017)

- Local leaders and members of the public were invited to take part in our watershed tour
- Focus of the tour highlighted the main goals created through the public process
- More then 60 people attended

Engage public in review of draft plan

- **Fall 2017**
  - Post in local papers/website/social media to invite community to participate in reviewing the draft plan.
  - Post in local paper/website/social media to invite community to the public hearing.

    - Host an informational meeting and a public hearing to engage the community in reviewing and commenting.

- **Spring 2018** Post in local papers/website/social media to introduce the final adopted plan to the community, and invite them to continue to engage with the district

Footnote References:

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[i] Comments from cities and agencies – please see end of this appendix.

[ii] Press release sent to news agencies on February 8th, 2016

Wanted: Your Thoughts and Ideas for Lakes and Streams in your Community
Watershed District seeks community input on the health of water resources

Is there a lake, creek, or wetland in your community that you love and want to take care of? How about a water body that you are worried about? Do you fight with erosion or flooding at your home? The Riley Purgatory Bluff Creek Watershed District wants to hear from you.

The Watershed District is a local organization with a mission of protecting, managing, and restoring the waters in our community. The district's actions are guided by a board of managers, regular residents committed to improving the health of our lakes, creeks, wetlands, and groundwater. The District is made up of three separate watersheds - Bluff Creek, Purgatory Creek, and Riley Creek – and includes over a dozen lakes like Ann, Duck, Lotus, and Susan. The district is starting to update its water management plan, a document that guides its actions over 10 years. And we want to know what you think. Residents and businesses can share their thoughts and concerns through a quick and simple online survey at www.rpbcwd.org, and at three community meetings in May, one for each watershed.

"The foundation of a great plan is great information" says Board President Perry Forster. "And so we need to hear from you, the District's residents, about what is important to you. Take the survey, come to a meeting, or both. Help us craft a plan to protect the water resources you care about." Jim Boettcher, a resident and member of the Citizens Advisory Committee, cares about Lake Susan in Chanhassen. "I worry about the pollution from rainwater runoff, phosphorous and sediment, that enters Lake Susan. I think pollution like this is the biggest concern facing our lakes and streams in the watershed district." What do you think is the biggest concern our water resources face? Have your voice heard by taking the survey and attending one of the public meetings.

The Riley Purgatory Bluff Creek Watershed District covers parts of Bloomington, Chanhassen, Chaska, Deephaven, Eden Prairie, Minnetonka, and Shorewood. To see a map of the District, find out more about the watershed planning process, answer survey questions, or find out how you can get involved, visit the District website: www.rpbcwd.org. You can also contact the District Administrator, Claire Bleser, at cbleser@rpbcwd.org or 952-607-6512.

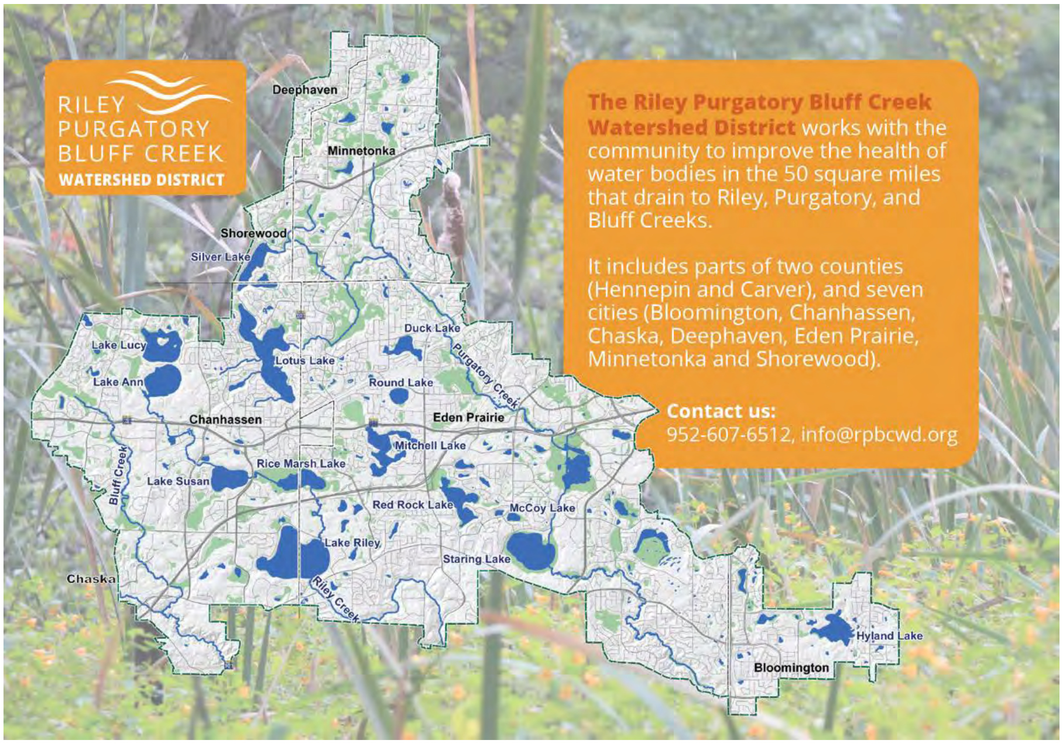
Watershed meeting details:

- Bluff Creek Watershed – May 11, 6:30-8:30 pm. Chanhassen Recreation Center. 2310 Coulter Blvd, Chanhassen MN 55317

- Riley Creek Watershed – May 18, 6-8 pm. Chanhassen Public Library. 7711 Kerber Blvd, Chanhassen, MN 55317

Purgatory Creek Watershed – May 24, 6:30-8:30 pm. Eden Prairie Community Center. 16700 Valley View Road. Eden Prairie, MN 55346

[iii] Insert published in local papers on March 31, 2016



[iv] Press release sent to news agencies on April 28, 2016

Speak up for clean water

Attend a watershed summit this May, and share your thoughts and concerns about water resources in your community

Is there a lake, creek, or wetland in your community that you love and want to take care of? How about a water body that you are worried about? Do you fight with erosion or flooding at your home? The Riley Purgatory Bluff Creek Watershed District wants to hear from you.

The Watershed District is a local organization with the mission of protecting, managing, and restoring the waters in our community. The district's actions are guided by a board of managers, regular residents committed to improving the health of our lakes, creeks, wetlands, and groundwater. The district is starting to update its water management plan, a document that guides its actions over 10 years, and we want to know what you think.

To that end, the district is holding three watershed summits, one for each of the three watersheds in its boundaries (Riley Creek, Purgatory Creek, Bluff Creek). The Riley Creek Watershed includes Lakes Ann, Lucy, Riley, Rice Marsh, and Susan. The Purgatory Creek Watershed includes eight lakes: Duck, Hyland, Idlewild, Lotus, Mitchell, Red Rock, Round and Silver. All three watersheds have many acres of wetlands and important groundwater sources.

At these summits, you'll hear updates about the work the district has been doing, and have an opportunity to share your concerns about water resources. You are welcome to attend any of the meetings. Help us plot a course for clean water in our community.

Watershed summit details:

- Bluff Creek Watershed – May 11, 6:30-8:30 pm. Chanhassen Recreation Center. 2310 Coulter Blvd, Chanhassen MN 55317
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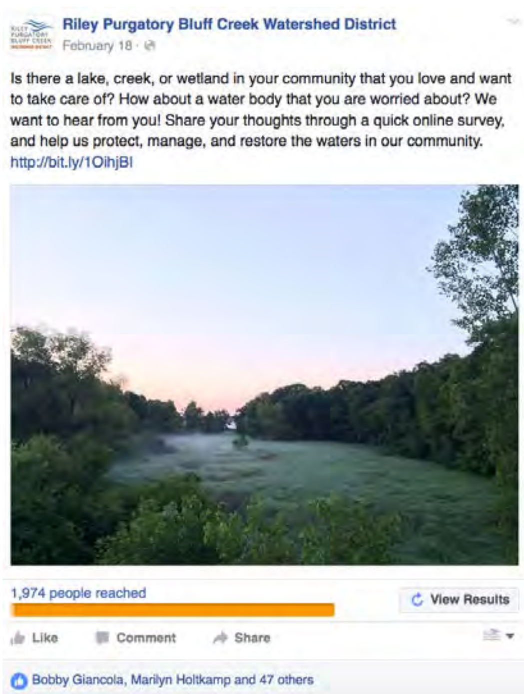
[v] Examples of social media promotions throughout campaign.

Facebook



Riley Purgatory Bluff Creek Watershed District
April 26

The Evening with the Watershed is next week! Join us May 3rd, 7 pm, at the Chanhassen American Legion for an evening of water education and stewardship.

Evening with the Watershed - May 3
The Riley Purgatory Bluff Creek Watershed District would like to invite you to the annual spring Evening With the Watershed, Tuesday May 3rd, 7 pm, at the Chanhassen American Legion (290 Lake Drive E, Chanhassen, MN 55317).
RPBCWD.ORG

2,648 people reached   View Results

Riley Purgatory Bluff Creek Watershed District
May 18 at 1:07pm

Speak up for clean water tonight! Join us for the Riley Creek Watershed Summit, and share your concerns about clean water in our community. The Riley Creek Watershed includes not just the creek, but Lakes Ann, Lucy, Susan, Rice Marsh and Riley, many acres of wetland, and groundwater. Tonight, 6 p.m., Chanhassen Library. Details: http://bit.ly/27An0bF

Twitter

RileyPurgBluff WD @RPBCWD · Feb 19
We'll be at the Bloomington Home Improvement Fair tomorrow. Visit us and take our watershed survey in person! info

Bloomington Home Improvement Fair
The City of Bloomington will host its 12th Home Improvement Fair on February 20, 2016 from 9:30 a.m. to 2:30 p.m. at Bloomington Civic Plaza.
bloomingtonmn.gov

RileyPurgBluff WD @RPBCWD · Mar 13
Continue the conversation by taking our survey about our waters at rpbcwd.org

RileyPurgBluff WD @RPBCWD · Apr 14
Check out our upcoming events, including opportunities to speak up for clean water and make your voice heard - eepurl.com/bRdixT

RileyPurgBluff WD @RPBCWD · May 12
We heard some powerful ideas at our Bluff Creek Summit last night, join us May 18th to share your thoughts on the Riley Creek Watershed

RileyPurgBluff WD @RPBCWD · Mar 12

1st kayaker of the season on duck lake!
Take our survey to tell us what you think
rpbcwd.org

RileyPurgBluff WD @RPBCWD · May 23

There is still time to make your voice heard, stop by our watershed summit tomorrow, May 24 - eepurl.com/b2SaPf

[vi] Conducted Board, Committee, Staff, and Public Input meetings

Six issue identification meetings were held: 1) Board & Staff, 2) Technical Advisory Committee, 3) Citizens Advisory Committee, 4) Public Input: Purgatory Creek Watershed, 5) Public Input: Bluff Creek Watershed, 6) Public Input: Bluff Creek Watershed.

All six meetings were conducted under the same format. They began with a brief introduction to the Watershed District and the work it does, modified depending on the familiarity of the group with the district. Participants were then broken into small groups (3-6) people and each group was assigned a water resource type: Lakes, Creeks, Wetlands, Groundwater, and Other. Groups were asked to share their concerns about their resource, and to write them down on a large piece of paper. The “other” group was included to catch anything that might not fit specifically into one of the water resources types.

Groups then moved on to another resource type. They were asked to star comments that the group before them made that they agreed with, and to add additional concerns. This continued until all participants commented on each type.

Afterward, a short presentation was given on how the district currently prioritizes projects across all three watersheds and among resources. The small groups were then asked to discuss and write down the criteria criteria strategies they thought would be most effective in prioritizing projects.

All of the papers were collected, and transcribed for analysis.

[vii]Analyzed Input Workshops/Meetings: Transcribed, coded, and summarized data

Board & Staff Workshop

#	Comment	Group	Category	Sub-category 1	Sub-category 2
1	Interaction between resources and public interaction with resources (public trails, wildlife viewing, etc.)	Creeks	Education/ Outreach	Awareness	Recreation
2	Education and increased interaction of upland residents with resources	Creeks	Education/ Outreach	Public Engagement	
3	Help citizens engage with creeks	Creeks	Education/ Outreach	Building Capacity	
4	Flooding because of climate change: how flooding is predicted to occur. Changes in hydrology	Creeks	Planning	Climate Change	
4	Flooding because of climate change: how flooding is predicted to occur. Changes in hydrology	Creeks	Water Quantity	Hydrology/ Hydraulics	Flood Control
5	Consider drought years	Creeks	Planning	Climate Change	
6	Reduce chloride levels: use of BMP's and education	Creeks	Water Quality	Pollution	Chloride
7	Restoring creeks to more natural conditions. Stabilizing banks where possible.	Creeks	Water Quality	Habitat	Green Corridors
8	Green corridor: less habitat fragmentation	Creeks	Water Quality	Habitat	Green Corridors
9	Healthy habitat to promote native species	Creeks	Water Quality	Habitat	Native Species
10	Creek nutrient standards	Creeks	Water Quality	Pollution	Nutrients
11	Reduce erosion, sedimentation, nutrients (Total phosphorus) and pollutants (pesticides, heavy metals, fertilizers)	Creeks	Water Quality	Pollution	
11	Reduce erosion, sedimentation, nutrients (Total phosphorus) and pollutants (pesticides, heavy metals, fertilizers)	Creeks	Water Quality	Erosion	
12	Healthy creeks = healthy lakes and a healthy MN river	Creeks	Water Quality		
13	Groundwater/creek interaction	Creeks	Water Quantity	Hydrogeolog y	Base flow
14	Capture, retain and filter water where it falls	Creeks	Water Quantity	Hydrology/ Hydraulics	Infiltration
15	Water infiltrating where it lands	Creeks	Water Quantity	Hydrology/ Hydraulics	Infiltration
16	Understand why erosion occurs and maintain baseflow/flow boundaries. Ravine erosion and tracking changes of erosion.	Creeks	Water Quantity	Erosion	
17	The real cost of water: take advantage of research on the resource. Assign a realistic value of groundwater	Groundwate r	Data Collection	Analysis/Stu dy	
18	Better system and record of new wells: managing new water use. Educate public on what is happening with groundwater.	Groundwate r	Data Collection	Modeling	
18	Better system and record of new wells: managing new water use. Educate public on what is happening with groundwater.	Groundwate r	Education/ Outreach	Awareness	

19	Education on watering/irrigation, and needs of the landscape	Groundwater	Education/ Outreach	Awareness	Water Conservation
20	Education and outreach about importance of groundwater: 10000 year old water used to water lawns, taken for granted.	Groundwater	Education/ Outreach	Awareness	
21	Protect groundwater from pollution: nitrates, chlorides. Establish protection areas	Groundwater	Water Quality	Pollution	Chloride
21	Protect groundwater from pollution: nitrates, chlorides. Establish protection areas	Groundwater	Water Quality	Pollution	Nitrate
22	Larger scale water retention systems: development in brown fields	Groundwater	Water Quality	Pollution	
23	Surface water and groundwater interaction and connectivity: understanding the resource	Groundwater	Water Quantity	Hydrogeology	Base flow
24	Creek baseflow from groundwater/retention times	Groundwater	Water Quantity	Hydrogeology	Base flow
25	Promote sustainable landscape and land use to conserve groundwater: capture, retain and let water infiltrate where it falls (recharge). Drought-tolerant plants use less groundwater	Groundwater	Water Quantity	Hydrogeology	Sustainability
26	Engage landowners in responsible and sustainable water use	Groundwater	Water Quantity	Hydrogeology	Sustainability
27	Water use systems (sustainable): rain barrels, soil moisture and precipitation sensors	Groundwater	Water Quantity	Hydrogeology	Sustainability
28	Water use restriction: lawn watering and drip irrigation	Groundwater	Water Quantity	Hydrogeology	Sustainability
29	Invasive species control: how we identify invasive; monitoring; rapid response; reduce spread; education	Lakes	Data Collection	Resource Assessment	
29	Invasive species control: how we identify invasive; monitoring; rapid response; reduce spread; education	Lakes	Education/ Outreach	Stewardship	
30	Education of impact of our lakeshore on the resource: mowed grass to the shoreline	Lakes	Education/ Outreach	Awareness	Best Management Practices
31	Difference between lake types and management: education and ecology	Lakes	Education/ Outreach	Awareness	Ecosystems
32	People that don't see connection between various areas of the watershed	Lakes	Education/ Outreach	Awareness	Ecosystems
33	Population ownership changes on lakes: shore land district enforcement	Lakes	Education/ Outreach	Awareness	Regulation
33	Population ownership changes on lakes: shore land district enforcement	Lakes	Education/ Outreach	Audience	
34	Challenge to reach all users in watershed: non-pollutant sources	Lakes	Education/ Outreach	Audience	
35	Shoreline protection and improvement	Lakes	Regulation		
35	Shoreline protection and improvement	Lakes	Education/ Outreach	Stewardship	
36	Clear water creates more vegetation: how to manage, educate	Lakes	Education/ Outreach	Awareness	
36	Clear water creates more vegetation: how to manage, educate	Lakes	Water Quality	Habitat	

37	Understanding the water system through the watershed approach	Lakes	Planning	Prioritization	Watershed Benefits
38	One water: upstream to downstream	Lakes	Planning	Prioritization	Watershed Benefits
39	Lake use: managing for a specific or a variety of uses and role of watershed district vs. lake association	Lakes	Planning	Partnership	
40	Changes in lake dynamics and stratification due to warming temperatures, both negative and positive feedback loops	Lakes	Planning	Climate Change	
41	Maintaining lake levels during drought, baseflow during flood, excessive bounce	Lakes	Planning	Climate Change	
42	Building resiliency into the system	Lakes	Planning	Climate Change	
43	Shoreline buffers: shoreline erosion	Lakes	Water Quality	Erosion	
43	Shoreline buffers: shoreline erosion	Lakes	Water Quality	Habitat	Buffers
44	Carp management long term	Lakes	Water Quality	Habitat	Fisheries
45	Algae in lakes	Lakes	Water Quality	Habitat	
46	Reduction of various inputs: phosphorus, nitrogen, chlorides, pollutants of emerging concern, ecoli	Lakes	Water Quality	Pollution	
47	Interaction between groundwater and lake systems: change in Base flow	Lakes	Water Quantity	Hydrology/ Hydraulics	Base flow
48	Meeting educational needs w/limited resources	Other	Administrati on	Staff Capacity	
49	Workload and how to get it done: staff, volunteers, contractors. Balancing the work	Other	Administrati on	Staff Capacity	
50	Assessment of vulnerabilities of communities due to intense storms and drought	Other	Data Collection	Climate Change	
51	Promoting Low Impact Development	Other	Education/ Outreach	Awareness	Best Managem ent Practices
52	Promoting multiple benefits of Green Infrastructure/Low Impact Development/Redevelopment/Redevelopment/Redevelopment to communities	Other	Education/ Outreach	Awareness	Best Managem ent Practices
53	Use Train The Teacher to educate teachers in K-12	Other	Education/ Outreach	Building Capacity	School Education
54	Provide initiatives and outreach to go above and beyond regular requirements to achieve multiple benefits of GI/CID	Other	Education/ Outreach	Public Engagement	
55	Find ways to leverage resources: e.g- MWS, Adopt a Resource	Other	Education/ Outreach	Building Capacity	
56	Educate the public on Watershed District role in management of the entire system, not just lakes.	Other	Education/ Outreach		
57	School with Green Infrastructure use to educate	Other	Education/ Outreach	Building Capacity	
58	More citizen science: volunteers	Other	Education/ Outreach	Building Capacity	

59	Web as a resource for education: videos, online tools	Other	Education/ Outreach	Public Engagement	
60	Changing demographics: landownership, education	Other	Education/ Outreach	Audience	
61	Understanding current and future impacts to water and other natural resources due to climate change	Other	Planning	Climate Change	
62	Developing more public-public and private-private partnerships. Look for opportunities to collaborate	Other	Planning	Partnership	
63	Take advantage of regulatory program to educate and collaborate on projects	Other	Planning	Partnership	
64	Flood control for Atlas 14 and projected/predicted climate change	Other	Water Quantity	Hydrology/ Hydraulics	Flood Control
64	Flood control for Atlas 14 and projected/predicted climate change	Other	Planning	Climate Change	
65	How do we fund all the needed projects? Collaboration	Other	Planning	Partnership	
66	More opportunities for pollinators habitat and corridors	Other	Water Quality	Habitat	Green Corridors
67	Promoting greenways and corridors.	Other	Water Quality	Habitat	Green Corridors
68	Nitratelevels impacting storm water and groundwater, and pollution regulations	Other	Water Quality	Pollution	Nitrate
69	Shifting baselines in water quality standards	Other	Water Quality		
70	Lack of understanding of what the watershed does and what we can/can't do	Other	Education/ Outreach	Awareness	Regulation
70	Lack of understanding of the whole watershed system and connection with groundwater	Other	Water Quantity	Hydrogeolog y	Base flow
71	Finding balance with workload	Process	Administrati on	Staff Capacity	
72	Need citizens to buy in. Will need robust education for that to work.	Process	Education/ Outreach	Awareness	
73	Return on investment: cost-benefits analysis	Process	Planning	Prioritization	Cost-Benefit
74	Multiple benefits: will the project create multiple benefits?	Process	Planning	Prioritization	Multiple Benefits
75	Give multiple benefits project a high priority (triple bottom line)	Process	Planning	Prioritization	Multiple Benefits
76	Craft plan such that we can take advantage of new funding opportunities as they arise	Process	Planning	Prioritization	Partnershi p
77	Explore ways to get things done, and don't overlook	Process	Planning	Prioritization	Partnershi p
78	Collaboration with other agencies (stretch out money used in projects)	Process	Planning	Prioritization	Partnershi p
78	Collaborative opportunities with cities	Process	Planning	Prioritization	Partnershi p
79	Protection of water bodies with higher water quality is a top priority	Process	Planning	Prioritization	Sensitivity
80	Need to work with the societal pressures, how to balance what the science says and what the community wants	Process	Planning	Prioritization	Analysis/St udy

81	Research based solutions/science based project	Process	Planning	Prioritization	Analysis/Study
82	Justification: what does the science say?	Process	Planning	Prioritization	Water Quality
83	Short term vs. long term benefits	Process	Planning	Prioritization	Watershed Benefits
84	Upstream to downstream (wetlands)	Process	Planning	Prioritization	Watershed Benefits
85	One water approach: upstream and downstream	Process	Planning	Prioritization	Watershed Benefits
86	Utilize collaborations, including grant funding on state, federal and local levels.	Process	Planning	Partnership	
87	Addressing citizen desire for perceived equity	Process	Planning	Prioritization	
88	More systematic weighting system across all watersheds (equity)	Process	Planning	Prioritization	
89	Community/social needs should be a factor: issues with equity	Process	Planning	Prioritization	
90	Wetlands are connected to our water resources (creeks/lakes). Mapping wetland drainage/connection to our water resources	Wetlands	Data Collection	Inventory	
91	Paleoenvironmental reconstruction of our wetlands to identify shifting baselines: research	Wetlands	Data Collection	Analysis/Study	
92	Educate about wetlands supporting a wide variety of wildlife and plant life	Wetlands	Education/ Outreach	Awareness	Ecosystems
93	Wetlands are our sponges/filters	Wetlands	Education/ Outreach	Awareness	Ecosystems
94	Need more education on wetland functions and benefits	Wetlands	Education/ Outreach	Awareness	Ecosystems
95	Need a wetland inventory and assessments	Wetlands	Data Collection	Inventory	
95	Need a wetland inventory and assessments	Wetlands	Education/ Outreach	Awareness	
96	Increase temperatures due to climate change drying up subsidence	Wetlands	Planning	Climate Change	
97	Protect cranberry bogs and wild rice	Wetlands	Regulation		
98	Protect existing high-quality wetlands	Wetlands	Regulation		
99	Protect functional values of wetlands	Wetlands	Regulation		
100	Encroachment by development, lack of buffers	Wetlands	Water Quality	Habitat	Buffers
101	Great buffers	Wetlands	Water Quality	Habitat	Buffers
102	Changes in connectivity due to development: green corridors	Wetlands	Water Quality	Habitat	Green Corridors
103	Restore degraded wetlands	Wetlands	Water Quality	Habitat	
104	Part of healthy hydrological system: healthy wetlands=healthy creeks=healthy lakes= good quality groundwater	Wetlands	Water Quality	Habitat	
104	Part of healthy hydrological system: healthy wetlands=healthy creeks=healthy lakes= good quality groundwater	Wetlands	Water Quality		
105	Lack of diversity in vegetation supports less wildlife and aquatic invertebrates	Wetlands	Water Quality	Habitat	

106	Old tile diverting water away from wetlands	Wetlands	Water Quantity	Hydrology/ Hydraulics	
107	Need policies to protect capacity of wetland for storage	Wetlands	Water Quantity	Hydrology/ Hydraulics	
108	Changes in hydrology and bounce: timing and duration	Wetlands	Water Quantity	Hydrology/ Hydraulics	
109	Identify changes in connectivity between wetlands and creeks	Wetlands	Water Quantity	Hydrology/ Hydraulics	
110	Leverage functions for better storage capacity	Wetlands	Water Quantity	Hydrology/ Hydraulics	
111	Water management	Wetlands	Water Quantity	Hydrology/ Hydraulics	

CAC Workshop

#	Comment	Group	Category	Sub-category 1	Sub-category 2
1	Manage trails/park land by creeks	Creeks	Education/ Outreach	Stewardship	Recreation
2	What is happening with fish in creeks?: varying depths; are there fish?	Creeks	Education/ Outreach	Awareness	
3	Who controls redirecting creeks?: straight vs. meandering; plants vs. rip wrap	Creeks	Education/ Outreach	Awareness	
4	Education	Creeks	Education/ Outreach		
5	"Ignorant" homeowners; not their jobs: not fertilizing; rake leaves/grass clippings into creek	Creeks	Education/ Outreach	Awareness	Best Management Practices
6	What to do with creeks that are dry part of the year	Creeks	Education/ Outreach	Awareness	
7	Effects of climate change	Creeks	Planning	Climate Change	
8	Missing Buffers and floodplains	Creeks	Water Quality	Habitat	Buffers
9	Native plant buffers	Creeks	Water Quality	Habitat	Buffers
10	Amount of development along creek	Creeks	Water Quality	Habitat	Development/ Redevelopment
11	Fish ladders/barriers	Creeks	Water Quality	Habitat	Fisheries
12	Erosion: who helps control it and how?	Creeks	Water Quality	Erosion	
13	"Stuff" going down the creek into the river (silt)	Creeks	Water Quality	Pollution	
14	Deteriorating infrastructure	Creeks	Water Quantity	Hydrology/ Hydraulics	Infrastructure
15	Is ground water being polluted? By agriculture? By manufacturing?	Groundwater	Data Collection	Resource Assessment	
16	Who is monitoring wells?	Groundwater	Education/ Outreach	Awareness	Regulation
17	Who is monitoring heavy users?	Groundwater	Education/ Outreach	Awareness	Regulation
18	Arsenic in groundwater resources: Who is monitoring and how do people know if there well is impacted?	Groundwater	Education/ Outreach	Awareness	Regulation

19	Who manages aquifers?: role of watershed/city/state	Groundwater	Education/ Outreach	Awareness	Regulation
20	Define aquifers being used: age of recharge water	Groundwater	Education/ Outreach	Awareness	
21	Public knowledge: lack of responsibility by any agency and public doesn't know anything	Groundwater	Education/ Outreach	Awareness	
22	Where is our drinking water coming from?	Groundwater	Education/ Outreach	Awareness	
23	What motivates someone to care about groundwater?	Groundwater	Education/ Outreach	Stewardship	
24	Label storm drains	Groundwater	Education/ Outreach	Stewardship	
25	How much groundwater are we using? Is it monitored?	Groundwater	Education/ Outreach	Awareness	
26	Plans to increase infiltration/recharge	Groundwater	Planning		
27	Are there rules to control heavy users?	Groundwater	Regulation		
28	Potential depletion: how is this resource faring? Minimize use (lawn irrigation)	Groundwater	Water Quantity	Hydrogeology	
29	Boating/navigability	Lakes	Education/ Outreach	Awareness	Recreation
30	Residents make illegal sand blankets and dump algaecide	Lakes	Education/ Outreach	Awareness	Regulation
31	Education of residents	Lakes	Education/ Outreach		
32	Citizen misconception	Lakes	Education/ Outreach	Awareness	
33	Cost/benefit analysis	Lakes	Planning	Prioritization	Cost-Benefit
34	How to prioritize lake projects	Lakes	Planning	Prioritization	
35	Safe eating (fish): fish health	Lakes	Water Quality	Habitat	Fisheries
36	AIS	Lakes	Water Quality	Habitat	Invasive Species
37	Shoreline erosion: amount of silt buildup on Duck lake and Susan Lake; Buffer silver lake; requirements?	Lakes	Water Quality	Erosion	Stabilization
38	Closing for high water or no wake	Lakes	Water Quality	Erosion	
39	Sewer lines and management/septic tank monitoring/storm sewers	Lakes	Water Quality	Pollution	
40	Safe swimming	Lakes	Water Quality	Pollution	
41	Appearance/green algae/blue-green algae	Lakes	Water Quality	Habitat	
42	Depth	Lakes	Water Quality		
43	Clarity	Lakes	Water Quality		
44	Turbidity	Lakes	Water Quality		
45	Odor	Lakes	Water Quality		
46	Storm water runoff: pollution	Lakes	Water Quality	Pollution	
47	Wildlife health?	Lakes	Water Quality	Habitat	
48	Recreation vs. water clarity	Lakes	Water Quality		
49	Lake levels	Lakes	Water Quantity		
50	Threats: lack of funding; lack of public understanding; deteriorating roads/infrastructure.	Other	Administration		

51	Concerns: new construction; impact of LRT; Educating lake home owners; Educating home owners in general- rain gardens, native plants, rain barrels. Cost sharing program.	Other	Education/ Outreach	Awareness	Best Management Practices
52	Threats: lack of funding; lack of public understanding; deteriorating roads/infrastructure.	Other	Education/ Outreach	Public Engagement	
53	Educating lake home owners; Educating home owners in general- rain gardens, native plants, rain barrels. Cost sharing program.	Other	Education/ Outreach	Cost-Share	
54	Issues: how money is determined for project; Prioritization; Bang for buck; cost benefit analysis; more public Education/ Outreach; partner with city and state-joint funding.	Other	Planning	Prioritization	Cost-Benefit
54	Issues: how money is determined for project; Prioritization; Bang for buck; cost benefit analysis; more public Education/ Outreach; partner with city and state-joint funding.	Other	Planning	Prioritization	Education/ Outreach
54	Issues: how money is determined for project; Prioritization; Bang for buck; cost benefit analysis; more public Education/ Outreach; partner with city and state-joint funding.	Other	Planning	Prioritization	Partnership
55	How to balance environmentalists vs. recreationists (needs/wants)	Other	Planning	Prioritization	Recreation
56	How good are we at partnering with cities and counties? DNR?	Other	Planning	Partnership	
57	Effects of climate change on all the resources	Other	Planning	Climate Change	
58	Threats: lack of funding; lack of public understanding; deteriorating roads/infrastructure.	Other	Water Quantity	Hydrology/ Hydraulics	Infrastructure
59	Have to monitor, where are we at, how do we get to next level, how much time/money will it cost	Process	Planning	Prioritization	Cost-Benefit
59	Have to monitor, where are we at, how do we get to next level, how much time/money will it cost	Process	Planning	Prioritization	Analysis/Study
60	Use cost-benefit analysis	Process	Planning	Prioritization	Cost-Benefit
61	Cost today vs. future cost	Process	Planning	Prioritization	Cost-Benefit
62	Self-sustaining vs. required maintenance	Process	Planning	Prioritization	Cost-Benefit
63	Potential for public education	Process	Planning	Prioritization	Education/ Outreach
64	Look at history; what has been done in the past; don't keep redoing or reusing solutions	Process	Planning	Prioritization	Effectiveness
65	How many goals will the project address?	Process	Planning	Prioritization	Multiple Benefits
66	More natural processes than man-made	Process	Planning	Prioritization	Natural Processes
67	Priority: 1. Partners available? Money Available? 2. Matching priority to keep the 'best" resources in " best" shape	Process	Planning	Prioritization	Partnership

67	Priority: 1. Partners available? Money Available? 2. Matching priority to keep the 'best" resources in " best" shape	Process	Planning	Prioritization	Sensitivity
68	Cost to district: priorities could be driven by available funds/partnerships	Process	Planning	Prioritization	Partnership
69	Proactive vs. reactive	Process	Planning	Prioritization	Sensitivity
70	Cost to protect and restore	Process	Planning	Prioritization	Sensitivity
71	Determine worst and best of each resource based on science: assessment strategy- Worst (rate) worst to best lake, worst to best creek, worst to best wetland, worst to best groundwater	Process	Planning	Prioritization	Water Quality
72	Look at what creates the best water resources as a whole water resource- creek feeds more sediment/nitrogen/phosphorous to the MN river, creek gets the money vs. the lack AIS; not based on population numbers	Process	Planning	Prioritization	Watershed Benefits
73	What are the criteria for the goals?	Process	Planning	Prioritization	
74	What end results are we looking for?	Process	Planning	Prioritization	
75	How to prioritize lake vs. creek vs. ground water v wetland	Process	Planning	Prioritization	
76	Did past projects work?	Process	Planning	Evaluation	
77	Accountability	Process	Planning	Evaluation	
78	How to improve with different resources and processes	Process	Planning	Prioritization	
79	Clear attainable end state: is the end state Different today than yesterday? Is there a different need today than yesterday?	Process	Planning	Prioritization	
80	Boundaries? Where do they start and end?	Wetlands	Data Collection	Inventory	
81	What is different between storm water pond vs. wetland?	Wetlands	Education/ Outreach	Awareness	Ecosystems
82	How does trading wetland acreage work correctly? Water are the rules?	Wetlands	Education/ Outreach	Awareness	Regulation
83	The natural evolution of wetland is prairie? How do we maintain them?	Wetlands	Education/ Outreach	Awareness	
84	Loss/protection of current wetlands	Wetlands	Regulation		
85	AIS and purple loosestrife, new and existing	Wetlands	Water Quality	Habitat	Invasive Species
86	Breeding grounds for carp/zebra mussels	Wetlands	water Quality	Habitat	Invasive Species
87	Health	Wetlands	Water Quality		
88	Stormwater	Wetlands	Water Quality	Pollution	
89	Sediment	Wetlands	Water Quality	Pollution	
90	Reduced effectiveness	Wetlands	Water Quality		
91	Adding wetlands: do we have enough? Expanding rain gardens and infiltration basin	Wetlands	Water Quality	Habitat	
92	Pollution: runoff of salt and sand	Wetlands	Water Quality	Pollution	

93	Manage wildlife habitat	Wetlands	Water Quality	Habitat	
94	Wildlife and impact of damaged wetlands: birds, amphibians, dragonflies	Wetlands	Water Quality	Habitat	
95	Hybrid cattails: do we address them?	Wetlands	Water Quality	Habitat	
96	Dumping trash	Wetlands	Water Quality	Pollution	

TAC Workshop

#	Comment	Group	Category	Sub-category 1	Sub-category 2
1	ID navigable water trails and maintain for paddling	Creeks	Education/ Outreach	Recreation	Access
2	Public engagement and outreach: adopt a creek program; drainage mapping "local;" increase visibility of creeks	Creeks	Education/ Outreach	Public Engagement	
3	Report and share success	Creeks	Education/ Outreach	Public Engagement	
4	Creek restoration action strategy: use for prioritization	Creeks	Planning	Prioritization	Analysis/Study
5	Flood plain with Atlas 14 updates: seamless permitting; compliant/safe development' infrastructure upgrades	Creeks	Regulation		
5	Flood plain with Atlas 14 updates: seamless permitting; compliant/safe development' infrastructure upgrades	Creeks	Water Quantity	Hydrology/ Hydraulics	
6	Buffer management/enforcement/prioritization	Creeks	Water Quality	Habitat	Buffers
7	Shoreland protection should explore alternatives, include/favor bioengineering (not hard armor) and consider habitat creation and enhancement	Creeks	Water Quality	Habitat	Buffers
8	Salt management	Creeks	Water Quality	Pollution	Chloride
9	Habitat improvement in creeks (i.e. fishery). Manage desirable species	Creeks	Water Quality	Habitat	Fisheries
10	Green space preservation: throughout the entire corridor; Greater incentive to incorporate natural resource benefits for developers	Creeks	Water Quality	Habitat	Green Corridors
11	Man-made fragmentation	Creeks	Water Quality	Habitat	Green Corridors
12	Terrestrial invasive management: use volunteers	Creeks	Water Quality	Habitat	Invasive Species
13	Shoreland protection for creeks: upland restoration/protection; bluffs and steep slopes	Creeks	Water Quality	Erosion	Stabilization
14	Erosion/head-cutting/embeddedness: property loss; habitat; water quality	Creeks	Water Quality	Erosion	
14	Erosion/head-cutting/embeddedness: property loss; habitat; water quality	Creeks	Water Quality	Habitat	
15	Restore channel meandering	Creeks	Water Quality	Erosion	
16	Base flow (Bluff Creek): maintenance; recharge	Creeks	Water Quantity	Hydrology/ Hydraulics	Base flow
17	ID upstream storage possibilities and rate control	Creeks	Water Quantity	Hydrology/ Hydraulics	

18	Encourage correctly sized floodplain culverts (engineering and DNR review)	Creeks	Regulation		
18	Encourage correctly sized floodplain culverts (engineering and DNR review)	Creeks	Water Quantity	Hydrology/ Hydraulics	
19	Groundwater information modeling: continued monitoring and observation of wells	Groundwater	Data Collection	Modeling	
20	Education of policy makers and private consumers on BMP's	Groundwater	Education/ Outreach	Awareness	Best Management Practices
21	Cost share for upgrading to water sense irrigation systems, especially Associations	Groundwater	Education/ Outreach	Cost-Share	Conservation
22	Work with stakeholders on making groundwater use and drawdown levels easier to access	Groundwater	Education/ Outreach	Public Engagement	Data Access
23	Cost share for well sealing or abandonment	Groundwater	Education/ Outreach	Cost-Share	Wells
24	Seminary Fen is a priority resource: promote awareness of municipal well impacts on this resource	Groundwater	Education/ Outreach	Resource Vulnerability	
25	Use of groundwater for irrigation: This ensures compliance of irrigators. Outreach to irrigators for rules/regs. On permits needed	Groundwater	Regulation	Irrigation	
26	Salt alternatives: what are their impacts? Look into research?	Groundwater	Water Quality	Pollution	Chloride
27	Salt impacts on aged pipes/infrastructure: Salt use needs to be reduced	Groundwater	Water Quality	Pollution	Chloride
28	Be aware of potential for shallow groundwater's impacts on bluff and steep slope instability	Groundwater	Water Quality	Erosion	High Risk
29	Industrial irrigation leading to contaminated groundwater. Thinking about limiting use of salt and nitrates	Groundwater	Water Quality	Pollution	Nitrate
29	Industrial irrigation leading to contaminated groundwater. Thinking about limiting use of salt and nitrates	Groundwater	Water Quality	Pollution	Chloride
30	Reducing storm water in order to reduce groundwater usage: potential contamination	Groundwater	Water Quality	Pollution	
31	Well head protection areas: S/B watershed based as areas cross city boarders	Groundwater	Water Quantity	Hydrogeology	Base flow
32	Surface water reservoirs for irrigation: maybe conduct feasibility study	Groundwater	Water Quantity	Conservation	Reuse
33	Public vs. private irrigation: public should limit use without jeopardizing safe use	Groundwater	Water Quantity	Hydrogeology	Sustainability
34	Overuse of groundwater/drawdown: encourage conservation measures to reduce overuse. Ensuring all municipal water supplies are sustainable	Groundwater	Water Quantity	Hydrogeology	Sustainability
35	Well interference: well field sizes	Groundwater	Water Quantity	Hydrogeology	Zone of Influence
36	Groundwater recharge	Groundwater	Water Quantity	Hydrogeology	
37	Infiltration and impervious surfaces: promote native landscapes to reduce water use	Groundwater	Water Quantity	Conservation	
38	Increase/continued monitoring: focus cost sharing initiatives based on areas of concern	Lakes	Data Collection	Partnership	

39	Evaluate and report progress	Lakes	Data Collection	Evaluation	
40	Create brochures/website info: natural shoreline; native veg; invasive species management	Lakes	Education/ Outreach	Awareness	Ecosystems
41	Invasive species (aquatic): prevention/early detection (zebra mussels, etc.); management and reduction; maximizing partnerships with counties to get financial and technical assistance; new invasives, public education on what is coming.	Lakes	Education/ Outreach	Awareness	Invasive Species
41	Invasive species (aquatic): prevention/early detection (zebra mussels, etc.); management and reduction; maximizing partnerships with counties to get financial and technical assistance; new invasives, public education on what is coming.	Lakes	Planning	Partnership	Invasive Species
41	Invasive species (aquatic): prevention/early detection (zebra mussels, etc.); management and reduction; maximizing partnerships with counties to get financial and technical assistance; new invasives, public education on what is coming.	Lakes	Water Quality	Habitat	Invasive Species
42	Lake UUA information in a format for public lake improvement plan	Lakes	Education/ Outreach	Building Capacity	
43	Encourage lake associations/local ownership of resources: educate these groups; expectation for shallow lake environments- wont have the same outcomes/uses as deeper lake habitats	Lakes	Education/ Outreach	Awareness	
43	Encourage lake associations/local ownership of resources: educate these groups; expectation for shallow lake environments- wont have the same outcomes/uses as deeper lake habitats	Lakes	Education/ Outreach	Building Capacity	
44	LRT in general: Purgatory/Staring chain and how it will be impacted. Promote and require buffers	Lakes	Education/ Outreach	Awareness	
45	Partner with other agencies like Three Rivers	Lakes	Planning	Partnership	
46	Shoreline management: enforce your DNR general permit; discourage retaining walls on shorelines; Education, outreach, restoration projects; As area developed go back and work with established residents; buffers.	Lakes	Regulation	Enforcement	
46	Shoreline management: enforce your DNR general permit; discourage retaining walls on shorelines; Education, outreach, restoration projects; As area developed go back and work with established residents; buffers.	Lakes	Water Quality	Habitat	Buffers
46	Shoreline management: enforce your DNR general permit; discourage retaining walls on shorelines; Education, outreach, restoration projects; As area developed go back and work with established residents; buffers.	Lakes	Education/ Outreach	Stewardship	
47	Promote and require buffers	Lakes	Regulation	Buffers	
48	Idlewild and LRT: how to protect as LRT and surrounding area develops. Actively participate in early discussions	Lakes	Water Quality	Habitat	Development/ Redevelopment
49	Continue with carp management and how to restore lakes as the carp population is managed. Be wise about money invested into this project.	Lakes	Water Quality	Habitat	Fisheries

50	Protect, enhance and restore upland resources: plant more trees	Lakes	Water Quality	Habitat	Green Corridors
51	Expand green way along creeks to help with lake water quality and the protection of habitat leading/connecting lakes	Lakes	Water Quality	Habitat	Green Corridors
52	Lake management plan for plants /animals	Lakes	Water Quality	Habitat	
53	Stormwater retrofitting and regional treatment development to provide more treatment for lakes (and drainage to lakes)	Lakes	Water Quality	Pollution	
54	Steep slopes and bluffs: monitoring development impacts and their protection and restoration. Promoting natural channel discharge. Info sharing with the public, other watershed districts.	Other	Data Collection	Erosion	
54	Steep slopes and bluffs: monitoring development impacts and their protection and restoration. Promoting natural channel discharge. Info sharing with the public, other watershed districts.	Other	Education/ Outreach	Awareness	Best Management Practices
55	Share lessons learned: carp management	Other	Education/ Outreach	Awareness	Ecosystems
56	Partnerships; engage volunteers and enforce rules	Other	Education/ Outreach	Building Capacity	
56	Partnerships; engage volunteers and enforce rules	Other	Planning	Partnership	
56	Partnerships; engage volunteers and enforce rules	Other	Regulation	Enforcement	
57	Balance protection of resources with development/redevelopment (cost share)	Other	Education/ Outreach	Cost-Share	
58	Consider resources outside the boundaries of the district that may be impacted by activities in the district: fens, trout streams, MN river.	Other	Planning	Prioritization	Watershed Benefits
59	Strategize funding: best bang for your buck; where can you move the needle?; cooperate with other agencies to maximize money allocation	Other	Planning	Prioritization	
60	Climate adaptation and education: how to fund long term.	Other	Planning	Climate Change	
61	Innovative management practices/alternatives to volume control. AIS: Carp, Milfoil, zebra mussels, other invasives	Other	Planning	Adaptive Management	
62	Linear projects: storm water	Other	Regulation	Stormwater	Maintenance
63	Pond dredging as storm water maintenance	Other	Regulation	Stormwater	Maintenance
64	How to manage the maintenance of private storm water facilities: what to do if no financial ability to repair?	Other	Regulation	Stormwater	Maintenance
65	One and one regulation: what do you do with sump discharge? Algae flooding of streets and sidewalks, etc. Cost share?	Other	Regulation		
66	Rate and volume controls: salt/salinity issues	Other	Water Quality	Pollution	Chloride
67	Topsoil management on development sites. Is research needed? Maintenance	Other	Water Quality	Erosion	Development/ Redevelopment
68	Work with LRT as station areas redevelop and development intensifies	Other	Water Quality	Habitat	Development/ Redevelopment

69	Upland resources: management, including management of terrestrial invasives and managing pollutant release (tracking).	Other	Water Quality	Habitat	Invasive Species
69	Upland resources: management, including management of terrestrial invasives and managing pollutant release (tracking).	Other	Water Quality	Pollution	
70	AIS: Carp, Milfoil, zebra mussels, other invasives	Other	Water Quality	Habitat	Invasive Species
71	Flooding and upland storage: aging infrastructure may be a potential problem.	Other	Water Quantity	Hydrology/ Hydraulics	Flood control
71	Flooding and upland storage: aging infrastructure may be a potential problem.	Other	Water Quantity	Hydrology/ Hydraulics	Infrastructure
72	Must protect public infrastructure.	Other	Water Quantity	Hydrology/ Hydraulics	Infrastructure
73	Removals/$- cost benefit	Process	Planning	Prioritization	Cost-Benefit
74	Where will the funds have the most impact? What is a lost cause? Need for project should include cost-benefit analysis as well as prioritization of magnitude of source. What are the focus areas? Can't do everything. (i.e. next ten years- then move on).	Process	Planning	Prioritization	Cost-Benefit
75	Greatest impact/improvement with least amount of cost	Process	Planning	Prioritization	Cost-Benefit
76	Include benefit analysis and risk analysis?- pollutant loads versus cost reduction; Aesthetics versus cost; exposure versus cost; education versus cost.	Process	Planning	Prioritization	Cost-Benefit
77	Take Advantage of adding projects when development/redevelopment takes place	Process	Planning	Prioritization	Development/ Redevelopment
78	Combine with development	Process	Planning	Prioritization	Development/ Redevelopment
79	Public visibility/educational value	Process	Planning	Prioritization	Education/ Outreach
80	Exposure to public	Process	Planning	Prioritization	Education/ Outreach
81	Habitat	Process	Planning	Prioritization	Habitat
82	Stacked Benefit Project	Process	Planning	Prioritization	Multiple Benefits
83	Cooperatively \planning with Cities/counties	Process	Planning	Prioritization	Partnership
84	Grant Funding Availability	Process	Planning	Prioritization	Partnership
85	Talk to potential partners early in the planning or even research process- don't wait until after decisions are made. Lots of education.	Process	Planning	Prioritization	Partnership
86	Ability to attract/ form partnerships	Process	Planning	Prioritization	Partnership
87	Partnerships	Process	Planning	Prioritization	Partnership
88	Need to balance recreational usage to stop or reduce disconnect between residents, cities and district	Process	Planning	Prioritization	Recreation
89	Recreation	Process	Planning	Prioritization	Recreation
90	Consider prioritization of "tipping point" resources	Process	Planning	Prioritization	Sensitivity
91	Time sensitive Projects	Process	Planning	Prioritization	Sensitivity

92	Comparison of status quo	Process	Planning	Prioritization	Sensitivity
93	Can you justify what you are doing?	Process	Planning	Prioritization	Analysis/Study
94	Pollutant loads	Process	Planning	Prioritization	Water Quality
95	Connectability- Downstream effect	Process	Planning	Prioritization	Watershed Benefits
96	Impact on downstream resource	Process	Planning	Prioritization	Watershed Benefits
97	Watershed benefit-downstream/upstream	Process	Planning	Prioritization	Watershed Benefits
98	"Life, limb, and property" consideration	Process	Planning	Prioritization	
99	Concentrate on one sub-watershed at a time-leave some flexibility for projects in other sub-watersheds	Process	Planning	Prioritization	
100	Managing the export of nutrients: modeling, monitoring and observation. We need more understanding of the role of wetlands play in nutrient reduction	Wetlands	Data Collection	Pollutant removal	
101	Inventory of existing wetlands: woodland wetlands	Wetlands	Data Collection	Inventory	
102	Promote native vegetation: control of invasives and educating the public about identification and function of invasives.	Wetlands	Education/ Outreach	Awareness	Invasive Species
102	Promote native vegetation: control of invasives and educating the public about identification and function of invasives.	Wetlands	Water Quality	Habitat	Invasive Species
103	How to use and promote water steward/stewardship	Wetlands	Education/ Outreach	Awareness	
104	Education on the value of wetlands	Wetlands	Education/ Outreach	Awareness	
105	Shoreland restoration education and programs for residents: simplify the process	Wetlands	Education/ Outreach	Awareness	
106	Demonstrate or showcase wetland sites to educate the public. Work with cities and counties to find and build/promote wetlands. Other partners like 3-Rivers parks and LMRWD	Wetlands	Education/ Outreach	Awareness	
107	No net loss (area, type) of wetlands: function and value of the wetland within district. Need mitigation sites	Wetlands	Regulation	Mitigation	
108	Creation of bank sites and partnering with development community on mitigation options.	Wetlands	Regulation	Mitigation	
109	Enforcing wetland buffer zones: signage of buffer areas to prevent damage	Wetlands	Regulation	Buffers	
110	Clarification and simplification of agency roles in management, permitting and protection	Wetlands	Regulation	Responsibilities	
111	Habitat and resource connectivity	Wetlands	Water Quality	Habitat	Green Corridors
112	Identify restorable sites and basins for restoration. Prioritize them (what type of methodology for prioritization?)	Wetlands	Water Quality	Habitat	Restoration
113	Preserve wetland quality	Wetlands	Water Quality	Preservation	

114	Enhancing existing native vegetation	Wetlands	Water Quality	Habitat	
115	Role of wetlands in stormwater management	Wetlands	Water Quality	Stormwater	
116	Enhancing flood storage capacity and promoting pretreatment of stormwater	Wetlands	Water Quantity	Stormwater	

Purgatory Creek Watershed Workshop

#	Comment	Group	Category	Sub-category 1	Sub-category 2
1	Private public land on creek	Creeks	Data Collection		
4	Charity car wash: allowed on parking lots	Creeks	Education/ Outreach	awareness	
5	Rain garden cost sharing	Creeks	Education/ Outreach	Cost-Share	
6	Stream quality monitoring by community, schools, service projects groups	Creeks	Education/ Outreach	Building Capacity	
3	What are regulations?	Creeks	Education/ Outreach	Awareness	
2	What is it I can do next creek	Creeks	Education/ Outreach	Stewardship	
7	Maintain the stream bed as a navigable waterway for canoeing (high water) and cross country skiing	Creeks	Planning	Recreation	
8	Bring back grass gutters	Creeks	Water Quality		
9	Emphasis on wildlife protection	Creeks	Water Quality	Habitat	
10	Good water quality/healthy	Creeks	Water Quality		
11	Green corridor with healthy ecosystem	Creeks	Water Quality	Habitat	Green Corridors
12	Movement of invasives problematic	Creeks	Water Quality	Habitat	Invasive Species
13	Urban pollution/runoff to creek	Creeks	Water Quality	Pollution	
14	Full spectrum of consequences-downstream	Creeks	Water Quantity	Hydrology/ Hydraulics	
15	Sudden water flow causing unstable banks and erosion from channeled runoff	Creeks	Water Quantity	Hydrology/ Hydraulics	Erosion
16	Changes in groundwater quality/quality in district	Groundwater	Data Collection	Analysis/Study	
17	What is the groundwater hydrology connections with the lakes? Mapping	Groundwater	Data Collection	Analysis/Study	
18	Is groundwater withdrawal an issue: by city, private wells	Groundwater	Education/ Outreach	Awareness	
19	Watershed do reporting on groundwater	Groundwater	Education/ Outreach	Awareness	
20	What groundwater monitoring is in place?	Groundwater	Education/ Outreach	Awareness	
21	Who is responsible for groundwater regulation: who protects it? What agencies have what role?	Groundwater	Education/ Outreach	Awareness	

22	Groundwater contamination: salt, other contaminants. The move to not use sand; I can remove sand from a catch basin or the discharge area from a storm sewer (takes labor and $) I can't remove the salt	Groundwater	Water Quality	Pollution	
23	Miller spring groundwater study: 40 years ago Ag chemicals used are now entering the aquifer and are being detected in the spring	Groundwater	Water quality	Pollution	
24	Management/monitoring/protection of wildlife: beavers, otter, muskrats, birds, fish	Lakes	Data Collection	Ecosystems	
25	Lake weeds: filling in (management/control), lily pads, undergrowth	Lakes	Education/ Outreach	Awareness	
26	Silver lake: cooking to form association	Lakes	Education/ Outreach	Building Capacity	
27	We are not in favor of the delisting of Red Rock: Bakers, Satterness, Kitrells, Richardson, Lien	Lakes	Education/ Outreach	Public Engagement	
28	Are the watershed district's resources spent equitably?	Lakes	Planning	Prioritization	
29	Concerned about algae growth and how it limits access and recreational use (Red Rock): canoeing, paddle boats, fishing	Lakes	Planning	Recreation	Access
30	Upstream benefit to downstream resources	Lakes	Planning	Prioritization	Watershed Benefits
31	Algae	Lakes	Water Quality		
32	Biggest source of lake pollution= stormwater system. BMP's impact; more retention ponds	Lakes	Water Quality	Pollution	
33	Controlling road drainage	Lakes	Water Quality	Pollution	
34	Don't disturb lake SW/GW interaction: maintain buffers; storm sewer connection (chain of lakes project) deteriorated water quality, adversely affected levels	Lakes	Water Quality	Habitat	
34	Don't disturb lake SW/GW interaction: maintain buffers; storm sewer connection (chain of lakes project) deteriorated water quality, adversely affected levels	Lakes	Water Quality	Pollution	
34	Don't disturb lake SW/GW interaction: maintain buffers; storm sewer connection (chain of lakes project) deteriorated water quality, adversely affected levels	Lakes	Water Quantity	Hydrology/ Hydraulics	
35	Floating bogs: silver?	Lakes	Water Quality	Habitat	
36	Healthy fish populations (red Rock): maintain	Lakes	Water Quality	Habitat	Fisheries
37	Invasive vegetation	Lakes	Water Quality	Habitat	Invasive Species
38	Road construction affecting Water quality	Lakes	Water Quality		
39					
40	Water level	Lakes	Water Quantity		
41	assist in the establishing of an association	Other	Education/ Outreach	Building Capacity	

42	Helping local associations improve water quality in their specific lake	Other	Education/ Outreach	Awareness	
43	More volunteer citizens monitoring lakes, streams, wetlands	Other	Education/ Outreach	Building Capacity	
44	Working with schools on watershed education and management: programs, rain gardens, etc.	Other	Education/ Outreach	Stewardship	
45	Watershed district objectives are consistent with association objectives.	Other	Planning	Partnership	
46	Further regulation and education on herbicide and pesticide use	Other	Regulation		
47	Monitoring of wildlife	Other	Water Quality	Habitat	
48	Understand where resource ranks	Process	Data Collection	Resource Assessment	
49	Be up front about how and why projects are implemented: objective and measurable so no suspicion that politics and personal preference influence priorities	Process	Education/ Outreach	Public Engagement	
50	Better communication: mailing to individuals; city newsletters	Process	Education/ Outreach	Awareness	
51	A 10 year plan should be a 100 year plan	Process	Planning	Prioritization	Localized
52	Availability of partnering funds: municipal, state, federal, land owners	Process	Planning	Prioritization	
53	Come up with a scale or formula to prioritize factors affecting a lake	Process	Planning	Prioritization	
54	Cost/benefit: water quality, invasives, wildlife, city, riparian owners	Process	Planning	Prioritization	
55	Education	Process	Planning	Prioritization	Education/ Outreach
56	Faster formula input: use the money collected from the taxes on storm sewer discharge (sub watershed) use the money to fix the problems in that area, that sub watershed	Process	Planning	Prioritization	
57	Immediate concerns shouldn't override long-term	Process	Planning	Prioritization	
58	Local association a must: consider level of activity in prioritizing; priorities of local association; work with for strong support	Process	Planning	Prioritization	Planning
59	Looking for connections to publicly owned land	Process	Planning	Prioritization	Partnership
60	Prioritize those with multiple benefits: infiltration, wildlife	Process	Planning	Prioritization	Multiple Benefits
61	Reinstate responsibility for recreational uses: is it in current plan?	Process	Planning	Recreation	
62	Survey users: boat landings, beach, homeowners, etc… Help inform components of formula	Process	Planning	Prioritization	Recreation
63	To take care of upstream lakes first and make the downstream lakes wait is not fair	Process	Planning	Prioritization	Localized

64	We need a formula to quantify the benefit from a project: a clear, measurable formula to determine benefit	Process	Planning	Prioritization	
65	What were the conditions historically?	Process	Planning	Prioritization	Water Quality
66	Where are they now?	Process	Planning	Prioritization	Water Quality
67	Work with cities on development	Process	Planning	Prioritization	Partnership
68	Wildlife monitoring?	Wetlands	Data Collection		
69	Can wetlands take over lake? Plants?	Wetlands	Education/ Outreach		
70	Need for focus: educational awareness about local wetlands	Wetlands	Education/ Outreach	Awareness	
71	Settling sediments: how do we reduce sediment? When is removal of sediment appropriate?	Wetlands	Education/ Outreach	Awareness	
72	Storm water ponds testing: which are monitored?	Wetlands	Education/ Outreach	Awareness	
73	Where is the wetland edge?	Wetlands	Education/ Outreach	Awareness	
74	Buffer zone	Wetlands	Water Quality	Habitat	
75	Deterioration	Wetlands	Water Quality		
76	Maintain wildlife freshwater sourcing	Wetlands	Water Quality	Habitat	
77	Plants management? Community involvement: buckthorn pulls and wetland plant issues; continue to support removal	Wetlands	Water Quality	Habitat	Invasive Species
78	Runoff into it	Wetlands	Water Quality	Pollution	
79	Stagnant> smelly? Sometimes on east side of Red Rock Lake; bubbler needed? (north end too)	Wetlands	Water Quality		

Riley Creek Watershed Workshop

#	Comment	Group	Category	Sub-category 1	Sub-category 2
1	Seasonal creeks sediment inputs into the lakes: does that need control? Monitoring	Creeks	Data Collection	Resource Assessment	
2	What human activities add to creek erosion (bridge building, tile, etc.)?	Creeks	Education/ Outreach	Awareness	
3	Is there farmland that still affects water in streams? What are you doing to work with landowners?	Creeks	Education/ Outreach	Awareness	
4	Access walking and bike trails, not adding to erosion	Creeks	Planning	Recreation	Access
5	Invasive fish migration	Creeks	Water Quality	Habitat	Fisheries
6	Invasive plant transfer between lakes	Creeks	Water Quality	Habitat	Invasive Species
7	Erosion: creek banks at bends in the woods	Creeks	Water Quality	Erosion	
8	Storm water adding pollution from hard surfaces through pipes: transferring/connectivity to lakes	Creeks	Water Quality	Pollution	

9	Free flowing/lake level control	Creeks	Water Quantity	Hydrology/ Hydraulics	
10	How and to what extent does groundwater affect the aquifers/overall hydrology of the district?	Groundwater	Data Collection	Modeling	
11	What are trend levels of aquifers? Are groundwater sources drawing down/ recharging as they should? Are we depleting aquifers?	Groundwater	Data Collection	Resource Assessment	
12	Which lakes are receiving groundwater and which are contributing to groundwater?	Groundwater	Data Collection		
13	How long does it take for pollution to get into drinking water?	Groundwater	Data Collection	Resource Assessment	
14	What chemicals/nutrients and how much of them are building up in groundwater sources?	Groundwater	Water Quality	Pollution	
15	Do not water grass/lawns with "vintage" water (10000 years old)	Groundwater	Water Quantity	hydrogeology	Sustainability
16	No-net-loss of aquifers: how do we do this?	Groundwater	Water Quantity	hydrogeology	Sustainability
17	Water quality: clarity, phosphorous, weeds and algae (continue plant management plan)	Lakes	Data Collection	Resource Assessment	
18	Education on native aquatic plants vs. invasives, "god vs. bad"	Lakes	Education/ Outreach	Awareness	Ecosystems
19	Types of algae in lakes? How do we control it? What nutrients to stop/control? Are good algae doing okay? Balance	Lakes	Education/ Outreach	Awareness	
20	How to manage for climate change? How to implement it into current management?	Lakes	Planning	Climate Change	
21	Maintaining shoreline habitat: erosion, vegetation removal, buffers	Lakes	Water Quality	Habitat	Buffers
22	Manage for recreation, boating, fishing, swimming: shoreline erosion (minimize); lake restrictions; high water situations	Lakes	Water Quality	Erosion	
23	Cost/benefits of management/plans/programs: what benefits will we see and when?	Other	Data Collection	Evaluation	
24	How do we get faster data on effects of projects? Real-time lake updates online	Other	Data Collection		
25	General education: impacts of "everyday" activities; speaking with property management organizations	Other	Education/ Outreach	Awareness	Best Management Practices
26	Training professionals on impacts of everyday activities: lawn mowing, etc.; speaking with city maintenance	Other	Education/ Outreach	Awareness	Best Management Practices
27	What are the ways you use to get information to people? Provide the "why" why is it important? How will it affect residents?	Other	Education/ Outreach	Public Engagement	
28	Volunteer outreach to general public in district: expand volunteer network; attending homeowner association meeting and educating.	Other	Education/ Outreach	Building Capacity	
29	Health impacts: what are these chemicals? How do plants and water health affect my health? How do bad plants affect my health?	Other	Education/ Outreach	Awareness	

30	What preventative measures can reduce future cost?	Other	Education/ Outreach	Awareness	
30	What preventative measures can reduce future cost?	Other	Regulation		
31	How to communicate/educate on watershed/water quality needs: explain standards of measurements/study- improve understanding of plans and why they are needed; what are goals and why?	Other	Education/ Outreach	Public Engagement	
32	How do you measure benefit?: most people; most pollution reduction	Other	Planning	Prioritization	multiple benefits
33	Water clarity should not be only goal	Other	Planning	Prioritization	Multiple benefits
34	Key benefits (to general public) to articulate: boating, swimming, fishing, trails, safety/health of drinking water and recreation, accessibility. Recharge (groundwater), water quality, healthy native populations, invasives, home/land	Other	Planning	Prioritization	Multiple Benefits
35	Have a rating system to prioritize biggest problems/worst pollution issues	Other	Planning	Prioritization	sensitivity
36	How are we measuring watershed benefits? How to decide what is the "best" plan? Determining down stream/adjacent water benefits; prioritization	Other	Planning	Prioritization	Watershed Benefits
37	Climate change considerations: how to implement into Planning and management	Other	Planning	Climate Change	
38	Prioritize lake projects over creek	Other	Planning	Prioritization	
39	Prioritize lakes with public beaches over other private lakes	Other	Planning	Prioritization	
40	Measuring usage/recreational/aesthetic benefits and balancing these with water quality benefits: how to compare and weigh each of these?	Other	Planning	Prioritization	
41	Measuring usage/aesthetics and weighing these benefits against each other: what aspects/aesthetics are more important to people?	Other	Planning	Prioritization	
42	Excessive goose population	Other	Water Quality	Pollution	
43	Muskrat and beaver impacts: erosion due to vegetation removal; Environmental engineering impacts (caused by these animals)	Other	Water Quality	Erosion	
44	Flood water control	Other	Water Quantity	Hydrology/ Hydraulics	Flood Control
45	Flow chart of wetlands into creeks/lakes	Wetlands	Data Collection	Inventory	
46	Knowing about classifications of wetlands	Wetlands	Data Collection	Inventory	
47	Can we and how can we control water movement into wetlands (and out) to benefit adjacent waters? How can we treat the water?	Wetlands	Data Collection	Resource Assessment	
48	Bug control	Wetlands	Data Collection	Resource Assessment	
49	Why don't wetlands have names like lakes?	Wetlands	Education/ Outreach	Awareness	

50	Access: bike paths/walking paths	Wetlands	Planning	Recreation	Access
51	Education on wetlands/wetland types and current impacts: pollutants and nutrients entering and exiting wetlands	Wetlands	Education/ Outreach	Awareness	

Bluff Creek Watershed Workshop

#	Comments	Type	Category	Sub-category 1	Sub-category 2
1	What criteria did watershed district use to rate the quality of the creeks? Publish a "watch for" list of indicators residents can monitor; solutions?	Creeks	Education/ Outreach	Public Engagement	
2	Are there invasive plants along creeks? Create volunteer opportunities?	Creeks	Education/ Outreach	Awareness	
3	Erosion problem on bluff creek: how can municipalities encourage landowners to control erosion?	Creeks	Education/ Outreach	stewardship	
4	Flashy flow	Creeks	Water Quantity	Hydrology/ Hydraulics	
5	Is water (aquifer) being drawn down for drinking water?	Groundwater	Education/ Outreach	Awareness	
6	How is groundwater affected by development?	Groundwater	Education/ Outreach	Awareness	
7	Is groundwater use affecting surface water resources?	Groundwater	Education/ Outreach	Awareness	
8	Is groundwater use sustainable?	Groundwater	Education/ Outreach	Awareness	
9	Would like public access around more lakes	Lakes	Planning	Recreation	Access
10	Not much fishing: clean water quality?	Lakes	Water Quality	Habitat	Fisheries
11	Shorelines: protection, restoration	Lakes	Water Quality	Habitat	
12	More urban, shallow, not much flow through	Lakes	Water Quantity	Hydrology/ Hydraulics	
13	Flow is flashy	Lakes	Water Quantity	Hydrology/ Hydraulics	
14	Outreach to schools: build boxes	Other	Education/ Outreach	Building Capacity	
15	Partner with service groups on volunteer restoration opportunities: build and install wood duck boxes	Other	Planning	Partnership	
16	Public education: need more input	Process	Education/ Outreach		
17	Cost share is important	Process	Education/ Outreach	Cost-Share	
18	Work with HOAs: outreach (MWS) monthly HOA news letters; highlight local projects; cost-share programs	Process	Education/ Outreach	Cost-Share	
18	Work with HOAs: outreach (MWS) monthly HOA news letters; highlight local projects; cost-share programs	Process	Education/ Outreach	Public Engagement	

19	Is there adequate pollinator forage/habitat? Restoration opportunity	Wetlands	Data Collection	Resource Assessment	
20	What impact do fallen trees have on wetlands?	Wetlands	Education/ Outreach	Awareness	
21	Use the walking paths frequently	Wetlands	Planning	Recreation	Access
22	Repair shorelines at same time as you repair recreational amenities: walkways; partner with service groups	Wetlands	Planning	Partnership	

viii [7]Analyzed Input Workshops/Meetings: Incorporated participant feedback into coding

Riley Creek Watershed Workshop (1 response)

Participant feedback #1

I attended the Riley Creek session as an observer. I felt that I had made the comments at the board session. I do feel that we need to re-examine awareness. It is passive. But in some cases, we need something more active, public engagement. We need things to be done.

District response:

No changes called for.

Board and Staff Workshop (3 responses)

Participant feedback #1

3. Sub Cat 1 - public engagement
12. Sub Cat 1 - public engagement
19. Sub Cat 1 - public engagement
30. Sub Cat 1 - Public Engagement
35. Sub Cat 1 - Public Engagement
60. Sub Cat 1 - Public Engagement
72. Sub Cat 1 - Public Engagement
95. Sub Cat 1 - Public Engagement
97. Sub Cat 1 - Public Engagement
98. Sub Cat 1 - Public Engagement
99. Sub Cat 1 - Public Engagement
104. Sub Cat 1 - Hydrology/Hydraulics

District response:

The “public engagement” subcategory as used in the coding, describes communication strategies and materials implemented by the district with the aim to connect community members to district activities. With this in mind, the following changes were made in response to the following feedbacks.

3. Duplicated the line and added a second coding: Stewardship
12. Duplicated the line and added a second coding: Awareness
19. Duplicated the line and added a second coding: Stewardship
30. No change
35. No Change

60. Duplicated the line and added a second coding: Public Engagement
72. Changed to Public Engagement
95. Removed: coded incorrectly as Education & Outreach
97. Duplicated the line and added a second coding: Stewardship
98: Duplicated the line and added a second coding: Stewardship
99. Duplicated the line and added a second coding: Stewardship
104. Duplicated the line and added a second coding: Stewardship

Participant Feedback #2

Great list with such a wide scope! Lots of work to do. Under item 29, recognition that invasive species impact more than just lakes. Great process thanks everyone for all the hard work.

District response:

No changes made. The "Type" (Lake/Creek/Wetland/Groundwater/Other/Process) for each comment was not assigned by the reviewers. This was part of the structure of the workshop wherein participants shared their concerns for each "Type" individually. Comment #29 was originally made and recorded in reference to lakes specifically.

Participant Feedback #3

I find over 110 categories inspirational but difficult to work with. The abbreviated descriptions do not get to the point of the comment(s). For instance, what does # 111 really tell us about the comment? I do recognize my input in the following categories: 45, 46, 49, 65, 71, 73, 74, 82, 83, 95 and 109 and agree these areas should be discussed. But so do the other categories. The issue Is: what are the practical things the Watershed District can do at this time?

District response:

No changes made. The District did not prioritize any of the comments as it wanted to make sure that workshop participants agreed with the way staff categorized their issues/concerns. Next step in the process is to identify common threads from all input processes which will be used to build goals and develop a strategic plan for the District.

Citizens Advisory Committee Workshop (2 responses)

Participant feedback #1

19 - what is missing from the categories is the topic of Sustainability/Responsible water use to avoid depleting the resource.
28 - add Stewardship as the top category
39 - add groundwater as sub-category
46 - add Education/Outreach as sub-category
50 - 59 instead of Other, consider using Watershed to capture the hydraulic connection between water resources.
63 - could include targeting education of youth / future generations to increase education effectiveness
76 & 77 - add Education/outreach to communicate to the public
88 - add Buffer - using wetlands as floodplain to manage flooding due to storm events

District response:

19. Duplicated the line and added a second coding: Water Quantity -> Hydrogeology -> Sustainability

28. Duplicated the line and added a second coding: Education & Outreach -> Stewardship
39. Added groundwater as a sub-category
46. Duplicated the line and added a second coding: Education & Outreach -> Awareness
50-59. No change made. The “Type” (Lake/Creek/Wetland/ Groundwater/Other/Process) for each comment was not assigned by the reviewers. This was part of the structure of the workshop wherein participants shared their concerns for each “Type” individually. “Other” was a catch-all for any concerns not falling into the resource or process types.
63. No change made. The suggestion adds specificity beyond the original comment.
76. No change made. The original comment is from the “Process” type. In this conversation, participants were asked to give suggestions and ideas on how projects should be prioritized.
77. Duplicated the line and added a second coding: Education & Outreach -> Public Engagement.
88. Triplicated the line and added two additional codings: Wetlands -> Water Quality -> Habitat -> Buffers and Water Quantity -> Hydrology/Hydraulics -> Flood Control

Participant feedback #2

82 is "What are the rules" not "Water are the rules"   # 59 is listed twice; #18 is "their well" not "there well". Nos.#30,31, 32 37,39,41, 42,43, 44, and 47 also apply to wetlands, not just lakes. Please add to wetlands.

District response:

82. Changed per suggestion.
59. No change made. Some comments were duplicated or triplicated if they had multiple major themes.
18. Changed per suggestion.
Remaining line numbers. No changes made. The “Type” (Lake/Creek/ Wetland/ Groundwater/ Other/Process) for each comment was not assigned by the reviewers. This was part of the structure of the workshop wherein participants shared their concerns for each “Type” individually. All of these comments were made within the “Lake” Type conversation.

Technical Advisory Committee (1 response)

Participant feedback #1

#5 seems like it could be related to basins as well.

District response:

The “Type” (Lake/Creek/ Wetland/ Groundwater/ Other/Process) for each comment was not assigned by the reviewers. This was part of the structure of the workshop wherein participants shared their concerns for each “Type” individually. All of these comments were made within the “Creek” Type conversation.

Purgatory Creek Watershed Workshop

No comments.

Bluff Creek Workshop

No comments.

[ix] Published data and summary on website & social media; distributed to cities and other partners; placed a summary ad in the Sun Sailor, Sun Current, Eden Prairie News, and Chanhassen Villager.

Community Weighs In On Clean Water Issues

Public input survey shows that residents value and are concerned about water resources in their community.

RILEY PURGATORY BLUFF CREEK **WATERSHED DISTRICT**

The Riley Purgatory Bluff Creek Watershed District is a local government organization with a mission of protecting, managing, and restoring the waters in our community. Its actions are guided by a management plan that is currently being updated. As part of the update process, the watershed district asked watershed residents what they valued about their local lakes, creeks, wetlands and groundwater, and what concerns they had for these resources.

80% ENJOY WILDLIFE WATCHING AND ADJACENT RECREATION

Wildlife watching and walking or running on nearby trails are the most common ways respondents use local waterbodies.

COMMON CONCERNS

The three most common concerns that survey respondents had about water resources were:

81% of respondents chose: **Pollution entering waterbodies**

75% of respondents chose: **Aquatic invasive species**

75% of respondents chose: **Clarity of water**

ACTIONS FOR IMPROVEMENT

Respondents selected actions for improving the health of water resources. Here are the top two:

42% of respondents chose: **Reduce pollutants from stormwater**

41% of respondents chose: **Reduce the amount of aquatic invasive species**

To read the full report and learn more, visit
www.rpbcwd.org

A BIG THANK YOU to all the survey respondents!

x Distributed a news release about the event to local papers and cities.

What would move you to take action to protect our lakes, creeks, and wetlands?

An invitation to a conversation with the Riley Purgatory Bluff Creek Watershed District.

Please join us November 17th to explore how the Riley Purgatory Bluff Creek Watershed District can create resources and programs that support clean water stewardship in our community.

At the watershed district, we do our best to encourage and support stewardship of local lakes, streams, and wetlands. The education and outreach programs we offer are most effective when they reflect the interests and needs of you, our community. And so, we want to hear from you.

The ideas we collect at this workshop will be used in creating our new education and outreach plan, and will affect our programming for years to come.
We hope to see you there.

Details: Thursday, November 17th. 6:30 pm. Eden Prairie Community Center. Reservations are required. RSVP here. Light refreshments will be served. Contact Michelle with questions or to RSVP: mjordan@rpbcwd.org, 952-607-6481.
www.rpbcwd.org

About the Riley Purgatory Bluff Creek Watershed District: The Riley Purgatory Bluff Creek Watershed District is a local government organization charged with protecting, managing, and restoring water resources. It encompasses all the land that drains into any of the three creeks in its name and includes parts of seven cities: Bloomington, Chanhassen, Chaska, Deephaven, Eden Prairie, Minnetonka, and Shorewood. The District partners with local communities to identify top priorities and plan, implement, and manage efforts to protect and improve the waters in its boundaries. The District also works to educate and engage community members in stewardship. Watershed activities are funded through property tax levies.

[xi] Placed an ad in the Sun Sailor, Sun Current, Eden Prairie News, and Chanhassen Villager.

[xii] Comments from Watershed Outreach Workshop.

Question 1: What do you want to know about your lakes and streams that you don't know now?	
Comment #	**Comment**
1	Good idea to make ice rinks in winter to allow sunlight to keep plants growing through winter?
2	Is the ground water clean when it gets to the lake?
3	Why do lawn care providers have to put up signs to "keep dogs and children" off lawns after treatment?
4	Are land developers required to use native landscaping?
5	What watershed feed ours?
6	How do we expect to be affected by mining degradation?
7	What is the goal (management goals)/ what is considered a success with these goals?
8	Are taxes and pay tied to performance in any way?
9	Does the watershed district work with 3rd parties?
10	Has Riley Purgatory Creek spoken up against BWCA mining requests?
11	Are we just preventing degradation?
12	Should we be in the business of rehab, prevention, or both?

13	What is the impact of climate change on lakes and streams?
14	Is there no going back in relation to pollution/damage?
15	Can the system of drainage from stream to lake carrying sediment be changed?
16	What information/ education is available to help boaters understand why they shouldn't be "power loading" boats at boat ramps?
17	Are rip-rap/ rock wall shorelines good or bad in relation to erosion?
18	How do we compare to other states?
19	What toxins do you measure in our water?
20	How do our lakes compare in quality to other states or areas?
21	Are there standard metrics?
22	Should we be concerned about chemical runoff from winter road treatments (salt alternatives)?
23	How are we measuring improvement?
24	Landowners can make a difference to water quality.
25	How can I easily find information about the water quality for the lake and stream near my house?
26	How do I know if any kids can swim in my lake?
27	Blue green algae
28	"Talk about my lake."
29	How bad is my water quality, and is it too late to do anything?
29	How bad is my water quality, and is it too late to do anything?
30	Quality is degrading- weedy lakes are normal.
31	How do citizens identify hazardous algae/pollutants that affect swimming, and what can they do to prevent it?
31	How do citizens identify hazardous algae/pollutants that affect swimming, and what can they do to prevent it?
32	Which algae and pollutants are harmful, and which aren't.
33	How to control weeds.
34	How much road salt impacts water quality and alternatives?
35	Is it safe for kids to swim and play in creeks and lakes?
36	What specific water quality tests are done to determine water safety?
37	Do water quality tests vary in different seasons?
38	Is there a water quality grading system for the lakes?
39	What are some strategies to remove invasive species and weeds?
40	What is the worst pollutant in the watershed?

41	Is water quality in lakes improving or declining (where are we at)?
42	Algae outbreak in lakes: How do we identify and control it?
43	Amount of pollutants getting into ground water: How is what we are doing on the surface affecting the ground water?
44	How do we control weeds?
45	How often, how, and what time of year is water quality checked?
46	What is the worst situation in the lake?
47	Who do you contact about cost shares and grants?
48	Is it safe to swim in area lakes and streams?
49	Where do you think we are in terms of water quality and where might we be in the future (10 years from now)?
49	Where do you think we are in terms of water quality and where might we be in the future (10 years from now)?
50	What specific water tests are used by the watershed district?
51	Does time of year lead to different results in water quality?
52	What is the "worst" pollutant in our lakes in relation to water quality?
53	What tests are used to determine the safety of water qualtiy?
54	What tests are used to determine the safety of water qualtiy?
55	What is the "worst" pollutants for water quality?
56	Is it safe to swim in creeks and streams?
57	Does our watershed district label the quality of water (grade)?
58	How and what goes into the lakes and streams, and how do they connect and effect each other (stormwater)?
58	How and what goes into the lakes and streams, and how do they connect and effect each other (stormwater)?
59	What is getting into our ground water?
60	Is water clean when it gets into our lakes and streams (groundwater)?
61	What is getting into our ground water?
62	How much salt is running off into our lakes/ streams and how does it affect them?
63	Salt on the roadways is not taken care of.
64	We are caring about lakes and streams
65	How does salt on roads affect streams and lakes?
66	Would like more information about the treatment of spent lime.
67	What historical data is available on water quality trends per lake or creek (how are we doing/is info available)?

68	To what extent does 2, 4-D degrade our water?
69	More information about 2, 4-D/ milfoil.
70	Phosphate load in lake bed?
71	What is curly pond weed, what is the best time to harvest it, and should it be left alone or harvested?
72	How can we educate our citizens about the downside of lawn chemical use?
73	How do we find service providers that use lake-friendly options for lawn treatment?
74	How to help citizens find "organic" lawn services.
75	How to measure results of lake-- information boxes spent on lime
76	How to find lake friendly chemical option offered by professional services?
77	Why is the watershed working to de-list lakes from "disturbed" list?
78	What do we expect or think about lakes and creeks (awareness and clarity)?
79	Why does the UofM (politics) say "limit the use of fertilizers" instead of "you don't need fertilizers"?
80	How much "duff" can go down a storm drain, and is there some tolerance?
81	What is the tolerance of lakes and streams to accept what goes into drains?
82	What are regulations to access private lakes?
83	Where are public access locations in our lakes and streams?
84	Who owns the wetlands, and can they be kayaked in?
85	Why dont all lakes have public access?
86	Can the watershed buy property to preserve the water qualtiy of a lake or stream?
87	What regulations are in place for homeowners who live on a pond, lake, or stream?
88	How do we get more residents to be awarew of lakes and streams?
89	Send messages over social media/ partner with media more closely.
90	Everyone affects the lake, and everyone is a part of the solution.
91	Pollution flows to your lake- make that prominent in messaging
92	How can we make info about how storm drains, creeks, and lakes all connect within a watershed?
93	More education to homeowners about steps they can take to improve water quality (raingardens)
94	What are strategies for getting rid of invasive species in lakes?

95	Put up NO LITTERING signs at public lakes.
96	Proper signs to prevent lake pollution.
97	What can homeowners to be more aware of what they are doing?
98	How to control the weeds so that people can enjoy the fish and the water.
99	What can we do around our home to support our lakes, streams, and rivers?
100	What are strategies for getting rid of invasive weeds?
101	How do we identify algae blooms and how can we control them?
102	Make information more visible
103	What can we do to help watersheds stay clean?
104	How can citizens monitor lakes within the district?
105	How do you organize a purgatory creek cleanup?
106	What can be done to prevent and reverse the sediment build up in lakes?(sediment build up reduces the amount of water that a lake can hold)
107	Whose responsibility is it to keep them clean (trees, debris, garbage)?
108	What is the long term plan to stop bule green algae?
109	What can be done to clean up current trails along creeks and streams?
110	What is RPBCWD doing to keep wetlands clean and healthy?
111	What work is being done about sediment in our lakes and streams?
112	How have management projects that have been implemented in the watershed improved water quality or lakes and streams?
113	Is there a noticeable difference in water quality where water from upstream watershed flows into ours?
114	How do watersheds impact each other?
115	How can we tell if our water is clean?
116	What are some indicators of clean water compared to contaminated water?
117	How "clean" are our lakes and streams?
118	How many people use the water of the watershed?
119	Where are the water access points?
120	What is the current water quality?
121	What is the water quality target?
122	How do restoration efforts and projects tie together?
123	What is the cost benefit of improving water quality?

124	Is there a trail map for creeks? Why cant these trails connect?
125	Where are the trails along creeks?
126	Why is there no trail along purgatory creek?
127	How can we help raise awareness of cost sharing programs?
128	What is the cost of different kinds of projects?
129	How much has been spent to date on each stream, river, and lake in the district?
130	How to recycle/ dispose of waste water.
131	Wastewater and household chemicals in water.
132	Have watershed districts been combined?
133	Where do our storm drains go? Is there a map?
134	Can students do a stencil project on stormdrains- "Don't dump drains to river."
135	Is there farmland that impacts this watershed?
136	Is there farmland in our watershed?
137	What are the differences between lakes, streams, and storm water pond ecosystems? How are they managed?
137	What are the differences between lakes, streams, and storm water pond ecosystems? How are they managed?
138	How to clean off boats to prevent the spread of invasive species.
139	What does blue-green algae look like?
140	What is AIS?
141	Is purgatory creek a public water?
142	Interactive website that allows citizens to find access points on rivers and streams in district.
143	What kinds of fish should be in lakes?
144	Where can I find plants that are good for water?
145	What is the impact of invasive species (carp)?
146	What is the impact of the removal of invasive species?
147	Where are the carp? What are the negative impacts of them?
148	Has there been a survey of plant and animal species in the water district?
149	What species of frogs live in my pond?
150	How many wildlife species are dependent on the lakes and streams in our watershed?
151	What impact are carp having on the lakes?

152	What causes duckweed to form in a pond?
153	What impact does duckweed have on the ecosystem?
154	What is the threat of invasive species?
155	What is the number of fish species?
156	Why are there no buffer zones on lakes, rivers, or streams?
157	What is the impact of the new buffer law?
158	What is being done to keep swim beaches safe?
159	How does what I do on my property affect the nearby creek?
160	How does runoff affect a lake (resident properties, roads, and parking lots)?
161	What is the UofM weed study on Mitchell lake? When can land owners remove weeds?
161	What is the UofM weed study on Mitchell lake? When can land owners remove weeds?
162	Why does the UofM keep checking out lakes for weeds? What is the study about?
163	Who takes care of outlets/flow from lakes?
164	Can we put signage (or a fine) to deter people from throwing garbage into lakes?
165	The public should be aware of pollution in lakes.
166	Post a sign upon (lakes) about littering.
167	Why are the exit drains in a lake not cleaned regularly? The city is responsible.
168	Who takes care of outlets/flow from lakes?
169	Watershed ownership
170	How many watersheds are there in the state?
171	How many watershed districts are there in Minnesota?
172	How are different watershed districts connected?
173	Water level: Flow, where, how?
174	How can homeowners best manage waterfront property?
175	Who do I call when I notice that leaf litter has not been removed and the storm drains are clogged?
176	What can we do to reduce weeds?
177	What can residents of the watershed do to help preserve the lakes and streams (how can people get involved)?
178	How do we address these risks or mitigate them?
179	Is it possible to get rid of the duckweed in a pond? (It clogs conduit impedeing waterflow)

180	What invasive species are of the most concern?
181	How are invasive species managed?
182	How do watershed districts affect each other?
183	Impact of RPBCWD on Minnesota river.
184	Impct of temperature warming on water- ecosystem.
185	Rainfall impact on flow and levels (runoff)
186	Watershed: linkage, impact on each other
187	Have notices go to homeowners and businesses that leave grass clippings on the street (grass clippings make it to the watershed. Give them fines!
188	Cities adding fluoride to water is concerning (It's a known neurotoxin and its value in reducing cavities is being challenged) Is there anything we can do to change this?

Question 2: What kinds of water education materials have you been looking for?	
Comment #	**Comment**
37	"Lets find a solution" meetings
38	How can we positively affect the quality of water
39	Motivation to make changes
40	Set them afire with good materials
46	Stencils at storm drains about where water drains
47	Community involvement- data collection at source by the community
48	Tools to involve- tip the narrative into action
49	workshops- comparison studies, impact, and statistics
51	Workshops within the community
52	Seminars in person during the day
54	Have a "water week" in the watershed district
61	volunteer to clean up the neighborhood lakes, creeks, and wetlands
82	Reward points for involvement (build point and redeem for water friendly prizes).
88	Why cant we have one giant clean up day?
89	Local canoe day at each lake (rent a canoe to see each lake)
90	Minnetonka high school on their volunteer day for seniors
91	Water recreation activities
92	Homeowner workshops for water front property

107	Do after school courses
108	"Storm drain stenciling"
121	What others are doing that is working well.
5	Visual/metric guide for lakes
44	Species identification
45	Website with questions field for public research
63	Get into and talk at local garden fairs
70	Design tools for landscape improvement.
97	signage posted at lakes, streams, and rivers to inform of goals and efforts in wildlife preservation
98	signage at sensitive dump areas- lake access to protect water quality
99	signage
100	demonstration rain gardens/ shoreline buffers at beaches and boat launches
101	beautiful, well maintained, colorful signage
102	Signage on sites to teach
103	ED. Material The case against the lawn
104	fertilizers
105	herbicides
106	pesticides
110	Education programs for the kids, young adults, and adults at the Staring Lake education center
111	citizen science monitoring programs
112	work closely with schools and middle schools with the citizen science programs
114	Environmental eduaction and outreach materials for schools
115	Speakers at schools who are experts
119	Zero turf in Eden Prairie- public spaces
124	Need useful data and information
125	More things like the outdoor learning center on Staring Lake
126	Do more at water treatment centers
127	How do you get a speaker?
128	How do we get a water science teacher?
1	What are the projects that the water district funds?

2	List of water master stewards found in the district and projects they have worked on
3	Maintain a blog forum for questions and answers. This way homeowners/ residents would have a credible source to reference and reach out to.
4	Answer line/blog Online website
6	Engage experts in discussion... message boards
7	App for the phone like "next door" for local community connection
8	Chat window with live experts for "complex" actions
9	A kick-butt website for community engagement
11	Increase awareness of what watershed is doing
12	Short informative talks on a website
13	Put more Av things on Facebook
14	Website- searchable info... Interactive maps
15	Cost share database
16	Better online websites
17	Online information
18	Who to call with questions
19	Online database for cost share projects
21	Dynamic and interactive website
23	Links to city resources for water info
24	Mark canoe trails between lakes and on creeks
26	Links to detailed information of ongoing projects
27	Examples of successful management projects on the website
29	Personal connections to good sources, and education on what is being talked about
30	Make website up-to-date
31	Current websites
32	Websites with current information
33	Are there rules and guidelines on how to build a trail?
34	Printable versions of fliers and info sheets for people to print off and share themselves
35	If we are asked not to do something, explain why.
36	A ranking for each lake and creek section
41	Website links to educational purposes

55	Flier in your waterbill about the watershed or highlight a topic
58	What information or summary documents are available to talk to my neighbors
59	City water bill needs to tell us: how much water we used, where the water comes from, and is the city water use sustainable
73	News releases
74	articles
75	fliers to educate public reguarding negative effects of lawn chemicals
76	Post pictures of invasive species VISUALS
78	On site explanation of projects
80	News letters to be sent out to residents of the watershed
84	signage on sites to teach
85	Team of stewards to work each neighborhood to connect a topic to each resident
86	Targetted neighborhood info by targetted email
87	Info on neighborhood wetlands quality "targetted neighborhood info"
94	Increased communication with the community to know who to talk to
95	Articles in the newspaper
96	Educational materials: models, posters, maps
109	3 rivers park district comes to schools 3 times a year: so should the watershed district
117	Facts/figures and the rules of them
120	Provide ways to connect to other watershed districts
123	Speakers are needed
56	Need better representation in local newspapers
57	Educational Signs at public parks
62	Mail a move in packet "Welcome to watershed" that explains what the community needs to do
42	Help make association members feel more responsible- that they can do something positive
50	Build partnerships with local schools (science/biology class)
53	Education partnership with school groups
60	Master water steward or lake association you can talk to
64	Make as many loal partnerships as possible
65	Water Steward locator and contacts
66	Watershed steward contacts in the district.

67	Partnerships wider
68	wild bird stores, community group-ups
69	Do relators have info to share? Do they play any role?
71	neighborhood emails
72	Home owner association emails
77	neighborhood events
81	How do we connect to other community members? Boards or organizations?
113	Become a part of local school programs
10	More information on the internet
20	Copy of summary page report
22	Forum with information
25	A watershed website
28	no paper
43	Literature and wed references
79	consultaion with a water quality technician- water quality evaluation
83	Proactive communication is me having to find resources on my own
93	How to get community members to care about the science
116	Volunteer for school groups
118	Public people and media
122	What kind of resources are you looking for? City DNR?
129	What kind of resources are you looking for? Visual?

Question 3: What kinds of water related programs do you enjoy most?	
Comment #	**Comment**
1	Anything that brings the community together
2	Anything that brings the community together
3	Gathering with other people who want to protect out water
4	Learn about where our drinking water comes from
5	Where do other states get their water from?
6	Drinking water facts
7	Program that considers the legacy of water
8	Programs that you can interact with

9	Water usage and availability data
10	Information about conventional agricultural runoff
11	Have an event (like a picnic) at an affected lake. Talk about progress, challenges, and values.
12	Miller Spring is awesome
13	Train the trainer, teach educators how to educate on the issues
14	Lawn care education
15	How to start your own raingarden
16	How to put in "water friendly" landscaping
17	Presentation by the city on how it plans to improve water quality
18	Water quality education
19	Learn what we can do to make a difference by ourselves on a daily basis
20	How we can improve rain gardens
21	Hands on workshops for restoration over time
22	Baby steps so people arent overwhelmed.
23	increase awareness of zebra mussels and weeds on boat landings
24	UNDER COMMUNITY EVENTS
25	Youtube
26	Online seminars (This can be used at many events)
27	Free online webinars and courses
28	Could high schoolers create a watershed?
29	Clean up projects
30	Poster contests
31	Music
32	Put children on a water project
33	Hands on educational programs
34	Interacting with youth and putting them in water education programs
35	Incentives to go to a water program
36	Competition/ incentive/ activities
37	How do you make it a competition/ contest?
38	Low mow grass seed packets?
39	Being at "on-site learning programs."
40	Bus tour of watershed projects

41	Education with experience- real people with real projects
42	subwatershed associations
43	seminars on how do I manage my property to improve water
44	In person seminars and group tours of water resources
45	In person seminars and group tours of water resources
46	Nibi walk
47	Family Oriented
48	Anything we can engage our kids in- cleanup/ activit.
49	Anything we can engage our kids in- cleanup/ activit.
50	Seminars held in a series and are presented at different locations
51	History of watershed events
52	Historical information while enjoying the watershed
53	Kayak/ canoe events
54	lakeshore cleanup
55	mini watershed neighborhood event
56	programs on the water or near the creek
57	on site events
58	exploring by kayak
59	Action events that involve participation
60	Hands on sampling and testing programs for schools
61	hands on workshops
62	kayak/ canoe tourwater, wildlife tour
63	raingarden tour
64	Lots of good information with the tours
65	walking on lakes in the winter
66	Lakeside/ streamside activities
67	Kayaking/ canoeing
68	Hands on learning
69	outdoor activities- fishing
70	Cleaning area lake shores
71	Be outside: at the lake, creek, etc.
72	Hands on monitoring/ clean up

72	Hands on monitoring/ clean up
73	canoeing, kayaking, etc.
74	gardening
75	wildlife watching
76	paddleboard tours around lake pointing out clues
77	talk about invasive species, native species
78	Bike, hike, canoe
79	Any activities on, in, or under water
80	paddle board
81	boating
82	water recreation: kayaking, canoeing
83	kayak tour
84	I love the bike trips! (me too)
85	"Learn and Play."
86	Urban tour of water BMPs
87	Fishing event: how to keep water clean
88	2 day weekend trip of hiking, camping, and learning
89	walk, bike, run, paddle, swim in, and around water
90	enjoy the resources
91	fishing- fun to see different species in different lakes, rivers, etc.
92	Learning the history of lake/creek through local historical society- learning through program
93	Citizen science monitoring program
94	Citizen monitoring programs
95	Lots of people want tour: these can be seen under the other categories
96	RPBCWD demonstration site for public education
97	Joint programs with the Minnesota arboretum for site demonstrations
98	Make a program that helps people afford to make the change in their environment
99	Creek or lake cleanup day
100	Hands on projects involving enhancing watershed resources
101	Install raingarden/ shoreline buffer
102	Joint presentation with other watersheds on how to clean up the Minnesotan River

103	Charitable
104	Contributions as a group with kids/ community
104	Contributions as a group with kids/ community
105	Support improvement grant projects
106	lakeshore for humanity
107	bike program

RILEY
PURGATORY
BLUFF CREEK
WATERSHED DISTRICT

14500 Martin Drive | Suite 1500
Eden Prairie, MN 55344
952-607-6512
www.rpbcwd.org

January 8, 2016

Minnesota Board of Water and Soil Resources
Metropolitan Council
State Review Agencies

Re: Riley-Purgatory-Bluff Creek Watershed District's 2017 Watershed Management Plan

Dear Future Watershed Management Plan Reviewers:

The Riley-Purgatory-Bluff Creek Watershed District Board of Managers (RPBCWD or Managers) is in the early stages of updating its *Watershed Management Plan* (Plan). The Plan sets the mission and policies for managing the lakes, ponds, creeks, streams, wetlands, drainages and groundwater in the district.

State statutes and rules govern the watershed planning process and require that watershed management plans be updated every 10 years; the RPBCWD's current plan expires in February 2021. However, the District would like to update their plan and follow a similar timeline as the comprehensive planning process for our communities. The RPBCWD's goal is to complete the draft plan by summer 2017, and then to submit the draft plan for review to the member cities, review agencies and the public. The Minnesota Board of Water and Soil Resources' (BWSR) authority includes approving the plan and overseeing the planning process.

Development of the 2017 Plan will rely on input from cities and townships, and other local stakeholders. With this letter, we are requesting any comments you might have on the following areas:

- Priority issues and your expectations for RPBCWD involvement in these issues
- Summaries of relevant water management goals
- Pertinent water resource information
- Official controls and programs (as applicable)

Contact the RPBCWD

Claire Bleser
District Administrator

cbleser@rpbcwd.org
952-607-6512

RPBCWD.org

The Managers also welcome other comments about the existing Plan, watershed conditions, or RPBCBWD administration and responsibilities. The Managers respectfully request that you provide this information within 60 days of receipt of this letter (**March 8, 2016**). The information you provide will help the Managers identify the issues and goals that should be addressed in the updated plan. The Managers will hold an issue identification and prioritization meeting after they have received and reviewed the requested information. You will receive a separate notification inviting you to this future meeting.

Thank you for your time and assistance in providing this requested information. Information should be provided to the Managers in care of Claire Bleser, District Administrator, cbleser@rpbcwd.org or 952-607-6512. If you have any questions, please contact Claire Bleser, District Administrator, cbleser@rpbcwd.org or 952-607-6512

Sincerely,

Perry Forster

Perry Forster
President, Riley-Purgatory-Bluff Creek Watershed District Board of Managers

c: RPBCWD Board of Managers
Metropolitan Council
Minnesota Board of Water and Soil Resources
Minnesota Department of Health
Minnesota Department of Natural Resources
Minnesota Department of Transportation
Minnesota Pollution Control Agency

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January 8, 2016

Cities and Townships
Carver County
Carver Soil and Water Conservation District
Hennepin County

Re: Riley-Purgatory-Bluff Creek Watershed District's 2017 Watershed Management Plan

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Sincerely,

Perry Forster

Perry Forster
President, Riley-Purgatory-Bluff Creek Watershed District Board of Managers

c: RPBCWD Board of Managers
Carver County
Carver County Soil and Water Conservation District
Carver County Water Management Organization
City of Bloomington
City of Chanhassen
City of Chaska
City of Deephaven
City of Eden Prairie
City of Minnetonka
City of Shorewood
Hennepin County
Lower Minnesota River Watershed District
Minnehaha Creek Watershed District
Minnesota Board of Water and Soil Resources
Nine Mile Creek Watershed District

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February 23, 2016

Ms. Claire Bleser, Administrator
Riley-Purgatory-Bluff Creek Watershed District
14500 Martin Drive, Suite 1500
Eden Prairie, MN 55344

Subject: Watershed Management Plan Update Request for Comments

Dear Ms. Bleser:

Thank you for your letter regarding your proposed Watershed Management Plan (WMP) Update that is scheduled to begin in 2016. It is our hope that by working together the District will develop a Plan that provides a good foundation for joint management and improvement of our water resources. Our recommendations are that the WMP should provide:

1. Implementation measures and dedication of resources for <u>all</u> beneficial uses of our water resources. It is our opinion that dedicating funds to allow more flexibility for recreational usage would provide a greater awareness and deeper sense of respect for management of these important resources. A resource that has good water quality but does not allow recreational use would not be held in as high of a regard to the public. This could include measures such as:
   - Management of deadfall within creek corridors to allow canoe or kayak access within areas with sufficient flow and depth.
   - Management of vegetation within lakes to allow recreational boating at months with peak summer usage

2. Written procedures for the development review process which would include guidelines and schedules to hand out for private project proposals to allow greater cooperation between the city and the District and better coordination of development proposals. In addition, administrative permit approval for smaller scale projects that include less than one acre in impact, such as parking lot revisions, construction of proof of parking, or building additions, would help keep these types of projects on a more concise review schedule. Review of the online Permit Application Guide is also recommended as it doesn't always provide the guidance expected.

3. An administrative permit approval process to allow faster turnaround for approval of project proposals which meet district rules. For example, this could include projects that would be considered smaller in scale or routine maintenance. The time that is required to initiate and permit infrastructure repairs or maintenance is not timely under the current process that requires individual rather than general permits. The result is the continued discharge of pollutants into the stormwater system while waiting for the permit to be reviewed and issued.

Not true – Permits can be issued on an emergency basis.

4. Flexibility in calculating and charging permit fees to allow the City and Watershed District to coordinate financial sureties to reduce duplication and project development costs.

5. General maintenance agreement templates for a variety of situations. Each of these types of situations have unique challenges and limitations as to what can be done within the bounds of the type of easement or property-ownership. This could include:
   - Private projects constructed with the intent that the infrastructure will become city owned or city maintained (for example placed under a drainage easement) which would then become monitored and maintained under the City's NPDES MS4 Permit.
   - Public projects performed on private properties that are within drainage easements.
   - Public projects performed on private properties that are within conservation easements.

6. Maintenance agreements for public property or for private property under a drainage easement should be written in a way that recognizes the City's responsibilities under the NPDES MS4 Stormwater Permit. In many situations a maintenance agreement with the District would be redundant. Instead, a short-term agreement or permit to cover construction may be more appropriate.

7. Specific guidelines on education, communications and District project proposals to allow cities and the public more opportunities to understand and participate in the many planning and education processes that the Board is undertaking. For example, the City has a wide array of requirements under our NPDES MS4 Stormwater Permit that have the potential of expending duplicate resources. MS4 cities monitor creek corridors for erosion and outfall stability; assess stormwater systems for treatment effectiveness and capacity; model sub-watersheds to evaluate the stormwater pattern for ponds, wetlands and lakes; inspect stormwater outfalls; evaluate lake water quality to determine the status of impairments; determine stormwater infrastructure needs for city-owned facilities; provide education for the public and staff; among many others. The City would prefer to work with the District as an active partner for projects such as public education workshops, Use Attainability Analyses, TMDLs, WRAPs and others that assess water quality of or have the potential to impact water quality rather than just providing information on the activities undertaken.

8. More detailed information on action items within monthly meeting packets to provide a greater understanding of the items that will be addressed. For example, the City writes Agenda for each item in the City Council packet that provides the proposed action and a detailed description of what will be discussed at the meeting. Currently it is often difficult to determine exactly what will be discussed at each meeting, if it would be beneficial to have City staff attend the meeting, or if a project proposal has the potential to be significantly different than what has been provided to the city for review.

Thank you for the opportunity to comment on the WMP Update process. We look forward to working with you on developing a plan that is beneficial to all stakeholders within the District.

Sincerely,

Leslie Stovring

Leslie A. Stovring
Environmental Coordinator

Minnesota Department of Natural Resources
Ecological and Water Resources Division
Central Region Headquarters
1200 Warner Road, Saint Paul MN 55106
Telephone: (651) 259-5845
Fax: (651) 772-7977

March 7, 2016

Claire Bleser
District Administrator
Riley Purgatory Bluff Creek Watershed District
14500 Martin Drive Suite 1500, Eden Prairie, MN 55344

RE: Riley Purgatory Creek Watershed District (RPBCWD) Watershed Management Plan Update

Dear Claire:

In accordance with your letter of January 8, 2016 and MN Rules Chapter 8410, I am writing to advise RPBCWD of the DNR's priority issues and expectation's for the Watershed Management Plan (Plan) update, along with summaries of relevant water management goals, and water resource information.

DNR would first like to acknowledge and express our appreciation for the excellent water resource management work that the District has been doing over the years and the significant changes recently that are sure to provide added protection for the watershed's water resources. Overall, RPBCWD's water management goals are closely aligned with DNR's and we have been working in partnership on a number of fronts, including the streamlining of our overlapping public waters regulatory programs via the recently issued DNR General Permit. We anticipate that this partnership will continue and be enhanced with this Plan update and implementation over the next ten-year period. Following are DNR's priority issues, with web links to background and additional information.

Integrated Water Resource Management

In general, DNR's water management goals and expectations focus on achieving healthy watersheds through a "whole-system" approach. Various ecological processes interact to provide services such as clean water, available groundwater, and diverse plant and animal communities. All components of the system should work together to provide a healthy watershed.

As RPBCWD begins the watershed management plan update process, it is important that water resource issues and goals be addressed not as independent prescriptions, but as integrated activities strategically applied toward the improvement of the entire watershed system. DNR's Watershed Health Assessment Framework uses a five component framework (hydrology, biology, connectivity, geomorphology, and water quality) to address the interdependent nature of

ecological systems that operate within a watershed. Placing the goals and actions identified by the District into this framework can help to:
• Evaluate District goals and actions in the context of the five aspects of watershed health
• Identify gaps between goals and actions
• Prioritize chosen actions effectively
• Examine the potential for unintended consequences

Please refer to the Watershed Health Assessment Framework webpage at http://www.dnr.state.mn.us/whaf/index.html for additional information and data sets.

We recommend the following general watershed management strategies, which align well with DNR's watershed health goals:

- Keep water where it falls by protecting and restoring wetlands, ensuring water courses are connected to their floodplains, and managing stormwater runoff with rate control and volume reduction standards
- Protect and create buffers of native perennial vegetation along watercourses and water bodies
- Reduce the flow of water volume and nutrients through ditches and drainage systems
- Design culverts and bridges to retain floodplain functions and bank stability on natural channels and other drainage systems
- Support land use planning and practices that protect, restore, and enhance priority resources
- Maintain and enhance perennial vegetation including protection of working forest lands
- Promote conservation practices on agricultural lands and drainage systems
- Use water efficiently and implement conservation measures that further reduce water demand

Additional, more specific recommendations by topical area follows:

Groundwater Sustainability

With the State's growing awareness that ground water resources are not unlimited and could face depletion in some areas if current trends continue, we would like to see the District play a stronger role in promoting groundwater use conservation. For example, the District's rules/standards could be updated to require stormwater reuse for landscape irrigation systems in new developments and the use of drought-tolerant native plant materials for landscaping. The Commission's education and outreach program could also include groundwater conservation as a priority focus area. Please refer to the DNR Groundwater website at http://www.dnr.state.mn.us/gwmp/index.html for additional information.

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MNDNR

Aquatic Invasive Species

Aquatic invasive species (AIS) pose a significant threat to Minnesota's lakes and rivers and continue to be a high priority issue for DNR. We recommend that the District include actions in the Plan to help prevent the spread of AIS through monitoring and public awareness efforts. For more information and ongoing coordination on the AIS Program, please contact Keegan Lund (keegan.lund@state.mn.us; 651-259-5828), DNR Invasive Species Specialist.

Stream and Lake Bank Stabilization and Restoration

DNR's underlying philosophy regarding stream management is that streams are self-forming and self-maintaining systems. When they are artificially manipulated there can be negative impacts to channel stability. Alterations in pattern, dimension, or profile of a stream can lead to an increase in stream bank erosion, increased turbidity, embedded sediments, and a general reduction in biological productivity. DNR encourages NMCWD to consider these stream dynamics when planning steam stabilization or restoration projects. Please refer to the following web pages for additional background and information:

http://files.dnr.state.mn.us/publications/waters/understanding_our_streams_and_rivers.pdf
http://files.dnr.state.mn.us/publications/waters/understanding_our_streams_and_rivers_resource_sheet_1.pdf
http://files.dnr.state.mn.us/publications/waters/toe_woodsod_mat_dec2010.pdf
http://files.dnr.state.mn.us/publications/waters/understanding_our_streams_and_rivers_resource_sheet_2.pdf

Consideration of Plant Communities, Rare Species, and Special Features

We appreciate your attention to the DNR Heritage Program mentioned in the RPBCWD Plan under Section 3.5 Unique Features and Scenic Areas. There are rare Natural Communities and rare species within the Riley-Purgatory-Bluff-Creek Watershed District. The presence of rare species is one indication of the health of a watershed, where plant and animal diversity help the landscape to maintain important watershed functions. The DNR recommends that the Watershed Plan Update incorporate these rare Natural Communities and rare species.

- Information on the biology, habitat use, and conservation measures of the rare species of interest can be obtained from the DNR Rare Species Guide: http://www.dnr.state.mn.us/rsg/index.html. For further information on how to address the protection of rare nongame species and their habitats, please contact Erica

Hoaglund, Regional Nongame Specialist (Erica.hoaglund@state.mn.us; 651-259-5772).

- We recommend the RPBCWSD request a Minnesota Natural Heritage Information System (NHIS) database query and list the date (MM/DD/YY) in the Plan Update. It is DNR policy that NHIS reviews are not considered valid if it has been more than one year since the review. The NHIS is continually updated as new information becomes available and will include current records and surveys.
- We also suggest that the RPBCWSD consider applying for a NHIS data license. As a watershed district, you would receive the license for free. The license is provided on a two year basis. Under a license agreement, you would have access to rare features data for the RPBCWSD. Information on the DNR Rare Features data license, and a Data Request form for a NHIS review completed by the can be found at: http://www.dnr.state.mn.us/eco/nhnrp/nhis.html. Questions regarding the NHIS should be directed to Lisa Joyal, Endangered Species Review Coordinator (lisa.joyal@state.mn.us; 651-259-5109).
- We also recommend documenting the *S rank* (conservation status) of the Natural Communities within the Watershed Plan. The *S rank* reflects the relative rarity and endangerment of these communities throughout Minnesota.
  - **S1** = Critically Imperiled
  - **S2** = Imperiled
  - **S3** = Vulnerable to Extirpation
  - **S4** = Uncommon but not Rare
  - **S5** = Common and Abundant

- The DNR recommends the RPBCWSD incorporate additional information that would be useful in identifying and protecting sensitive areas and species within the watershed including the following.
  - The Central Region Regionally Significant Ecological Areas (CRRSEA): CRRSEA information is available in GIS format via the Minnesota Geospatial Commons (https://gisdata.mn.gov/). Bluff Creek, Riley Creek and Purgatory Creek watercourses all have CRRSEA of high rank in the vicinity, and Riley Creek has CRRSEA of outstanding rank in close proximity. CRRSEA have terrestrial and wetland resources of various qualities (ranked moderate to outstanding) that support a variety of plant and animal species, and provide habitat connectivity to other ecologically intact areas. The DNR Central Region (in partnership with the Metropolitan Council for the 7-county metro area), identified these ecologically

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significant terrestrial and wetland areas by conducting a landscape-scale assessment based on the size and shape of the ecological area, land cover within the ecological area, adjacent land cover/use, and connectivity to other ecological areas. The purpose of the data is to inform regional scale land use decisions, especially as it relates to balancing development and natural resource protection. Disturbance activities within them should be minimized to the extent feasible. Indirect impacts, such as hydrological changes or the spread of invasive species, should also be considered and minimized. This feature is not considered sensitive information and therefore may be included on maps for distribution. Additional information regarding CRRSEA data can be found at the following website: http://www.dnr.state.mn.us/rsea/index.html.

- The Minnesota Biological Survey (MBS) Sites of Biodiversity Significance: MBS Sites of Biodiversity Significance information can be found at http://www.dnr.state.mn.us/eco/ mcbs/biodiversity_guidelines.html. MBS Sites of Biodiversity Significance have varying levels of native biodiversity (ranked below to outstanding) with rankings based on the relative significance of this biodiversity at a statewide level. We encourage the RPBCWSD to use this information in resource assessment and in planning for the cumulative impacts of land use. The GIS spatial data is available at the Minnesota Geospatial Commons website: https://gisdata.mn.gov/. This feature is not considered sensitive information and therefore may be included on maps for distribution.

Watershed projects

- DNR encourages the use of site-appropriate native plants for shoreline stabilization, buffers, and erosion control for all watershed projects. These species provide important stabilization and erosion control functions, have the greatest chance of establishment success, and contribute to biodiversity of landscape vegetation.
  - Query the DNR Restore Your Shore Native Plant Encyclopedia (https://webapps8.dnr.state.mn.us/restoreyourshore/search?type=resetreturned) for a list of plants tailored to specific site characteristics.
- The District should encourage the use of native plants in future development of parks, trails, restored riverbanks, and additional projects that may result in urban greenspaces. The use of native plants may increase habitat for native wildlife in an urban setting.
  - Native plant resources can be found on the MnDNR Landscaping with Native Plants website: http://www.dnr.state.mn.us/gardens/ nativeplants/index.html.
- DNR recommends the establishment of native grassland and herbaceous plant communities in the place of mowed turf grasses on watershed and highway projects as a means to support native insect pollinator communities. Interest in pollinators has grown

since the term Colony Collapse Disorder appeared in 2006. While this disorder does not affect native pollinators, many of the challenges that face honey bees also affect native insects, including pesticide use, habitat loss, pathogens, parasites, climate change, and invasive species.

- DNR has developed a Best Management Practices Guide for restoring and enhancing native plant community habitat for native insect pollinators, available at: http://files.dnr.state.mn.us/natural_resources/npc/2014_draft_pollinator_bmp_guidelines.pdf

- The importance of forested riparian areas to water resources cannot be understated. Forested riparian areas provide an array of goods and services for plant diversity, wildlife and fish habitat, nutrient, sediment, and water interception, storage, and transformation and recreational opportunities. Keeping riparian areas intact so that the functions and roles of terrestrial and aquatic ecosystems can continue to provide these services is imperative. We recommend keeping forested riparian areas forested, which does not necessarily preclude forest management activities. If riparian forests are managed in the WMO area, we highly recommend consulting and using the Minnesota Forest Resource Council's *Voluntary Site-Level Forest Management Guidelines for Landowners, Loggers, and Resource Managers* to protect these valuable ecosystems into the future (http://mn.gov/frc/docs/MFRC_Revised_Forest_Management_Guidelines_(2012).pdf).

- Two schools in the WMO area are enrolled in the DNR's School Forest Program. Scenic Heights Elementary School in Minnetonka has a 4 acre school forest adjacent to Purgatory Park and St. Therese Catholic School of Deephaven has a 7 acre forest. These forests are both school-owned and act as an outdoor classroom for students. In addition, both schools are providing important water quality benefits for the watershed. For more information about the School Forest Program, visit our website: http://www.dnr.state.mn.us/schoolforest/index.html

- Communities interested in caring for and managing their urban and community forests can find helpful information at the DNR's website on the Community Forestry webpage. Information and links about grant programs, DNR Arbor Month, and best management practices for preventing spreading invasive species and conserving wooded areas can be found here: http://www.dnr.state.mn.us/forestry/urban/index.html

- Emerald ash borer (EAB) will likely have an impact on communities in the WMO area within the next 10 year watershed plan cycle. EAB is likely already in the watershed

Minnesota Department of Natural Resources
Ecological and Water Resources Division
Central Region Headquarters
1200 Warner Road, Saint Paul MN 55106
Telephone: (651) 259-5845
Fax: (651) 772-7977

boundaries given the rate of spread in the Twin Cities area. The rate of ash infestation in the watershed will likely be similar to that of the core Twin Cities' infestation zone. Once EAB is discovered in the watershed, it might be discovered at a rate of 3 miles per year. This means there could be EAB discoveries across the watershed by 2017. Trees in the eastern part of the watershed are likely to be impacted first based on the nearest known location today (http://www.mda.state.mn.us/emeraldashborer). Communities should start planning for EABs arrival and take action now to reduce the sudden financial burden that comes with EAB. One can find information at this website (http://www.myminnesotawoods.umn.edu/eab/). At a city level, large amounts of dead ash trees will need to be dealt with about 6 years after the initial infestation is noticed in a community. For example, EAB was discovered in Winona in 2010. Massive numbers of ash trees started dying in that area in about 2015. To minimize pesticide exposure in the environment and to save people's money, we would not recommend applying insecticides to save ash trees until symptoms of EAB infestation are within about ¼ - ½ mile of any given location. Note that ash trees can still be saved from EAB if they are lightly infested (they must still have over 50% of their normal number of leaves that are normally sized). Ideally ash trees should be treated when they are 100% healthy and not infested at all, so there is some risk of waiting until EAB infestation symptoms are visible within a ½ mile. In natural areas, forested wetlands with ash dominant in the canopy will experience a more drastic change in plant community composition and hydrology than upland communities with a minor ash component.

In closing, I want to confirm that Kate Drewry and/or I will be participating on the Technical Advisory Committee for RPBCWD's Plan update process as the DNR representative. If you have questions regarding the content of this letter or would like to discuss individual topics or recommendations further, please do not hesitate to contact me. I look forward to working with the District on your next generation Plan and future projects.

Sincerely,

Jennie Skancke
DNR South and West Metro Area Hydrologist

City of
minnetonka
Where quality is our nature

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(952) 939-8200 • Fax (952) 939-8244
eminnetonka.com

March 8, 2016

Riley Purgatory Bluff Creek Watershed District
Attn: Claire Bleser
14500 Martin Dr., Suite 1500
Eden Prairie, MN 55344

Dear Ms. Bleser:

Thank you for providing the City of Minnetonka (City) the opportunity to comment on the initial stages of the Riley-Purgatory-Bluff Creek Watershed District's (District) of the Watershed Management Plan (Plan) updates. Per your request, please find the City's comments included below.

Priority Issues and Expectations:

- The area surrounding the southeastern quadrant of CSAH 101 and TH 7 is likely to develop in the coming years. The City would appreciate the opportunity to coordinate with the District when preliminary discussions occur. The goal of the coordination is to facilitate seamless permitting and investigate potential opportunities to expand natural resource/stormwater amenities.

Summaries of Relevant Water Management Goals:

- The Silver Lake Creek area currently has limited reduction of phosphorus prior to discharge into Purgatory Creek. The City requests a management plan for this area be generated to reduce phosphorus loads to Purgatory Creek and improve local water quality.

Pertinent Water Resource Information:

- Continuation of partnership in the development of floodplain mapping updates.

Official Controls and Programs:

- The City would like to coordinate education and outreach efforts targeted towards Minnetonka residents for the purposes of promoting the District's cost share initiatives, raising awareness, and engaging the citizen base.

Other Comments:

- Permit Administration:
    - The City would like to formalize a process detailing how the District and City will coordinate through the development process and administration of rules/ordinances.
    - In regards to the stormwater requirements for linear projects, the City respectfully requests examining the possibility of differentiating "linear reconstruction projects" from "new linear projects". Incorporating stormwater treatment into reconstruction projects under the current iteration of the rules presents an undue difficulty considering the limited availability of right-of-way in a built-out environment.
    - The City would like to investigate the opportunity to jointly pursue financial assurance with the District.

Thank you again for the opportunity to comment on the upcoming revisions to the District's Water Management Plan. Should you have any questions or concerns, please contact me at (952) 939-8233 or tdietrich@eminnetonka.com.

Sincerely,

Tom Dietrich
Water Resources Engineering Coordinator

February 29, 2016

Claire Bleser, District Administrator
Riley-Purgatory-Bluff Creek Watershed District
14500 Martin Drive #1500
Eden Prairie, MN 55344

RE: Riley-Purgatory-Bluff Creek Watershed District Watershed Management Plan Update

Dear Ms. Bleser:

This letter is in response to your email from January 8, 2016 soliciting input on the Riley-Purgatory-Bluff Creek Watershed District's (District) Watershed Management Plan.

Board of Water and Soil Resources expectations for Plan Updates focuses on: 1. The Process – an opportunity to talk about the right things and affirm, align, or change direction based on the upfront input and issue identification that is brought forward; 2. Coordination – good planning feels collaborative from the beginning involving multiple LGUs, stakeholders and multiple levels of planning; 3. Plan Contents – revolving plans around priority issues, capturing clear 5-10 year intent, data analysis with trends, short/mid/long-term measurable goals based on science, priorities and frequently updated targeted implementation plans; and 4. Organization Capacity – increased self-evaluation, accountability and efficiency of implementation.

A few comments from my review of watershed information and activities as you embark on this planning effort include:

- Implementation Actions (refer to MN Rule 8410 for additional requirements)
    - Prioritized Implementation Program (Capital Improvement Program). The implementation program should be clear in identifying what implementation actions the District will accomplish in the next ten years regardless of whether or not they receive any new grant funding. Be realistic in what the District has the capacity to accomplish, but at the same time do not be afraid to stretch those capabilities.

  - Include a procedure to evaluate progress for implementation activities at a minimum of every two years.
  - Define the District's process for evaluating implementation of local water plans.
  - Define who is responsible for inspection, operation and maintenance of stormwater facilities in the District.
  - If the District has or proposes an incentive type program it needs to be defined in the plan (the plan can also include a reference to District website for more detailed information on the program).

- The District should include a reference to the Twin Cities Metropolitan Area Chloride TMDL and incorporate elements of the Chloride Management Plan.

- The District should include a reference to the Carver County Groundwater Plan and include relevant strategies from the Implementation Table.

- We encourage exploring opportunities for new/increased partnerships with Hennepin County Department of Energy and Environment and Carver SWCD staff as well as neighboring watershed districts on projects contributing flows to the Minnesota River.

I would like to recognize the excellent work that the District has done. We appreciate the opportunity to provide comments and preliminary input. I look forward to continuing to work with you through the rest of the plan development process.

If you have any questions, please feel free to contact me at 651-296-2633, steve.christopher@state.mn.us

Sincerely,

Steve Christopher
Board Conservationist

cc: Randy Anhorn, Hennepin County Department of Environment and Energy (via email)
Mike Wanous, Carver SWCD (via email)
Jeanne Daniels, MnDNR (via email)
Karen Voz, MDH (via email)
John Freitag, MDH (via email)
Jeff Berg, MDA (via email)
Judy Sventek, Metropolitan Council (via email)
Juline Holleran, MPCA (via email)
Beth Neuendorf, MnDOT (via email)

February 11, 2016

Claire Bleser
District Administrator
Riley-Purgatory-Bluff Creek Watershed District
14500 Martin Drive
Eden Prairie, MN 55344

RE: Information request for watershed management plan update

I am providing information as requested for the preparation of the District's Watershed Management Plan update.

The direction and policy that follows comes from the Council's *Thrive MSP 2040* Regional Development Framework and the *2040 Water Resources Management Policy Plan*, both of which can be found on the Council's web page (www.metrocouncil.org).

In particular, the *2040 Water Resources Policy Plan* (Policy Plan) includes policies and strategies to achieve the following goal:

> *To protect, conserve, and utilize the region's groundwater and surface water in ways that protect public health, support economical growth and development, maintain habitat and ecosystem health, and provide for recreational opportunities, which are essential to our region's quality of life.*

The Policy Plan takes an integrated approach to water supply, water quality, and wastewater issues. This approach moves beyond managing wastewater and stormwater only to meet regulatory requirements by viewing wastewater and stormwater as resources, with the goal of protecting the quantity and quality of water our region's needs now and for future generations.

The Policy Plan includes policies and strategies to:

- Maximize regional benefits from regional investments in the areas of wastewater, water supply and surface water management and protection.
- Pursue reuse of wastewater and stormwater to offset demands on groundwater supplies.
- Promote greater collaboration, financial support, and technical support in working with partners to address wastewater, water quality, water quantity and water supply issues.
- Promote the concept of sustainable water resources through collaboration and cooperation, with the region taking steps to manage its water resources in a sustainable way with goals of:
  - ü Providing an adequate water supply for the region
  - ü Promoting and implementing best management practices aimed at protecting the quality and quantity of our resources
  - ü Providing efficient and cost effective wastewater services to the region
  - ü Efficiently addressing nonpoint and point sources pollution issues and solutions, and,
  - ü Assessment and monitoring of lakes, rivers, and streams to direct adequate management, protection, and restoration of the region's valued water resources.

The updated watershed management plan should include policies related to the protection of area water resources with these strategies in mind with the end goal of water sustainability.

In addition to being consistent with the Council's new policy plans, the plan also needs to include quantifiable and measurable goals and policies that address water quantity, water quality, recreation, fish and wildlife, enhancement of public participation, groundwater, wetlands, and erosion issues.

Council staff will be looking for the plan to address the issues and problems in the watershed and to include projects or actions and funding to address the issues and problems. At a minimum the watershed should address:

1. Any problems with lake and stream water quality and quantity including information on impaired waters in the watershed and the District's role in addressing the impairments,
2. Flooding issues in the watershed,
3. Storm water rate control issues in the watershed,
4. Impacts of water management on the recreation opportunities,
5. Impact of soil erosion problems on water quantity and quality,
6. The general impact of land use practices on water quantity and quality
7. Policies and strategies related to monitoring of area water resources
8. Policies and strategies related to use of best management practices
9. Issues concerning the interaction of surface water and groundwater in the watershed
10. A list of the requirements for local surface water management plans
11. Erosion and sediment control standards and requirements
12. Volume reduction goals at least as restrictive as requirements in the NPDES construction general permit, and,
13. Capital improvement plan with itemized list of actions, estimated costs, and timeline.

The Council also has monitoring data, flow, annual loads, and trend analyses for Bluff Creek, and Riley Creek, which are available as part of our report *Comprehensive Water Quality Assessment of Select Metropolitan Area Streams*, available at www.metrocouncil.org/streams/. Contact me to receive load spreadsheets and any other data and analyses in the report.

The following lakes within the District are on the Council's Priority Lakes List: Lake Ann, Lake Riley, Lotus Lake, Mitchell Lake, and Staring Lake. The Council webpage also has 2010 land use information for all of the communities in the watershed.

Please feel free to me call at 651-602-1401 with questions about my comments or for any assistance I can provide during the plan preparation.

Sincerely,

Joe Mulcahy
Environmental Analyst
Metropolitan Council – Environmental Services
651-602-1104
mailto:joe.mulcahy@metc.state.mn.us

resourceful. naturally.
engineering and environmental consultants

Technical Advisory Committee (TAC) Meeting Notes
Discuss Internal Draft of RPBCWD 10-Yr Watershed Management Plan

date: September 27, 2017
time: 10:30-11:30
location: 18681 Lake Dr E, Chanhassen, MN 55317 (RPBCWD offices)

meeting attendees

Claire Bleser (RPBCWD), Terry Jeffery (RPBCWD), Scott Sobiech (RPBCWD/Barr), Dave Modrow (Eden Prairie), Rod Rue (Eden Prairie), Leslie Stovring (Eden Prairie), Paul Oehme (Chanhassen), Vanesaa Strong (Chanhassen), Steve Segar (Bloomington), Bob Bean (Deephaven), Mike Wanous (Carver County), Tom Dietrich (Minnetonka), Jennie Skancke (MnDNR), Bill Alms (Shorewood), Steve Christopher (BWSR)

item description

A Overview Plan Presention

B Feedback on Internal Draft of 10-year Plan

1. VS –
    a. Are the appendices still coming or were they missed in PDF.
    b. CB – Appendices are being compiled and will be made available to TAC, One of the appendices will include a draft report card which will likely be given to board next week
2. JS –
    a. Complimentary on prioritization scheme and would like to see others implement something similar
    b. Highlight collaboration with other more
    c. What is the value of a wetlands vs lakes vs streams. Appear to all be same value
3. LS –
    a. Plan is more visual which is good
    b. Shallow lake forum – only one mention. Might consider describing how it evolved
    c. Need more on how working with cities, the district is not working in a vacuum
4. MW –
    a. Ditch Authority
    b. Clarify RPBCWD role / plan forward
    c. No ditches in Caver County
    d. Consider adding a brief description of the capital projects rather than the general description, maybe a 1-page fact sheet or summary

i. RR – Agreed with this and added that the dots on the BMP Map make it difficult to determine the exact location of the proposed project

5. SS –
    a. Wondered what the scoring means in Table 9-1.
    b. Consider adding a footnote
6. TD –
    a. Will there be a definitions section?
    b. What is sustainability?
        i. Appears to have different meanings in various part of the Plan
        ii. Consider explaining
7. VS –
    a. Strive for Plan consistency with other watershed districts, Cited 103B.2???
        i. Example: Define impervious surface consistent with other
        ii. Work towards more consistency to make it easier for cities with multiple WDs
    b. CB – Discussed rules process of coordination through the TAC. Also described uniqueness of each district may result in need for differences
    c. JS – suggested consideration of using statute definitions where possible
    d. SC – BWSR encourages coordination
8. SC –
    a. Might want to clarify why RPBCWD projects received higher scores than the project identified in the Bluff Creek TMDL (Table 6.2). He has heard MPCA ask for explanation at other WD meetings
9. BB –
    a. No discussion on WRAPS, TMDL credits in watershed sections (6.0, 7.0 or 8.0) and very limited description elsewhere in Plan
        i. Needs more info
        ii. What is WD role?
        iii. Is WD looking to take the lead role in tracking?
        iv. Consider policy or agreement with MS4s on how waste load allocations will be handled (MOUs, JPAs, etc).
10. TD –
    a. There could be a lot of value in the watershed district getting together to interface with MPCA (group with other WDs as united front)
11. BB –
    a. Cost share section could use more description (what is the guidance, is it changing, what qualifies, etc)
    b. CB - Program in already in place
12. RR –
    a. Why are some program dollars flat over 10 years
    b. Add more explanation of repairs and maintenance funds (i.e., what qualifies and who can utilize funds)
        i. CB: existing infrastructure, District project, conveyance

   c. MW – Consider increasing $$ for repairs and maintenance because District will be building more BMPs
   d. Why is PCRA berm is not shown in Table 9.1
   e. CB: Already levied funds that it will be a multiyear fund
13. VS –
   a. Consider adding pollinator initiative not mentioned
   b. Why does benefits volume only consider impervious area runoff
   c. What if prairie restoration or removing impervious surface→ No credit?
   d. BA – What about longer events for volume control – how is that considered
14. SS –
   a. Confusion with regulatory,
   b. Will roles or process be changing? Does Section 9.4 change status of what is currently done?
      i. CB – no, this are the same as current. The section is intended to describe the current process
15. TD –
   a. Regulatory efficiencies
   b. Allow for joint financial assurance and maintenance
   c. Minnetonka is having difficulty achieve abstraction requirements for linear projects. That portion of the rules should be reviewed
16. Next Tac meeting set for November 8 – RPBCWD Rules update

C Next TAC meeting : November 8 – RPBCWD Rules update

TAC Comment Tracking Form

TABLE 1 - Document Information

Document #	"Document" Information			
	Document Name	Type	Date	Description
1	Draft Watershed Mangement Plan	Report	September-17	Internal review of the DRAFT version of the RPBCWD 10-year Watershed Management Plan

TABLE 2 - Comments

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Agree	Response
Example	9/12/2017	John Doe	1	Figure 2.3.4	2	45	I'm having a hard time differentiating betweent the colors.	MSJ	
1	9/20/17	Jennie Skancke	plan draft	intro			First sentence, path downstream to a waterbody OR WATERWAY	VS	revised to or watercourse
2	9/20/2017	Jennie Skancke	1	all			All the doc needs some good proofing.		noted
3		Jennie Skancke	1	Figure 1.2			I really like this figure. i think it's a good component for the average citizen who wonders why you need X number of staff.		noted
4		Jennie Skancke	1	pg 1-8		1-8	Agencies represented on the committee vary from the Metropolitan Council, to the Minnesota Department of Natural Resources and Counties and Cities.		revised
5		Jennie Skancke	1	figure 1-3			MN DNR also works closely with Cities to help them adopt state shoreland standards that are established in statute and enforced through city zoning. Could just add "cities" after "citizens"		added ", cities, and other governmental units"
6		Jennie Skancke	1			1-11	The lake was at a low elevation because of dry climatic conditions when the homes were built. - when you say the lake was at a low elevation, it implies the lake bottom. I think you mean the water levels were low, not the actual lake. "lake water level" would work.	VS	revised
7		Jennie Skancke	1			1-12	Box - just BWSR, not "the BWSR".		revised
8		Jennie Skancke	1			1-13	Round Lake Restoration project through biomanipulation - what does this mean?	VS LS - See comment below	revised
9		Jennie Skancke	1			1-19 and others	Could you please state "MN Dept of Natural Resources", or just spell it out once and then use MN DNR?		revised to use MDNR for consistency
10	9/22/2017	Chris Zadak	1				MPCA would like to see a quantitative accounting of estimated pollutant reductions that your planned projects will accomplish over this 10-year plan cycle relative to what is ultimately needed/desired. In other words, for any waterbody with a completed or draft TMDL (or equivalent WD study) there are overall needed reductions to meet WQ standards (e.g., 400 lbs TP). How much will the planned projects for that waterbody collectively reduce compared to that overall need? Please state this (preferably in both mass and % of what is ultimately needed). This need aligns with the accountability provisions of the WRAPS statute (114D.26). By providing this info we can understand/evaluate (maybe marvel at!) how effective your plan will be for these waterbodies and perhaps get a sense for how long it may take to reach the ultimate targets. This information could be provided in its own table or added to an existing one. Estimates or ranges are fine. It appears you have the info available to accomplish this as pollutant reduction was part of your scoring system.	JPM-But may be very difficult., VS	The District is not an MS4. The District will publish the multi-faceted benefits of the project during implementation. In addition, the District is uncomfortable publishing another agencies draft materials. The District is investigating options for equitable distribution of project benefits to project partners for projects the District implements.
11	9/22/2017	Chris Zadak	1				Given its leadership role in the watershed it would be appropriate for the WD to go beyond accounting for only its own initiated projects and also track the reductions done among all the parties subject to WLAs relative to the needed reductions for relevant waterbodies. This need not be an involved undertaking as this may be accomplished with a spreadsheet or simple database approach. Further, MS4s should already be tracking their own progress for MPCA annual reporting purposes so it should mainly be a matter of requesting and managing this data. The MPCA would appreciate a brief mention in the plan that the WD would plan to do this tracking task.	JS, VS	The District is not an MS4. The District will publish the multi-faceted benefits of the project during implementation. In addition, the District is uncomfortable publishing another agencies draft materials. The District is investigating options for equitable distribution of project benefits to project partners for projects the District implements.
12	9/26/17	Mike Wanous	1	Acronyms		p.15	YOY = Young of the Year?	p xiii?	revised
13	9/26/17	Mike Wanous	1	Introduction		p.17	Plan Purpose - currently blank, assuming this will be completed later on along with the Executive Summary?		text added to section 1.1 Plan Purpose. Executive summary is under development
14	9/26/17	Mike Wanous	1	Table 1-5		p.25	Carver County and Carver SWCD reps not listed...hmmm	VS LS (p. 1-8 and 1-9 don't show anyone from Carver County)	sorry for the oversight. Mike Wanous and Paul Moline added
15	9/26/17	Mike Wanous	1	3.1		p.65	District Vision and Vision (Mission?)	LS	revised
16	9/26/17	Mike Wanous	1	3.2.5.1	Reg 2.	p. 71	Support Hennepin and Carver Counties to operate effectively as Ditch Authorities. Is this needed? Does any ditch work still take place? How does it fit in to 5.7.1 on page 108-109?	LS - Does Hennepin County maintain ditches in this district?	yes
17	9/26/17	Mike Wanous	1	Fig. 5-9		p.120	Difficult to see impaired streams - suggest making them bolder.	VS / LS	will be revised
18	9/26/17	Mike Wanous	1	Fig. 5-12		p.128	What are "multiple activities"?	VS / LS	

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Agree	Response
19	9/26/17	Mike Wanous	1	Fig. 9-5		p.250 9-118	Permanent easements may not always be needed to enhance or restore wetlands. Suggest changing to "impacted landowner permission" or similar.	LS - Suggest adding in other alternatives for "No" in the decision tree so that if they don't agree to an easement or outlot, there are other alt than just monitoring (i.e. work in cost share program, city rebate, etc.)	District typically requires permanent protection of projects to ensure the long-term viability and justify the expenditure of public funds
20	9/26/17	Jennie Skancke	1	pg 3-2			should 13 also say "reduce volume of"?		no change
21	9/26/17	Joe Mulcahy (JPM)	1	4.1.10.1		4-13	This section should explain exactly what the additional logistic factors are, which ones were used for each project in Table 9-1, and whether the same ones will always be applied in the future?	LS - some examples of additional logistical factors would help	cross reference added to Section 9.2.1 - logistical factor.
22	9/26/17	Joe Mulcahy (JPM)	1	6.3 Opportunity Projects		p. 6.6	Would these be subject to the same project prioritization process? I am unclear on how this process will work.	LS - how will these be funded in light of the other priorities? How will you determine which will be done when?	They would go through a prioritization ranking and funded through the opportunity project fund
23	9/26/17	Rod Rue	1	5.1		125	It indicates that the District plans to complete a District wetland inventory--coordinate with cities to avoid duplication of effort	JS. Also, please indicate jurisdiction and land ownership if known when this is compiled. , VS	noted
24	9/26/17	Joe Mulcahy (JPM)	1	Table 9-1		?	Text on p.9-79 and 9-92 indicates the entries and costs in this table are very tentative; The District should add another table of the projects most likely to be implemented (by year for the entire ten years) with the most accurate cost estimates available		most accurate cost estimates available are presented in Table 9-1
25	9/26/17	Rod Rue	1	Table 7-2		149	PCRA berm is not on the list - major repairs needed and provides treatment	LS - Chanhassen Reuse project is itemized but not Fire Station 2	funds levied in 2017 so not listed in table. PCRA berm will be a multi-year project
26	9/26/17	Rod Rue	1	Table 9-1		212	Provide better descriptions for projects (ID may be helpful for district staff but not for others--descriptions are too generic).	JPM, VS, LS	the general descriptions allow flexibility of the type of BMP implemented at the site to allow of emerging technologies
27	9/26/17	Rod Rue	1	Table 9-1		212	DL-3 (2018) Duck Lake - Duck Lake has better water quality than other projects that are funded at the end of the plan (i.e. Mitchell Lake, Staring Lake).		this water quality protection project moved forward in implementation timeline in hopes of coordinating with City roadway reconstruction
28	9/26/17	Rod Rue	1	Table 9-1		213	Cost share money is level for 10 years - should be increased annually to support partnering goals	VS	no change
29	9/26/17	Rod Rue	1	Table 9-1		213	Annual allocation to Repair and Maintenance Fund is only funded every third year.		this fund is an accumulating fund
30	9/26/17	Rod Rue	1	Table 9-1		213	Most programs have "flat" budgets - most of the identified increases are in "soft" costs.	VS	noted
31	9/26/17	Rod Rue	1	9.4.2		230-234	Regulatory program - the plan should address the fact that district municipalities are also regulated by NPDES/MS4 regulations. More discussion is needed to address the differences and provide goals to better align the regulations.	VS, Steve Segar- If RPBCWD Rules are more strict than a city's, do we still have our own permitting programs? (I'm a little confused).	the District is a separated regulatory agency required to implement a regulatory program to protect and restore water resources. As discussed in Section 9.4.2, Regulatory Authority, Roles and Responsibilities, Cities can enter into a MOU
32	9/26/17	Rod Rue	1	9.4			Address the need for general permits with municipalities for common repair and maintenance projects.	SS-This would improve expediting work	this is something that has been under-discussion with several cities for a couple of years. The challenge is in defining what fits under the terms of such a permit and the District's general permit with DNR does not allow delegation of actions covered under that permit
33	9/26/17	Rod Rue	1	9.4.2			Clarification is needed as to what criteria establishes the need to update a LWMP? I know I'm somewhat confused.	LS	As discussed in the last paragraph of Section 9.4.2 the LWMP and city ordinances would need to be updated to maintain conformity to the RPBCWD rules or defer exercise of regulatory authority for the work covered by the revised rule
34	9/26/17	Rod Rue	1	9.8		245	Clarification is needed to define projects eligible for Stormwater Repair Funds (i.e. maintenance of required BMP's, general system maintenance/repairs)		text added "and the cost of removing obstructions and accumulations of foreign substances from a drainage system"

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Agree	Response
35	9/26/17	Rod Rue	1	9.11			Somewhat confused by the message in this section. Urbanization of the landscape is not the main reason for the loss of wetlands (plan indicates that conversion of emergent wetlands to cultivated wetlands is not considered a wetland loss yet likely accounts for a dramatic share). Recognition should be given that the district and metro area has a higher standard for wetland management than throughout the state (in general).		WCA applies statewide
36	9/26/17	Rod Rue	1	9.11			Promote data sharing to avoid duplication of efforts.	VS	noted
37	9/26/17	Rod Rue	1	9.15			Clarification needed regarding the need and thresholds for district and local plan amendments. (i.e. better understanding on my part)		RPBCWD adopted a resolution requiring that a LWMP be amended if the City has elected to take on portion of the regulatory authority adn RPBCWD revises a rule. the LWMP and city ordinances would need to be updated to maintain conformity to the RPBCWD rules or defer exercise of regulatory authority for the work covered by the revised rule. In addition, plan amendments are needed as provided for in 8410. If there are questions about what triggers a plan amendment please contact the Distirct of BWSR.
38	9/27/17	Steve Segar	1	9.7		243	Suggest adding water quantity and/or flood protection as a cost-share to 1. Local Governments to assist with Atlas-14/climate change adaptation projects		added Wquan S1
39	9/27/2017	Leslie Stovring	1	Section 1.5		p 1-13	Rotenone was applied in 1980 and 1985 by the DNR which did result in a temporary increase in water clarity. Biomanipulation was fishery habitat managment.		revised
40	9/27/2017	Leslie Stovring	1			p 1-15	There is a typo at the end of the 1991 paragraph. Should be "much enjoyed and valued" recreation area. I would also recommend stating that this project also continues "to provovide" a water quality improvement role for Staring Lake and perhaps even Purgatory Creek.		revised
41	9/27/2017	Leslie Stovring	1	Section 1.6.3		p 1-18	The Shallow Lake Forum and subsequent Urban Lakes Forum were initiated by an idea generated by the City of EP and the District and then grew into a multi-agency partnership. More could be added on the success of partnership and how ideas are shared across multiple levels could be added not only here but in other areas as well. Cities and other over-lapping entities are a good source of ideas and partnerships both technically and financially.		section is intended to be a general discussion
42	9/27/2017	Leslie Stovring	1	Section 1.65		p 1-18	The herbicide treatment in Red Rock and Mitchell began in 2015 but isn't mentioned specifically until 2016.		intended to be general and not all encompassing
43	9/27/2017	Leslie Stovring	1	Section 2.2.4		p 2-8	The word city "committees" should be "commissions"		revised
44	9/27/2017	Leslie Stovring	1	Table 5-5		p 5-30	If Red Rock was delisted why not just delete it from the table rather than adding a tiny footnote. Do you want to add anything on the request for Mitchell to be delisted as a footnote?		still listed for mercury
45	9/27/2017	Leslie Stovring	1				Add in clarification that habitat restoration will include analysis of ability to add in pollinator habitat and how best to manage these areas for pollinators (perhaps through education)		noted
46	9/27/2017	Leslie Stovring	1				Clarify the TMDL process and how the district will work with the cities to provide information on how the projects implemented will help meet their TMDL goals and track the information that results from the completed projects. Clarify the Districts relationship in assisting with TMDL implementation.		see response to comment 10 and 11
47	10/3/2017	Tom Dietrich (TDD)	1	Section 3.2.4.2		p3-5	I recommend explicitly defining sustainability somewhere in the plan. There are a wide array of practices that can apply under the umbrella of sustainability, and the District should be specific on those methods it will choose to pursue/implement.		The Envision™ rating system definition added to Section 4.1.2 "a set of environmental, economic and social conditions in which all of society has the capacity and opportunity to maintain and improve its quality of life indefinitely without degrading the quantity, quality or the availability of natural resources and ecosystems
48	10/3/2017	Tom Dietrich	1	Section 3.2.4.2		p3-6	In regards to Plan S5 - will there be a specific methodology that will be employed to evaluate programs and projects?		the District plans to develop score cards and metrics to track the benefits of implementing the projects and programs
49	10/3/2017	Tom Dietrich	1	Section 4.1		p4-2	Make sure 'sustainability' as defined here is consistent with the definition you are using elsewhere in the plan.		see response to comment 47
50	2/23/2016	City of EP	Notification Letter				Implementation measures (i.e., projects, studies, programs) and resources (e.g., funding) to support recreational usage (e.g., removing deadfall from creeks/lakes to allow boating).		
51	2/23/2016	City of EP	Notification Letter				Written procedures for the development review process, including guidelines the City can provide to developers; updates to the Permit Application Guide.		this is related rule not plan development
52	2/23/2016	City of EP	Notification Letter				Administrative permit approval process to allow faster approval of projects meeting District rules (e.g., smaller scale projects or routine maintenance).		this is related rule not plan development
53	2/23/2016	City of EP	Notification Letter				Flexibility in calculating and charging permit fees to coordinate financial sureties with the District.		this is related rule not plan development

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Agree	Response
54	2/23/2016	City of EP	Notification Letter				General maintenance agreement templates for a variety of projects.		this is related rule not plan development
55	2/23/2016	City of EP	Notification Letter				Short term maintenance agreements to address construction and avoid redundancy with the City's MS4 responsibilities.		this is related rule not plan development
56	2/23/2016	City of EP	Notification Letter				Guidelines for District education, communication, and project proposals to give the City and public more opportunity to understand and participate in District planning and education efforts (e.g., City and District cooperated to host public education workshops).		the District undertook a detailed and transparent public input process as described in section 2.0 and appendix A. In addition the District has additional information about the education and outreach in the plan
57	2/23/2016	City of EP	Notification Letter				More detailed information in monthly packets about action items and items to be discussed; it is currently difficult for the City to determine what will be discussed at each meeting.		not plan related
58	3/8/2016	City of Mtka	Notification Letter				Coordination with the District with the area southeast of CSAH 101 and TH 7 develops in the future; this coordination would facilitate the permitting process and maximize opportunities to expand natural resource/stormwater amenities.		welcome the opportunity to partner
59	3/8/2016	City of Mtka	Notification Letter				Development of a management plan for the Silver Lake Creek area to reduce phosphorus loads to Purgatory Creek and improve local water quality.		agree
60	3/8/2016	City of Mtka	Notification Letter				Continuation of partnerships to update floodplain mapping.		agree
61	3/8/2016	City of Mtka	Notification Letter				Coordination of education and outreach efforts targeting Minnetonka residents to promote the District's cost share, raise awareness, and engage the public.		agree
62	3/8/2016	City of Mtka	Notification Letter				Permit administration: formalize a process for how the City and District coordinate through the development process and administration of rules/ordinances.		this is related rule not plan development
63	3/8/2016	City of Mtka	Notification Letter				Permit administration: consider revisions to stormwater requirements to differentiate "linear reconstruction projects" from "new linear projects" to reflect the undue difficulty of incorporating treatment in limited right-of-way in a developed environment.		this is related rule not plan development
64	3/8/2016	City of Mtka	Notification Letter				Permit administration: investigate the opportunity to jointly pursue financial assurance with the District.		this is related rule not plan development
65	2/11/2016	Met Council	Notification Letter				Water reuse to offset demands on groundwater supplies		agree
66	2/11/2016	Met Council	Notification Letter				Promoting the concept of sustainable water resources through collaboration and cooperation		agree
67	2/11/2016	Met Council	Notification Letter				Impacts of stormwater management on recreational opportunities		
68	2/11/2016	Met Council	Notification Letter				Issues concerning the interaction of surface water and groundwater		District has incorporated a strategy for groundwater and a groundwater management decision tree
69	2/11/2016	Met Council	Notification Letter				Volume reduction goals at least as stringent as the NPDES construction stormwater permit		this is related rule not plan development
70	2/11/2016	Met Council	Notification Letter				Quantifiable and measurable goals addressing water quantity, water quality, recreation, fish and wildlife, enhancement of public participation, groundwater, wetlands, and erosion issues		
71	2/29/2016	BWSR	Notification Letter				Providing opportunities for multiple local governmental units and stakeholders to collaborate in the planning process.		the District undertook a detailed and transparent public input process as described in section 2.0 and appendix A. In addition the District has additional information about the education and outreach in the plan
72	2/29/2016	BWSR	Notification Letter				Focusing on priority issues, incorporating data trend analysis and measurable goals.		agree
73	2/29/2016	BWSR	Notification Letter				Including a prioritized implementation plan that provides a realistic estimate of what the District will accomplish even if grant or other outside funding sources are not available.		District developed a detailed prioritization process for capital projects as presented I nSection 4.0
74	2/29/2016	BWSR	Notification Letter				Including a procedure to evaluate progress for implementation activities at lease every two years.		District plans to develop
75	2/29/2016	BWSR	Notification Letter				Defining the District's process for evaluating implementation of local water plans.		the District plans to develop score cards and metrics to track the benefits of implementing the projects and programs
76	2/29/2016	BWSR	Notification Letter				Defining maintenance responsibilities for stormwater facilities.		discussed in Sectin 9.8 and 9.15
77	2/29/2016	BWSR	Notification Letter				Description of any incentive programs.		discussed in Sectin 9.7
78	2/29/2016	BWSR	Notification Letter				Exploring opportunities for new or increased partnerships with Hennepin County Department of Energy and Environment and Carver Soil and Water Conservation District.		agree
79		MN Dept. of Ag.	Notification Letter				Impacts of agricultural land use on surface and ground water resources		noted
80	3/7/2016	MDNR	Notification Letter				Address goals through methods that integrate hydrology, biology, connectivity, geomorphology, and water quality		addressed by goals and strategies in Section 3.0
81	3/7/2016	MDNR	Notification Letter				Keep water where it falls by protecting and restoring wetlands, preserving floodplains, and requiring rate and volume control.		this is related rule not plan development
82	3/7/2016	MDNR	Notification Letter				Protect and create buffers along watercourses and basins.		WQual S1. The District recognizes the multiple benefits of vegetated buffers and promotes the use of vegetated buffers around all waterbodies.
83	3/7/2016	MDNR	Notification Letter				Reduce the flow of water (and nutrients) through ditches and drainage systems.		addressed by goals and strategies in Section 3.0

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Agree	Response
84	3/7/2016	MDNR	Notification Letter				Design culvers and bridges to retain floodplain functions.		addressed by goals and strategies in Section 3.0
85	3/7/2016	MDNR	Notification Letter				Support land use and planning and practices that restore and enhance priority areas.		addressed by goals and strategies in Section 3.0
86	3/7/2016	MDNR	Notification Letter				Maintain and enhance perennial vegetation.		addressed by goals and strategies in Section 3.0
87	3/7/2016	MDNR	Notification Letter				Promote conservation practices on agricultural and drainage lands.		addressed by goals and strategies in Section 3.0
88	3/7/2016	MDNR	Notification Letter				Use water efficiently and implement conservation measures to reduce demand.		addressed by goals and strategies in Section 3.0
89	3/7/2016	MDNR	Notification Letter				District play a stronger role in promoting groundwater use conservation		discussed in Section 9.12
90	3/7/2016	MDNR	Notification Letter				The MDNR recommends that the District include actions in the Plan to help prevent the spread of AIS through monitoring and public awareness efforts.		the CIP includes a line item for AIS monitoring in Rapid Response (section 9.9)
91	3/7/2016	MDNR	Notification Letter				MDNR encourages the District to consider natural stream dynamics when planning restoration or stabilization projects		addressed by goals and strategies in Section 3.0
92	3/7/2016	MDNR	Notification Letter				MDNR recommends that the plan updated incorporate the most recent information from: the rare species guide, Minnesota Biological Survey (MBS), and Natural Heritage Information System (NHIS)		dsicussed in Section 5.15

CAC Comment Tracking Form

TABLE 1 - Document Information

Document #	"Document" Information			
	Document Name	Type	Date	Description
1	Draft Watershed Management Plan	Report	September-17	Internal review of the DRAFT version of the RPBCWD 10-year Watershed Management Plan

TABLE 2 - Comments

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Agree	Response to comment
Example	9/12/2017	John Doe	1	Figure 2.3.4	2	45	I'm having a hard time differentiating between the colors.	MSJ	
1	9/13/2017	David	Index page ii		3.1	4	"District Vision and Vision" should be Mission and Vision	JPQ	revised
2	9/13	David	Introduction 1.1		1.1	1	"districts are special units government" should be "districts are special government units"	governmental units	revised
3	9/13	David	1-7	Table 1-4, Picture note		1-7	I'm not sure if it matters, but the CAC membership information is out of date.	JPQ, ABD	revised
4	9/24	Joan	Introduction	text	1.1	1	Third sentence, why is it singular lake, creek, wetland and pond singular instead of plural?		revised
5	9/24	Joan	1.2 location and boundaries	text	1.2	1-1	Grammar: last sentence, first paragrapy should be miles lie not lies (2 corrections)		revised
6	9/24	Joan	1.3.1 Board of Managers	Photo	1.1	1-3	Update photo of new board members or change caption to say this is the 2016 board.		revised
7	9/24	Joan	Employees and Consultants	caption under photo	1.3.2	1-5	Period missing after Dr in caption under photo. Also shouldn't Administrator be capitalized as other titles are?		revised
8	9/24	Joan	Employees and Consultants	text	1.3.2	1-5	CONTENT: I would like a little more detail on "retaining services" of engineers, legal, etc. Something like, retainers, with annual review or something about how they are chosen and nature of relationship./how they are reviewed. Pretty vague now.		revised to mention every two year selection
9	9/24	Joan	Introduction 1.0	Table 1-5	section 1.3.3. Advisory Committees	1-9	Remove word "Work" from phone listing of last TAC member for consistent formatting.		removed work
10	9/24	Joan	Introduction 1.0	Figure 1.3	section 1.4 Local and State Coordination	1-10	Nice table! However, i don't understand the last phrase "some are the wetland conversation act authority. " Is that complete and i'm just not understanding?		Wetland conservatin act authroity further described in 5.10, 5.13, 9.15.3 - no action
11	9/24	Joan	Introduction 1.0	Figure 1-4	1.5 early history	1-11	Format: Title of the Figure is placed below the figure, and on subsequent figures it look like this is the same. However, the Tables have their titles above the data. Also, some of the colored flowcharts, etc have the figure title above the content. Seems inconsistent to me I'd put all the titles above, regardless if it is a figure or table.		modified to be at the top
12	9/24	Joan	Introduction 1.0	text	1.5 early history	1-12	Format; first paragraph words "from Eden Prairie should be removed after Howard Peterson		revised
13	9/24	Joan	Introduction 1.0	text	1.5 early history	1-12	Edit: remove word monitoring at end of 1970 paragraph. Also, on this page, perhaps make a reference to description of data collection coming up later, in 2.3.2.		revised. Cross reference not included because discussing histry
14	9/24	Joan	Introduction 1.0	text	1.5 early history	1-13	Edit: Extra period in first line after word pipe; remove it		revised
15	9/24	Joan	Introduction 1.0	text	1.5 early history	1-13	Edit: comma after District in last line of 1974 section.		revised
16	9/24	Joan	Introduction 1.1	caption under picture	1.5 early history	1-14	Edit: I think a word is missing in the caption. "completion of the Eden Prairie for the ...." Is it competition of the Eden Prairie portion/section?		revised
17	9/24	Joan	Introduction 1.1	text	1.5 early history	1-15	Grammar: comma after"wetland restoration, while achieving..."		revised
18	9/24	Joan	Introduction 1.1	text	1.5 early history	1-15	Format; need space between 2003 and A		revised
19	9/24	Joan	Introduction 1.1	text	1.5 early history	1-16	CONTENT: There is a large gap between the 2008 summary and the 2011 10 year plan. I'd like to see more added for 2009, 2010 and 2011.		revised
20	9/24	Joan	Introduction 1.1	text	1.6 10 year plan	1-16	CONTENT: I believe this is the first reference to the 10 year plan, and it talks about it in the past tense, and what's happened since then. I'd like more on why the 2011 plan was created, etc. Between this and the comment (above), I think a little more is needed here.		revise Section 1.1 to describe the purpose and added information under historical timeline

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Agree	Response to comment
21	9/24	Joan	Introduction 1.1	photo captions	1.6.1 2102 Summary and 1.62 2013 summary	1-17	Format: Inconsistent treatment of captions. These two say photo before the caption, one with a colon, one with a comma. None of the other photos were described as photos. Consistency needed on all captions of this type. Get rid of the word Photo.		removed "photo"
22	9/24	Joan	Introduction 1.1	text	1.62 2013 summary	1-17	Format: Subwatershed is capitalized when name of a specific area in previous text. Search for consistency.		changed to watershed for consistency with section 6, 7, & 8
23	9/24	Joan	Introduction 1.1	text	1.62 2013 Summary	1-17	Consistency: Curly Leaf is one word in most other places in the doc, although in one spot it is hyphenated. Fix for consistency.		revised
24	9/24	Joan	Introduction 1.1	text	1.63 2014 Summary	1-18	CONTENT: last line in 2014 summary. New rules about what? Can we add a descriptor or two here? Permitting? What? Also referred to at end of 2015 summary. And do you want to mention where the new offices were?		add descriptor and removed office reference
25	9/24	Joan	Introduction 1-1	text	1.6.6 Key lessons	1-20	Content: Second line talks about implementing the "one Water's Approach. I'd change that word to adopted. This section is talking about a change in approach/focus and should start with adoption.		revised
26	9/24	Joan	2.0 Watershed Issue ID	text	2.1.1	2-1	Typo; misplaced comma after word involvement in last line of 2.1.1 first paragraph (involvement ,each)		revised sentence
27	9/24	Joan	2.0 Watershed Issue ID	text	2.2.1	2-3	Typo: Comma needed after plan update in second line of 2.2.1 and after the phrase for example, on the bottom of the same page. Do a search on For example, as there are other places in the document where the comma is missing.		revised
28	9/24	Joan	2.0 Watershed Issue ID	text	2.2.1	2-3	CONTENT: the quote at the bottom of the page is incomplete, looks like it was cut off or covered up.		revised
29	9/24	Joan	2.0 Watershed Issue ID	caption	2.2.5.	2-8	Typo: Last line in Teacher Comments Box should have a capital t in Thanks for asking. new sentence.		this was direct written quote. No revision
30	9/24	Joan	2.0 Watershed Issue ID	text	2.3.3	2-12	Typo: Add ? after the first bullet. How does water work?		revised
31	9/24	Joan	2.0 Watershed Issue ID	caption	2.3.3	2-12	extra word in caption ; watershed outreach of map? Need the word of?		revised
32	9/24	Joan	2.0 Watershed Issue ID	text	2.3.6.2	2-23	CONTENT: When talking about public awareness here, do you want to consider adding a comment about all the publicity Flint Michigan has received and how it demonstrates what can go dreadfully wrong.		noted - no action as Flint issue tied to lead pipes not GW contamination
33	9/24	Joan	2.0 Watershed Issue ID	text	2.3.6.3	2-25	Content: This is the first reference to Atlas 14 and perhaps you should make reference to section 5.15 where it is explained.		Atlas 14 reference removed
34	9/24	Joan	2.0 Watershed Issue ID	text and caption	2-4	2-27	Format: Caption basically repeats copy; Create new caption or make reference to, as shown below, and the caption could be: Example grid mapping issues to strategies.		caption revised
35	9/24	Joan	3 Goals and strategies	text	3.2.1.2. Admin S2	3-3	Content: Periodically? How often is that, or is it as needed?		noted. Noe revision to allow flexibility
36	9/24	Joan	3 Goals and strategies	text	3.2.2.2 ; DC S1	3-3	Content: Based on available data? If we need more are we not going to go collect it? Perhaps reference section 5.10 where this is elaborated.		revised
37	9/24	Joan	3 Goals and strategies	text	3.2.2.1.	3-3 and elsewhere	Content: I was taught that a good goal needs to be specific, measurable and include a timeframe: e.g. map existing wetlands and distribute map by Jan of 2019. Any way we can tighten up these goals in this whole section? for example, look at reg 2 under regulation goals; support Carver and hennepin county to operate effectively as Ditch Authorities. What does that mean? How do we know if it is achieved? and on things like 3.2.6.4 S2; b y when?		The Dsitrict annually reports on progress and will develop a report card
38	9/24	Anne	1	Table 6-2	6.2 Proposed Bluff Creek Projects	137	Project #23: What is Stream scarp stabilization?		streambank stabilization. This project was removed because there was overlap with project B1
39	9/24	Joan	3 Goals and strategies	text	3.2.3.2 EO S6	3-4 and 3-5	Content:Can we add outreach, e.g. through speaker's bureau?		revised
40	9/24	Joan	3 Goals and strategies	text	3.2.5.1 Reg 1	3-7	Typo: Reg 1 says were not where		revised
41	9/24	Joan	3 Goals and strategies	section head	3.2.6	3-7	Typo: Should be Water Resources (plural)		revised
42	9/24	Joan	3 Goals and strategies	strategy	3.2.6.6 WQan 58	3-11	Content: Perhaps also include publication of successful efforts and impact, after major rain events?		this is covered in sectin 3.2.3.2 EOS 4

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Agree	Response to comment
43	9/24	Joan	4 Project Prioritization Process	text	3.2.6.6 WQan 58	4-3	Clarification: refer the reader to the explanation of why watershed district is a 1-6 scale , e.g. ...with the exception of the District goals score, which is 1-6 (see below).		revised
44	9/24	Joan	4 Project Prioritization Process	table 4-1	4.1.1	4.3	Content: is this table really necessary? You already said one point per goal.		Table 4-1 unchanged for consistency with other metrics
45	9/24	Joan	5	text	5	4-13	Concise: listed here is where we can find lake and creek specific resource inventories. This is the second time this info is shared and it is shared twice more in the 5.0 section. Some of this can be edited out.		comment nclear. No revison made.
46	9/24	Joan	5	text	5.1.2	5-3	typo: need a space added: "Michael Simpson (NOAA, 2014)provides)		revised
47	9/24	Joan	5	table title	5.3	5-3	format: link is broken to table 2. says in bold "/Error! Reference source..."		revised
48	9/25	Joan	5	text	5.8	5-24	Format: extra space before third paragraph starts with "Table" Same issue at title of 5.8.1.2 and 5.9.1.1. and also in several places in section 9.		revised
49	9/25	Joan	5	9.5.2.1	Lake and stream monitoring	9-105	CONTENT: middle of this paragraph--want to make a comment that monitoring for zebra mussels is also done by participants in the successful adopt-a-dock program.		revised
50	9/25	Joan	5	table and map	table 5-5 and figure 5-9	5-29, 30 and 31	CONTENT: Table shows Red Rock Lake was de-listed, but map shows it as impaired		Lake remains impaired for Mercury
51	9/25	Joan	5	text	5.9.1	5.33	CONTENT;: Last paragraph on 5.33 is the first reference to the FIS, but it is not defined for the first time until the next page.		revised
52	9/25	Joan	5	text	5.13	5-42	Grammar: Last paragraph should be plural (are bogs) not is unless there really is only one of them, which is what it appears on the map. If so then the reference to bogs should be changed to bog (2 changes).		only one bog. Revised
53	9/25	Joan	5	figure legand	5.15	5-45	There appear to be icons on the map that are not included in the legend. Specifically round red icons and perhaps others. (Hard to see on screen)		removed icons 1, 2 &3 from figure
54	9/25	Joan	6,7,8	redundant text	6.3, 7.3, 8.3	6-6 to 6.8, 7-20 to 7-22, 8-58 to 8-60	If I am reading this correctly these include three pages of identical copy, once for each of the watersheds. I'm assuming this was done so each section could be free-standing, but seems like including in appendix or link would shorten this without loss of information.		Text is intentionally the same to allow sections to stand alone
55	9/25	Joan	9	text	9	9-79	Typo: First sentence should say this not the section		revised
56	9/25	Joan	9	text	9.1.2	9-89	CONTENT AND CLARIFICATION: So, if i understand this correctly there is an independent tool used (shown in decision tree) for assigning a "score" to creek projects, similar to what was done for lakes, but with different categories. Lakes use Modified Envision with 5 categories, and streams with 4 (stability, water quality, habitat and infrastructure) I think it would help the reader to make reference to this in the creak Management. Something as simple as: Similar to the Envision scoring of lakes, streams are subject to similar process, but with modified criteria. The Stream management diagram is called a decision tree--but it is also actually a scoring mechanism, right?		revised
57	9/25	Joan	9	text	9.2	9-91	Clarification: This is the first time you use the term LGU (other than in the glossary) In other cases in first use you define the term, as should be done here.		revised
58	9/25	Joan	9	text	9.2.2	9-96	Word choice; Memorialized? I think recorded, captured or documented would be more appropriate.		revide to documented
59	9/25	Joan	9	link	9.4	9-99	LinK: I suggest giving a more specific link to rule language, rather than the general website, making it easier for people to find the rules. This one worked for me: but goes only to A. So a different link, or instructions where to find . Also do you want to mention that you are doing workshops to explain the rules? http://rpbcwd.org/index.php/download_file/view/393/160/		link revised

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60	9/25	Joan	9	section order	9.4.2	9-100	ORDER: to me 9.4.2 explaining the roles and responsibility should come at the beginning, not end of section 9.4. after reading it it makes more sense about the district reinstate the regulatory program in Jan of 2015.		noted
61	9/25	Joan	9	Order	9.5.1	9-103	ORDER: Section 9.5.1: Should this be put with other creek monitoring activities, rather than here, where it seems out of place, not aligning with the two section heads listed above it? Perhaps as part of 9.1.2.		the intent is to describe each line item in Table 9-1. Therefore no revision
62	9/25	Joan	9	clarification in text	9.5.2.1	9-105	CLARIFICATION: Sonde is not a word in my vocabulary. Can you add in explanation e.g. "sonde (automated instrument) measurements or however you would define.		revised
63	9/25	Joan	9	section title	9.5	9-103	Clarify: Is Assessment and Engineering the right title for this section? It is all about data collection and monitoring. and i'm not sure how 9.5.3 to 9.5.6 fit in. maybe just labeling? Pattern/association is not clear to me, what is being described. Things we need to monitor? (Sorry, i'm' getting tired!)		Noted. Will look into clarifing. Section titles are tied to heading in table 9-1.
64	9/25	Joan	9	additional text	9.7	9-112	CONTENT: In first paragraph on page 9-112 i think it would be valuable to add statement that participants are required to provide ongoing maintenance for at least 5 years, and to provide progress reports 1 year, 3 years and 5 years after completion.		Details about the program are developed outside of the plan to allow for flexibility
65	9/25	Joan	9	Content	9.9	9-113	CONTENT: This is a very brief comment on AIS, and refers to "this program" but doesn't explain the program. Is there more content? I searched for "AIS" and did not find more detail. As it reads now it says it's important and we will support. Can more detail be added here? Contrast this, for example, with the next section which is more specific on Lake Vegetation.		the currently supports inspections with two cities and rapid response program (e.g., brittle naid, eurasian watermilfoil)
66	"	Joan	9	content	9.15.4	9-129	CONTENT: Can we add something about CAC responsibilities and impact, as with TAC?		This section is specific to City responsibilities. The CAC is described further in section 1.3.3, Figure 1-2. Cross refence add
67	9/25/	Joan	All	general			What a tremendous effort! And it hangs together very well, and has a clear "voice" even though i'm sure you had lots of writers. Lots of great stuff in here. I look forward to seeing the Appendices.		Thank you
68	9/17/2017	Sharon McCotter	Acronyms			xi	Great idea to have the extensive acronym table!		noted
69	9/17/2017	Sharon McCotter				1.1	Missing "of" - "Watershed districts are special units of government with bo…"		revised
70	9/17/2017	Sharon McCotter	Fig. 1-2	Org. Structure		1 4	Good material! Check spacing especially of words under "Legal" category		checked
71	9/17/2017	Sharon McCotter	Table 1-2	2017 Employees		1 5	Under Josh's info the address wraps with his name		format adjusted
72	9/17/2017	Sharon McCotter	Fig. 1-3			1 10	It was almost impossible if not very difficult reading white letters on light blue background		noted
73	9/17/2017	Sharon McCotter				1.13	Remove the period		revised
74	9/17/2017	Sharon McCotter				1.18 and 1.19	Suggest you add the number of water stewards who graduated for each of the appropriate years		noted
75	9/17/2017	Sharon McCotter	Fig 2-2	Stakeholder Involvement		2.4	Words/spacing in the table are cut off		noted
76	9/17/2017	Sharon McCotter				2.7	Add s to stakeholder "and in-person conversations to invite stakeholders to the workshop"		revised
77	9/17/2017	Sharon McCotter				2.12	1st bullet - Either add a ? Or change to "How Water Works"		revised
78	9/17/2017	Sharon McCotter				3.1	3.2.1.1 I love the administration's goal… "while advancing the Districts visions and goals"		noted
79	9/17/2017	Sharon McCotter				3.3	3.2.2.2 DC S3 - I like "periodic review"; would yearly be appropriate?		periodic allows flexibility
80	9/17/2017	Sharon McCotter				3.4	Like DC S8 "with other entities, promoting efficiency, increasing data availability and to identify and fill data gaps" Would you want to add "cost effective"?		no change
81	9/17/2017	Sharon McCotter				3.6	Plan S5 - Love the commitment to evaluate every 2 years		noted

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Agree	Response to comment
82	9/17/2017	Sharon McCotter				Overall comments about the plan and approach	Kudos on a job well done! Very comprehensive plan. I did not see anything missing that I was expecting or that I couldn't envision in a broader category. This plan matches what is being done today; don't see a lot of transition time necessary. Appreciate the transparency in project prioritization. I like the strategies grouped by goal and topic area; easy to see the influence of public input on the whole plan. Documenting why decisions have been made is a good idea especially as things change over time. Also really like the education pieces coupled with good data and then tied to public input. Specific yet allows for unknown future opportunities. Also gives us the chance to reevaluate decisions based on numerous factors that drive common sense decisions. Strategies are all encompassing which afford latitude i.e. 3.2.6.5 WQuan 2. Limit the impact of stormwater runoff on receiving waterbodies. This can be accomplished in a number of ways. Love that flexibility to a solid goal.		noted
83	9/17/2017	Sharon McCotter				5.7	Says TABLE 5-7 ERROR! REFERENCE SOURCE NOT FOUND.		revised
84	9/17/2017	Sharon McCotter				5.26	5.8.1.1 Table - Does it make sense to maybe put the lakes in order by the headwaters?		listed aphabetical. Revised to be upstream to downstream
85	9/17/2017	Sharon McCotter				5.42	"There are unique cranberry bogs" versus "There is a unique cranberry bogs"		revised
86	9/17/2017	Sharon McCotter				5.44	Arrange lakes in watershed order? Helps with a visual image of the flow, for me.		revised
87	9/18/2017	Sharon McCotter				9.86	9.1.1.1 Fisheries - Is "fly" the right word? Should it be "die"?		revised
88	9/18/2017	Sharon McCotter				9.88	Last sentence, remove "of" before xxxxxx		revised
89	9/18/2017	Sharon McCotter				9.97	9.3.6 - OFFICE COST - Add CAC meetings		added TAC and CAC meetings
90	9/18/2017	Sharon McCotter				9.98	9.3.8 - Remove) before "for"		revised
91	9/18/2017	Sharon McCotter				9.98	Do we add secretarial costs or the secretarial/minutes role or is that role considered like paying someone for a service i.e. any lab work we outsource?		those cost are covered under recording services (section 9.3.7
92	9/18/2017	Sharon McCotter				9.119	Add "a" in front of limited resource		revised
93	9/18/2017	Sharon McCotter				9-125	Add "d" to provide		revised
94	9/18/2017	Sharon McCotter				9-127	9.15.2 Change sentence to read, Amendments will be revised "in a timely manner"		revised
95	9/18/2017	Sharon McCotter				9-128	1. TAC - spelling of "district"		revised
96	9/18/2017	Sharon McCotter				9-130	9. Add "d" to compile		revised
97	10/7/2017	Paul Bulger				2-20	1st para - inlcude "habitat loss" ir wetalands are not managed		revised
98	10/7/2017	Paul Bulger				2-20	bullets on habitat comments - were there comments about having public access to green space areas that support habitat?		in a general sense
99	10/7/2017	Paul Bulger				2-21	were there comments regarding managing development too close to lakes and creeks, increasing erosion?		in a general sense
100	10/7/2017	Paul Bulger				2-24	Implementing practices to promote groundwater conservation (e.g., infiltration, water reuse) add "reduce irrigation/sprinkling"		revised
101	10/7/2017	Paul Bulger				3-1	Effective administration and judicious use of public resources - clarify use of term resouces, I expected to see Financial / fiscal management, in other places you refer to "water resources' 'District resources - staff?" . Clairy if public resource is tax $		Could be tax $, staff time, public equipment, etc. Board discussed several options at workshop and elected to use this term.
102	10/7/2017	Paul Bulger				3-1	Regulation to protect District **habit and water** resources from degradation		revised natural resources
103	10/7/2017	Paul Bulger				3-1	it would benefit to define or differentiate goals vs strategies - how is the District characterizing these terms?		included "The goals aid in defining the purposes of the District. To achieve these goals, the District identified strategies that guide present and future management decisions."
104	10/7/2017	Paul Bulger				3-2	Design, maintain, and implement Education and Outreach programs to educate, inform and engage public to help protect, manage and restore water resources. (EO 1)		please see E&O plan for additional detail
105	10/7/2017	Paul Bulger				3-5	Section 3.2.4 Planning seems embedded in all the other goals and strategies, why is this called out separately in a new section, seems redundant		to maintain connection to public input process and comment coding asa well as requirements in 8410
106	10/7/2017	Paul Bulger				3-9	WQualS13 revise this goal to be similar to Gov 25% by 2025 initiative. (i.e. improve lakes WQ 25% by 2025)		unchanged to allow for flexibility

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Agree	Response to comment
107	10/7/2017	Paul Bulger				3-9	Too vague WQual S14. The District will continue to identify and implement opportunities and actions to protect, restore, and enhance District-managed water resources.		No revision. Actions allows flexibility to implmentent. District managed resources allows for more than water managemant, such as habitat
108	10/7/2017	Paul Bulger				3-9	WQual S16. The District will work with the state agencies and local governmental units to identify emerging pollutants of concern. to protect lakes, creeks, wetlands and groundwater.		no revision as all goals and strategies are related to the overall mission
109	10/7/2017	Paul Bulger				3-9	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 and reduce consumption (e.g., water reuse).		revised
110	10/7/2017	Paul Bulger				3-9	add strategy Adopt practices to minimize groundwater withdrawls, to avoid aquifer depletion below 2015 water levels.		no revision
111	10/7/2017	Paul Bulger				3-9	Ground2- make the GW Plan an annual update like other District Plans, not a static document.		noted
112	10/7/2017	Paul Bulger				3-10	Coordinate with appropriate local government units and state agencies to develop and utilize tools to assess surface water impacts and groundwater impacts of groundwater use (e.g., refinement of the Metro groundwater model, synchronization of the surface water models with groundwater models). Connect with City Wellhead Protection Plan. Also, factor in recent White Bear Lake court case.		added collaboration with cities on Wellhead Protection Plans
113	10/7/2017	Paul Bulger				3-10	WQuan14 - state this is Atlas 14		removed atlas 14 in favor of most recent NWS reference data because it could change
114	10/7/2017	Paul Bulger				3-11	WQuan S9. The District will work with cities and other stakeholders to encourage conservation practices (e.g., ~~water reuse~~ infiltraion basins, floodplain storage) to protect creeks, lakes and wetlands		revised
115	10/7/2017	Paul Bulger				4-1	The project benefit priority lists and prioritization tool are living documents		no revision. prioritizatin tool will be reevaluated as needed
116	10/7/2017	Paul Bulger				4-7	Projects without impervious area or volume abstraction are assigned a minimum volume score of 1. Clarify "no pervious area"? or "all impervious"		added footnote: "1 Abstraction volume as estimated from impervious surface in tributary watershed. Conversion of impervious surface to pervious area would be scored based on the amount of impervious reduction (25-50% reduction =3, 50-75% reduction = 5, >75%=7)"
117	10/7/2017	Paul Bulger				4-7	section 4.1,4- clarify which 'resource plan', also add that these are updated on annual basis		revised by adding e.g., UAAs
118	10/7/2017	Paul Bulger				TOC	it would help to add a table of the various District plans and list the frequency that these are updated. Also make available on District website.		noted
119	10/7/2017	Paul Bulger				chap 5	appreciate the links to other govt websites for more info		noted
120	10/7/2017	Paul Bulger				5-17	This task of protecting groundwater quality has become complicated by the increased use of infiltration as a means to improve surface water quality and promote sustainable groundwater supplies. Re-word I do follow sentance.		paragraph revised
121	10/7/2017	Paul Bulger				Sec 5.6	Add report - " The Water Underground, Stretching Supplies" Freshwater Society 2017 - This matches strategies for District and good E&O		informational callout added
122	10/7/2017	Paul Bulger				5-30	Table 5-5 - add the WQ data that exceeds the impairment limit		added footnote to Table 5.5 to "6 Lake specific water quality data, impairments, and TMDLs are presented in greater detail in the major watershed sections for Purgatory Creek (Section 7.0) and Riley Creek (Section 8.0). Information used to determine the impairments is available from the MPCA."

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Agree	Response to comment
123	10/7/2017	Paul Bulger				9-84	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. Add example of these indicators		revised to list "...indicators (e.g., aquatic plant index of biological integrity (IBI)., fish IBI, lakeshore habitat assessments, etc.)"
124	10/7/2017	Paul Bulger				Fig 9-2	Fig 9-2 does not seem to include shoreline factors, shoreline restoration		Figure 9-2 updated to include terrestial and aquatic vegetation mangement
125	10/7/2017	Paul Bulger				9-86	collaboration is a great idea. clarify when this will take place, both timing and frequency		current text provides flexibility to follow adaptive management apporach
126	10/7/2017	Paul Bulger				Table 9-2	we already know some lakes are impaired, how will this health evaluation be used on those lakes? Should there be 2 criteria - 1. impaired lakes 2. below TMDL lakes?		public input indicated protection is as important as restoring impaired lake so the evaluation is similar
127	10/7/2017	Paul Bulger				9.1.1.2	clarify, will each lake have a LVMP? Some AIS responses were emergency, no time for LVMP.		text indicates LVMP would be developed for non-native management. Added "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)."
128	10/7/2017	Paul Bulger				9-88	if no preference to impaired lakes/creeks, add explanation on how table 9-1 was developed and how the ranking system considers both impaired and non-impaired (prevention)		prioritization system and logistical factors used to develop table 9-1 are described in Section 4 and 9.2.1
129	10/7/2017	Paul Bulger				Fig 9-3	clarify how the CRAS fits into the scheme for evaluation		revised sentence to read :"The RPBCWD creek management decision tree illustrated in Figure 9-3 is based on the CRAS"
130	10/7/2017	Paul Bulger				9-96	phosporous treatment Internal load control longevity is anticipated to last 15 years or more. - I thought Alum treamtents were in doses 2-5 years apart - clairfy thei timing and decicions		each lake is unique and requires specific planning which will be defined in the design on internal load control
131	10/7/2017	Paul Bulger				9-100 top[	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) - also mention the E&O with workshops for permit applicants		added "In addition, the District reaches out to permit applicants through education workshops about the regulatory program."
132	10/7/2017	Paul Bulger				table 9-3	impairment is due to turbity - clarify which parameter measures Turbitiy. Also add water level monitoring as parameter		transparency tube/Turbidity already in table. Lake level monitoring discussed in text
133	10/7/2017	Paul Bulger				table 9-4	add a sentance or 2 to introduce the table		Table 9-4 now referenced in section 9.5.2.1
134	10/7/2017	Paul Bulger				9.5.2.2	a. add the rotating monitoring program to Distric web site. b. as part of assessment, include criteria to verify the 3 year rotation is adequate c. also include plants monitoring to evaluate wetland health		a. noted, b. added"to efficiently use District resources" c. see Section 9.11.
135	10/7/2017	Paul Bulger				9.5.2.3	add statement about dates for completing these plans		revised to state "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."
136	10/7/2017	Paul Bulger				9.5.3	Our communities would like the District to increase the level of detail in the District's floodplain models, in order to better manage xyz (claerify why/benefit). Also incorporate Community Resiliency project as part of the effort.		revised to state"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 resilence, among others."
137	10/7/2017	Paul Bulger				9-109	Residets -- also capture -individuals who are users of water resources, lakes, boating, parks, trails, etc.		revised

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Agree	Response to comment
138	10/7/2017	Paul Bulger				section 9.9 and 9.10	clarify why there is section 9.5.2.2 and 9.10. Seems like same topic same comment with section 9.9. why not put all 3 together		Section 9.5.2.2 is intended to discuss the all Distirct data collection programs as required by 8410 whereas 9.9 & 9.10 describe how the Dsitrict intends to manage these area. In addtion the predown better aligns with the CIP table (9-1)
139	10/7/2017	Paul Bulger				Fig 9-5	Fig 9-5 is missing the step to identify, categorize and create inventory database Add criteria for proximity to creeks and lakes, and provide flood plain storage Add criteria for habitat / wild life benefit, including trails, public access.		identifing, categorizing and creating inventory database is all covered under the first step. The descision tree is intended to ab a framework guide rather than a details step by step diagram. Added "The first steps will be to develop a inventory of the wetlands within the District as described in the data collection strategy DC S1."
140	10/7/2017	Paul Bulger				9.11.2.1	change heading to Maintain and Restore		9.11.2.1 unchange but revised 9.11.2.2 to be rehabilitation and protection
141	10/7/2017	Paul Bulger				9.11.2.2	is there a need to have both rehabilitation and restoration - claify if there is a difference		Both are needed 9.11.2.1 is related to restoring drained wetland while 9.11.2.2 is more about increasing the functions of existing wetlands
142	10/7/2017	Paul Bulger				9-119	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		revised
143	10/7/2017	Paul Bulger				9-119	In addition, groundwater sustainability has become a critical concern in the Twin Cities -- add reference or link		links to Met Council and MDNR added
144	10/7/2017	Paul Bulger				9-119	Reword to be more clear on District regs and role......Under Minnesota Statutes 103D.201, the RPBCWD has the authority to regulate groundwater, although its specific role in groundwater management is somewhat ambiguous.		revised to state:"Under Minnesota Statutes 103D.201, the RPBCWD has the authority to regulate groundwater to protect the resource and preserve it for beneficial purposes. "
145	10/7/2017	Paul Bulger				Fig 9-6	base of Fig 9-6 change to "develop plan,".... solution implies remediation. also add E&O to diagram		
146	10/7/2017	Paul Bulger				9-122	great ideas - concern that 100K budget per year is way too low 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		noted
147	10/8/2017	Paul Bulger				Sect 10.2	does this exist today? Other wise, add target for completing this scorecard		drafts in appendix G
148	10/8/2017	Anne Deuring					I am struck with how "traditional" our approach is. While I'm sure our diligence has averted some disasters, traditional water protection methods haven't shown much overall gain in water quality. Can we somehow emphasize a need for and a goal of utilizing new ideas, innovation, creativity?		BMP descriptions and opportunity project allow flexibility for new innovation
149	10/13/2017	Joan Palmquist	Appendix A	Timeline of Actions	2	Watershed outreach workshop	Can we indicate how many people attended. Now it just says "held the event"		no change
150	10/13/2017	Joan Palmquist	Appendix A	Projected: Engaged public in review of draft plan	2	Projected:	I don't understand how we jumped from analysis of data to reviewing the draft plan from Jan to Spring Summer 2017; no time in here for actually writing it, and we are now 6 months behind this plan. Should this be updated to reflect planned and actual timeline?		no change
151	10/13/2017	Joan Palmquist	Appendix A	Public Input meetings	2	Public Input meeting comments	Show the comments from public meetings, starting on page 24 in the same order as the meetings were held: Bluff, Riley, Pergatory. Same for the Committee and Staff workshops. List in order done: CAC, TAC, Board and Staff.		no change
152	10/13/2017	Joan Palmquist	Appendix A	Board and staff workshop	32	Direct response	Incomplete thought/sentence at end of first paragraph. ends with in response to the.... the what?		addressed

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Agree	Response to comment
153	10/13/2017	Joan Palmquist	Appendix F	Zooplankton Summary Data tables	54	Table	I know this is very technical, and in looking at it i can't tell if there are improvements or degradations. Is there a way to indicate for which items lower numbers are "better" and for which items higher numbers are better, or are they all the same.		Example from 2016 is a published document
154	10/13/2017	Joan Palmquist	Appendix F	Exhibit E	99	Exhibit E	Exhibit is missing, only title is there.		Example from 2016 is a published document
155	10/15/2017	Joan Palmquist	Appendix B	text	1.0 Objective	4	Last sentence in section 1.0 says the e&O plan will be evaluated and updated as needed every three years. Which is it, as needed, or every three years? What if it is needed before 3 years. I'd change this to read "evaluated and updated as needed, and no less frequently than every three years." Later at EO S2 there is no timeline mentioned at all for revie3w. Harmonize these?		addressed
156	10/15/2017	Joan Palmquist	Appendix B	text	2.1 public engagement	5	The first sentence is focused on telling, not asking. In the next sentence we add in asking. I'd suggest modifying the first to say, "...describes direct action by the District to share and seek information.....		addressed
157	10/15/2017	Joan Palmquist	Appendix B	text	2.2. Awareness	4	I think we should also specifically call out awareness of the watershed district as a steward of our water resources, improving knowledge among the community of what the Watershed District is and what we do. And how do we measure this?		addressed
158	10/15/2017	Joan Palmquist	Appendix B	text	2.3 Stewardship	5	Identifying desired changes seems to be missing from this. Before we can eliminate barriers, we have to determined what is desired. Also the language here and in 30 S7 is quite vague. What does increased stewardship look like? How is it measured? How do we know if we achieved it?		addressed
159	10/15/2017	Joan Palmquist	Appendix B	text	2.4 Capacity	6	Third sentence, the District can build.... should be the district **will** build build		addressed
160	10/15/2017	Joan Palmquist	Appendix B	text	2.4 Capacity	6	More definition of what a watershed champion is, how many we have now, how we will measure....		addressed
161	10/15/2017	Joan Palmquist	Appendix B	text	6.0 topics	11	Data collection: This seems to be focused on scientific data, but other data need to be collected as well to evaluate our programs. Does that fit here, or elsewhere. Also, in the how E&O can help i would edit it to say "make data accessible, meaningful and approachable"		addressed
162	10/15/2017	Joan Palmquist	Appendix B	text	6.0 topics	11	Under Community Resiliency, the goal and two strategies are basically the same. Can we get a bit more detail here and differentiate them.		addressed
163	10/15/2017	Joan Palmquist	Appendix B	text	6.0 topics	12	Under Habitat and ecology it says E&O can help by "Translate district practices for audience involvement" I don't know what that means can you clarify		addressed
164	10/15/2017	Joan Palmquist	Appendix B	text	6.0 topics	12	Under Habitat and ecology, AIS; Should we add creation/distribution/awareness building of emergency rapid response to AIS?		addressed
165	10/15/2017	Joan Palmquist	Appendix B	text	6.0 topics	13	Non-point source pollution: Can't E&O help with something there, celebrating successes, building awareness, etc.?		addressed
166	10/15/2017	Joan Palmquist	Appendix B	text	6.0 topics	13	Under infiltration practices it says E&O can help by "Translate district practices for audience involvement" I don't know what that means can you clarify		addressed
167	10/15/2017	Joan Palmquist	Appendix B	text	7 methods	14	Word missing: There is a word missing in last sentence:....organizations will be sought strengthen messaging. I think the word "to" as in "to strengthen" is missing.		addressed
168	10/15/2017	Joan Palmquist	Appendix B	text	9.0 Evaluation	17	Same as comment 155, which is it, as needed or every three years.		addressed
169	10/15/2017	Joan Palmquist	Appendix B	text	9.0 Evaluation	17	I think under active engagement, the description of" Track number of individuals engaged and whether they engage again with the district" should be clarified or expanded. AT events, e.g. outdoor activities, tracking participation is a simple metric--how many showed up. I'd like to know how we can quantify "engagement".		addressed

BOARD OF WATER AND SOIL RESOURCES

January 16, 2018

Claire Bleser, District Administrator
Riley Purgatory Bluff Creek Watershed District
18681 Lake Drive East
Chanhassen, MN 55317

RE: Riley Purgatory Bluff Creek Watershed District Comprehensive Plan Update: 60-day Comments

Dear Ms. Bleser:

BWSR Staff have completed the 60-day review of the Riley Purgatory Bluff Creek Watershed District's (District) draft of the Watershed Management Plan (plan) update. This review and comment is based upon the submittal received November 14, 2017. The District should be commended for an inclusive planning process and its accomplishments in its current plan. The plan is an excellent example of sound justification for District programs and projects and provides clear direction for the next ten years.

General comments:
There are a large number of goals (thirteen) many of which are strategic and difficult to measure. The District should identify quantifiable goals to best measure its progress toward water resource improvement/protection. A quantified resource change should be considered and could be included in the District's Report Card.

I would like to recognize the excellent work that the District has done. We appreciate the opportunity to provide comments. I look forward to continuing to work with you through the rest of the plan development process. If you have any questions, please feel free to contact me at 651-249-7519, steve.christopher@state.mn.us

Sincerely,

Steve Christopher
Board Conservationist

DEPARTMENT OF NATURAL RESOURCES

Minnesota Department of Natural Resources
Ecological and Water Resources Division
Central Region Headquarters
1200 Warner Road, St Paul MN 55106

01/15/2018

Claire Bleser
District Administrator
Riley Purgatory Bluff Creek Watershed District
14500 Martin Drive Suite 1500
Eden Prairie, MN 55344

Re: 2018 – 10 Year Management Plan – 60 day review

The DNR appreciates the opportunity to review and comment on the Riley-Purgatory-Bluff Creek Watershed District's 2018 - 10 Year Management Plan, "Planning for the next ten year 2018-2027".

Our Area Hydrologists have reviewed the plan and notes the follow:

- The plan is well thought out and aligns well with DNR goals and policies.
- We appreciate the regulatory authority they've undertaken and that they are continuing to develop that role with cities and other stakeholders in the district.
- Their goal to promote sustainable management of groundwater resources is important and we are glad to see that they've identified it and have develop strategies to provide education and outreach about it.

Thank you for the opportunity to comment on the RPBCWD Plan Amendment. If you have questions, feel free to contact Area Hydrologist, Jason Spiegel at Jason.spiegel@state.mn.us or by phone at (651)259-5822.

Sincerely,

Jeanne M. Daniels

Jeanne Daniels, District Manager
Jeanne.daniels@state.mn.us
651-259-5784

ec. Dan Lais, EWR
Jason Spiegel, EWR
Jennie Skancke, EWR
Kate Drewry, EWR
Steve Christopher, BWSR

MINNESOTA POLLUTION CONTROL AGENCY

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January 16, 2018

Dr. Claire Bleser
Riley Purgatory Bluff Creek Watershed District
18681 Lake Drive East
Chanhassen, MN 55317

RE: Riley Purgatory Bluff Creek Watershed District 60 - Day Review Comments

Dear Dr. Bleser:

The Minnesota Pollution Control Agency (MPCA) has reviewed your draft Watershed Plan received on November 15, 2017. The MPCA appreciates the opportunity to participate and provide input throughout your Watershed Plan development process. We have no additional comments as part of the official 60-day review and comment period, and recommend it for approval.

Again, thank you for the opportunity to review and comment on the draft Watershed Plan. If we may be of further assistance, please contact Chris Zadak at 651-757-2837 at the MPCA's St. Paul Office.

Sincerely,

Teresa McDill

This document has been electronically signed.

Teresa McDill, Manager
Metro Watershed Section
Watershed Division

cc: Steve Christopher, BWSR
Rebecca Flood, MPCA

TM:jdf

January 10, 2018

Claire Bleser
District Administrator
Riley-Purgatory-Bluff Creek Watershed District
14500 Martin Drive, Suite 1500
Eden Prairie, MN 55346

RE: Draft Riley-Purgatory-Bluff Creek Watershed District Water Management Plan (plan)
Metropolitan Council Reviews File No. 21820-1

Dear Ms. Bleser:

The Metropolitan Council (Council) has completed its review of the Riley-Purgatory-Bluff Creek Watershed District's (District) draft water management plan, entitled "*Planning for the Next Ten Years 2018-2027*." The District has produced an excellent plan that is consistent with Council policies and the Council's Water Resources Policy Plan.

The plan is thorough and well organized, and uses a "one water approach" describing the water resources of each major (creek) subwatershed, their condition, and proposed subwatershed projects. The plan was formulated using several elements and processes including:

- Evaluation of long-term monitoring data from multiple points throughout the watershed.
- A comprehensive public engagement and outreach process to define issues important to the citizens of the watershed and set goals to address them.
- A project ranking and prioritization process to quantitatively compare project benefits and use of additional logistical factors to set implementation priorities.
- A commitment to adaptive management to continue to assess progress in meeting goals using up-to-date monitoring data.

The district is a progressive organization that has evolved and adapted to changing conditions and needs in the watershed, and the plan reflects this.

Thank you for the opportunity to comment on this amendment. If you would like to discuss the comments further, please contact Joe Mulcahy at 651-602-1104.

Sincerely,

Sam Paske
Assistant General Manager, MCES, Environmental Quality Assurance Dept.

January 15, 2018

Dr. Claire Bleser, Administrator
Riley-Purgatory-Bluff Creek Watershed District
18681 Lake Drive East
Chanhassen, MN 55317

Subject: 60-Day Draft Watershed Management Plan Comments

EDEN PRAIRIE
LIVE • WORK • DREAM

Dear Dr. Bleser:

Thank you for the opportunity to comment on the Riley Purgatory Bluff Creek Watershed District (District) 60-Day Draft Watershed Management Plan (WMP) Update. City of Eden Prairie (City) staff appreciates the opportunities to supply input throughout the plan update process through public comment and the Technical Advisory Committee (TAC) meetings. We would like to offer the following additional comments:

1. Chapter 3
    a. 3.2.6.2 – The City would like to see the District take an active interest in the quantitative accounting of estimated pollutant reductions to assist cities and the MPCA in meeting TMDL goals. Given the large, multiple agency, government regulation of surface water, agencies should be looking to achieve common goals wherever possible.
    b. 3.2.6.2 – The City appreciates the management of carp throughout the District. We would however like to work with the District on a more sustainable solution for the Purgatory Creek Recreation Area carp gate. Given it was supposed to be a temporary application, it is an ongoing maintenance and flood concern to have a trash rack in line with the creek.
    c. 3.2.6.4 – The City has some concern over the District looking to develop a "groundwater budget" for the watershed. Focusing on protecting the interaction of surface water and groundwater should be of a higher concern as Drinking Water Supply Management Areas cross city boundaries but can be looked at more comprehensively at a watershed scale.
    d. 3.2.6.6 – Alternative strategies should be investigated in lieu of infiltration to more productively promote volume reduction in areas of Type D soils and other areas not conducive to standard infiltration BMPs.

2. Chapter 5
    a. 5.9 – Since the majority of the District lacks a detailed FEMA Flood Insurance Study with defined base flood elevations, The City would like the District to consider leading the effort on a District Wide Map Revision. The current maps, consisting of primarily outdated and inaccurate Zone A Special Flood Hazard Areas, are a burden for property owners and lessens the value of the National Flood Insurance Program.
    b. 5.10 – The City has interest in partnering and sharing resources to complete a comprehensive wetland inventory.

3. Chapter 9
   a. General – The City needs to be involved early on large capital projects with ongoing maintenance needs. Having clear long-term maintenance plans as well as project acceptance criteria is key to the ongoing success of the projects.
   b. Table 9-1 – Cost share money is level for 10 years, consider increasing annually to support partnering goals.
   c. Table 9-1 – Most programs have flat budgets with increases only identified in soft costs.
   d. 9.4 – While the City understands the importance of the regulatory program, we want to reiterate the need for a streamlined process including increased flexibility for restricted sites.
   e. 9.4 – The City looks forward to working with the District over the upcoming rules update to establish a general permit and programmatic maintenance agreement.
   f. 9.4.2 - The WMP should address that cities within the District are also regulated by the PCA and their Municipal Separate Storm Sewer System general permits. In addition, the City has multiple watershed districts within its boundaries. Adopting rules at least as restrictive as all of the agencies involved is not always practical. Watersheds should aim to establish regulatory strategies that are consistent with the City, the MPCA and the other neighboring watershed districts so a collaborative goal is met.
   g. 9.5.3 – The City would like to partner on expanding the detail of the floodplain model throughout the City. The goal is to provide an accurate, calibrated model with surveyed critical points.
   h. 9.11.12 – Permanent Easements may not always be needed to enhance or restore wetlands. We suggest you add in other alternatives to permanent easements rather than applying a strict no to the project.
   i. 9.15 – The City has just recently updated and adopted its Local Water Management Plan (LWMP) and received approval from the Met Council for inclusion in our Comprehensive Plan update. The District will have the opportunity to review the Comprehensive Plan and the corresponding LWMP during the agency review period. The City understands there may be some minor updates to the LWMP needed as part of this District WMP update, but the City is confident that our recent collaboration to complete the plan will make this a relatively small effort.

Thank you again for the opportunity to comment on the WMP. The City appreciates the level of detail, thought and outreach that was put into the plan.

Sincerely,

David Modrow, PE
Water Resources Engineer

Chaska

January 10, 2018

Riley Purgatory Bluff Cheek
Watershed District
18681 Lake Drive East
Chanhassen, MN 55317

RE: Review of RPBCWD Watershed Plan Amendment

Dear Mrs. Bleser,

Chaska's comments of the proposed Watershed Plan Amendment of the Riley Purgatory Bluff Creek Watershed District are listed below.

Section 3. Goals and Strategies

Page 3-7: Strategy 3.2.5.2 states that the "District will implement its regulatory program by reviewing projects for compliance with applicable District rules, policies, and standards."

> -No specific standards are provided in the plan, only relatively general strategies. Standards are instead provided only in the watershed rules. An update to the rules was distributed early in the process attended by the City's agent where comments were provided. Chaska requests to also provide comments on any proposed rule updates they may not have been received.

Section 9. Implementation: The Next 10 Years

Sections 9.4 and 9.15.1.1 states the City must adopt water resource protections at least as effective as the RPBCWD's or defer sole regulatory authority to the District.

> -The City of Chaska does not choose to exercise sole regulatory authority over water resources in its portion of the RPBCWD but rather will share regulatory authority with the RPBCWD, with each enforcing its water resource requirements.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

Mathew Clark
Chaska City Engineer
MClark@chaskamn.com or 952-227-7703

WM/dw

MEMORANDUM

TO: DR. CLAIRE BLESER, DISTRICT ADMINISTRATOR

FROM: BLOOMINGTON SUSTAINABILITY COMMISSION

SUBJECT: COMMENTS ON THE DRAFT 2018 RILEY PURGATORY BLUFF CREEK WATERSHED MANAGEMENT PLAN

DATE: JANUARY 9, 2018

CC: KARL KEEL, DIRECTOR OF PUBLIC WORKS

MARY HURLIMAN, DEPUTY DIRECTOR OF PUBLIC WORKS

BRYAN GRUIDL, SENIOR WATER RESOURCES MANAGER

Greetings Dr. Bleser,

This memorandum serves to transmit the comments of the City of Bloomington Sustainability Commission on the Draft 2018 Riley Purgatory Bluff Creek Watershed Management Plan. Thank you for the opportunity to review, and for considering these comments. The comments submitted represent the views and experiences of the Bloomington Sustainability Commission, a recently appointed commission of 9 members that serve the residents of Bloomington and city staff in the areas of sustainability and environmental and natural resources issues. These comments have not been endorsed by city staff or the city council.

Questions or comments on the Commission's comments should be directed to the Bloomington Sustainability Commission Staff Liason & Deputy Director of Public Works, Mary Hurliman, at mhurliman@BloomingtonMN.gov or (952) 563-8730.

1. The Bloomington Sustainability Commission commends District staff, the Board of Managers, the Technical Advisory Committee, the Citizens Advisory Committee, plan writers, reviewers, the public and others that have played a role in the drafting of the plan. The plan is comprehensive, clear, well written and organized, and encompasses and addresses many issues relating to our shared water resources and our environment. The Bloomington Sustainability Commission looks forward to working with you on many of these issues.

2. The Bloomington Sustainability Commission specifically looks forward to working with the District on improving the water quality of Hyland Lake and other water bodies that lay within the District and the City of Bloomington. As improving water resources is one of the goals of the Commission, we are happy to provide education and outreach, including the promotion of the Adopt a Stormdrain program in order to meet the shared water quality improvement goals of the District and Commission.

Sincerely,

The City of Bloomington Sustainability Commission

Lotus Lake Conservation Alliance
7008 Dakota Avenue
Chanhassen, MN 55317

Dr. Claire Bleser
Riley Purgatory Bluff Creek Watershed District
18681 Lake Drive East
Chanhassen, Minnesota 55317

Dear Claire,

The LLCA commends the RPBCWD on the tremendous amount of work that has gone into the rewriting of the 10-Year Plan and the resulting draft plan. The Plan is well thought out, organized, and easy for a non-water professional to understand. We would like to offer the following comments:

Chapter 1

- The plan should state how the Citizen Advisory Committee volunteers are chosen – what criteria is used by the Managers to choose CAC members. Since they make recommendations based on the community interests and influence strategy and decisions for the district, it would be helpful to learn how they are appointed and about their backgrounds. It would also be good to have a goal for which types of water the CAC members represent – do they live on a wetland, creek, lake, or none? Do the CAC members represent concerns of all types of people?

Chapter 2

- none

Chapter 3

- The District's number one vision objective is to administrate well, whereas its last objective is to improve water bodies. We would prefer a focus on improvement and protection supported by adequate administration. Please consider reordering these goals, to put water quality improvement as the main goal of the District.
- We feel that goals 8,9,10,11, and 13 be moved higher in ranking and goals 1, 4, 6 and 7 moved down or eliminated.

- Goal #2 could be construed to focus on the district generating data rather than taking action, and should be restated.
- Goal #4 could be eliminated. If the watershed district believes in the vision, then there is no need to set a goal to try to develop plans that support the vision
- There are no measurable aspects to these goals. Further into the goal section, the language is really oriented to more how the district plans to conduct business rather than how they will strive to accomplish the goals. Governance is a good thing but would probably be better stated somewhere else rather than intermixed with the goals.
- Goals should be clearly stated, actionable, and measurable. Because the goals, as they are currently stated, are hard to measure, it will be hard to track progress towards the goals. Please consider restating the goals so the work of the District can be measured against each goal.

Chapter 4

- None

Chapter 5

- 5.7: The Watershed plan needs more concrete detail on drainage ditches flowing into bodies of water in the district. These are major sources of the pollutants listed in Section 5. Are there plans/goals for improvement of drainage ditches into the lakes and streams? If so, where in the plan is this stated?
  - The Watershed plan states that cities have jurisdiction over the lateral (primary) storm water systems and are responsible for maintenance and improvement. What encompasses a "public ditch"?
  - There are MANY more ditches flowing into Lotus Lake (for example) than the three listed in the plan. Some were constructed many years ago and have been neglected and disowned by the cities. Road runoff is flowing though private properties into our lakes. The plan should address how these major sources of pollution will be addressed over the next 10 years.
- 5.8: What concrete steps are being taken to improve our water quality? What are the hard deadlines? Are there plans to improve the quality of the bodies of water within the district that are listed on the MCPA impaired water's list and to prevent more from being placed on the list?

Chapters 6, 7, and 8

- In the table that shows potential projects, there is a column called "Funding Partner Opportunity". Is there a goal/strategy to get partners for the Funding Partner Opportunity? Does Minnesota have an "Adopt a Lake" program? This might be something to consider to secure partners.

- It would be good, for the information brochures done for each body of water, to include community survey statistics that are relevant to that body of water. 90% of survey respondents said lakes were very important to their communities. This information should be shared with the community on the information sheets for lakes that are developed by the District.

Chapter 8

- It would help if table 8-2 had footnotes/descriptions on the various indices/scoring plan rather than having to look elsewhere

Chapter 9

- Table 9-1:
  - It would be more appropriate to use project figures that account for inflation. A project that is planned to require $100,000 in 2018 would probably cost at least $130,000 in 2028 (with 3% inflation). All of the Administration categories account for inflation, but the CIP section, AIS prevention spending, and Lake Vegetation Management do not account for inflation – this should be changed. To ignore inflation is to build problems into the plan.
  - The projects that have been selected for Lotus Lake on the middle-western side of the lake are addressing water that is already being well treated prior to entering the lake. The water flowing into Lotus from this creek is moderate in flow and clear. We would like to see a change in priorities away from these projects and instead, see a project or projects to do significant work on the south-western creek that is a large source of pollutants and silt entering the lake. We feel that priority should be put on the major source of loading issues.
- We feel that it is important to put a waiting period between the first creek restoration projects and later projects, to see how time affects the desired results. Do these projects provide the predicted benefits for an acceptable period of time, or are the efforts washed away by large rain events?
- 9.1.1: We agree that stopping the spread of AIS should be a high priority of the District.
- 9.1.1.2: We agree that emphasis should be placed on controlling plant AIS. Furthermore, we would like to see the District and all contractors hired by the District and partners working with the District to implement a strict AIS “hygiene” protocol, which prohibits boats belonging to or working for/with the District from traveling from water infested with any AIS, to water that does not have that same AIS, without following a stringent decontamination program, in order to avoid further spread of AIS throughout the District.
- Figure 9-2: The final phase of any project should be an assessment of the overall impact on water quality – i.e. how much improvement was actually achieved. We should assess how much “bang” we are getting for our “bucks”, and determine whether or not the type of

project undertaken would be a good or poor project to attempt again in the future. Without assessment, we could end up just doing projects for the sake of doing projects.

- Table 9-3: We are glad to see that the District is monitoring a wide variety of factors affecting water quality, and would like to see an explanation as to why projects are done primarily to lower one pollutant (phosphorus) and not other pollutants.
- 9.5.5: If the TMDL's are completed for the impaired waters of the District, this would be a good place to refer to those plans. If not, information on when the plans will be completed for each water body should be in this section.

Chapter 10

- We agree that the use of a scorecard to measure the watershed's work in relation to state level assessments and a district scorecard to report their progress to the watershed constituents are a good idea, but believe the District should state more than that they will develop a report card. This report card should be developed now, and be part of the 10-Year Plan, so it can be used during 2018 to measure progress against goals. As we stated earlier, this is why it is critical to have goals that are measurable, particularly regarding water quality improvement. We would like to see at least a draft report card included in the 10-Year Plan.
- This chapter (one page long) is very light in detail, and should be given the same level of attention as the other chapters. It is arguably the second most important feature of the plan after goals – the methods that will be used to figure out whether or not the District is meeting its goals.

Overall comments:

When the District conducted its survey of people's priorities, 90% (the highest ranking) of people stated that lakes are very important to the quality of life in their communities, as compared to 66% for creeks, 62% for wetlands, and 54% for ponds. The most critical feature of the lakes to District residents, according to the survey, is the ability to recreate IN the lake – swim, boat, fish, ski, paddleboard, etc. In its efforts to rebalance the plan from an over-focus on the lakes, it seems as though the District has weighted the scale too far away from lakes.

The lakes are the bodies of water that are most used, most enjoyed by, and most important to the taxpaying residents of the District. They are significant feeders of Riley and Purgatory creeks. Without healthy lakes, we cannot have healthy waters in the District. Lakes importance to the community and overall health of the District should not be minimized.

Also in the survey, it was revealed that Lotus Lake is the body of water that most respondents were concerned about. Their chief concern was pollutants entering the water, and reducing pollutants from stormwater was their highest priority for addressing the pollutant issue. However, the projects selected to do over the next 10 years for Lotus Lake do little to address the pollutant loading from untreated stormwater entering the lake. We would like to see the District and Chanhassen work together with the LLCA to identify and complete a series of smaller projects that address stormwater gullies and direct runoff into Lotus Lake from the streets surrounding the lake – projects beyond the traditional District cost-share program. This type of work may well be necessary on other lakes in the District too. We would like the District to think outside of the UAA box, and consider these smaller types of projects – not just the larger engineering projects typically identified in the UAA's, and allow for budget over the next 10 years to accomplish some of these small but important pollutant-reducing programs.

Finally, we would like to suggest the District set a goal for itself in the new 10-Year Plan, that at least 45% of each yearly budget go to water quality improvement projects. We understand that the goal might not be reached every year, but the current plan calls for spending only 38% of the budget on actual projects, and we feel this is too low. The setting of this goal should be a topic of discussion for an upcoming Board meeting.

Thank you for considering these comments as you work to finalize the new 10-Year Plan. Again, overall, we think the Plan is well done, with our primary concerns being a reorientation of the major goals away from administration and towards water quality improvement, and a restating of goals so progress can be measured.

Sincerely,

The Board of the Lotus Lake Conservation Alliance

Carrie Barclay, Kim Birdwell, Rob Goggins, Paul Granos, Steve Gullickson, Ryan Johnson, Steve McAuley, Terry McGrotty, Laurie Susla, JoAnn Syverson

First Name	Last Name	Email Address	Comment	Page	Date
Ryan	Majkrzak	ryan.majkrzak@gmail.com	On behalf of the Lake Riley Improvement Association (LRIA) Board, I would like to thank the RPBCWD Watershed Staff and Managers for putting this 10 Year Plan together. Our LRIA Board has reviewed the Plan and had the opportunity to speak with the District Administrator at length regarding its contents. It is our view that the process used to develop the plan was thorough, public visibility of the process was high, and the projects identified for implementation are appropriate. We specifically reviewed with great interest the projects planned for the Riley Creek Watershed, and are generally pleased to see a number of beneficial projects planned for the next 10 years. This includes: completion of alum treatment on Lake Riley, alum treatments for Rice Marsh Lake and Lake Susan, stabilization and restoration of Upper and Middle Riley Creeks, and a few watershed load control projects for the Lake Susan and Rice Marsh Lake watersheds. Our one concern is the absence of specific watershed load control projects planned for the Lake Riley watershed during the plan period. We look forward to understanding more about how the boat ramp project completed on Lake Riley in 2017 may have achieved some level of reduction in loading for LR_88 and LR_90. We also look forward to working with the RPBCWD Staff to help identify Opportunity and Cost Share projects to benefit the Lake Riley watershed as we move forward. On behalf of the LRIA Board, Ryan Majkrzak President, LRIA	Page Attribute cPath: watershed-plan/	1/15/2018 at 7:53 PM
Dave	Jackett	dave.jackett@gmail.com	Dave Jackett and I am the current president of the Mitchell Lake Association. I am writing these comments on behalf of our board and the membership of our association. I believe we share a common goal of improving and restoring our water resources. To that end our association is active in educating our membership and the wider community on water stewardship and taking action through lake cleanups, rebates for weed harvesting and restoration projects, invasive species monitoring, tree planting, advocacy and community building events. We also survey the membership annually to get their feedback. I am including the results of our most recent survey as additional context on the interests of our membership. Thank you for your efforts and passion to improve Mitchell Lake and the rest of the watershed. 10 Year Plan Comments - The overall plan is well put together with good data collection and a strong process for prioritization and development of strategies. Compared with previous plans however, this iteration is lighter on specific details about projects which makes it sometimes difficult to connect the strategies to action. - We are very concerned about the lack of any funding for Mitchell Lake from 2018 thru 2027. Our lake was recently delisted despite inconsistent water clarity measures and an upward trend in both Chlorophyll and Phosphorus measures. The later two being above the MPCA standard for the last two years. After years of investment by both of our organizations and the city, we are worried that the 'plug' is being pulled too early and we will see regression without consistent maintenance. - The budget and implementation plan (section 9) is generally clear and transparent. Our concern is about the percentage of funding allocated to Administration and Planning. It is 24% of the overall budget in 2018 growing to 29% in 2026 and 32% in 2028. It may not be a good comparison, but by non-profit standards this is decent currently, but the consistent upward trend	Page Attribute cPath: watershed-plan/	1/15/2018 at 2:36 PM
					1/11/2018 at 3:24 PM

Sharon	McCotter	sharon.a.mccotter@wellsfargo.com	Paul Bulger, from the CAC, submitted comments on the overall plan that had some very specific SMART goals. Overall I agree with Paul's comments and the idea of SMART goals. I am not an expert in these areas and am not sure that the specific goals he has stated are attainable. With that said, if Paul's goals are attainable, I would support them. If a goal is too far out of reach, I would recommend staff offer an alternate SMART goal that would be attainable within the scope of the plan. Thanks for listening and for all your hard work at bringing the plan to life.	Page Attribute cPath: watershed-plan/	1/10/2018 at 3:51 PM
					1/5/2018 at 12:50 PM
Joan	Palmquist	Joan.Palmquist@outlook.com	This is a general comment, not just about the introduction. As a member of the CAC I support the detailed comments made by another CAC member, Paul Bulger. In particular, I strongly believe the plan would be greatly strengthened by incorporating specific, measurable, actionable, reasonable and time bound (SMART) goals. The exact wording can be determined by staff, but as currently worded much of this is open ended, with no way of really measuring the impact. I hope these comments are taken to heart. Thank you.	Page Attribute cPath: watershed-plan/chapter-1/	1/5/2018 at 11:02 AM
David	Ziegler	david_ziegler@outlook.com	1-11 Section 1.4. With all of the agencies involved in water protection, it would be helpful to have a chart with answers to frequently asked questions like: 1Which agencies are responsible for developing and maintaining the storm water drains and pipes? 2Which agencies are responsible for monitoring and managing the aquifers, and managing water usage drawn from the aquifers? 3. Which agencies are responsible for managing native and invasive aquatic plant groth in lakes in the watershed district?	Page Attribute cPath: watershed-plan/chapter-1/	12/31/2017 at 10:47 AM
					12/26/2017 at 1:33 PM
					12/19/2017 at 2:25 PM
David	Ziegler	david_ziegler@outlook.com	In Chapter 3, section 3.2.6.1 Water Quality Goals. WQual 1. Protect, manage, and restore water quality of District lakes and creeks to maintain or achieve designates uses. Protect and manage water quality of all lakes in the district that are not currently listed as impaired by the DNR. Implement BMPs to restore all impaired lakes to meet or exceed DNR standards for each lake by the end of 2025. Implement BMPs and regulations to protect, manage, and restore all creeks in the district so 95% of the creek water meets or exceeds DNR standards for non-impaired creeks by the end of 2025. In chapter 3, section 3.2.6.3 Ground Water Goals. Ground 1. Promote the sustainable management of groundwater resources. Implement programs to reduce then eliminate aquafer drawdown to zero by the end of 2025.	Page Attribute cPath: watershed-plan/chapter-3/	12/15/2017 at 1:05 PM
					12/15/2017 at 7:43 AM
					12/4/2017 at 3:36 PM
					11/30/2017 at 10:02 AM
test535	t34t4t	test@test.com	fj4892j	Page Attribute cPath: watershed-plan/chapter-5	11/14/2017 at 1:46 PM
test5	fwefwef	test@test.com	fwefwef	Page Attribute cPath: watershed-plan/	11/14/2017 at 1:40 PM
test4	tstst	test@test.com	tetwetw	Page Attribute cPath: watershed-plan/appendices	11/14/2017 at 1:38 PM
test	repeat	test@Test.com	fwefwefw	Page Attribute cPath: watershed-plan/chapter-7?success=true	11/14/2017 at 1:36 PM
test	ch7	test@test.com	fjiowejf 89fw9ef	Page Attribute cPath: watershed-plan/chapter-7	11/14/2017 at 1:36 PM
test	ch2	test@test.com	hello	Page Attribute cPath: watershed-plan/chapter-2	11/14/2017 at 1:31 PM
Kelly	7635916611	kelly.spitzley@hdrinc.com	Hi	Page Attribute cPath: watershed-plan/appendices	11/14/2017 at 12:24 PM
					10/20/2017 at 9:28 AM
					9/29/2017 at 12:47 PM
					9/21/2017 at 7:24 PM

Date: 21 Dec 2017

RE: **10 YEAR PLAN COMMENTS**

TO: RPBCWS District Board of Managers, Administrator Bleser, E& O Coordinator Jordan

FROM: Paul Bulger

The comment box does not seem to have the ability to include red text. So these comments are submitted by email.

Overview Comments

The District is to be commended for taking a leadership position and multiple accomplishments in recent years. This includes:

- Hiring and development of talented District Staff to actively manage the District activities. This is a cost effective means to collect, maintain and analyzed the data needed to guide district decisions.
- Implementation of Regulations.
- Development and implementation of the CRAS.
- 2016 Watershed District of the Year
- Climate Adaptation seminar and planning
- AIS Rapid Response efforts
- Hosting a Minnesota's 25% by 2025 Water Quality Improvement Forum
- 10 Year Plan – Developing a comprehensive framework for resource management. In particular obtaining stakeholder input and incorporate this input into the plan is greatly appreciated.

I encourage the Board continue this progress and in taking a strong leadership position. In the Introduction Section, it states that Hyland Lake was cited to have algal problems in 1971. Later in the Plan, Table 5-5 list Hyland Lake as impaired for nutrients, suggesting there is minimal improvement almost 50 years later, despite establishing a Watershed District and the above cited accomplishments. Further, in 2018 at least four lakes and creeks in the District are being added to the impaired waters list.

The District has a 2018 annual levy of approximately $3,400,00, for the estimated 80,000 residents in the district. This amounts to ~$42/person annually, approximately one beverage from Starbucks/Caribou per month. Eden Prairie and Chanhassen have been ranked highly in Money magazines as one of the top places to live in the country, with the aesthetic natural resources considered to be an asset. Your role and efforts to protect and enhance these resources is appreciated.

The Board is encouraged to adopt more proactive, numerical and time bound measures into the District 10 Year Plan to protect, manage and restore these resources for the current and future generations. To achieve the priorities stated by the public during the 10 Year Plan input process, this may include increasing the levy in future years. I recognize budget decisions are made annually. Yet the Board is setting the District priorities and intention in this Plan, so it is important to be clear about what steps the District may take to measure and achieve responsible environmental stewardship.

Detailed Comments

Please see the proposed revisions to the Plan text shown in red.

Intro Chap 1

p. 16-19 – The addition of more projects post-2005 benefits to show District activities.

p. 20 add brief timeline for creation of the 2011 - 10 Year Plan. While it is mentioned over the various years in section 1.5, the text seems to jump to section 1.6 “10 Year Plan accomplishments”.

Goals and Strategies Chap 3

Overall comments for Chap 3

The clarification of goals vs. strategies is appreciated. Please consider how to include measurable goals and strategies, both numerical and time bound, criteria in this section. I provided this comment on the previous draft yet it does not seem to be incorporated. Also, I have heard Administrator Bleser say ‘the Pan includes guidelines for the district’, yet in other statements ‘capital improvement projects cannot be initiated unless they are included in the Plan’. Thus, I take this to mean the Plan should include all potential projects and the target the district is seeking. The projects are then selected based on science and budget. The redline text below is important to make it clear what the target criteria the District will use to ensure adequate progress toward – ‘ protect, restore, preserve’. Without adding more explicit criteria to the strategies, I am concerned meeting water quality standards will not be obtained for decades.

(p. 2) 3. Design, maintain, and implement Education and Outreach programs to educate, inform and engage the public, to facilitate protecting, managing and restoring water resources. (EO 1)

(p. 9, Pollution)

WQual S13. The District will continue to minimize pollutant loading to water resources through implementation of the District’s regulatory, education and outreach, and incentive programs. This includes establishing specific targets for water bodies, following the criteria of the proposed Minnesota’s 25% by 2025 Water Quality Improvement goal. Using 2017 as baseline data:

- 25% reduction in phosphorus levels in streams and lakes, by 2025
- 25% reduction in sediment streams and lakes, by 2025
- 25% reduction in nitrogen in surface water and groundwater by 2025
- 25% improvement in lake water clarity, by 2025
    - Alternatively each of the above goals could be revised to 15% by 2025 and an additional 10% by 2030.

WQual S14. The District will continue to identify opportunities and actions to protect, restore, and enhance District-managed resources. For creeks and lakes monitoring data that show increased pollutant concentration more than three consecutive years and/or reach 90% of the applicable state water quality standard , the BMP and treatment plans listed in the UAA for that water body will be initiated within one year.

WQual S17. The District will cooperate with member cities, the MPCA and other stakeholders in the development of total maximum daily load (TMDL) and watershed restoration and protection strategies (WRAPS) studies. This strategy includes the following objectives:

- All District lakes and creeks on the impaired waters list in 2017 will have a TMDL developed prior to 2020 for each pollutant listed on Table 5-5
- All District lakes and creeks on the impaired waters list in 2017 will implement treatment programs to attain water quality that allows delisting of 50% of the water bodies by 2025 and the remaining 50% by 2035.
- The District has a primary objective of using monitoring and regulatory programs to avoid the addition of more lakes and creeks to the impaired waters list after 2018. Lakes / creeks with results that are 90% of the State WQ standards will implement the appropriate treatment and BMP programs, as identified in the UAA, to avoid further impairment. (Note: this rapid response would be comparable to the capability shown by the District during AIS rapid response completed in 2016/2017).

(p. 9)

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., reduced consumption, water reuse). This includes working with Cities to adopt practices to reduce/minimize groundwater withdrawls and prevent aquifer depletion below 2015 water levels, as measured in the proximity (i.e. <1000 feet) of each city supply well.

Ground S2. The District will develop, or cooperate with others to develop and update annually, a groundwater action plan in an effort to gain a better understanding of groundwater-surface water interaction and develop management strategies that consider the protection of both resources. The role of the District may include:…

(p. 10 Climate Adaptation) Add strategy for low water levels in lakes, similar to the following,

> WQuan S10. The District will work with cities and other stakeholders to encourage conservation practices while avoiding/prohibiting use of groundwater resources to supplement water levels in creeks, lakes and wetlands, during periods of dry climatic conditions (i.e. drought).

Land and Water Resources Chap 5

p. 17

Protecting groundwater quality has become complicated by the increased use of infiltration as a means to improve surface water quality and promote sustainable groundwater supplies. Figure 5-5 shows the delineated wellhead protection areas within the RPBCWD. This diagrams illustrate that the WHP areas cover the entire District and that the most of the WHP area for each city is overlapping.

(p.30)

Several waterbodies within the District have been listed on the MPCA impaired waters (303(d)) list for a variety of impairments. Waterbodies on the impaired waters list are required to have an assessment completed that addresses the causes and sources of the impairment. This process is known as a total maximum daily load (TMDL) analysis. The TMDL analysis includes the recommended treatment program for the water body and the target goals for water quality improvement.

> Table 5-5 foot note
> [6] Lake specific water quality data, impairments, and TMDLs are presented in greater detail in the major watershed sections for Purgatory Creek (Section 7.0) and Riley Creek (Section 8.0). Information used to determine the impairments is available from the MPCA. (add link to specific section on MPCA website)

Figure 5-9 confirm this graphic shows all of the impaired creek sections listed in 2017/18. Also label the Minnesota River.

Chap 6 Bluff Creek

Table 6-2 – should the projects identified as TMDL be given a higher score? Clarify what TMDL means on this table. The table would be more clear to add the information on Table 9-6, into Table 6-2. Splitting into different tables makes it hard to decipher what pollutant is being addressed by each project.

Chap 7 Purgatory Creek

Table 7-2 – should the projects identified as TMDL be given a higher score? Clarify what TMDL means on this table. The table would be more clear to add the information on Table 9-6, also on Table 7-2. Splitting into different tables makes it hard to decipher what pollutant is being addressed by the project.

(p. 4) Proposed projects the District may implement within the Purgatory Creek watershed are listed in Table 7-2; additional details are provided in the District's overall implementation program (see Table 9-1). Table 9-1 adds budget and dates, it does not provide more detail on how these projects were selected. i.e. Silver lake has 1 project, while Lotus lake has 5 projects listed – yet all projects have similar scores and Lotus project names are all basically the same. Add more detail or revise the statement that details are provided.

Chap 8 Riley Creek

Table 8-2 – should the projects identified as TMDL be given a higher score? Clarify what TMDL means on this table. The table would be more clear to add the information on Table 9-6, also on Table 8-2. Splitting into different tables makes it hard to decipher what pollutant is being addressed by the project.

Chap 9

Section 9.16 and would be more appropriate as Section 9.1, given that UAA and TMDL should be the fundamental criteria to determine project priorities. Table 9-6 and Table 9-1 should be merged. I find it very hard to correlate the projects listed on Table 9-1 with the estimated % reduction listed on Table 9-6. For non-technical readers the benefits for each project in Table 9-1 should be illustrated more clearly.

Table 9-1 – for each project, clarify whether this helps to Protect, Manage or Restore

Table 9-2 paragraph below discusses lakes meeting the goal…add 2nd paragraph and/ or table to address lakes that are already impaired. Consider including specific actions beyond monitoring to address the impairment to demonstrate the District will be taken action to address impairment, not just study data.

Section 9.1.1.1.2 add time table for LVMP for lakes (i.e. prior to 2022)

Sect 9.1.1.1.3 If water quality is poor or exhibits a declining trend, the District ~~may~~ will implement a series of watershed and/or in-lake management practices to improve the lake health based on recommendations from the lake-specific UAA updates…..

p. 10 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.

> Comment: Given the addition of lakes and creek sections to the impaired waters list in 2018, suggests the past efforts have not met the Protect and Preserve objectives, thus cumulative / multifaceted efforts need to be increased and more effective. It would benefit to include a threshold to trigger further actions by the district. Other regulated industries have pre-established criteria that drive the organization to 'require' a response action.

The District will ~~consider internal load control measures after considering~~ prioritize 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. After these external sources are mitigated, internal load control measures will be considered. These considerations are critical because failure to address external sources them could lead to the internal measure being compromised and reducing the effective life of the treatment

Fig 9-6 --- modify this diagram to include a. generate management plan, b. add conservation and reduced consumption, c. add E&O as part of solution and management program, d. clarify or revise what is meant by "solution" since there are no capital improvement projects planned for groundwater

To:
Claire Bleser, Administrator
Riley-Purgatory-Bluff Creek Watershed District
18681 Lake Drive East
Chanhassen, MN 55317
Via email: cbleser@rpbcwd.org

From:
Bill Satterness
8597 Red Oak Drive
Eden Prairie, MN 55347
Billsatterness2@gmail.com

Date: January 15, 2018

Subject: Comments on Draft Watershed Management Plan

I was a member of the Citizen Advisory Committee that helped to write the current Water Management Plan, approved in 2011. Below are my comments made during the "Matters of General Public Interest" portion of the Manager's Meeting December 6, 2017. Please consider these points as you work to modify the present draft.

"I'd like to share with you my initial reaction to the new draft long-range plan.

I always like to start with the big picture. Why are we here?

What is the mission of the district? Your new mission has just three words - protect, manage, restore. But WHAT will you protect, manage and restore? To answer that, one has to look beyond the mission statement, to the vision, goals, and budget.

The vision says you aim to protect, manage, and restore water resources. You're all about water resources! That's great.

Then I looked at the goals in Section 3. There are six goals. The first five all have to do with protecting, managing, and growing the district itself: admin, data, education, planning, regulation.

Water resources - the only reason for the district to exist - get the sixth and final goal. But our water resources should be our first and only goals. The district's activities should support our water resources goals. I'm suggesting a restructuring of the goals, so all the district's activities can be listed as subsets of the water resources goals.

Then I looked at the proposed budget. You know, five years ago we had one contractor who served as coordinator, recorder, and attorney, all for a flat fee that was less than 10% of the total budget. Now you have double the budget, but only half of it will be spent on practical actions - that is, long-term capital projects in the three watersheds and short-term treatments around the district. The other half of your budget is overhead - 27% admin, 9% education, 8% assessments, 3% reserve, 3% regulations.

And unfortunately, this proposed plan sidesteps accountability. It does not set specific, measurable goals for the conditions of each water body. It avoids discussion of the city storm water system - which is the source of most of the water, and most of the water problems.

For years I, and others, have been asking you to spend your money in ways that will be cost-effective - to prioritize by comparing costs versus practical benefits. But now you intend to make decisions according to an overgrown, overblown point system, with factors and weights that are far removed from what ordinary citizens want you to do.

Where in your plan are boating, fishing, and swimming - the so-called beneficial human uses? Well, they're one subset of one subset of one of the district's six goals, which in turn are just one of the nine categories that have assigned points. Your point scheme is heavily biased against lakes and recreation.

I think the taxpayers want you to spend their money doing things that will actually improve their quality of life.

In summary, there is considerable room for improvement in this draft plan."

Bill Satterness

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60-Day Review Draft RPBCWD 10-Year Plan Review Comment Tracking Form

TABLE 1 - Document Information

Document #	"Document" Information			
	Document Name	Type	Date	Description
1	60-Day Review Draft Planning for the Next Ten Years 2018-2027	Report	11/15/2017	DRAFT version of the RPBCWD 10-year Watershed Management Plan released for 60-day public and agency review between (60-day review period 11/15/17-1/5/18)

TABLE 2 - Comments

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Response to comment
Example	9/12/2017	John Doe	1	Figure 2.3.4	2	45	I'm having a hard time differentiating between the colors.	
1	1/15/2018	Ryan Majkrzak			Watershed Plan		On behalf of the Lake Riley Improvement Association (LRIA) Board, I would like to thank the RPBCWD Watershed Staff and Managers for putting this 10 Year Plan together. Our LRIA Board has reviewed the Plan and had the opportunity to speak with the District Administrator at length regarding its contents. It is our view that the process used to develop the plan was thorough, public visibility of the process was high, and the projects identified for implementation are appropriate. We specifically reviewed with great interest the projects planned for the Riley Creek Watershed, and are generally pleased to see a number of beneficial projects planned for the next 10 years. This includes: completion of alum treatment on Lake Riley, alum treatments for Rice Marsh Lake and Lake Susan, stabilization and restoration of Upper and Middle Riley Creeks, and a few watershed load control projects for the Lake Susan and Rice Marsh Lake watersheds. Our one concern is the absence of specific watershed load control projects planned for the Lake Riley watershed during the plan period. We look forward to understanding more about how the boat ramp project completed on Lake Riley in 2017 may have achieved some level of reduction in loading for LR_88 and LR_90. We also look forward to working with the RPBCWD Staff to help identify Opportunity and Cost Share projects to benefit the Lake Riley watershed as we move forward. On behalf of the LRIA Board, Ryan Majkrzak President, LRIA	Thank you for your comments. We look forward to continued collaboration with our partners and the LRIA to manage, protect and restore our resources.
2	1/10	Sharon McCotter			Watershed Plan		Paul Bulger, from the CAC, submitted comments on the overall plan that had some very specific SMART goals. Overall I agree with Paul's comments and the idea of SMART goals. I am not an expert in these areas and am not sure that the specific goals he has stated are attainable. With that said, if Paul's goals are attainable, I would support them. If a goal is too far out of reach, I would recommend staff offer an alternate SMART goal that would be attainable within the scope of the plan. Thanks for listening and for all your hard work at bringing the plan to life.	The District has incorporated in page 1 of section 9 a plan outcomes that highlight the water improvements we intend to implement in the next ten years.
3	1/5	Joan Palmquist			Chapter 1		This is a general comment, not just about the introduction. As a member of the CAC I support the detailed comments made by another CAC member, Paul Bulger. In particular, I strongly believe the plan would be greatly strengthened by incorporating specific, measurable, actionable, reasonable and time bound (SMART) goals. The exact wording can be determined by staff, but as currently worded much of this is open ended, with no way of really measuring the impact. I hope these comments are taken to heart. Thank you.	The District has incorporated in page 1 of section 9 a plan outcomes that highlight the water improvements we intend to implement in the next ten years.
4	12/13	David Ziegler			Chapter 1		1-11 Section 1.4. With all of the agencies involved in water protection, it would be helpful to have a chart with answers to frequently asked questions like: 1. Which agencies are responsible for developing and maintaining the storm water drains and pipes? 2. Which agencies are responsible for monitoring and managing the aquifers, and managing water usage drawn from the aquifers? 3. Which agencies are responsible for managing native and invasive aquatic plant groth in lakes in the watershed district?	The District modified Figure 1-3 to incorporate answers to questions 2 and 3. We added a "did you know box" to answer question1.
5	12/15	David Ziegler			Chapter 3		In Chapter 3, section 3.2.6.1 Water Quality Goals. WQual 1. Protect, manage, and restore water quality of District lakes and creeks to maintain or achieve designates uses. Protect and manage water quality of all lakes in the district that are not currently listed as impaired by the DNR. Implement BMPs to restore all impaired lakes to meet or exceed DNR standards for each lake by the end of 2025. Implement BMPs and regulations to protect, manage, and restore all creeks in the district so 95% of the creek water meets or exceeds DNR standards for non-impaired creeks by the end of 2025. In chapter 3, section 3.2.6.3 Ground Water Goals. Ground 1. Promote the sustainable management of groundwater resources. Implement programs to reduce then eliminate aquafer drawdown to zero by the end of 2025.	*The District has incorporated in page 1 of section 9 a plan outcomes that highlight the water improvements we intend to implement in the next ten years.*
6	12/21	Paul Bulger					The District is to be commended for taking a leadership position and multiple accomplishments in recent years. This includes: • Hiring and development of talented District Staff to actively manage the District activities. This is a cost effective means to collect, maintain and analyzed the data needed to guide district decisions. • Implementation of Regulations. • Development and implementation of the CRAS. • 2016 Watershed District of the Year • Climate Adaptation seminar and planning • AIS Rapid Response efforts • Hosting a Minnesota's 25% by 2025 Water Quality Improvement Forum • 10 Year Plan – Developing a comprehensive framework for resource management. In particular obtaining stakeholder input and incorporate this input into the plan is greatly appreciated. I encourage the Board continue this progress and in taking a strong leadership position.	Thank you for your support.
7	12/22	Paul Bulger					In the Introduction Section, it states that Hyland Lake was cited to have algal problems in 1971. Later in the Plan, Table 5-5 list Hyland Lake as impaired for nutrients, suggesting there is minimal improvement almost 50 years later, despite establishing a Watershed District and the above cited accomplishments. Further, in 2018 at least four lakes and creeks in the District are being added to the impaired waters list.	Comment noted

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Response to comment
8	12/23	Paul Bulger					The District has a 2018 annual levy of approximately $3,400,00, for the estimated 80,000 residents in the district. This amounts to ~$42/person annually, approximately one beverage from Starbucks/Caribou per month. Eden Prairie and Chanhassen have been ranked highly in Money magazines as one of the top places to live in the country, with the aesthetic natural resources considered to be an asset. Your role and efforts to protect and enhance these resources is appreciated.	Thank you
9	12/24	Paul Bulger					The Board is encouraged to adopt more proactive, numerical and time bound measures into the District 10 Year Plan to protect, manage and restore these resources for the current and future generations. To achieve the priorities stated by the public during the 10 Year Plan input process, this may include increasing the levy in future years. I recognize budget decisions are made annually. Yet the Board is setting the District priorities and intention in this Plan, so it is important to be clear about what steps the District may take to measure and achieve responsible environmental stewardship.	Thank you for your comment.
10	12/25	Paul Bulger					p. 16-19 – The addition of more projects post-2005 benefits to show District activities.	The district history is intended to be a high level overview of past efforts.
11	12/26	Paul Bulger			Chapter 1		p. 20 add brief timeline for creation of the 2011 - 10 Year Plan. While it is mentioned over the various years in section 1.5, the text seems to jump to section 1.6 "10 Year Plan accomplishments".	References to the 3rd generation plan in section 1.5 where revised to tied to the 2011 plan.
12	12/27	Paul Bulger			Chapter 3		The clarification of goals vs. strategies is appreciated. Please consider how to include measurable goals and strategies, both numerical and time bound, criteria in this section. I provided this comment on the previous draft yet it does not seem to be incorporated. Also, I have heard Administrator Bleser say 'the Pan includes guidelines for the district', yet in other statements 'capital improvement projects cannot be initiated unless they are included in the Plan'. Thus, I take this to mean the Plan should include all potential projects and the target the district is seeking. The projects are then selected based on science and budget. The redline text below is important to make it clear what the target criteria the District will use to ensure adequate progress toward – ' protect, restore, preserve'. Without adding more explicit criteria to the strategies, I am concerned meeting water quality standards will not be obtained for decades.	The Plan is indeed a guide for the District on how to manage activities in the watershed. The District has limited funds to implement projects and programs. In order to determine which projects would be a higher priority to implement, the district developed a prioritization tool that looked at all possible project at the time of the evaluation. All these are included in the plan but not all of them have been incorporated into the implementation table 9-1. Yes, you are correct in stating that we would need a plan amendment in the possibility that they became a priority for the District.
13	12/28	Paul Bulger			Chapter 3		(p. 2) 3. Design, maintain, and implement Education and Outreach programs to educate, inform and engage the public, to facilitate protecting, managing and restoring water resources. (EO 1)	Thank you for your comments. EO1 has been revised. Design, maintain, and implement Education and Outreach programs to educate the community and engage them in the work of protecting, managing and restoring water resources.
14	12/29	Paul Bulger			Chapter 3		(p. 9, Pollution) WQual S13. The District will continue to minimize pollutant loading to water resources through implementation of the District's regulatory, education and outreach, and incentive programs. This includes establishing specific targets for water bodies, following the criteria of the proposed Minnesota's 25% by 2025 Water Quality Improvement goal. Using 2017 as baseline data: • 25% reduction in phosphorus levels in streams and lakes, by 2025 • 25% reduction in sediment streams and lakes, by 2025 • 25% reduction in nitrogen in surface water and groundwater by 2025 • 25% improvement in lake water clarity, by 2025 • Alternatively each of the above goals could be revised to 15% by 2025 and an additional 10% by 2030.	For the last two years, the District has been reporting this pollutant load reductions and other improvements through it's annual reporting system under the regulatory section. The District currently working on streamlining this process of reporting to be included in our incentive programs. Our education and outreach program will use a reporting mechanism that falls into line with the Education and Outreach Plan that can be found in Appendix B. The District plans on developing a web interface where the community will be able to track where we are in the 10 year plan in the implementation of our projects and view the many benefits of these projects. A draft of the report card is included in the section 10. The District has incorporated in page 1 of section 9 a plan outcomes that highlight the water improvements we intend to implement in the next ten years. Thank you for your comment.
15	12/30	Paul Bulger			Chapter 3		WQual S14. The District will continue to identify opportunities and actions to protect, restore, and enhance District-managed resources. For creeks and lakes monitoring data that show increased pollutant concentration more than three consecutive years and/or reach 90% of the applicable state water quality standard , the BMP and treatment plans listed in the UAA for that water body will be initiated within one year.	As part of the data collection program the District intends to continue to monitor and assess the lake using its adaptive management approach described in Figure 9-1 and the District's lake management decision tree (see Figure 9-2).
16	12/31	Paul Bulger			Chapter 3		WQual S17. The District will cooperate with member cities, the MPCA and other stakeholders in the development of total maximum daily load (TMDL) and watershed restoration and protection strategies (WRAPS) studies. This strategy includes the following objectives: • All District lakes and creeks on the impaired waters list in 2017 will have a TMDL developed prior to 2020 for each pollutant listed on Table 5-5 • All District lakes and creeks on the impaired waters list in 2017 will implement treatment programs to attain water quality that allows delisting of 50% of the water bodies by 2025 and the remaining 50% by 2035. • The District has a primary objective of using monitoring and regulatory programs to avoid the addition of more lakes and creeks to the impaired waters list after 2018. Lakes / creeks with results that are 90% of the State WQ standards will implement the appropriate treatment and BMP programs, as identified in the UAA, to avoid further impairment. (Note: this rapid response would be comparable to the capability shown by the District during AIS rapid response completed in 2016/2017).	The Minnesota Pollution Control Agency is the authority that is developing TMDLs and incorporating them into the WRAPS program. We will continue to assist the MPCA in this effort. However, we do not know their time frame. The District will be evaluating the plan every two to determine if adjustments are needed in the plan's course of action. These adjustment would be in line with our management decision trees.
17	1/1	Paul Bulger			Chapter 3		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., reduced consumption, water reuse). This includes working with Cities to adopt practices to reduce/minimize groundwater withdrawls and prevent aquifer depletion below 2015 water levels, as measured in the proximity (i.e. <1000 feet) of each city supply well.	Thank you for your comment. The Department of Health and the Department of Natural Resources are the agencies that have regulatory authority in the management of groundwater specifically municipal drinking water. The District has identified in their plan a groundwater management decision tree that identifies the importance of connectivity between surface and groundwater but also the importance of water conservation.
18	1/2	Paul Bulger			Chapter 3		Ground S2. The District will develop, or cooperate with others to develop and update annually, a groundwater action plan in an effort to gain a better understanding of groundwater-surface water interaction and develop management strategies that consider the protection of both resources. The role of the District may include:…	Thank you for your comment. The District is in the early phase of engaging with its community on this topic.
19	1/3	Paul Bulger			Chapter 3		(p. 10 Climate Adaptation) Add strategy for low water levels in lakes, similar to the following, WQuan S10. The District will work with cities and other stakeholders to encourage conservation practices while avoiding/prohibiting use of groundwater resources to supplement water levels in creeks, lakes and wetlands, during periods of dry climatic conditions (i.e. drought).	The District has strategies WQuanS9 that encourage conservation practices to protect the water resource as well WQuanS2 that minimizes base flow impacts. Our regulatory program also regulates small users for both appropriation of surface and groundwater.
20	1/4	Paul Bulger			Chapter 5		p. 17 Protecting groundwater quality has become complicated by the increased use of infiltration as a means to improve surface water quality and promote sustainable groundwater supplies. Figure 5-5 shows the delineated wellhead protection areas within the RPBCWD. This diagrams illustrate that the WHP areas cover the entire District and that the most of the WHP area for each city is overlapping.	Thank you for your comment. We have change accordingly.

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Response to comment
21	1/5	Paul Bulger			Chapter 5		(p.30) Several waterbodies within the District have been listed on the MPCA impaired waters (303(d)) list for a variety of impairments. Waterbodies on the impaired waters list are required to have an assessment completed that addresses the causes and sources of the impairment. This process is known as a total maximum daily load (TMDL) analysis. The TMDL analysis includes the recommended treatment program for the water body and the target goals for water quality improvement.	*Thank you for your comments. The TMDL does not recommend a treatment program for water bodies. The TMDL implementation plan does. However, the MPCA has in recent years changed their approach- instead of doing a TMDL and then a TMDL implementation plan for individual water bodies, the MPCA is looking at resources on a watershed scale using the WRAPS process. Section changed accordingly.*
22	1/6	Paul Bulger		Table 5-5	Chapter 5		Table 5-5 foot note 6 Lake specific water quality data, impairments, and TMDLs are presented in greater detail in the major watershed sections for Purgatory Creek (Section 7.0) and Riley Creek (Section 8.0). Information used to determine the impairments is available from the MPCA. (add link to specific section on MPCA website)	Link was added to the table.
23	1/7	Paul Bulger		Figure 5-9	Chapter 5		Figure 5-9 confirm this graphic shows all of the impaired creek sections listed in 2017/18. Also label the Minnesota River.	The figure was updated to incorporate the Minnesota River Label and is reflective of the 2018 impaired waters list.
24	1/8	Paul Bulger		Table 6-2	Chapter 6		Table 6-2 – should the projects identified as TMDL be given a higher score? Clarify what TMDL means on this table. The table would be more clear to add the information on Table 9-6, into Table 6-2. Splitting into different tables makes it hard to decipher what pollutant is being addressed by each project.	Impairment criteria was not of the prioritization tool developed in collaboration with the CAC , TAC and Board. The intent of this chapter is to identify all the different water quality projects and practices identified as a means to improve the resource. The intent of the table is to highlight the multiple benefits of the projects. If the primary purpose of the project is pollution reeducation and reduction have been calculated, the project description will reflect the pollutant of concern.
25	1/9	Paul Bulger		Table 7-2	Chapter 7		Table 7-2 – should the projects identified as TMDL be given a higher score? Clarify what TMDL means on this table. The table would be more clear to add the information on Table 9-6, also on Table 7-2. Splitting into different tables makes it hard to decipher what pollutant is being addressed by the project.	Impairment criteria was not of the prioritization tool developed in collaboration with the CAC , TAC and Board. The intent of this chapter is to identify all the different water quality projects and practices identified as a means to improve the resource. The intent of the table is to highlight the multiple benefits of the projects. If the primary purpose of the project is pollution reeducation and reduction have been calculated, the project description will reflect the pollutant of concern.
26	1/10	Paul Bulger					(p. 4) Proposed projects the District may implement within the Purgatory Creek watershed are listed in Table 7-2; additional details are provided in the District's overall implementation program (see Table 9- 1). Table 9-1 adds budget and dates, it does not provide more detail on how these projects were selected. i.e. Silver lake has 1 project, while Lotus lake has 5 projects listed – yet all projects have similar scores and Lotus project names are all basically the same. Add more detail or revise the statement that details are provided.	Selection projects were based on scoring as well as our management decision trees as well as logistical factors. We have added clarification within page 7.4.
27	1/11	Paul Bulger			Chapter 8		Table 8-2 – should the projects identified as TMDL be given a higher score? Clarify what TMDL means on this table. The table would be more clear to add the information on Table 9-6, also on Table 8-2. Splitting into different tables makes it hard to decipher what pollutant is being addressed by the project.	Impairment criteria was not of the prioritization tool developed in collaboration with the CAC , TAC and Board. The intent of this chapter is to identify all the different water quality projects and practices identified as a means to improve the resource. The intent of the table is to highlight the multiple benefits of the projects. If the primary purpose of the project is pollution reduction and reduction have been calculated, the project description will reflect the pollutant of concern.
28	1/12	Paul Bulger			Chapter 9		Section 9.16 and would be more appropriate as Section 9.1, given that UAA and TMDL should be the fundamental criteria to determine project priorities. Table 9-6 and Table 9-1 should be merged. I find it very hard to correlate the projects listed on Table 9-1 with the estimated % reduction listed on Table 9-6. For non-technical readers the benefits for each project in Table 9-1 should be illustrated more clearly.	Impairment criteria was not of the prioritization tool developed in collaboration with the CAC , TAC and Board. The intent of this chapter is to identify all the different water quality projects and practices identified as a means to improve the resource. A note was added to Table 9-1 to direct the reader to the individual watershed chapters that provide details on the multiple benefits of the projects as identified the variable scorings.
29	1/13	Paul Bulger			Chapter 9		Table 9-1 – for each project, clarify whether this helps to Protect, Manage or Restore	Some of the projects identified actually do all of them as they might protect another resource. For example, a Lake Lucy watershed load project might help in the restoration of Lake Lucy but it also protect Lake Ann which in turn benefits the whole Riley Creek watershed.
30	1/14	Paul Bulger			Chapter 9		Table 9-2 paragraph below discusses lakes meeting the goal…add 2nd paragraph and/ or table to address lakes that are already impaired. Consider including specific actions beyond monitoring to address the impairment to demonstrate the District will be taken action to address impairment, not just study data.	thank you for your comment. We have added language that outlines the actions the District will take if the numerical goals are not achieved.
31	1/15	Paul Bulger			Chapter 9		Section 9.1.1.1.2 add time table for LVMP for lakes (i.e. prior to 2022)	The Department of Natural Resources is responsible for developing and improving the LVMP. The District will assist in the development but can not guarantee a year as it is based on the resource need and agencies authority.
32	1/16	Paul Bulger			Chapter 9		Sect 9.1.1.1.3 If water quality is poor or exhibits a declining trend, the District may will implement a series of watershed and/or in-lake management practices to improve the lake health based on recommendations from the lake-specific UAA updates…	Projects still need to go through our prioritization tool and management decision trees in order to determine if the project is a priority for the District. Thus a project may or may not qualify.
33	1/17	Paul Bulger			Chapter 9		p. 10 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. Comment: Given the addition of lakes and creek sections to the impaired waters list in 2018, suggests the past efforts have not met the Protect and Preserve objectives, thus cumulative / multifaceted efforts need to be increased and more effective. It would benefit to include a threshold to trigger further actions by the district. Other regulated industries have pre- established criteria that drive the organization to 'require' a response action.	As per section 9.14, the District will review it's implementation program at least every two years as part of its evaluation and reporting duties and revised its implementation program as needed and identified in Table 9-1.
34	1/18	Paul Bulger			Chapter 9		The District will consider internal load control measures after considering prioritize 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. After these external sources are mitigated, internal load control measures will be considered. These considerations are critical because failure to address external sources them could lead to the internal measure being compromised and reducing the effective life of the treatment	Thank you for your comments, however the changes you have made do not reflect the lake management decision tree as identified in Figure 9-2.
35	1/19	Paul Bulger			Chapter 9		Fig 9-6 --- modify this diagram to include a. generate management plan, b. add conservation and reduced consumption, c. add E&O as part of solution and management program, d. clarify or revise what is meant by "solution" since there are no capital improvement projects planned for groundwater	Thank you for your comment. The diagram was modified to add language" identify, prioritize and implement solutions".
36	1/15	City of Eden Prairie			Chapter 3		a. 3.2.6.2 – The City would like to see the District take an active interest in the quantitative accounting of estimated pollutant reductions to assist cities and the MPCA in meeting TMDL goals. Given the large, multiple agency, government regulation of surface water, agencies should be looking to achieve common goals wherever possible.	Please see section 9.16. The District will be tracking pollutant reduction realized by the District's implementation of capital projects. This information will be available to partner city to assist in meeting TMDL goals.

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37	1/15	City of Eden Prairie			Chapter 3		b. 3.2.6.2 – The City appreciates the management of carp throughout the District. We would however like to work with the District on a more sustainable solution for the Purgatory Creek Recreation Area carp gate. Given it was supposed to be a temporary application, it is an ongoing maintenance and flood concern to have a trash rack in line with the creek.	According to the maintenance plan approved by the DNR, the carp barrier was not attended to be a temporary fixture. We are however, working on identifying an alternative solution.
38	1/15	City of Eden Prairie			Chapter 3		c. 3.2.6.4 – The City has some concern over the District looking to develop a "groundwater budget" for the watershed. Focusing on protecting the interaction of surface water and groundwater should be of a higher concern as Drinking Water Supply Management Areas cross city boundaries but can be looked at more comprehensively at a watershed scale.	The District's intents to work cooperatively with others to develop, a groundwater action plan focused on gaining a better understanding of groundwater-surface water interaction and develop management strategies that consider the protection of both resources. This effort is intended to look across governmental boundaries to result in a holistic look.
39	1/15	City of Eden Prairie			Chapter 3		d. 3.2.6.6 – Alternative strategies should be investigated in lieu of infiltration to more productively promote volume reduction in areas of Type D soils and other areas not conducive to standard infiltration BMPs.	We added strategy WQuandS10 to reflect that the District will investigate alternatives to infiltration practices to promote volume reduction in areas that are not conducive to standard infiltration techniques.
40	1/15	City of Eden Prairie			Chapter 5		a. 5.9 – Since the majority of the District lacks a detailed FEMA Flood Insurance Study with defined base flood elevations, The City would like the District to consider leading the effort on a District Wide Map Revision. The current maps, consisting of primarily outdated and inaccurate Zone A Special Flood Hazard Areas, are a burden for property owners and lessens the value of the National Flood Insurance Program.	The District will facilitate a meeting with the DNR and LGUs in the District to discuss improvement in the layering of Zone A.
41	1/15	City of Eden Prairie			Chapter 6		b. 5.10 – The City has interest in partnering and sharing resources to complete a comprehensive wetland inventory.	We look forward to working with you.
42	1/15	City of Eden Prairie			Chapter 9		a. General – The City needs to be involved early on large capital projects with ongoing maintenance needs. Having clear long-term maintenance plans as well as project acceptance criteria is key to the ongoing success of the projects.	The District looks forward in continuing our discussion and partnerships for projects.
43	1/15	City of Eden Prairie			Chapter 9		b. Table 9-1 – Cost share money is level for 10 years, consider increasing annually to support partnering goals.	The cost-share funds will be assessed on an annual bases and potentially increase if all resources are used.
44	1/15	City of Eden Prairie			Chapter 9		c. Table 9-1 – Most programs have flat budgets with increases only identified in soft costs.	The District will assess every year cost to determine additional needs.
45	1/15	City of Eden Prairie			Chapter 9		d. 9.4 – While the City understands the importance of the regulatory program, we want to reiterate the need for a streamlined process including increased flexibility for restricted sites.	The District will continue to work with the City and TAC to identify potential flexibilities and new technologies for restricted site that protect the water resources.
46	1/15	City of Eden Prairie			Chapter 9		e. 9.4 – The City looks forward to working with the District over the upcoming rules update to establish a general permit and programmatic maintenance agreement.	Thank you for you comment.
47	1/15	City of Eden Prairie			Chapter 9		f. 9.4.2 - The WMP should address that cities within the District are also regulated by the PCA and their Municipal Separate Storm Sewer System general permits. In addition, the City has multiple watershed districts within its boundaries. Adopting rules at least as restrictive as all of the agencies involved is not always practical. Watersheds should aim to establish regulatory strategies that are consistent with the City, the MPCA and the other neighboring watershed districts so a collaborative goal is met.	The District will work with watershed cities and counties, as well as state and regional agencies, to develop an efficient and effective regulatory program that achieve these goals. Every watershed district is unique in that they have different resource vulnerabilities.
48	1/15	City of Eden Prairie			Chapter 9		g. 9.5.3 – The City would like to partner on expanding the detail of the floodplain model throughout the City. The goal is to provide an accurate, calibrated model with surveyed critical points.	The District looks forward to working with you.
49	1/15	City of Eden Prairie			Chapter 9		h. 9.11.12 – Permanent Easements may not always be needed to enhance or restore wetlands. We suggest you add in other alternatives to permanent easements rather than applying a strict no to the project.	Thank you for your comment. The District are financed by public dollars and thus, the public's investment needs to protected. This can be done either through a permanent protection, sell fee title or other mechanism.
50	1/15	City of Eden Prairie			Chapter 9		i. 9.15 – The City has just recently updated and adopted its Local Water Management Plan (LWMP) and received approval from the Met Council for inclusion in our Comprehensive Plan update. The District will have the opportunity to review the Comprehensive Plan and the corresponding LWMP during the agency review period. The City understands there may be some minor updates to the LWMP needed as part of this District WMP update, but the City is confident that our recent collaboration to complete the plan will make this a relatively small effort.	Thank you for your comment.
51	1/9	Bloomington Sustainability Commission					The Bloomington Sustainability Commission commends District staff, the Board of Managers, the Technical Advisory Committee, the Citizens Advisory Committee, plan writers, reviewers, the public and others that have played a role in the drafting of the plan. The plan is comprehensive, clear, well written and organized, and encompasses and addresses many issues relating to our shared water resources and our environment. The Bloomington Sustainability Commission looks forward to working with you on many of these issues.	Thank you for your comment. We look forward to working with the Bloomington Sustainability Commission.
52	1/9	Bloomington Sustainability Commission					The Bloomington Sustainability Commission specifically looks forward to working with the District on improving the water quality of Hyland Lake and other water bodies that lay within the District and the City of Bloomington. As improving water resources is one of the goals of the Commission, we are happy to provide education and outreach, including the promotion of the Adopt a Stormdrain program in order to meet the shared water quality improvement goals of the District and Commission.	We look forward to working with the Bloomington Sustainability Commission in improving Hyland Lake.
53	1/15	MN DNR					The plan is well thought out and aligns well with DNR goals and policies.	Thank you for you comment
54	1/16	MN DNR					We appreciate the regulatory authority they've undertaken and that they are continuing to develop that role with cities and other stakeholders in the district.	Thank you for your continued support of the District regulatory authority
55	1/16	MN DNR					Their goal to promote sustainable management of groundwater resources is important and we are glad to see that they've identified it and have develop strategies to provide education and outreach about it.	Thank you for your comment.
56	1/16	BWSR					There are a large number of goals (thirteen) many of which are strategic and difficult to measure. The District should identify quantifiable goals to best measure its progress toward water resource improvement/protection. A quantified resource change should be considered and could be included in the District's Report Card.	The District has incorporated in page 1 of section 9 a plan outcomes that highlight the water improvements we intend to implement in the next ten years.
57	1/16	MPCA					We have no additional comments as part of the official 60-day review and comment period, and recommend it for approval	Thank you for reviewing the draft plan, participating in its development, and continued supporting its approval.
58	1/15	Bill Satterness					What is the mission of the district? Your new mission has just three words - protect, manage, restore. But WHAT will you protect, manage and restore? To answer that, one has to look beyond the mission statement, to the vision, goals, and budget.	Thank you for your comment. State Statue direct us in our mission.
59	1/15	Bill Satterness					The vision says you aim to protect, manage, and restore water resources. You're all about water resources! That's great.	Thank you for you comment.
60	1/15	Bill Satterness					Then I looked at the goals in Section 3. There are six goals. The first five all have to do with protecting, managing, and growing the district itself: admin, data, education, planning, regulation.	Goals listed in Section 3.2 were listed in alphabetical order. The goals are not listed in prioritized order. The first 7 goals are related to administration, data collection, education and outreach, planning and regulations - All of which were identified in the public input process and support the mission of the District.
61	1/15	Bill Satterness					Water resources - the only reason for the district to exist - get the sixth and final goal. But our water resources should be our first and only goals. The district's activities should support our water resources goals. I'm suggesting a restructuring of the goals, so all the district's activities can be listed as subsets of the water resources goals.	Goals listed in Section 3.2 were listed in alphabetical order. The goals are not listed in prioritized order. The first 7 goals are related to administration, data collection, education and outreach, planning and regulations - All of which were identified in the public input process and support the mission of the District.

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62	1/15	Bill Satterness					Then I looked at the proposed budget. You know, five years ago we had one contractor who served as coordinator, recorder, and attorney, all for a flat fee that was less than 10% of the total budget. Now you have double the budget, but only half of it will be spent on practical actions - that is, long-term capital projects in the three watersheds and short-term treatments around the district. The other half of your budget is overhead - 27% admin, 9% education, 8% assessments, 3% reserve, 3% regulations.	Thank you for your comments. The District changed directions on how they wanted to operate five years ago and believes that the current structure has greater benefits then the past structure.
63	1/15	Bill Satterness					And unfortunately, this proposed plan sidesteps accountability. It does not set specific, measurable goals for the conditions of each water body. It avoids discussion of the city storm water system - which is the source of most of the water, and most of the water problems.	The District has added a plan objective outlining outcomes for the District. The District through a series of study updates for the whole District has identified projects that identified areas in need of further treatment and not. The areas in need of treatments were included when the District prioritized projects.
64	1/15	Bill Satterness					For years I, and others, have been asking you to spend your money in ways that will be cost-effective - to prioritize by comparing costs versus practical benefits. But now you intend to make decisions according to an overgrown, overblown point system, with factors and weights that are far removed from what ordinary citizens want you to do.	The capital project prioritization process is based on the extensive input from the public, the District's Citizen and Technical Advisory Committees and Manager input
65	1/15	Bill Satterness					Where in your plan are boating, fishing, and swimming - the so-called beneficial human uses? Well, they're one subset of one subset of one of the district's six goals, which in turn are just one of the nine categories that have assigned points. Your point scheme is heavily biased against lakes and recreation.	The Goals were developed based on the public input process. The prioritization tool was developed based on the public input process as well as interactions with the CAC, TAC and Board.
66	1/15	Bill Satterness					I think the taxpayers want you to spend their money doing things that will actually improve their quality of life.	The plan was developed based on the public input process.
67	1/15	Bill Satterness					In summary, there is considerable room for improvement in this draft plan.	No comment
68		Lotus Lake Conservation Alliance					The LLCA commends the RPBCWD on the tremendous amount of work that has gone into the rewriting of the 10-Year Plan and the resulting draft plan. The Plan is well thought out, organized, and easy for a non-water professional to understand.	Thank you for you comment.
69		Lotus Lake Conservation Alliance			Chapter 1		The plan should state how the Citizen Advisory Committee volunteers are chosen – what criteria is used by the Managers to choose CAC members. Since they make recommendations based on the community interests and influence strategy and decisions for the district, it would be helpful to learn how they are appointed and about their backgrounds. It would also be good to have a goal for which types of water the CAC members represent – do they live on a wetland, creek, lake, or none? Do the CAC members represent concerns of all types of people?	The Board of managers select the CAC members in accordance of state statute.
70		Lotus Lake Conservation Alliance			Chapter 3		The District's number one vision objective is to administrate well, whereas its last objective is to improve water bodies. We would prefer a focus on improvement and protection supported by adequate administration. Please consider reordering these goals, to put water quality improvement as the main goal of the District.	Goals listed in Section 3.2 were listed in alphabetical order. The goals are not listed in prioritized order. The first 7 goals are related to administration, data collection, education and outreach, planning and regulations - All of which were identified in the public input process and support the mission of the District.
71		Lotus Lake Conservation Alliance			Chapter 3		We feel that goals 8,9,10,11, and 13 be moved higher in ranking and goals 1, 4, 6 and 7 moved down or eliminated.	Goals listed in Section 3.2 were listed in alphabetical order. The goals are not listed in prioritized order. The first 7 goals are related to administration, data collection, education and outreach, planning and regulations - All of which were identified in the public input process and support the mission of the District.
72		Lotus Lake Conservation Alliance			Chapter 3		Goal #2 could be construed to focus on the district generating data rather than taking action, and should be restated.	Data Collection is an important element in understanding how healthy the resource is. It allows the District to base actions/decisions on sound science. Goal 2 is about collecting scientific data to use the best available science to recommend and support management decisions.
73		Lotus Lake Conservation Alliance			Chapter 3		Goal #4 could be eliminated. If the watershed district believes in the vision, then there is no need to set a goal to try to develop plans that support the vision	Continued planning is an important element to adaptive management of our resources.
74		Lotus Lake Conservation Alliance			Chapter 3		There are no measurable aspects to these goals. Further into the goal section, the language is really oriented to more how the district plans to conduct business rather than how they will strive to accomplish the goals. Governance is a good thing but would probably be better stated somewhere else rather than intermixed with the goals.	The first 7 goals are related to administration, data collection, education and outreach, planning and regulations - All of which were identified in the public input process and support the mission of the District. The rest of the goals are resource related and are reflective of the input gathered during the initial public input process. The District has added a plan objective text outlining outcomes for the District into section 9.
75		Lotus Lake Conservation Alliance			Chapter 3		Goals should be clearly stated, actionable, and measurable. Because the goals, as they arecurrently stated, are hard to measure, it will be hard to track progress towards the goals. Please consider restating the goals so the work of the District can be measured against each goal.	The District has added a plan objective outlining outcomes for the District. The District also will be reporting progress through the required annual reporting as discussed in Section 9.14.
76		Lotus Lake Conservation Alliance		5.7	Chapter 5		5.7: The Watershed plan needs more concrete detail on drainage ditches flowing into bodies of water in the district. These are major sources of the pollutants listed in Section 5. Are there plans/goals for improvement of drainage ditches into the lakes and streams? If so, where in the plan is this stated?	There are several public ditches within the Purgatory Creek Watershed as shown on Figure 5-7. However, the District is not a drainage ditch authority as identified in Chapter 103 E.
77		Lotus Lake Conservation Alliance		5.7	Chapter 5		The Watershed plan states that cities have jurisdiction over the lateral (primary) stormwater systems and are responsible for maintenance and improvement. What encompasses a "public ditch"?	A public ditch is defined through Chapter 103E of Minnesota Statutes
78		Lotus Lake Conservation Alliance		5.7	Chapter 5		There are MANY more ditches flowing into Lotus Lake (for example) than the three listed in the plan. Some were constructed many years ago and have been neglected and disowned by the cities. Road runoff is flowing though private properties into our lakes. The plan should address how these major sources of pollution will be addressed over the next 10 years.	Public ditches are defined under Chapter 103 E. Lotus Lake has many ravines due to the steep topography and how the land was developed around it. These natural drainage ways are technically not a public ditch. The District over the years has worked with homeowners in providing them tools and grants to help stabilize and restore the land for the benefit of the resource. The District continues to have cost-share resources available for both city, residents and lake associations.
79		Lotus Lake Conservation Alliance		5.8	Chapter 5		5.8: What concrete steps are being taken to improve our water quality? What are the hard deadlines? Are there plans to improve the quality of the bodies of water within the district that are listed on the MCPA impaired water's list and to prevent more from being placed on the list?	All the projects identified in the plan are projects that were recommended through studies the District and partners have identified. All the projects meet at least one of the Water Quantity or Water Quality goals. Projects identified in the plan protect, manage, or restore the resources.
80		Lotus Lake Conservation Alliance			Chapter 6, 7 & 8		In the table that shows potential projects, there is a column called "Funding Partner Opportunity". Is there a goal/strategy to get partners for the Funding Partner Opportunity? Does Minnesota have an "Adopt a Lake" program? This might be something to consider to secure partners.	Funding Partner Opportunities category related to agencies or local partners that would financially partner on the different initiative. This allows us to leverage are funds farther. The Minnesota Department of Natural Resources has an Adopt a River program, where volunteers walk along the river to clean it up from trash. An Adopt a Lake program has yet to be developed but seems like a great idea.

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81		Lotus Lake Conservation Alliance			Chapter 6, 7 & 8		It would be good, for the information brochures done for each body of water, to include community survey statistics that are relevant to that body of water. 90% of survey respondents said lakes were very important to their communities. This information should be shared with the community on the information sheets for lakes that are developed by the District.	The District publish survey results and fact sheet on our website. http://rpbcwd.org/news/community-survey-results-are/ Please note that Purgatory Creek was identified as the most highly valued resource and was identified by about 60% of survey respondents. Over 40% of respondents identified Wetlands as valuable. No other resources were identified as most valuable by more than 40% of survey respondents. Forty-one respondents provided an open-ended response. Of these, 9 responses indicated "all" District waterbodies are important. Several responses identified waterbodies outside or downstream of the District (e.g., Lake Minnetonka, Minnesota River). Furthermore, the majority of the 403 respondents considered each of the listed resources as very important. Nearly 90% of all respondents identified each waterbody type as somewhat or very important. Respondents generally considered lakes to be most important, followed by the creeks, wetlands, and ponds (all scoring similarly).
82		Lotus Lake Conservation Alliance			Chapter 8		It would help if table 8-2 had footnotes/descriptions on the various indices/scoring plan rather than having to look elsewhere	A footnote was added to Tables 6-2, 7-2, and 8-2 to direct the reader to Section 4 which describes in detail the scoring variables.
83		Lotus Lake Conservation Alliance		Table 9-1:	Chapter 9		It would be more appropriate to use project figures that account for inflation. A project that is planned to require $100,000 in 2018 would probably cost at least $130,000 in 2028 (with 3% inflation). All of the Administration categories account for inflation, but the CIP section, AIS prevention spending, and Lake Vegetation Management do not account for inflation – this should be changed. To ignore inflation is to build problems into the plan.	The Plan is a guiding document. The District will review the status of all projects and programs and the priority for budget and levy purposes, and will allocate funds for the following year accordingly.
84		Lotus Lake Conservation Alliance		Table 9-1:	Chapter 9		The projects that have been selected for Lotus Lake on the middle-western side of the lake are addressing water that is already being well treated prior to entering the lake. The water flowing into Lotus from this creek is moderate in flow and clear. We would like to see a change in priorities away from these projects and instead, see a project or projects to do significant work on the south-western creek that is a large source of pollutants and silt entering the lake. We feel that priority should be put on the major source of loading issues.	The District completed in 2017 a study specifically looking at the sources of phosphorus load for the Lotus Lake subwatershed. The projects identified in the plan are those project identified as phosphorus sources to Lotus Lake, including a project on the south-western drainage way.
85		Lotus Lake Conservation Alliance		Table 9-1:	Chapter 9		We feel that it is important to put a waiting period between the first creek restoration projects and later projects, to see how time affects the desired results. Do these projects provide the predicted benefits for an acceptable period of time, or are the efforts washed away by large rain events?	Creek stabilization projects are designed to withstand the typical erosional forces expected at the site including reconnection with the adjacent floodplain. This results in a robust system that slow velocities and restore habitat for storms of various duration and intensities. The sequence in creek restoration rotates between the three major watershed.
86		Lotus Lake Conservation Alliance		9.1.1	Chapter 9		9.1.1: We agree that stopping the spread of AIS should be a high priority of the District.	Thank you for your support in this effort.
87		Lotus Lake Conservation Alliance		9.1.1.2	Chapter 9		9.1.1.2: We agree that emphasis should be placed on controlling plant AIS. Furthermore, we would like to see the District and all contractors hired by the District and partners working with the District to implement a strict AIS "hygiene" protocol, which prohibits boats belonging to or working for/with the District from traveling from water infested with any AIS, to water that does not have that same AIS, without following a stringent decontamination program, in order to avoid further spread of AIS throughout the District.	The District is a certified lake service provider. The District follows decontamination protocols, as established by the MnDNR, between any water resources. In addition, the District's regulatory program requires that work done within waterbodies be conducted in a manner to minimize the potential transfer of aquatic invasive species (e.g., zebra mussels, Eurasian Watermilfoil, etc.) to the maximum extent possible.
88		Lotus Lake Conservation Alliance		Figure 9-2	Chapter 9		Figure 9-2: The final phase of any project should be an assessment of the overall impact on water quality – i.e. how much improvement was actually achieved. We should assess how much "bang" we are getting for our "bucks", and determine whether or not the type of project undertaken would be a good or poor project to attempt again in the future. Without assessment, we could end up just doing projects for the sake of doing projects.	As part of our adaptive management strategy, the district will assess if projects are successful or not as outlined in Section 9-1.
89		Lotus Lake Conservation Alliance		Table 9-3	Chapter 9		Table 9-3: We are glad to see that the District is monitoring a wide variety of factors affecting water quality, and would like to see an explanation as to why projects are done primarily to lower one pollutant (phosphorus) and not other pollutants.	At the time of identifying water quality projects, most studies have focused on phosphorus for UAA but also sediment transport for creeks. As other pollutants of concerns are identified the District intends to determine possible solutions. Projects can be evaluated and assessed using the prioritization tool to determine if the District should implement the project.
90		Lotus Lake Conservation Alliance		9.5.5	Chapter 9		9.5.5: If the TMDL's are completed for the impaired waters of the District, this would be a good place to refer to those plans. If not, information on when the plans will be completed for each water body should be in this section.	Table 5-5 identifies the target start and completions years for the various impaired waters in the District. The table also lists the year the TMDL study was approved by the MPCA and EPA.
91		Lotus Lake Conservation Alliance			Chapter 10		We agree that the use of a scorecard to measure the watershed's work in relation to state level assessments and a district scorecard to report their progress to the watershed constituents are a good idea, but believe the District should state more than that they will develop a report card. This report card should be developed now, and be part of the 10- Year Plan, so it can be used during 2018 to measure progress against goals. As we stated earlier, this is why it is critical to have goals that are measurable, particularly regarding water quality improvement. We would like to see at least a draft report card included in the 10-Year Plan.	Thank you. The report card is located in Appendix G.
92		Lotus Lake Conservation Alliance			Chapter 10		This chapter (one page long) is very light in detail, and should be given the same level of attention as the other chapters. It is arguably the second most important feature of the plan after goals – the methods that will be used to figure out whether or not the District ismeeting its goals.	The District has added a plan objective text outlining outcomes for the District into Section 9.
93		Lotus Lake Conservation Alliance			Chapter 10		When the District conducted its survey of people's priorities, 90% (the highest ranking) of people stated that lakes are very important to the quality of life in their communities, as compared to 66% for creeks, 62% for wetlands, and 54% for ponds. The most critical feature of the lakes to District residents, according to the survey, is the ability to recreate IN the lake – swim, boat, fish, ski, paddleboard, etc. In its efforts to rebalance the plan from an over-focus on the lakes, it seems as though the District has weighted the scale too far away from lakes.	Furthermore, the majority of the 403 respondents considered each of the listed resources as very important. Nearly 90% of all respondents identified each waterbody type as somewhat or very important. Respondents generally considered lakes to be most important, followed by the creeks, wetlands, and ponds (all scoring similarly). Wildlife watching and recreation adjacent to waterbodies were the most popular uses and were selected by about 80% of survey respondents. Other recreational activities such as boating, swimming, and fishing were each selected by more than half of the survey respondents. The District also conducted public workshops that help identify all the concerns for lakes, creeks, groundwater and wetlands. All 4 resources were identifies as important and hence goals were identified for all four resources.
94		Lotus Lake Conservation Alliance			Chapter 10		The lakes are the bodies of water that are most used, most enjoyed by, and most important to the taxpaying residents of the District. They are significant feeders of Riley and Purgatory creeks. Without healthy lakes, we cannot have healthy waters in the District. Lakes importance to the community and overall health of the District should not be minimized.	Lakes are one of four resources that the District is protecting, managing and restoring. Purgatory Creek was identified as the most highly valued resource and was identified by about 60% of survey respondents. Over 40% of respondents identified Wetlands as valuable. Because there are many wetlands and creek reaches tributary to the lakes in the District, these resources are critical to the health of the lakes and cannot be overlooked. The plan recognizing this important interaction between water resources.

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95		Lotus Lake Conservation Alliance			Chapter 10		Also in the survey, it was revealed that Lotus Lake is the body of water that most respondents were concerned about. Their chief concern was pollutants entering the water, and reducing pollutants from stormwater was their highest priority for addressing the pollutant issue.However, the projects selected to do over the next 10 years for Lotus Lake do little to address the pollutant loading from untreated stormwater entering the lake. We would like to see the District and Chanhassen work together with the LLCA to identify and complete a series of smaller projects that address stormwater gullies and direct runoff into Lotus Lake from the streets surrounding the lake – projects beyond the traditional District cost-share program. This type of work may well be necessary on other lakes in the District too. We would like the District to think outside of the UAA box, and consider these smaller types of projects – not just the larger engineering projects typically identified in the UAA's, and allow for budget over the next 10 years to accomplish some of these small but important pollutant-reducing programs.	Yes, it is true that in question 12 where survey takers were asked Are there one or more water resources you are worried about. 26 out of 251 responses identified all waterbodies and Lotus Lake. Question 13 of the survey identifies the concerns about the conditions of lakes, creeks and wetlands in the community. Three concerns were identified by over 70% of survey respondents, including: 1. Pollutant loading to water bodies (81% of respondents) 2. Aquatic invasive species (75% of respondents) 3. Clarity of water (75% of respondents) Other concerns were selected by no more than 53% of survey respondents. Flooding was identified as a concern by only 16% of survey respondents. The District provides technical assistant and has a cost-share program to help cities and homeowners with projects linked to helping improve water quality. The District is also working with the LLCA to educate and inform residents of the
96		Lotus Lake Conservation Alliance			Chapter 10		Finally, we would like to suggest the District set a goal for itself in the new 10-Year Plan, that at least 45% of each yearly budget go to water quality improvement projects. We understand that the goal might not be reached every year, but the current plan calls for spending only 38% of the budget on actual projects, and we feel this is too low. The setting of this goal should be a topic of discussion for an upcoming Board meeting.	Thank you for your comment.
97		Lotus Lake Conservation Alliance			Chapter 10		Thank you for considering these comments as you work to finalize the new 10-Year Plan. Again, overall, we think the Plan is well done, with our primary concerns being a reorientation of the major goals away from administration and towards water quality improvement, and a restating of goals so progress can be measured.	The goals identified in the plan are not a prioritized list but are simply present alphabetically by category. The District's overarching mission is to protect, manage and restore the water resources (Ie., wetlands, creeks, lakes, and groundwater). Text was added to describe overarching district-wide outcomes of implementing this plan over the next 10 years into Section 9.
98	1/15	Mitchell Lake Association					The overall plan is well put together with good data collection and a strong process for prioritization and development of strategies. Compared with previous plans however, this iteration is lighter on specific details about projects which makes it sometimes difficult to connect the strategies to action	Thank you for your comment.
99	1/15	Mitchell Lake Association					We are very concerned about the lack of any funding for Mitchell Lake from 2018 thru 2027. Our lake was recently delisted despite inconsistent water clarity measures and an upward trend in both Chlorophyll and Phosphorus measures. The later two being above the MPCA standard for the last two years. After years of investment by both of our organizations and the city, we are worried that the "plug" is being pulled too early and we will see regression without consistent maintenance.	As part of the data collection program the District intends to continue to monitor and assess the lake using its adaptive management approach described in Figure 9-1 and the District's lake management decision tree (see Figure 9-2). The District has also identified the importance of protecting resources as identified in Water Quality Goal 1. Thank you for your comment.
100	1/15	Mitchell Lake Association					The budget and implementation plan (section 9) is generally clear and transparent. Our concern is about the percentage of funding allocated to Administration and Planning. It is 24% of the overall budget in 2018 growing to 29% in 2026 and 32% in 2028. It may not be a good comparison, but by non-profit standards this is decent currently, but the consistent upward trend is cause for concern over time. It would be good to understand opportunities and strategies to reduce overhead and potentially set a target of holding costs in check. This would allow more of the public money to go towards programs and direct action.	The District's administrative goal identifies operating in a manner that used uses District resources and capacity efficiently. One strategy to accomplish this is to periodically assess the it capacity and resources as identified in Administrative strategy 2. Thank you for your comment
101	1/15	Barb Spilane					As a resident of Lotus Lake, I read your 10 Year Plan with great interest. The level of work necessary to achieve such a project is evident in the document and I commend you on this. I believe water quality improvement should be a high, if not the top, priority of the plan and allocation of funds towards this goal should be commensurate. To that end, storm water runoff directly into lakes should be addressed in greater detail. Lotus Lake, among others, has a number of culverts and gullies that drain into the lake so that pollutants enter freely. Water quality is difficult to achieve without some sort of filtering process. I would like to see a greater emphasis and recognition of this in your plan.	While assessing Lotus Lake for water quality projects the District thoroughly assesses the stormwater pipesheds as well as major ravines discharging into Lotus Lake. Through that effort numerous water quality y improvement projects were identified (see Section 7 for list of studies and project) . The District also has a cost share project for residents interested in improving water quality or stabilizing their shoreline. Please contact the us if you would like to learn more about these opportunities. Thank you for your comment.
102	1/15	Wendi Moffly					As newer residents of Chanhassen and Lotus Lake, we are unfamiliar with the history of issues surrounding the area watershed. However, we can share some observations and concerns from our past two summers here: We definitely noticed a decrease in the water clarity from 2016 to 2017. We noticed clusters of dead fish in the water and washing up on shore in 2017 that we had not seen in 2016. We have been sad to see trash and debris including human waste left by ice fishing enthusiasts. One of the greatest assets of Minnesota is its 10,000 plus lakes and the natural beauty and recreational oportunities associated with them. Please protect and maintain both through thoughtful planning, and the setting of measurable criteria and outcomes. Please present this information to the community for periodic review. Please prioritize water health and clarity as an overall objective. Please do all possible to stay within the budget set forth — with respect for the limits of the tax revenues.	Thank you for you comment. The District will continue to monitor the water quality in Lotus Lake. The District published an e-newsletter, annual report and annual communication highlighting the District efforts in managing, protecting and restoring the water resources. Please let us know if you would like to be included on our distribution list. Through the web and our reporting we present the benefits of our projects and programs. The District intends to further develop the report card identified in Section 10.
103	1/10	Chaska			Section 3	3-7	Page 3-7: Strategy 3.2.5.2 states that the "District will implement its regulatory program by reviewing projects for compliance with applicable District rules, policies, and standards." -No specific standards are provided in the plan, only relatively general strategies. Standards are instead provided only in the watershed rules. An update to the rules was distributed early in the process attended by the City's agent where comments were provided. Chaska requests to also provide comments on any proposed rule updates they may not have been received.	Thank you for your comments and participating in our Technical Advisory Committee. The city of Chaska is on our list of reviewers. Also, any changes to the rules are required to go through a public review process.
104	1/10	Chaska			Section 9		Sections 9.4 and 9.15.1.1 states the City must adopt water resource protections at least as effective as the RPBCWD's or defer sole regulatory authority to the District. -The City of Chaska does not choose to exercise sole regulatory authority over water resources in its portion of the RPBCWD but rather will share regulatory authority with the RPBCWD, with each enforcing its water resource requirements.	Thank you for your comment.

Comment #	Date	Reviewer Name	Document # [see TABLE 1]	Document Element [Report, Figure, Appendix, etc.]	Reference [Section #]	Page/Sheet	Comment	Response to comment
105	1/10	Metropolitan Council					The Metropol itan Council (Council) has completed its review of the Riley-Purgatory-Bluff Creek Watershed District's (District) draft water management plan, entitled "Planning /or the Next Ten Years 2018-2027 ." The District has prod uced an excellent plan that is consistent with Council policies and the Cou ncil 's Water Resources Policy Plan . The plan is thorough and well organized, and uses a "one water approach" describing the water resources of each major (creek) subwatershed, their condition, and proposed subwatershed projects. The plan was formulated using several elements and processes including: • Evaluation of long-term monitoring data from multiple points throughout the watershed. • A comprehensive pu blic engagement and outreach process to define issi.1es important to the citizens of the watershed and set goals to address them. • A project ranking and prioritization process to quantitatively compare project benefits and use of additional logistical factors to set implementation priorities. • A commitment to adaptive management to continue to assess progress in meeting goals usi ng up- to-date monitoring data. The d istrict is a progressive organization that has evolved and adapted to changing conditions and needs in the watershed, and the plan reflects this.	Thank you for you comment. We look forward to our continued partnership and working to gather to protect the water resources.

MEETING MINUTES

Riley-Purgatory-Bluff Creek Watershed District

March 15, 2018, Board of Managers Public Hearing and Monthly Meeting

PRESENT:

Managers:	Richard Chadwick, Secretary	
	Jill Crafton, Treasurer	
	Dorothy Pedersen, Vice President	
	Dick Ward	
	Leslie Yetka, President	
Staff:	Claire Bleser, District Administrator	
	Zach Dickhausen, Water Resources Technician	
	Joshua Maxwell, Water Resources Coordinator	
	Louis Smith, Attorney (Smith Partners)	
	Scott Sobiech, Engineer (Barr Engineering Company)	
Other attendees:	Paul Bulger, CAC	Bryan Maloney, LRIA
	Mike Colehour, Minnetonka Resident	JoAnn Syverson, LLCA
	Ryan Majkrzak, Chanhassen Resident*	David Ziegler, CAC; Eden Prairie Resident
	*Indicates attendance only at Monthly Meeting	

1. Call to Order

President Yetka called to order the Thursday, March 15, 2018, Board of Managers Public Hearing and Monthly Meeting at 7:04 p.m. in the District Office, 18681 Lake Drive East, Chanhassen, MN 55317.

2. Approval of Agenda

President Yetka pulled item 9b – Channel Protection Update - from the agenda. Administrator Bleser requested the addition of a Consent Agenda item to authorize the Administrator to enter into an agreement with the Carver County Soil and Water Conservation District for technical services and a new 9b - Legislative Update. Manager Chadwick moved to approve the agenda as amended. Manager Pedersen seconded the motion. Upon a vote, the motion carried 5-0.

3. 10-Year Management Plan Public Hearing

President Yetka introduced Administrator Bleser to talk about the 10-Year Plan.

Administrator Bleser presented the plan. She provided a brief overview of the physical watershed such as its size and communities, listed the Board members, committees, and staff. Administrator Bleser talked about the input gathering process for the 10-Year Plan update and described how that input was the basis of building the plan's goals and strategies. She summarized the 13 District goals identified in the plan and explained that the goals are grouped into the categories of Administration, Date Collection, Education & Outreach, Planning, Regulatory, Water Quality, and Water Quantity.

Administrator Bleser went through the prioritization variables used to identify the projects included in the Plan. The prioritization variables included Goals, Habitat Restoration, Partnerships, Pollution Management, Public Access and Education, Streambank/Shoreline Restored/Stabilized, Sustainability, Volume Management, and Watershed Benefits. Administrator Bleser explained the prioritization process and how 175 projects were weighed against the variables and then reviewed against project considerations such as logistical constraints, including partnership and coordination opportunities. She reported that after all these evaluation processes, 34 projects were identified to be included in the updated 10-Year Plan.

She said that 10 of the 34 are Riley Creek projects, 7 are Bluff Creek projects, and 17 are Purgatory Creek projects. President Yetka opened the public hearing.

Ms. Joann Syverson, Chanhassen resident and Lotus Lake Conservation Alliance board member, commented that she appreciates that the 10-Year Plan has a focus on lakes and that Lotus Lake projects are included in the plan. She asked about the process for swapping out of the Plan any projects, and the funds for those projects, that have been identified but do not come to fruition with new projects that might be identified in the future. Ms. Syverson also asked if the plan factors in inflation and maintenance costs. There was a discussion about the plan amendment process and the process that proposed projects go through to be approved and get funded, such as the feasibility study process. Administrator Bleser noted that the projects identified in the 10-Year Plan will be reviewed over time and that regarding project maintenance the District develops agreements with project partners or utilizes long-term maintenance funds.

Mr. Paul Bulger, Eden Prairie resident, thanked the Board for embarking on the 10-year plan update and for engaging the community. He remarked that 8 of the 17 entities that commented on the draft plan asked that the goals and objectives in the plan would reflect more of a smart goal or quantitative measure that is time bound. Mr. Bulger noted that the revised plan did make steps to quantify the removal to be achieved by projects and how the plan will work with the adaptive management plan. He said that in his experience regulatory bodies express rules and objectives that are time bound and have specific quantitative measures of what they are trying to achieve. Mr. Bulger remarked that the District is trying to reach certain water quality standards for shallow lakes and other water bodies and resources and those don't seem to be factored in to the 10-year plan's goals and objectives. He said that a lot of the goals state that the District will assess and monitor but do not go the next step and identify how the goals will be met and make the commitment to meet those goals. Mr. Bulger talked about the plan's figure 9-2 and suggested improving that graphic to make it clearer to the public how the decisions are being made. He noted his surprise that managers haven't commented on the need for smart goals and requested that managers comment on public record regarding their position on smart goals. Mr. Bulger raised the topic of Governor Dayton's goals for ground water and nitrate levels for certain areas around the state. He talked about how the goals are measurable and time bound. Mr. Bulger had specific comments about section 9-12 groundwater and said that it doesn't talk about the bedrock system or how to protect the bedrock system.

The managers and Administrator offered comments in response.

President Yetka called for additional public comments. Upon hearing none, President Yetka closed the public hearing at 7:46 p.m.

4. Matters of General Public Interest

No matters of general public interest were raised.

5. Reading and Approval of Minutes

a.i February 7, 2018, RPBCWD Board of Managers Monthly Meeting

Manager Pedersen requested a change on page 2, paragraph 2, to replace the word "hoping" with "encouraging." She also requested a correction to a misspelling on page 2, paragraph 5. Manager Pedersen noted that on page 3, paragraph 7, a correction should be made to change "Mr. Lori" to "Ms. Lori." Manager Crafton pointed out a misspelling on page 5, item 10a, in the final paragraph.

Manager Ward moved to approve the minutes as amended. Manager Crafton seconded the motion. Upon a vote, the motion carried 5-0.

6. Consent Agenda

Manager Yetka read aloud the Consent Agenda items: 7a – Accept Staff Report; 7b - Accept Engineer's Report (with Attached Inspection Report); 7c – Approve Permit 2018-008 Staring Lake Park Play Court with staff recommendations; 7d – Approve Permit 2016-013 Reconstruction of Soccer Field #11 at Miller Park with Staff Recommendations; 7e – Approve Permit 2017-072 O'Reilly Auto Parts in Eden Prairie with Staff Recommendations; 7f – Approve Permit 2018-011 Maloney Shoreline Stabilization on Lake Riley with Staff Recommendations; 7g - Approve Permit 2018-014 - Eden Prairie Road Reconstruction with staff recommendations; 7h - Approve hire of new Outreach and Office Assistant; 7i – Authorize the District Administrator to Enter into an Agreement with the Carver County Soil and Water Conservation District for Technical Services.

Manager Chadwick asked staff to comment on the status of 2018 alum treatment projects. Administrator Bleser responded that the feasibility study for the Rice March Lake alum treatment is complete and the treatment is planned for fall 2018. She said that the feasibility study for the Lotus Lake alum treatment is still in progress, but if the project is feasible, then it would also take place fall 2018.

Manager Chadwick moved to approve the Consent Agenda. Manager Crafton seconded the motion. Upon a vote, the motion carried 5-0.

7. CAC

Mr. Ziegler noted that the Board has the CAC meeting minutes in the meeting packet. He reported that the CAC approves the direction of the 10-Year Plan. Mr. Ziegler pointed out that the CAC recommends that the Board review the prioritization tool every three years and that the projects are also reviewed every three years based on current data. He reported that the CAC is in favor of the rules change as presented to the CAC by Mr. Jeffery although the CAC is concerned whether handling a two-year rain event is enough.

Administrator Bleser pointed out that the prioritization tool wouldn't really change over time, but logistical factors could. The Board discussed the topic of when to review the projects included in the 10-Year Plan. Engineer Sobiech commented that staff is constantly on the lookout for new technology regarding the projects.

President Yetka said that she hears the Board saying that the District will review the 10-Year Plan projects at year 3 instead of year 5 as currently stated in the Plan.

8. Action Items-

a. Accept January Treasurer's Report

Manager Crafton reported that that she and staff have been working with Redpath on updating the format of the treasurer's report and they are making good progress. Manager Crafton moved to accept the January Treasurer's report. Manager Ward seconded the motion.

Manager Pedersen suggested that a footnote be added on page 2 to note when the levy funds are anticipated to be received. The Board agreed that it would be a good addition to the report. Manager Chadwick noted that there wasn't a letter from the Treasurer in this month's meeting packet certifying the Treasurer's Report. He asked if the Treasurer and Administrator certify the Treasurer's Report. Manager Crafton said yes. Manager Chadwick asked about the work performed by Barr Engineering that was reflected in the most recent invoice because the invoice seemed like a large cost. Engineer Sobiech and Administrator Bleser talked about the work performed by Barr Engineering as reflected in the invoice. Manager Chadwick had several more questions and comments. Upon a vote, the motion carried 5-0.

b. Approve Paying of Bills

Manager Crafton moved to pay the bills. Manager Ward seconded the motion. Upon a vote, the motion carried 5-0.

c. Adopt Resolution Assuming WCA LGU Administrative Responsibility in Deephaven

Administrator Bleser introduced the resolution for the District to assume Wetland Conservation Act local governmental unit administrative responsibility in the City of Deephaven. She reported that the Deephaven City Council has adopted a resolution as well. She went through the history of the District relinquishing its role, in late 2000, as the officer of the Wetland Conservation Act. Administrator Bleser explained that Deephaven then arranged with the Minnehaha Creek Watershed District to take on that role for Deephaven regarding our watershed area.

Manager Ward moved to adopt Resolution 2018-01Affirming Acceptance and Responsibility for Wetland Conservation Act Administration in the City of Deephaven. Manager Pedersen seconded the motion.

Upon a roll call vote, the motion carried 5-0.

Manager	Aye	Nay	Abstain	Absent
Chadwick	X			
Crafton	X			
Pedersen	X			
Ward	X			
Yetka	X			

d. Authorize President to Enter into Cooperative Agreement with the City of Chanhassen for the Lake Susan Park Pond

Administrator Bleser asked the Board to authorize the Board President to enter into an agreement with the City of Chanhassen for the Lake Susan Park Pond project. Manager Pedersen moved to authorize President Yetka to enter into an agreement with the City of Chanhassen for the Lake Susan Park Pond Project subject to non-substantive revisions to the agreement. Manager Crafton seconded the motion. There was a discussion about the 20-year term of the project's maintenance agreement. Upon a vote, the motion carried 5-0.

e. Authorize President to Enter into Cooperative Agreement with the City of Chanhassen and ISD 112 for the Chanhassen High School Capture and Reuse System

Administrator Bleser gave an update on the project timeline and noted a modification about the pipeline encroachment. Manager Pedersen moved to authorize President Yetka to enter into a cooperative agreement with the City of Chanhassen and Independent School District 112 for the Chanhassen High School Capture and Reuse System. Manager Crafton seconded the motion. Upon a vote, the motion carried 5-0.

9. Discussion Items

a. 50th Anniversary Planning

Administrator Bleser announced that the District's Education and Outreach theme this year is "Come explore with us." She talked about the year-long theme and listed activities planned. Administrator Bleser noted that one activity planned is a celebration of the watershed's anniversary through a celebration of community. Administrator Bleser said that staff investigated renting a room at the Chanhassen Dinner Theater and holding a community dinner there. She went into details about costs and the possible date of July 31, which is the District's birthday. She noted that if the Board is interested in doing this event at the Chanhassen Dinner Theater on that date, it is time to make the District's reservation and send the down payment in to the theater. The Board talked about the idea and indicated interest in a celebration of community event but asked staff to look into lower cost venues, such as asking the City of Eden Prairie about its Garden Room.

b. Legislative Update

Attorney Smith reported that five bills have been introduced to the state legislature including one bill introduced just this week. He reviewed the five bills and their file numbers with the Board.

c. Upcoming Meetings

President Yetka read aloud the list of upcoming meetings and events, noting that the March 26th CAC meeting time will be 6 p.m. and not 5:30 p.m. as listed on the agenda. The Board added a workshop starting at 5:30 p.m. on April 4 at the District Office prior to the Board's Regular Monthly Meeting at 7 p.m.

10. Upcoming Events

- CAC Monthly Meeting, Monday, March 26, 6:00 p.m., District Office, 18681 Lake Drive East, Chanhassen
- Board of Managers Workshop at 5:30 p.m. and Regular Monthly Meeting at 7:00 p.m., Wednesday, April 4, District Office, 18681 Lake Drive East, Chanhassen

11. Adjourn

Manager Ward moved to adjourn the meeting. Manager Crafton seconded the motion. The meeting adjourned at 8:59 p.m. Upon a vote, the motion carried 5-0.

Respectfully submitted,

____

Richard Chadwick, Secretary

DEPARTMENT OF NATURAL RESOURCES

Minnesota Department of Natural Resources
Ecological and Water Resources Division
Central Region Headquarters
1200 Warner Road, St Paul MN 55106

05/17/2018

Claire Bleser
District Administrator
Riley Purgatory Bluff Creek Watershed District
14500 Martin Drive Suite 1500
Eden Prairie, MN 55344

Re: 2018 – 10 Year Management Plan – 90 day review

The DNR appreciates the opportunity to review and comment on the Final Draft of the Riley-Purgatory-Bluff Creek Watershed District's 2018 - 10 Year Management Plan.

We would like to recognize all of the great work the District is doing, and the thought put into the development of this plan. The continuing commitment to the protection and restoration of water quality, floodplain management, aquatic invasive species prevention and control, groundwater sustainability, and restoration and protection of stream, natural areas and native communities is very important and greatly appreciated by DNR. We also appreciate the focus on "resiliency" as a topic for community outreach and engagement.

We do have a few minor editorial comments as follows:

1. The plan uses both the terms "groundwater" and "ground water". We suggest that you use one or the other consistently, preferably "groundwater".

2. In Section 5.13, the maps look good, but the descriptions are off in the first few paragraphs. We recommend you use the following websites as references for citing the information.
   - MBS Sites of Biodiversity Significance Rank: https://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html
   - Natural Heritage and Nongame Research Program: https://www.dnr.state.mn.us/nhnrp/index.html
   - Natural Heritage Information System: https://www.dnr.state.mn.us/nhnrp/nhis.html

3. In Section 5.13, waterfalls, springs, historic mills, and cultural heritage elements are not tracked by the NHIS program (as stated in this section).

4. In Section 5.13, the term "scientific and natural area" seems to be used generically, as there are no DNR designated SNA's within the District's boundary. We suggest that this language be clarified.

We look forward to a continuation and further development of the strong working partnership between the District and the DNR during the next 10 years.

Sincerely,

Kate Drewry
District Hydrologist

ec. Dan Lais, Regional Manager
Jeanne Daniels, District Manager
Kate Drewry, District Hydrologist
Jennie Skancke, South and West Metro Area Hydrologist
Jason Spiegel, North Metro Area Hydrologist
Becky Horton, Regional Environmental Assessment Ecologist
Steve Christopher, BWSR

Appendix B Education and Outreach Plan

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Education & Outreach Plan

2018-2027

Education & Outreach Plan

2018

Contents

1.0 Objective

Clean water through an engaged community

The objective of the Education and Outreach Plan (E&O Plan) is to improve water quality within the Riley Purgatory Bluff Creek Watershed District (the District) by leveraging the power of engaged residents, professionals, and visitors to effect change and engage in protecting the watershed. Restoration projects, regulation, and management by the District are important components of its mission to protect clean water; a mission which cannot be completed without participation of citizens in the District. By fostering an engaged community, the District can increase awareness, grow stewardship, and build capacity to achieve the shared goal of protecting clean water.

The contents of this plan are informed in part by feedback gained through the public input process of the 10-Year Plan update. The process engaged multiple stakeholder groups, including residents, teachers, technical experts and leaders. The District thanks all those who made their voices heard throughout this process.

The E&O Plan provides the overall goals and objectives for Education and Outreach by the District. Each year the District uses the E&O Plan to develop a focused work-plan. Events and programs for each year are reflected on the District website: rpbcwd.org. The E&O Plan will be evaluated every three years and updated as needed at that time.

2.0 Goals & Strategies

The E&O Plan supports the Education & Outreach Goals and Strategies described in the Education & Outreach section of the 10-Year Pan. As noted in the previous section, these goals and strategies were developed through the public engagement process as a part of the 10-Year Plan update.

2.1 Education & Outreach Goal

EO 1. Design, maintain, and implement Education and Outreach program to educate the community and engage them in the work of protecting, managing, and restoring water resources.

2.2 Education & Outreach Strategies

EO 2. The District will develop and implement its E&O Plan. The E&O Plan specifies the objectives, guiding questions, target audiences, and methods to achieve the District's education and outreach goal. The District will regularly review its E&O Plan and update it as necessary.

EO 3. The District will collect data to evaluate the success of its education and outreach program and adjust its program to improve effectiveness.

EO 4. The District will tailor its education and outreach strategies to present complex and/or technical issues in a manner that is appropriate for each audience.

EO 5. The District will use its education and outreach program to raise awareness of watershed management issues and best practices (e.g., aquatic invasive species, conservation).

EO 6. The District will build awareness of our water resources by highlighting recreational opportunities and access.

EO 7. The District will seek opportunities to engage the public in its projects and programs through diverse methods outlined in the E&O Plan, including but not limited to: electronic communications, social media, website, informational signage, demonstration projects, tours, and open houses.

EO 8. The District will provide resources to increase stewardship within the community.

EO 9. The District will build community capacity by working with schools, lake associations, non-profits, or other stakeholders to develop a network of watershed champions.

EO 10. 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.

2.3 Planning strategy

Plan S1. The District will partner with cities, state agencies, and other entities to implement projects and programs to meet District goals.

This planning strategy from the 10 Year Plan is repeated within the E&O Plan to emphasize the value of partnership for creating effective and cost-effective programing.

3.0 Engaging the community

Community-scale problems require community-scale actions, and water quality is an issue that affects and belongs to all. The E&O Plan aims to fulfill the District's clean water objectives by fostering a community of stewards. The District began by inviting the community to participate in creating the E&O Plan itself, helping to identify community issues, priorities, and needs. The issues and priorities related to E&O generally fell into one of four categories of action: public engagement, awareness, stewardship, and capacity. These are all part of a multifaceted approach to education and outreach, and are reflected in the goals and strategies listed in section 2.0. The categories are described below, and the associated strategies are referenced.

3.1 Public engagement

Public Engagement as used in this document describes direct action by the District to share and seek information, and include the community in District processes. It includes asking questions of, and deeply listening to, stakeholders to learn their interests and concerns and gain a deeper understanding of community needs. Actions that could fall under the public engagement category include: public meetings and discussions about upcoming projects, presentations at association meetings, news releases to local papers, tabling and conversations at community events, door knocking, and growing newsletter and social media audiences. (EO 4 & EO 7)

3.2 Awareness

While awareness alone may not be sufficient to change behavior, it is an important and necessary component of education and outreach. Increased awareness is needed of not just the threats to clean water, but of a general understanding of "how water works", and the work and role of the District in protecting clean water, and the wealth of natural resources within the District. To effectively raise awareness, science and data must be translated into clear messages, utilizing audience-specific language. Actions to increase awareness range from news releases to local papers and social media, to events that celebrate the many and varied natural resources in the District. (EO 4, EO 5 & EO 6)

3.3 Stewardship

Stewardship is the act of caring for or managing something. To become a steward of water resources might involve changing a habit, or many habits over time. Awareness alone may not be sufficient to prompt behavior change, as there may be barriers to action in addition to knowledge (time constraints, cost, etc.). Supporting stewardship requires identifying desired behavior change and the barriers to that action, and creating programs and resources to help overcome them. (EO 8 & EO 10)

3.4 Capacity

The threats to clean water are large-scale, community issues. The work to address them needs to be at that same scale. The District will build capacity to do this work by partnering with stakeholders to create a network of watershed champions. These champions will not only take action themselves, but advocate for others in their communities to join them in stewardship. (EO 9)

4.0 Audiences

Audiences are groups within a community who likely share motivations and common goals, needs, or issues. The topics of interest for each group, and the District's messaging for each may vary considerably, as will the best methods of delivery. It is therefore important that programs and resources be created with specific audiences in mind. The District has identified four general audiences for its education and outreach programing.

4.1 Residents

This is a diverse audience that includes homeowners and renters, families, couples and singles of all ages. Their local identity may be influenced by the city they live in, their proximity to a water body, land use practices on their property and the community groups associate with. These groups can be informal and formal and include neighborhood organizations, lake and home-owner associations, community and outdoor groups. One task with this audience is to create awareness that the behavior of each resident can affect clean water within the watershed.

4.2 Local Leaders

Local leaders may include elected and appointed officials like mayors, city council members and commissioners. This audience generally includes individuals with decision-making power on a local (city, county, state) level. It may also include leaders on a smaller or non-governing scale, like lake/homeowner association presidents, or heads of environmental and sporting groups. This audience typically is involved with visible projects on public or private property, and may have the opportunity to influence public policy or social norms.

4.3 K-12

The K-12 audience includes children, their parents, teachers and administration. Effectively reaching this audience requires not just the creation of new engaging youth programs, but identifying how best to support the current work of educators and tapping into existing programs. 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 emersion schools. In addition, the Staring Lake Outdoor Education Center and Three Rivers Park District at Hyland Lake provide additional forums to engage this audience.

4.4 Businesses & Professionals

Local businesses and non-profits (including faith-based organizations) have the potential to be leaders in the implementation of best practices to protect water. Their campuses often have large footprints, and their own community of employees or members who are impacted by the organization's culture. Professionals may be private businesses or government, and are those who do work that impacts water resources. These include individuals who manage winter snow and ice, turf grass, water conservation and habitat restoration, as well as landscapers, builders and developers.

5.0 Guiding questions

One goal of the public input process for the 10 Year Plan was to better understand the needs and interests of the community to help the District frame its messages, and create programs that are meaningful to its audiences. Through this process, three themes were identified. The first relates to the identity and function of watershed districts. The second relates to understanding how water resources work. The third is how community members can participate in the District's work of protecting clean water. Below, each theme is described in more detail, along with guiding questions that emerged through the public input process. These questions help to clarify the information, assistance, and experiences the community is looking for within the broad themes.

What is the Watershed District and how does it function?

These questions address the role of the District in protecting clean water. They range from the structure and function of the organization, to details about local water resources.

- What are the purpose and vision of the District?
- What is its governance structure?
- Who does it work with?
- What authority does it have?
- What are the water resources in its boundaries?
- How does the District make decisions about using resources and prioritizing projects?
- What has it done, and where is it headed?
- How does the District fit into the larger scale/landscape?

How does water work?

These questions relate to the science of natural resources. They range from how the District assesses water quality, to the current status of different water bodies, to how those water bodies respond to change.

- How is water resource health measured?
- How are local water resources doing?
- How are things changing?
- What are the primary pollutants of concern?
- How does water move through my community?
- How do invasive species impact water resources?
- How does storm water work?

- How do different types of water resources (e.g. lakes vs wetlands vs stormwater ponds) differ?

What can I do?

These questions are about actions that individuals can take. They range from regulation to stewardship.

- What can I do on my property to help protect clean water?
- What am I allowed to do on my property, and who makes the rules?
- How can I manage aquatic plants?
- What can I do about invasive species?
- How can I conserve water?
- What are best practices I can follow?

6.0 Topics

The E&O Plan exists to support the goals of the 10-Year Plan, and therefore topics for E&O programs and projects are taken directly from the goals and strategies of the 10-Year Plan. Topics, the associated goals/strategies, and the role of E&O are listed in the table below. Each year, topics will be selected as the education & outreach themes for the year and incorporated into the work-plan. Topics may be selected based on projects the district is implementing, current events, community interest etc. Some topics, like administration and planning, data collection, and best management practices will be incorporated every year.

TOPIC		GOAL	STRATEGY	HOW CAN E&O SUPPORT THESE GOALS
Administration & planning	Evaluation	Admin 1. Operate in a manner that uses District resources and capacity efficiently and effectively while advancing the District's vision and goals	Admin S3. The District will annually review its progress toward accomplishing the District's vision, goals, and planned implementation items. The District will publish the assessment as a part of its annual report	Build connections with stakeholders. Grow partnerships. Support transparency.
	Planning & prioritization	Plan 1. Plan and conduct the District's implementation program to most effectively accomplish its vision with consideration for all stakeholders and resources.	Plan S7. The District will seek to incorporate ecological, economic, and social benefits into its projects as opportunities allow. Plan S9. The District will partner with cities, state agencies, and other entities to implement projects to meet District goals.	
Data collection	Data collection & monitoring	DC1. Collect data and use the best available science to recommend and support management decisions.	DC S8. The District will coordinate its monitoring efforts with other entities to promote efficiency, increase data availability, and to identify and fill in data gaps.	Make data accessible, meaningful, and approachable. Engage community in data collection.
Community resiliency	Climate change	Plan 2. Consider sustainability and the impacts of climate change in District projects, programs, and planning.	Plan S2. The District will consider the potential impact of climate change when developing and implementing District projects and programs.	Increase community understanding. Grow support for action on resiliency.
	Sustainability		Plan S3. The District will consider sustainability in the design and implementation of its projects and programs.	

TOPIC		GOAL	STRATEGY	HOW CAN E&O SUPPORT THESE GOALS
regulation	Permitting program	Reg 1. Continue to use the District's regulatory program to protect water resources from further degradation.	Reg S2. The District will periodically review its rules and update them as necessary. The District will update its rules in accordance with applicable Minnesota Statutes and with involvement of cities, state agencies, and other stakeholders. Reg S3. The District will periodically review the implementation of its regulatory and permit program for opportunities to improve the process.	Increase awareness Increase understanding of the importance of regulation Identify and decrease process barriers Communicate the program's impact Increase transparency
Habitat & ecology	Habitat protection & establishment	WQual 1. Protect, manage, and restore water quality of District lakes and creeks to maintain designated uses. WQual 2. Preserve and enhance the quantity, as well as the function and value of wetlands. WQual 3. Preserve and enhance habitat important to fish, waterfowl, and other wildlife.	WQual S3. The District encourages cities and developers to seek opportunities to incorporate habitat protection or enhancement into development and redevelopment projects.	Share recommended practices with audiences Increase awareness and implementation of techniques Identify and decrease barriers to implementing best practices Facilitate opportunities and awareness for public access to natural resource areas Increase general awareness Increase awareness of emergency rapid response
	Buffers & bioengineering		WQual S7. The District will promote the use of natural materials and bioengineering for the maintenance and restoration of shorelines and streambanks where appropriate. WQual S11. The District recognizes the multiple benefits of vegetated buffers and promotes the use of vegetated buffers around all waterbodies.	
	Aquatic Invasive Species		WQual S9. The District will partner with other entities to minimize the spread and reduce the adverse ecological impacts of aquatic invasive species.	
Pollution	Erosion & sediment pollution	WQual 1. Protect, manage, and restore water quality of District lakes and creeks to maintain designated uses. WQual 2. Preserve and enhance the quantity, as well as the function and value of wetlands. WQual 3. Preserve and enhance habitat important to fish, waterfowl, and other wildlife.	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.	Increase awareness and implementation of techniques Identify and decrease barriers to implementing best practices Celebrate community successes
	Chloride pollution		WQual S12. The District will assist and cooperate with cities, MPCA, MNDNR, 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.	

TOPIC		GOAL	STRATEGY	HOW CAN E&O SUPPORT THESE GOALS
	Non-point source pollution		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.	
Groundwater	Groundwater conservation	Ground 1. Promote the sustainable management of groundwater resources.	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)	Translate data and science for audiences Increase awareness and implementation of techniques Identify and decrease barriers
	Groundwater-surface water interactions		Ground S3. The District will work to increase the understanding of the interaction between groundwater resources and surface waters within the District and consider those interactions in future management decisions.	
Best management practices	Baseflow impacts	WQuan 1. Protect and enhance the ecological function of District floodplains to minimize adverse impacts. WQuan 2. Limit the impact of stormwater runoff on receiving waterbodies.	WQuan S2. The District will promote strategies that minimize baseflow impacts.	Share recommended practices with audiences Increase awareness and implementation of techniques Identify and decrease barriers
	Infiltration practices		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.	
	Low impact development		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.	
	Conservation practices		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.	

TOPIC		GOAL	STRATEGY	HOW CAN E&O SUPPORT THESE GOALS
Other	Emerging topics	WQual 1. Protect, manage, and restore water quality of District lakes and creeks to maintain designated uses. WQual 2. Preserve and enhance the quantity, as well as the function and value of wetlands. WQual 3. Preserve and enhance habitat important to fish, waterfowl, and other wildlife.	WQual S15. The District will cooperate with other entities to investigate treatment effectiveness of emerging practices. WQual S16. The District will work with the state agencies and local governmental units to identify emerging pollutants of concern.	Translate data and science for audiences Build connections with stakeholders

7.0 Methods

The are many and varied methods the District can use to deliver its programs. Through the public input process, a variety of methods were identified. Below is a description of the main methods that will be utilized. As noted in the goals and strategies section, partnerships will be sought to strengthen messaging and increase efficiency and capacity.

METHOD	DESCRIPTION	EXAMPLES
Web-based	Multi-media internet-hosted resources	Website, online document library, social media, forums, instructional videos, online newsletters
Print media	Physical materials and resources	Handouts, press releases, flyers, signage
Seminars	In-person lectures and presentations	Evening seminars on emerging topics, best practices, and understanding permit program
Hands-on programs	Programs that involve practice in a skill, and/or physical education component	Workshops, volunteer planting events, lesson plans, working with school groups
Active engagement	Connecting with existing community networks	Tabling at community events, door knocking, presentations at association meetings
Outdoor activities	Programs with an outdoor component	Tours, on-the water events, recreation

Incentive programs	Programs that offer resources to decrease barriers to action	Cost-share grants for water quality projects, teacher grants for projects or field trips
Action projects	Opportunities for community members to participate in district water stewardship activities	Master Water Stewards, citizen science, rain garden and other best practice implementation, clean-up events
Trainings	Continuing education programs	Teacher trainings, turf management best practices

8.0 Implementation

To implement its E&O program, the District will annually create a work-plan that identifies specific events and activities based on the Audiences, Topics, and Methods described above. It will craft messaging with the Guiding Questions in mind, to ensure these messages are meaningful to its audiences. The annual work-plan will cover all engagement categories and address all target audiences. The District will stay up-to-date on emerging topics and delivery methods, and incorporate modifications as appropriate. Programs that the District will implement include, but are not limited to those described below.

	Audience	Primary category(s)
Local leaders outreach program This effort offers educational programming, provides resources and creates effective tools to assist and enable community leaders to make informed decisions regarding water resources. It may include activities such as participating in the University of Minnesota Extension's NEMO program (Nonpoint source Education For Municipal Officials), presentations to city councils and commissions, and watershed tours or workshops.	Local leaders	All
Volunteer program The District's volunteer program engages community members in projects that protect and improve water resources, educate the community, and expand the District's capacity. The volunteer program includes opportunities like the Master Water Stewards, citizen science, and outreach at community events.	All	Stewardship Capacity
Cost-share program The cost-share program provides funding and technical assistance for projects that protect and conserve water resources, and increase public awareness of the vulnerability of these resources and solutions to improve them.	Residents Local leaders Businesses	Awareness Stewardship
Continuing education program The District offers continuing education which may take many forms. Examples of continuing education programs include seminars for professionals on best management practices, workshops for residents on raingardens, Project WET trainings for educators, and tours of resources or projects.	All	Awareness Stewardship
Youth outreach program The youth outreach program seeks to create meaningful childhood experiences connected to water resources, and expand increase understanding and stewardship of water resources in children and their families. Examples activities include guest presentations and citizen science opportunities for local schools and scout groups, service learning opportunities for high-school and college students, and providing financial and other resources to increase education about, and access to local water bodies.	K-12 Residents	Awareness Stewardship

	Audience	Primary category(s)
Communications program The communication program encompasses both passive and active communications. Passive communications include press releases and advertisements with both traditional and social media, as well as print materials and interpretive signage. Active communications include direct connections between district staff and representatives, and the community.	All	Public engagement Awareness

9.0 Evaluation

Understanding program effectiveness requires collecting and analyzing data on outcomes over time. The types and methods to collect data depend on the program implementation. Below are general evaluation strategies by method. Overall evaluation of the E&O program requires looking at whether the E&O goals are being addressed, all the District's audiences are being targeted, and all topics are being incorporated. A database will be created and this will be assessed on an ongoing basis, and evaluated annually. The E&O Plan will be evaluated every three years and updated as needed at that time. This may include gathering additional community input to reassess and update community needs and issues.

METHOD	EVALUATION TOOLS
Web-based	Track usage through website/social media/list-serve analytics using subpages and unique URLs and calls to action whenever possible
Seminars	Track participation; program evaluations
Hands-on programs	Track participation; program evaluations
Active engagement	Track number of individuals engaged in some capacity with the District (ex: attend an event, join the mailing list) and whether they engage again with the District (ex: attend a second event).
Outdoor activities	Track participation; program evaluations
Incentive programs	Track participation; track pollution reduction/habitat enhancement as possible/appropriate; track how participants find out about the programs; participant evaluations
Action projects	Track participation; track how participants find out about the programs; track project success; participant evaluations
Trainings	Track participation; collect feedback/quotes from participants to prompt future engagement; participant evaluations

Appendix C Goals and Strategies Tied to Stakeholder Input

Appendix X - Summary of Comments Received at Issue Identification Workshops

Comment ID Number	Stakeholder Meeting (see Section 3.2.2)	Comment, question, or general issue	Resource Type (if applicable)	Issue Category (see Section 3.3)	Issue Subcategory (if applicable)	Applicable District Strategies (see Section 4.0)		
						Strategy 1	Strategy 2 (if applicable)	Strategy 3 (if applicable)
1	Purgatory	Storm water ponds testing: which are monitored?	Wetlands	Education & Outreach	Awareness	EO S4	DC S2	
2	Board	Protect cranberry bogs and wild rice	Wetlands	Education & Outreach	Stewardship	EO S7		
3	Board	promote sustainable landscape and land use to conserve groundwater: capture, retain and let water infiltrate where it falls (recharge). Drought-tolerant plants use less groundwater	Groundwater	Water Resources	Groundwater	Ground S1	WQuan S3	
4	Purgatory	We are not in favor of the delisting of Red Rock: Bakers, Satterness, Kitrells, Richardson, Lien	Lakes	Education & Outreach	Public Engagement	EO S6		
5	Board	Water use restriction: lawn watering and drip irrigation	Groundwater	Water Resources	Groundwater	Ground S1		
6	Board	Shoreline protection and improvement	Lakes	Education & Outreach	Stewardship	EO S7		
7	Riley	Training professionals on impacts of everyday activities: lawn mowing, etc.; speaking with city maintenance	Other	Education & Outreach	Awareness	EO S4	EO S1	EO S8
8	Riley	Climate change considerations: how to implement into Planningand management	Other	Planning	Climate Change	Plan S2		
9	Riley	No-net-loss of aquifers: how do we do this?	Groundwater	Water Resources	Groundwater	Ground S1	WQuan S3	
10	Board	Craft plan such that we can take advantage of new funding opportunities as they arise		Planning	Prioritization	Plan S6	Plan S10	
11	TAC	Inventory of existing wetlands: woodland wetlands	Wetlands	Data Collection	Inventory	DC S1		
12	TAC	Partnerships; engage volunteers and enforce rules	Other	Education & Outreach	Building Capacity	EO S8		
13	CAC	who is monitoring wells?	Groundwater	Education & Outreach	Awareness	EO S4	Reg S1	Ground S2
14	Purgatory	assist in the establishing of an association	Other	Education & Outreach	Building Capacity	EO S8		
15	Board	Flood control for Atlas 14 and projected/predicted climate change	Other	Planning	Climate Change	Plan S2		
16	Board	invasive species control: how we identify invasive; monitoring; rapid response; reduce spread; education	Lakes	Education & Outreach	Stewardship	EO S7		
17	CAC	Education	Creeks	Education & Outreach		EO S1		
18	TAC	LRT in general: Purgatory/Staring chain and how it will be impacted. Promote and require buffers	Lakes	Education & Outreach	Awareness	EO S4	WQual S11	
19	Board	Building resiliency into the system	Lakes	Planning	Climate Change	Plan S2		
20	CAC	What end results are we looking for?		Planning	Prioritization	Plan S6	Admin S3	
21	Riley	Is there farmland that still affects water in streams? What are you doing to work with landowners?	Creeks	Education & Outreach	Awareness	EO S4		
22	Board	School with Green Infrastructure use to educate	Other	Education & Outreach	Building Capacity	EO S8		
23	Purgatory	What are regulations?	Creeks	Education & Outreach	Awareness	EO S4	Reg S1	
24	TAC	Lake UUA information in a format for public lake improvement plan	Lakes	Education & Outreach	Building Capacity	EO S8	DC S7	
25	CAC	Concerns: new construction; impact of LRT; Educating lake home owners; Educating home owners in general- rain gardens, native plants, rain barrels. Cost sharing program.	Other	Education & Outreach	Awareness	EO S4	EO S8	REG S1
26	Riley	Water clarity should not be only goal	Other	Planning	Prioritization	Plan S6		
27	Board	Population ownership changes on lakes: shore land district enforcement	Lakes	Education & Outreach	Audience	EO S3	EO S1	
28	Board	Better system and record of new wells: managing new water use. Educate public on what is happening with groundwater.	Groundwater	Data Collection	Modeling	EO S4	Ground S2	
29	Riley	Can we and how can we control water movement into wetlands (and out) to benefit adjacent waters? How can we treat the water?	Wetlands	Data Collection	Resource Assessment	DC S7		
30	TAC	Share lessons learned: carp management	Other	Education & Outreach	Awareness	EO S1	EO S4	
31	TAC	Education on the value of wetlands	Wetlands	Education & Outreach	Awareness	EO S4		
32	Board	Water use systems (sustainable): rain barrels, soil moisture and precipitation sensors	Groundwater	Water Resources	Groundwater	Ground S1		
33	CAC	Threats: lack of funding; lack of public understanding; deteriorating roads/infrastructure.	Other	Administration		Admin S2		

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						Strategy 1	Strategy 2 (if applicable)	Strategy 3 (if applicable)
34	Board	protect functional values of wetlands	Wetlands	Regulation		REG S1		
35	CAC	Have to monitor, where are we at, how do we get to next level, how much time/money will it cost		Planning	Prioritization	DC S2	Admin S3	Plan S6
36	Purgatory	Reinstate responsibility for recreational uses: is it in current plan?		Planning	Recreation	Plan S6		
37	TAC	strategize funding: best bang for your buck; where can you move the needle?; cooperate with other agencies to maximize money allocation	Other	Planning	Prioritization	Plan S6		
38	Purgatory	faster formula input: use the money collected from the taxes on storm sewer discharge (sub watershed) use the money to fix the problems in that area, that sub watershed		Planning	Prioritization	Plan S6		
39	TAC	Encourage lake associations/local ownership of resources: educate these groups; expectation for shallow lake environments- wont have the same outcomes/uses as deeper lake habitats	Lakes	Education & Outreach	Awareness	EO S4		
40	TAC	Work with stakeholders on making groundwater use and drawdown levels easier to access	Groundwater	Education & Outreach	Public Engagement	EO S1	DC S8	Ground S2
41	TAC	Habitat improvement in creeks (i.e. fishery). Manage desirable species	Creeks	Water Resources	Habitat	WQual S4	WQual S5	
42	Riley	What preventative measures can reduce future cost?	Other	Regulation		REG S1		
43	Board	Understand why erosion occurs and maintain baseflow/flow boundaries. Ravine erosion and tracking changes of erosion.	Creeks	Water Resources	Erosion	WQual S2	WQuan S2	
44	Riley	Knowing about classifications of wetlands	Wetlands	Data Collection	Inventory	DC S1		
45	TAC	Continue with carp management and how to restore lakes as the carp population is managed. Be wise about money invested into this project.	Lakes	Water Resources	Habitat	WQual S4	WQual S5	
46	TAC	Report and share success	Creeks	Education & Outreach	Public Engagement	EO S6	Admin S3	
47	TAC	Life, limb, and property consideration		Planning	Prioritization	Plan S6		
48	Board	Promoting multiple benefits of Green Infrastructure/Low Impact Development/Redevelopment/Redevelopment/Redevelopment to communities	Other	Education & Outreach	Awareness	EO S1	EO S4	
49	CAC	Manage trails/park land by creeks	Creeks	Education & Outreach	Stewardship	EO S5	EO S8	
50	Purgatory	Where is the wetland edge?	Wetlands	Education & Outreach	Awareness	EO S4	DC S1	
51	Purgatory	Helping local associations improve water quality in their specific lake	Other	Education & Outreach	Awareness	EO S4		
52	Riley	Water quality: clarity, phosphorous, weeds and algae (continue plant management plan)	Lakes	Data Collection	Resource Assessment	WQual S14	WQual S10	DC S7
53	Board	Shoreline buffers: shoreline erosion	Lakes	Water Resources	Habitat	WQual S11	WQuan S4	
54	CAC	Missing Buffers and floodplains	Creeks	Water Resources	Habitat	WQual S11	WQuan S1	
55	Board	Shoreline buffers: shoreline erosion	Lakes	Water Resources	Erosion	WQual S1	WQual S11	
56	CAC	how to prioritize lake projects	Lakes	Planning	Prioritization	Plan S6		
57	Purgatory	Are the watershed district's resources spent equitably?	Lakes	Planning	Prioritization	Plan S6		
58	TAC	Cost share for well sealing or abandonment	Groundwater	Education & Outreach	Cost-Share	EO S4	EO S9	
59	Purgatory	Buffer zone	Wetlands	Water Resources	Habitat	WQual S11		
60	TAC	Industrial irrigation leading to contaminated groundwater. Thinking about limiting use of salt and nitrates	Groundwater	Water Resources	Pollution	WQual S18	WQual S12	
61	Riley	What human activities add to creek erosion (bridge building, tile, etc.)?	Creeks	Education & Outreach	Awareness	EO S4	WQual S2	
62	CAC	Define aquifers being used: age of recharge water	Groundwater	Education & Outreach	Awareness	EO S4		
63	Purgatory	floating bogs: silver?	Lakes	Water Resources	Habitat	WQual S8	WQual S3	
64	CAC	Appearance/green algae/blue-green algae	Lakes	Water Resources	Habitat	WQual S14		
65	CAC	Effects of climate change	Creeks	Planning	Climate Change	Plan S2		
66	TAC	restore channel meandering	Creeks	Water Resources	Erosion	WQual S7		

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						Strategy 1	Strategy 2 (if applicable)	Strategy 3 (if applicable)
67	Bluff	What criteria did watershed district use to rate the quality of the creeks? Publish a "watch for" list of indicators residents can monitor; solutions?	Creeks	Education & Outreach	Public Engagement	EO S6	DC S7	
68	TAC	partnerships		Planning	Prioritization	Plan S6	Plan S9	
69	CAC	The natural evolution of wetland is prairie? How do we maintain them?	Wetlands	Education & Outreach	Awareness	EO S4		
70	Bluff	What impact do fallen trees have on wetlands?	Wetlands	Education & Outreach	Awareness	EO S4		
71	Board	Educate about wetlands supporting a wide variety of wildlife and plant life	Wetlands	Education & Outreach	Awareness	EO S1	EO S4	
72	Purgatory	What groundwater monitoring is in place?	Groundwater	Education & Outreach	Awareness	EO S4	DC S2	
73	Board	Reduction of various inputs: phosphorus, nitrogen, chlorides, pollutants of emerging concern, ecoli	Lakes	Water Resources	Pollution	WQual S13		
74	Purgatory	Better communication: mailing to individuals; city newsletters		Education & Outreach	Awareness	EO S6	EO S4	
75	Board	Provide initiatives and outreach to go above and beyond regular requirements to achieve multiple benefits of GI/CID	Other	Education & Outreach	Public Engagement	EO S6	EO S7	
76	Bluff	Public education: need more input		Education & Outreach		EO S6	EO S1	
77	CAC	How does trading wetland acreage work correctly? What are the rules?	Wetlands	Education & Outreach	Awareness	EO S4	Reg S1	
78	Purgatory	Don't disturb lake SW/GW interaction: maintain buffers; storm sewer connection (chain of lakes project) deteriorated water quality, adversely affected levels	Lakes	Water Resources	Habitat	WQual S8		
79	TAC	Education of policy makers and private consumers on BMP's	Groundwater	Education & Outreach	Awareness	EO S4	EO S9	
80	CAC	How many goals will the project address?		Planning	Prioritization	Plan S6		
81	Riley	Erosion: creek banks at bends in the woods	Creeks	Water Resources	Erosion	WQual S1	WQual S2	
82	CAC	Who controls redirecting creeks?: straight vs. meandering; plants vs. rip wrap	Creeks	Education & Outreach	Awareness	EO S4		
83	CAC	Have to monitor, where are we at, how do we get to next level, how much time/money will it cost		Planning	Prioritization	Plan S6		
84	Board	wetlands are our sponges/filters	Wetlands	Education & Outreach	Awareness	EO S1	EO S4	
85	CAC	Who manages aquifers?: role of watershed/city/state	Groundwater	Water Resources	Groundwater	Ground S1	Ground S2	
86	CAC	Who manages aquifers?: role of watershed/city/state	Groundwater	Education & Outreach	Awareness	EO S4	Reg S1	Ground S2
87	Riley	Invasive plant transfer between lakes	Creeks	Water Resources	Habitat	WQual S9		
88	Purgatory	Need for focus: educational awareness about local wetlands	Wetlands	Education & Outreach	Awareness	EO S4		
89	TAC	Preserve wetland quality	Wetlands	Water Resources	Habitat	WQual S6	WQual S8	
90	Board	Healthy habitat to promote native species	Creeks	Water Resources	Habitat	WQual S3	WQual S8	
91	Purgatory	Maintain the stream bed as a navigable waterway for canoeing (high water) and cross country skiing	Creeks	Planning	Recreation	Plan S6	EO S6	
92	Riley	How and to what extent does groundwater affect the aquifers/overall hydrology of the district?	Groundwater	Data Collection	Modeling	Ground S3		
93	Board	Need more education on wetland functions and benefits	Wetlands	Education & Outreach	Awareness	EO S1	EO S4	
94	TAC	Partnerships; engage volunteers and enforce rules	Other	Planning	Partnership	Plan S9		
95	TAC	Create brochures/website info: natural shoreline; native veg; invasive species management	Lakes	Education & Outreach	Awareness	EO S1	EO S4	
96	Board	Education of impact of our lakeshore on the resource: mowed grass to the shoreline	Lakes	Education & Outreach	Stewardship	EO S7		
97	Board	People that don't see connection between various areas of the watershed	Lakes	Education & Outreach	Awareness	EO S1	EO S4	
98	Board	Assessment of vulnerabilities of communities due to intense storms and drought	Other	Data Collection	Climate Change	DC S4		
99	CAC	Is ground water being polluted? By agriculture? By manufacturing?	Groundwater	Data Collection	Resource Assessment	DC S7	Ground S2	WQual S18
100	Board	Surface water and groundwater interaction and connectivity: understanding the resource	Groundwater	Water Resources	Groundwater	Ground S3	Ground S2	

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						Strategy 1	Strategy 2 (if applicable)	Strategy 3 (if applicable)
101	TAC	Partner with other agencies like Three Rivers	Lakes	Planning	Partnership	Plan S9		
102	CAC	Shoreline erosion: amount of silt buildup on Duck lake and Susan Lake; Buffer silver lake; requirements?	Lakes	Water Resources	Erosion	WQual S1	WQual S2	
103	Board	Protect cranberry bogs and wild rice	Wetlands	Regulation		REG S1		
104	Purgatory	Miller spring groundwater study: 40 years ago Ag chemicals used are now entering the aquifer and are being detected in the spring	Groundwater	Water Resources	Pollution	WQual S13		
105	CAC	Odor	Lakes	Water Resources	Pollution	WQual S14		
106	Bluff	Would like public access around more lakes	Lakes	Planning	Recreation	EO S5		
107	Purgatory	come up with a scale or formula to prioritize factors affecting a lake		Planning	Prioritization	Plan S6		
108	Board	One water: upstream to downstream	Lakes	Planning	Prioritization	Plan S6		
109	Purgatory	Algae	Lakes	Water Resources	Pollution	WQual S13	WQual S14	
110	TAC	erosion/head-cutting/embeddedness: property loss; habitat; water quality	Creeks	Water Resources	Erosion	WQual S1		
111	Board	Clear water creates more vegetation: how to manage, educate	Lakes	Water Resources	Habitat	EO S9		
112	Purgatory	Survey users: boat landings, beach, homeowners, etc… Help inform components of formula		Planning	Prioritization	Plan S6		
113	Riley	Education on wetlands/wetland types and current impacts: pollutants and nutrients entering and exiting wetlands	Wetlands	Education & Outreach	Awareness	EO S4		
114	Board	Community/social needs should be a factor: issues with equity		Planning	Prioritization	Plan S6		
115	CAC	Clear attainable end state: is the end state Different today than yesterday? Is there a different need today than yesterday?		Planning	Prioritization	Plan S6		
116	CAC	potential for public education		Planning	Prioritization	Plan S6		
117	Riley	Invasive fish migration	Creeks	Water Resources	Habitat	WQual S4		
118	Board	Green corridor: less habitat fragmentation	Creeks	Water Resources	Habitat	WQual S6	WQuan S5	
119	TAC	Consider prioritization of "tipping point" resources		Planning	Prioritization	Plan S6		
120	Purgatory	movement of invasives problematic	Creeks	Water Resources	Habitat	WQual S9		
121	Board	protect functional values of wetlands	Wetlands	Education & Outreach	Stewardship	EO S7		
122	Board	Need citizens to buy in. Will need robust education for that to work.		Education & Outreach	Public Engagement	EO S6		
123	Board	Understanding current and future impacts to water and other natural resources due to climate change	Other	Planning	Climate Change	Plan S2		
124	Purgatory	is groundwater withdrawal an issue: by city, private wells	Groundwater	Education & Outreach	Awareness	EO S4	Ground S2	Ground S1
125	Board	Maintaining lake levels during drought, baseflow during flood, excessive bounce	Lakes	Planning	Climate Change	Plan S2	WQuan S2	
126	CAC	Did past projects work?		Planning	Evaluation	Plan S5		
127	Purgatory	changes in groundwater quality/quality in district	Groundwater	Data Collection	Analysis/Study	DC S2	Ground S3	Ground S2
128	CAC	Dumping trash	Wetlands	Water Resources	Pollution	WQual S13		
129	TAC	Shoreline management: enforce your DNR general permit; discourage retaining walls on shorelines; Education, outreach, restoration projects; As area developed go back and work with established residents; buffers.	Lakes	Education & Outreach	Stewardship	EO S7		
130	Riley	Measuring usage/recreational/aesthetic benefits and balancing these with water quality benefits: how to compare and weigh each of these?	Other	Planning	Prioritization	Plan S6		
131	Riley	How do you measure benefit?: most people; most pollution reduction	Other	Planning	Prioritization	Plan S6	Plan S5	
132	Board	Creek nutrient standards	Creeks	Water Resources	Pollution	WQual S13		
133	CAC	Label storm drains	Groundwater	Education & Outreach	Stewardship	EO S7		
134	Riley	How to manage for climate change? How to implement it into current management?	Lakes	Planning	Climate Change	Plan S2		

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						Strategy 1	Strategy 2 (if applicable)	Strategy 3 (if applicable)
135	TAC	Groundwater information modeling: continued monitoring and observation of wells	Groundwater	Data Collection	Modeling	DC S2	Ground S3	Ground S2
136	TAC	Public vs. private irrigation: public should limit use without jeopardizing safe use	Groundwater	Water Resources	Groundwater	Ground S1		
137	Purgatory	Be up front about how and why projects are implemented: objective and measurable so no suspicion that politics and personal preference influence priorities		Education & Outreach	Public Engagement	EO S6		
138	CAC	Potential depletion: how is this resource faring? Minimize use (lawn irrigation)	Groundwater	Education & Outreach	Stewardship	EO S7		
139	TAC	Stacked Benefit Project		Planning	Prioritization	Plan S6		
140	TAC	Idlewild and LRT: how to protect as LRT and surrounding area develops. Actively participate in early discussions	Lakes	Water Resources	Habitat	WQual S3	Reg S1	
141	CAC	Public knowledge: lack of responsibility by any agency and public doesn't know anything	Groundwater	Education & Outreach	Awareness	EO S4		
142	Purgatory	More volunteer citizens monitoring lakes, streams, wetlands	Other	Education & Outreach	Building Capacity	EO S8		
143	Bluff	How is groundwater affected by development?	Groundwater	Education & Outreach	Awareness	EO S4		
144	Bluff	Work with HOAs: outreach (MWS) monthly HOA news letters; highlight local projects; cost-share programs		Education & Outreach	Public Engagement	EO S6		
145	Board	Utilize collaborations, including grant funding on state, federal and local levels.		Planning	Partnership	Plan S9		
146	Purgatory	watershed district objectives are consistent with association objectives.	Other	Planning	Partnership	Plan S9		
147	Riley	Education on native aquatic plants vs. invasives, "god vs. bad"	Lakes	Education & Outreach	Awareness	EO S1	EO S4	
148	Board	Education and outreach about importance of groundwater: 10000 year old water used to water lawns, taken for granted.	Groundwater	Education & Outreach	Awareness	EO S4		
149	Riley	How are we measuring watershed benefits? How to decide what is the "best" plan? Determining down stream/adjacent water benefits; prioritization	Other	Planning	Prioritization	Plan S6		
150	Purgatory	charity car wash: allowed on parking lots	Creeks	Education & Outreach	awareness	EO S4		
151	TAC	Shoreland restoration education and programs for residents: simplify the process	Wetlands	Education & Outreach	Awareness	EO S4		
152	TAC	Steep slopes and bluffs: monitoring development impacts and their protection and restoration. Promoting natural channel discharge. Info sharing with the public, other watershed districts.	Other	Education & Outreach	Awareness	REG S1	WQual S2	DC S8
153	Purgatory	further regulation and education on herbicide and pesticide use	Other	Regulation		REG S1	EO S4	
154	CAC	More natural processes than man-made		Planning	Prioritization	Plan S6		
155	Purgatory	Management/monitoring/protection of wildlife: beavers, otter, muskrats, birds, fish	Lakes	Data Collection	Ecosystems	DC S2	WQual S3	
156	Purgatory	Plants management? Community involvement: buckthorn pulls and wetland plant issues; continue to support removal	Wetlands	Water Resources	Habitat	WQual S9	WQual S10	
157	Board	Help citizens engage with creeks	Creeks	Education & Outreach	Stewardship	EO S7		
158	TAC	Impact on downstream resource		Planning	Prioritization	Plan S6		
159	Board	Interaction between groundwater and lake systems: change in Base flow	Lakes	Water Resources	Water Quantity	Ground S3	WQuan S2	
160	Riley	Which lakes are receiving groundwater and which are contributing to groundwater?	Groundwater	Data Collection		Ground S3	DC S2	
161	Board	Groundwater/creek interaction	Creeks	Water Resources	Groundwater	Ground S3		
162	CAC	stormwater	Wetlands	Water Resources	Habitat	WQual S11		
163	Bluff	Erosion problem on bluff creek: how can municipalities encourage landowners to control erosion?	Creeks	Education & Outreach	stewardship	EO S7		
164	TAC	promote native vegetation: control of invasives and educating the public about identification and function of invasives.	Wetlands	Education & Outreach	Awareness	WQual S9	WQual S10	
165	Bluff	Is groundwater use affecting surface water resources?	Groundwater	Education & Outreach	Awareness	Ground S3		
166	Purgatory	local association a must: consider level of activity in prioritizing; priorities of local association; work with for strong support		Planning	Prioritization	Plan S6	Plan S9	

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						Strategy 1	Strategy 2 (if applicable)	Strategy 3 (if applicable)
167	Purgatory	Wildlife monitoring?	Wetlands	Data Collection		DC S2		
168	TAC	Increase maintaining/observation/analysis modeling	Creeks	Data Collection	Modeling	DC S2	DC S7	
169	Purgatory	Don't disturb lake SW/GW interaction: maintain buffers; storm sewer connection (chain of lakes project) deteriorated water quality, adversely affected levels	Lakes	Water Resources	Water Quantity	Ground S3		
170	Board	Short term vs. long term benefits		Planning	Prioritization	Plan S6		
171	TAC	Cost share for upgrading to water sense irrigation systems, especially Associations	Groundwater	Education & Outreach	Cost-Share	EO S9	EO S4	
172	Purgatory	Private public land on creek	Creeks	Data Collection		DC S2		
173	TAC	promote native vegetation: control of invasives and educating the public about identification and function of invasives.	Wetlands	Water Resources	Habitat	WQual S9	WQual S10	
174	CAC	proactive vs. reactive		Planning	Prioritization	Plan S6		
175	TAC	AIS: Carp, Milfoil, zebra mussels, other invasives	Other	Water Resources	Habitat	WQual S9	WQual S10	WQual S4
176	Riley	What chemicals/nutrients and how much of them are building up in groundwater sources?	Groundwater	Water Resources	Pollution	WQual S18		
177	CAC	Potential depletion: how is this resource faring? Minimize use (lawn irrigation)	Groundwater	Water Resources	Groundwater	Ground S1	Ground S2	
178	Riley	What are trend levels of aquifers? Are groundwater sources drawing down/ recharging as they should? Are we depleting aquifers?	Groundwater	Data Collection	Resource Assessment	DC S7	Ground S2	
179	Board	Part of healthy hydrological system: healthy wetlands=healthy creeks=healthy lakes= good quality groundwater	Wetlands	Water Resources	Pollution	WQual S13	WQual S14	
180	Riley	Measuring usage/aesthetics and weighing these benefits against each other: what aspects/aesthetics are more important to people?	Other	Planning	Prioritization	Plan S6		
181	Board	Paleoenvironmental reconstruction of our wetlands to identify shifting baselines: research	Wetlands	Data Collection	Analysis/Study	DC S7	DC S2	
182	Riley	Health impacts: what are these chemicals? How do plants and water health affect my health? How do bad plants affect my health?	Other	Education & Outreach	Awareness	EO S4		
183	CAC	cost to district: priorities could be driven by available funds/partnerships		Planning	Prioritization	Plan S6	Plan S9	
184	Board	Education on watering/irrigation, and needs of the landscape	Groundwater	Education & Outreach	Stewardship	EO S7		
185	Board	healthy creeks = healthy lakes and a healthy MN river	Creeks	Education & Outreach	Awareness	EO S4		
186	Board	challenge to reach all users in watershed: non-pollutant sources	Lakes	Education & Outreach	Audience	EO S4		
187	TAC	Expand green way along creeks to help with lake water quality and the protection of habitat leading/connecting lakes	Lakes	Water Resources	Habitat	WQual S6	WQuan S5	
188	Purgatory	where are they now?		Planning	Prioritization	Plan S6		
189	TAC	Use of groundwater for irrigation: This ensures compliance of irrigators. Outreach to irrigators for rules/regs. On permits needed	Groundwater	Regulation	Irrigation	Reg S1	Ground S1	
190	CAC	safe eating (fish): fish health	Lakes	Water Resources	Habitat	WQual S5		
191	TAC	Role of wetlands in stormwater management	Wetlands	Water Resources	Pollution	WQual S13	WQuan S1	
192	Board	leverage functions for better storage capacity	Wetlands	Water Resources	Water Quantity	WQuan S1		
193	Purgatory	maintain wildlife freshwater sourcing	Wetlands	Water Resources	Habitat	WQual S8		
194	TAC	Take Advantage of adding projects when development/redevelopment takes place		Planning	Prioritization	Plan S6		
195	Purgatory	education		Planning	Prioritization	Plan S6		
196	CAC	ignorant homeowners; not their jobs: not fertilizing; rake leaves/grass clippings into creek	Creeks	Education & Outreach	Awareness	EO S4	EO S8	
197	Board	Carp management long term	Lakes	Water Resources	Habitat	WQual S4		
198	CAC	Storm water runoff: pollution	Lakes	Water Resources	Pollution	WQual S13		

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						Strategy 1	Strategy 2 (if applicable)	Strategy 3 (if applicable)
199	Board	Old tile diverting water away from wetlands	Wetlands	Water Resources	Water Quantity	WQuan S1		
200	Board	invasive species control: how we identify invasive; monitoring; rapid response; reduce spread; education	Lakes	Data Collection	Resource Assessment	DC S7		
201	Riley	Maintaining shoreline habitat: erosion, vegetation removal, buffers	Lakes	Water Resources	Habitat	WQual S11	WQual S3	
202	Board	Lack of understanding of what the watershed does and what we can/can't do	Other	Education & Outreach	Awareness	EO S4	Reg S1	
203	Board	Reduce erosion, sedimentation, nutrients (Total phosphorus) and pollutants (pesticides, heavy metals, fertilizers)	Creeks	Water Resources	Pollution	WQual S13		
204	Riley	Muskrat and beaver impacts: erosion due to vegetation removal; Environmental engineering impacts (caused by these animals)	Other	Water Resources	Erosion	WQual S1	WQual S11	
205	Board	Protect groundwater from pollution: nitrates, chlorides. Establish protection areas	Groundwater	Water Resources	Pollution	WQual S18	WQual S12	
206	CAC	Sewer lines and management/septic tank monitoring/storm sewers	Lakes	Water Resources	Pollution	WQual S18		
207	Purgatory	Don't disturb lake SW/GW interaction: maintain buffers; storm sewer connection (chain of lakes project) deteriorated water quality, adversely affected levels	Lakes	Water Resources	Pollution	WQual S13		
208	TAC	Managing the export of nutrients: modeling, monitoring and observation. We need more understanding of the role of wetlands play in nutrient reduction	Wetlands	Data Collection	Resource Assessment	DC S7		
209	Board	Larger scale water retention systems: development in brown fields	Groundwater	Water Resources	Pollution	WQual S13		
210	Board	Clear water creates more vegetation: how to manage, educate	Lakes	Education & Outreach	Awareness	EO S4		
211	Riley	Storm water adding pollution from hard surfaces through pipes: transferring/connectivity to lakes	Creeks	Water Resources	Pollution	WQual S13		
212	TAC	Industrial irrigation leading to contaminated groundwater. Thinking about limiting use of salt and nitrates	Groundwater	Water Resources	Pollution	WQual S18		
213	Board	Nitrate levels impacting storm water and groundwater, and pollution regulations	Other	Water Resources	Pollution	WQual S18		
214	Bluff	Are there invasive plants along creeks? Create volunteer opportunities?	Creeks	Education & Outreach	Awareness	EO S4	EO S8	
215	CAC	Use cost-benefit analysis		Planning	Prioritization	Plan S6		
216	TAC	Shoreline management: enforce your DNR general permit; discourage retaining walls on shorelines; Education, outreach, restoration projects; As area developed go back and work with established residents; buffers.	Lakes	Regulation	Enforcement	REG S1		
217	Board	Protect groundwater from pollution: nitrates, chlorides. Establish protection areas	Groundwater	Water Resources	Pollution	WQual S18		
218	Purgatory	groundwater contamination: salt, other contaminants. The move to not use sand; I can remove sand from a catch basin or the discharge area from a storm sewer (takes labor and $) I can’t remove the salt	Groundwater	Water Resources	Pollution	WQual S18		
219	Board	great buffers	Wetlands	Water Resources	Habitat	WQual S11		
220	Board	Need policies to protect capacity of wetland for storage	Wetlands	Water Resources	Water Quantity	WQuan S1	Reg S1	
221	Board	Justification: what does the science say?		Planning	Prioritization	Plan S6	Plan S8	
222	Board	Interaction between resources and public interaction with resources (public trails, wildlife viewing, etc.)	Creeks	Education & Outreach	Awareness	EO S4	EO S6	
223	TAC	Shoreland protection should explore alternatives, include/favor bioengineering (not hard armor) and consider habitat creation and enhancement	Creeks	Water Resources	Habitat	WQual S11	WQuan S4	
224	Board	Promoting Low Impact Development	Other	Education & Outreach	Awareness	EO S1	EO S4	Plan S3
225	CAC	Educating lake home owners; Educating home owners in general- rain gardens, native plants, rain barrels. Cost sharing program.	Other	Education & Outreach	Cost-Share	EO S9	EO S4	
226	TAC	Enhancing existing native vegetation	Wetlands	Water Resources	Habitat	WQual S3	WQual S8	
227	CAC	closing for high water or no wake	Lakes	Water Resources	Erosion	WQual S1		

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						Strategy 1	Strategy 2 (if applicable)	Strategy 3 (if applicable)
228	TAC	Removals/$- cost benefit		Planning	Prioritization	Plan S6		
229	CAC	Accountability		Education & Outreach	Public Engagement	EO S4	EO S8	
230	Purgatory	a 10 year plan should be a 100 year plan		Planning	Prioritization	Plan S4		
231	Board	increase temperatures due to climate change drying up subsidence	Wetlands	Planning	Climate Change	Plan S2		
232	TAC	combine with development		Planning	Prioritization	Plan S6		
233	Purgatory	monitoring of wildlife	Other	Water Resources	Habitat	DC S2	WQual S8	
234	CAC	Arsenic in groundwater resources: Who is monitoring and how do people know if their well is impacted?	Groundwater	Education & Outreach	Awareness	EO S4	WQual S18	
235	TAC	Habitat and resource connectivity	Wetlands	Water Resources	Habitat	WQual S6		
236	TAC	Salt management	Creeks	Water Resources	Pollution	WQual S12		
237	Riley	How long does it take for pollution to get into drinking water?	Groundwater	Data Collection	Resource Assessment	DC S7	Ground S3	WQual S18
238	CAC	look at what creates the best water resources as a whole water resource- creek feeds more sediment/nitrogen/phosphorous to the MN river, creek gets the money vs. the lack AIS; not based on population numbers		Planning	Prioritization	Plan S6		
239	TAC	Greatest impact/improvement with least amount of cost		Planning	Prioritization	Plan S6		
240	Board	Give multiple benefits project a high priority (triple bottom line)		Planning	Prioritization	Plan S6		
241	TAC	Base flow (Bluff Creek): maintenance; recharge	Creeks	Water Resources	Water Quantity	WQuan S2	WQuan S3	
242	Board	Capture, retain and filter water where it falls	Creeks	Water Resources	Water Quantity	WQuan S3		
243	Board	Wetlands are connected to our water resources (creeks/lakes). Mapping wetland drainage/connection to our water resources	Wetlands	Data Collection	Inventory	DC S1		
244	TAC	Partnerships; engage volunteers and enforce rules	Other	Regulation	Enforcement	REG S1		
245	Board	Education and increased interaction of upland residents with resources	Creeks	Education & Outreach	Public Engagement	EO S6		
246	Board	Protection of water bodies with higher water quality is a top priority		Planning	Prioritization	Plan S6		
247	Board	Return on investment: cost-benefits analysis		Planning	Prioritization	Plan S6	Plan S5	
248	TAC	Where will the funds have the most impact? What is a lost cause? Need for project should include cost-benefit analysis as well as prioritization of magnitude of source. What are the focus areas? Can't do everything. (i.e. next ten years- then move on).		Planning	Prioritization	Plan S6	Plan S5	
249	TAC	Flood plain with Atlas 14 updates: seamless permitting; compliant/safe development' infrastructure upgrades	Creeks	Regulation		REG S1		
250	TAC	Innovative management practices/alternatives to volume control. AIS: Carp, Milfoil, zebra mussels, other invasives	Other	Planning	Adaptive Management	Plan S1		
251	Board	Reduce chloride levels: use of BMP's and education	Creeks	Water Resources	Pollution	EO S4	WQual S12	
252	Board	Flooding because of climate change: how flooding is predicted to occur. Changes in hydrology	Creeks	Planning	Climate Change	Plan S2		
253	Board	Use Train The Teacher to educate teachers in K-12	Other	Education & Outreach	Building Capacity	EO S8		
254	CAC	Who is monitoring heavy users?	Groundwater	Education & Outreach	Awareness	EO S4	Reg S1	Ground S2
255	CAC	What is different between storm water pond vs. wetland?	Wetlands	Education & Outreach	Awareness	EO S1	EO S4	
256	TAC	Overuse of groundwater/drawdown: encourage conservation measures to reduce overuse. Ensuring all municipal water supplies are sustainable	Groundwater	Water Resources	Groundwater	Ground S1		
257	TAC	Surface water reservoirs for irrigation: maybe conduct feasibility study	Groundwater	Water Resources	Groundwater	Ground S1		
258	Board	Protect existing high-quality wetlands	Wetlands	Education & Outreach	Stewardship	EO S7		
259	Purgatory	Lake weeds: filling in (management/control), lily pads, undergrowth	Lakes	Education & Outreach	Awareness	EO S4	WQual S10	
260	TAC	habitat		Planning	Prioritization	Plan S6		

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261	Bluff	Is water (aquifer) being drawn down for drinking water?	Groundwater	Education & Outreach	Awareness	EO S4	Ground S2	Ground S1
262	Purgatory	working with schools on watershed education and management: programs, rain gardens, etc.	Other	Education & Outreach	Stewardship	EO S7	EO S8	
263	Board	Changing demographics: landownership, education	Other	Education & Outreach	Audience	EO S3		
264	CAC	AIS	Lakes	Water Resources	Habitat	WQual S9	WQual S10	
265	TAC	Evaluate and report progress	Lakes	Data Collection	Evaluation	DC S6	Plan S5	
266	TAC	Connectability- Down stream effect		Planning	Prioritization	Plan S6		
267	Board	More citizen science: volunteers	Other	Education & Outreach	Building Capacity	EO S8		
268	TAC	Linear projects: storm water	Other	Regulation	Stormwater	REG S1		
269	Board	Upstream to downstream (wetlands)		Planning	Prioritization	Plan S6		
270	Purgatory	cost/benefit: water quality, invasives, wildlife, city, riparian owners		Planning	Prioritization	Plan S6		
271	TAC	Grant Funding Availability		Planning	Prioritization	Plan S6	Plan S10	
272	Riley	How do we get faster data on effects of projects? Real-time lake updates online	Other	Data Collection		DC S8	DC S7	
273	Bluff	Is groundwater use sustainable?	Groundwater	Education & Outreach	Awareness	EO S4	Ground S1	Ground S2
274	Riley	Cost/benefits of management/plans/programs: what benefits will we see and when?	Other	Data Collection	Evaluation	DC S6	Plan S5	
275	Board	Flood control for Atlas 14 and projected/predicted climate change	Other	Water Resources	Water Quantity	WQuan S4	WQuan S5	
276	CAC	stormwater	Wetlands	Water Resources	Water Quantity	WQuan S6		
277	TAC	Consider resources outside the boundaries of the district that may be impacted by activities in the district: fens, trout streams, MN river.	Other	Planning	Prioritization	Plan S6		
278	Purgatory	upstream benefit to downstream resources	Lakes	Planning	Prioritization	Plan S6		
279	TAC	Rate and volume controls: salt/salinity issues	Other	Water Resources	Pollution	WQuan S6	WQual S12	
280	CAC	Storm water runoff: pollution	Lakes	Education & Outreach	Awareness	EO S4		
281	TAC	Increase/continued monitoring: focus cost sharing initiatives based on areas of concern	Lakes	Data Collection	Partnership	DC S8		
282	CAC	What is happening with fish in creeks?: varying depths; are there fish?	Creeks	Education & Outreach	Awareness	EO S4	WQual S5	
283	Bluff	Outreach to schools: build boxes	Other	Education & Outreach	Building Capacity	EO S8		
284	Board	Multiple benefits: will the project create multiple benefits?		Planning	Prioritization	Plan S6		
285	TAC	one and one regulation: what do you do with sump discharge? Algae flooding of streets and sidewalks, etc. Cost share?	Other	Regulation		REG S1		
286	Board	Educate the public on Watershed District role in management of the entire system, not just lakes.	Other	Education & Outreach		EO S1	EO S6	
287	TAC	How to use and promote water steward/stewardship	Wetlands	Education & Outreach	Awareness	EO S4		
288	TAC	Balance protection of resources with development/redevelopment (cost share)	Other	Education & Outreach	Cost-Share	EO S9		
289	Bluff	Not much fishing: clean water quality?	Lakes	Water Resources	Habitat	WQual S5		
290	Purgatory	Who is responsible for groundwater regulation: who protects it? What agencies have what role?	Groundwater	Education & Outreach	Awareness	EO S4	Ground S2	
291	CAC	What to do with creeks that are dry part of the year	Creeks	Education & Outreach	Awareness	EO S4		
292	TAC	Ability to attract/ form partnerships		Planning	Prioritization	Plan S6	Plan S9	
293	CAC	cost to protect and restore		Planning	Prioritization	Plan S6		
294	TAC	Public visibility/educational value		Planning	Prioritization	Plan S6		
295	CAC	ais and purple loosestrife, new and existing	Wetlands	Water Resources	Habitat	WQual S9	WQual S10	
296	CAC	Pollution: runoff of salt and sand	Wetlands	Water Resources	Pollution	WQual S13		
297	Board	Help citizens engage with creeks	Creeks	Education & Outreach	Building Capacity	EO S8		
298	TAC	erosion/head-cutting/embeddedness: property loss; habitat; water quality	Creeks	Water Resources	Habitat	WQual S11	WQual S8	

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299	CAC	Are there rules to control heavy users?	Groundwater	Regulation		Ground S2	Reg S1	
300	Board	Restore degraded wetlands	Wetlands	Water Resources	Habitat	WQual S8	WQual S1	
301	TAC	Encourage correctly sized floodplain culverts (engineering and DNR review)	Creeks	Water Resources	Water Quantity	WQual S8	WQual S10	
302	Board	water management	Wetlands	Water Resources	Water Quantity	WQuan S8	WQuan S6	
303	TAC	Shoreland protection for creeks: upland restoration/protection; bluffs and steep slopes	Creeks	Water Resources	Erosion	WQual S2		
304	Board	One water approach: upstream and downstream		Planning	Prioritization	Plan S6		
305	CAC	Issues: how money is determined for project; Prioritization; Bang for buck; cost benefit analysis; more public Education/ Outreach; partner with city and state-joint funding.	Other	Planning	Prioritization	Plan S6		
306	TAC	Comparison of status quo		Planning	Prioritization	Plan S6		
307	Purgatory	rain garden cost sharing	Creeks	Education & Outreach	Cost-Share	EO S9		
308	Bluff	Cost share is important		Education & Outreach	Cost-Share	EO S9		
309	TAC	Cooperatively Planningwith Cities/counties		Planning	Prioritization	Plan S6	Plan S9	
310	Purgatory	stream quality monitoring by community, schools, service projects groups	Creeks	Education & Outreach	Building Capacity	EO S8		
311	CAC	Health	Wetlands	Water Resources	Pollution	WQual S14		
312	Board	healthy creeks = healthy lakes and a healthy MN river	Creeks	Water Resources	Pollution	WQual S14		
313	Bluff	Work with HOAs: outreach (MWS) monthly HOA news letters; highlight local projects; cost-share programs		Education & Outreach	Cost-Share	EO S9		
314	TAC	Well interference: well field sizes	Groundwater	Water Resources	Groundwater	Ground S3		
315	TAC	Steep slopes and bluffs: monitoring development impacts and their protection and restoration. Promoting natural channel discharge. Info sharing with the public, other watershed districts.	Other	Data Collection	Erosion	WQual S2		
316	Riley	Manage for recreation, boating, fishing, swimming: shoreline erosion (minimize); lake restrictions; high water situations	Lakes	Water Resources	Erosion	WQual S1		
317	Riley	Flood water control	Other	Water Resources	Water Quantity	WQuan S6	WQuan S8	
318	TAC	Flooding and upland storage: aging infrastructure may be a potential problem.	Other	Water Resources	Water Quantity	WQuan S5	WQuan S8	
319	CAC	Depth	Lakes	Water Resources	Pollution	WQual S14		
320	Board	Encroachment by development, lack of buffers	Wetlands	Water Resources	Habitat	WQual S11	Reg S1	
321	TAC	Creation of bank sites and partnering with development community on mitigation options.	Wetlands	Regulation	Mitigation	REG S1		
322	Bluff	Repair shorelines at same time as you repair recreational amenities: walkways; partner with service groups	Wetlands	Planning	Partnership	Plan S9		
323	Riley	Bug control	Wetlands	Data Collection	Resource Assessment	DC S7		
324	Bluff	Shorelines: protection, restoration	Lakes	Water Resources	Habitat	WQual S8	WQual S14	
325	Purgatory	Emphasis on wildlife protection	Creeks	Water Resources	Habitat	WQual S6	WQual S8	
326	TAC	Work with LRT as station areas redevelop and development intensifies	Other	Water Resources	Habitat	WQual S3	Reg S1	
327	CAC	Native plant buffers	Creeks	Water Resources	Habitat	WQual S11		
328	CAC	Where is our drinking water coming from?	Groundwater	Education & Outreach	Awareness	EO S4		
329	Riley	Why don't wetlands have names like lakes?	Wetlands	Education & Outreach	Awareness	EO S4		
330	CAC	Look at history; what has been done in the past; don't keep redoing or reusing solutions		Planning	Prioritization	Plan S6	Plan S5	
331	Purgatory	deterioration	Wetlands	Water Resources	Pollution	WQual S14		
332	Purgatory	Road construction affecting Water quality	Lakes	Water Resources	Pollution	WQual S13	Reg S1	
333	CAC	What are the criteria for the goals?		Planning	Prioritization	Plan S6	WQual S14	

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						Strategy 1	Strategy 2 (if applicable)	Strategy 3 (if applicable)
334	Riley	Volunteer outreach to general public in district: expand volunteer network; attending homeowner association meeting and educating.	Other	Education & Outreach	Building Capacity	EO S8		
335	CAC	lake levels	Lakes	Water Resources	Water Quantity	WQuan S8	DC S2	
336	Board	Population ownership changes on lakes: shore land district enforcement	Lakes	Education & Outreach	Awareness	EO S4	Reg S1	
337	TAC	Invasive species (aquatic): prevention/early detection (zebra mussels, etc.); management and reduction; maximizing partnerships with counties to get financial and technical assistance; new invasives, public education on what is coming.	Lakes	Education & Outreach	Awareness	WQual S9	WQual S10	
338	Board	Protect existing high-quality wetlands	Wetlands	Regulation		REG S1		
339	Purgatory	What were the conditions historically?		Planning	Prioritization	Plan S6		
340	Board	Research based solutions/science based project		Planning	Prioritization	Plan S8	Plan S6	
341	TAC	Buffer management/enforcement/prioritization	Creeks	Water Resources	Habitat	WQual S11	Reg S1	
342	Board	Understanding the water system through the watershed approach	Lakes	Planning	Prioritization	Plan S6		
343	TAC	Include benefit analysis and risk analysis?- pollutant loads versus cost reduction; Aesthetics versus cost; exposure versus cost; education versus cost.		Planning	Prioritization	Plan S6		
344	CAC	cost/benefit analysis	Lakes	Planning	Prioritization	Plan S6		
345	Board	Finding balance with workload		Administration	Staff Capacity	Admin S2		
346	Bluff	Flow is flashy	Lakes	Water Resources	Water Quantity	WQuan S6		
347	TAC	Flooding and upland storage: aging infrastructure may be a potential problem.	Other	Water Resources	Water Quantity	WQuan S1	WQuan S6	
348	TAC	Stormwater retrofitting and regional treatment development to provide more treatment for lakes (and drainage to lakes)	Lakes	Water Resources	Pollution	WQual S13	Plan S6	
349	TAC	Invasive species (aquatic): prevention/early detection (zebra mussels, etc.); management and reduction; maximizing partnerships with counties to get financial and technical assistance; new invasives, public education on what is coming.	Lakes	Water Resources	Habitat	WQual S9	WQual S10	
350	Riley	General education: impacts of "everyday" activities; speaking with property management organizations	Other	Education & Outreach	Awareness	EO S4	EO S8	
351	CAC	loss/protection of current wetlands	Wetlands	Regulation		REG S1		
352	Purgatory	Understand where resource ranks		Data Collection	Resource Assessment	DC S7		
353	Board	Consider drought years	Creeks	Planning	Climate Change	Plan S6		
354	Bluff	Partner with service groups on volunteer restoration opportunities: build and install wood duck boxes	Other	Planning	Partnership	Plan S9	EO S8	
355	CAC	how much groundwater are we using? Is it monitored?	Groundwater	Education & Outreach	Awareness	EO S4	Ground S2	
356	TAC	Seminary Fen is a priority resource: promote awareness of municipal well impacts on this resource	Groundwater	Education & Outreach	Resource Vulnearibilities	EO S4		
357	Board	Workload and how to get it done: staff, volunteers, contractors. Balancing the work	Other	Administration	Staff Capacity	Admin S2	EO S8	
358	TAC	Identify restorable sites and basins for restoration. prioritize them (what type of methodology for prioritization?)	Wetlands	Water Resources	Habitat	WQual S7		
359	TAC	Groundwater recharge	Groundwater	Water Resources	Groundwater	WQuan S3		
360	CAC	adding wetlands: do we have enough? Expanding rain gardens and infiltration basin	Wetlands	Water Resources	Habitat	WQual S6	WQual S5	
361	TAC	Upland resources: management, including management of terrestrial invasives and managing pollutant release (tracking).	Other	Water Resources	Pollution	WQual S10		
362	TAC	Promote and require buffers	Lakes	Regulation	Buffers	REG S1	WQual S11	
363	TAC	Infiltration and impervious surfaces: promote native landscapes to reduce water use	Groundwater	Water Resources	Groundwater	WQuan S3	Ground S1	
364	Purgatory	sudden water flow causing unstable banks and erosion from channeled runoff	Creeks	Water Resources	Water Quantity	WQuan S6		

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						Strategy 1	Strategy 2 (if applicable)	Strategy 3 (if applicable)
365	Purgatory	what is the groundwater hydrology connections with the lakes? Mapping	Groundwater	Data Collection	Analysis/Study	Ground S3	DC S2	
366	CAC	Plans to increase infiltration/recharge	Groundwater	Planning		WQuan S3	Ground S2	
367	Board	Lack of understanding of the whole watershed system and connection with groundwater	Other	Water Resources	Groundwater	Ground S3	Ground S2	
368	TAC	Clarification and simplification of agency roles in management, permitting and protection	Wetlands	Regulation	Responsibilities	REG S1		
369	Board	Creek baseflow from groundwater/retention times	Groundwater	Water Resources	Groundwater	WQuan S2	WQuan S6	
370	TAC	terrestrial invasive management: use volunteers	Creeks	Water Resources	Habitat	WQual S9		
371	Bluff	Is there adequate pollinator forage/habitat? Restoration opportunity	Wetlands	Data Collection	Resource Assessment	DC S7	WQual S8	
372	Board	The real cost of water: take advantage of research on the resource. Assign a realistic value of groundwater	Groundwater	Data Collection	Analysis/Study	DC S7	Ground S2	
373	Board	Take advantage of regulatory program to educate and collaborate on projects	Other	Planning	Partnership	Plan S9		
374	CAC	How to prioritize lake vs. creek vs. ground water v wetland		Planning	Prioritization	Plan S6		
375	Purgatory	Controlling road drainage	Lakes	Water Resources	Pollution	WQual S13		
376	Riley	Key benefits (to general public) to articulate: boating, swimming, fishing, trails, safety/health of drinking water and recreation, accessibility. Recharge (groundwater), water quality, healthy native populations, invasives, home/land	Other	Planning	Prioritization	Plan S6		
377	TAC	recreation		Planning	Prioritization	Plan S6		
378	Board	Education of impact of our lakeshore on the resource: mowed grass to the shoreline	Lakes	Education & Outreach	Awareness	EO S4		
379	Riley	Do not water grass/lawns with "vintage" water (10000 years old)	Groundwater	Water Resources	Groundwater	Ground S1		
380	Board	Changing demographics: landownership, education	Other	Education & Outreach	Public Engagement	EO S6		
381	TAC	Must protect public infrastructure.	Other	Water Resources	Water Quantity	WQuan S5	WQuan S8	
382	Board	Web as a resource for education: videos, online tools	Other	Education & Outreach	Public Engagement	EO S6		
383	TAC	How to manage the maintenance of private storm water facilities: what to do if no financial ability to repair?	Other	Regulation	Stormwater	REG S1		
384	CAC	reduced effectiveness	Wetlands	Water Resources	Pollution	WQual S14		
385	CAC	safe swimming	Lakes	Water Resources	Pollution	WQual S14		
386	CAC	Clarity	Lakes	Water Resources	Pollution	WQual S13	WQual S14	
387	Purgatory	Biggest source of lake pollution= stormwater system. BMP's impact; more retention ponds	Lakes	Water Resources	Pollution	WQual S13	WQual S14	
388	TAC	Encourage correctly sized floodplain culverts (engineering and DNR review)	Creeks	Regulation		REG S1		
389	Purgatory	Watershed do reporting on groundwater	Groundwater	Education & Outreach	Awareness	EO S4	Ground S2	
390	CAC	Effects of climate change on all the resources	Other	Planning	Climate Change	Plan S2		
391	Riley	How to communicate/educate on watershed/water quality needs: explain standards of measurements/study- improve understanding of plans and why they are needed; what are goals and why?	Other	Education & Outreach	Public Engagement	EO S6		
392	CAC	stuff going down the creek into the river (silt)	Creeks	Water Resources	Pollution	WQual S13		
393	TAC	Man-made fragmentation	Creeks	Water Resources	Habitat	WQual S6		
394	Riley	Flow chart of wetlands into creeks/lakes	Wetlands	Data Collection	Inventory	DC S1		
395	TAC	creek restoration action strategy: use for prioritization	Creeks	Planning	Prioritization	Plan S8	Plan S6	
396	Board	More systematic weighting system across all watersheds (equity)		Planning	Prioritization	Plan S6		
397	TAC	Protect, enhance and restore upland resources: plant more trees	Lakes	Water Resources	Habitat	WQuan S3	WQuan S5	
398	Board	Collaborative opportunities with cities		Planning	Prioritization	Plan S6	Plan S9	

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						Strategy 1	Strategy 2 (if applicable)	Strategy 3 (if applicable)
399	TAC	Concentrate on one sub-watershed at a time-leave some flexibility for projects in other sub-watersheds		Planning	Prioritization	Plan S6		
400	TAC	Flood plain with Atlas 14 updates: seamless permitting; compliant/safe development' infrastructure upgrades	Creeks	Water Resources	Water Quantity	WQuan S4	WQuan S8	
401	Board	need a wetland inventory and assessments	Wetlands	Data Collection	Inventory	DC S1	DC S7	
402	CAC	Hybrid cattails: do we address them?	Wetlands	Water Resources	Habitat	WQual S10		
403	CAC	manage wildlife habitat	Wetlands	Water Resources	Habitat	WQual S3	WQual S8	
404	TAC	Shoreline management: enforce your DNR general permit; discourage retaining walls on shorelines; Education, outreach, restoration projects; As area developed go back and work with established residents; buffers.	Lakes	Water Resources	Habitat	WQual S11	EO S4	
405	TAC	Pond dredging as storm water maintenance	Other	Regulation	Stormwater	REG S1		
406	Board	Need to work with the societal pressures, how to balance what the science says and what the community wants		Planning	Prioritization	Plan S6		
407	Board	Reduce erosion, sedimentation, nutrients (Total phosphorus) and pollutants (pesticides, heavy metals, fertilizers)	Creeks	Water Resources	Erosion	WQual S1		
408	Board	Shifting baselines in water quality standards	Other	Water Resources	Pollution	WQual S14	DC S7	
409	Purgatory	Runoff into it	Wetlands	Water Resources	Pollution	WQual S13		
410	TAC	Well head protection areas: S/B watershed based as areas cross city boarders	Groundwater	Water Resources	Hydrogeology	WQual S18		
411	CAC	How to balance environmentalists vs. recreationists (needs/wants)	Other	Planning	Prioritization	Plan S6		
412	Purgatory	Full spectrum of consequences-downstream	Creeks	Water Resources	Water Quantity	WQuan S8		
413	Board	Developing more public-public and private-private partnerships. Look for opportunities to collaborate	Other	Planning	Partnership	Plan S9		
414	Board	Flooding because of climate change: how flooding is predicted to occur. Changes in hydrology	Creeks	Water Resources	Water Quantity	WQuan S4	WQuan S5	
415	Board	Part of healthy hydrological system: healthy wetlands=healthy creeks=healthy lakes= good quality groundwater	Wetlands	Water Resources	Water Quantity	WQuan S1		
416	Purgatory	Stagnant> smelly? Sometimes on east side of Red Rock Lake; bubbler needed? (north end too)	Wetlands	Water Resources	Pollution	WQual S14		
417	TAC	Demonstrate or showcase wetland sites to educate the public. Work with cities and counties to find and build/promote wetlands. Other partners like 3-Rivers parks and LMRWD	Wetlands	Education & Outreach	Awareness	EO S4		
418	CAC	breeding grounds for carp/zebra mussels	Wetlands	Water Resources	Habitat	WQual S9	WQual S4	
419	CAC	How good are we at partnering with cities and counties? DNR?	Other	Planning	Partnership	Plan S9		
420	TAC	watershed benefit-downstream/upstream		Planning	Prioritization	Plan S6		
421	Riley	Types of algae in lakes? How do we control it? What nutrients to stop/control? Are good algae doing okay? Balance	Lakes	Education & Outreach	Awareness	EO S4	WQual S14	
422	TAC	exposure to public		Planning	Prioritization	Plan S6		
423	CAC	Boating/navigability	Lakes	Education & Outreach	Awareness	Plan S6		
424	TAC	ID navigable water trails and maintain for paddling	Creeks	Education & Outreach	Recreation	EO S5	WQual S14	
425	TAC	Be aware of potential for shallow groundwater's impacts on bluff and steep slope instability	Groundwater	Water Resources	Erosion	WQual S2		
426	Board	Part of healthy hydrological system: healthy wetlands=healthy creeks=healthy lakes= good quality groundwater	Wetlands	Water Resources	Habitat	WQual S8		

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						Strategy 1	Strategy 2 (if applicable)	Strategy 3 (if applicable)
427	TAC	Salt alternatives: what are their impacts? Look into research?	Groundwater	Water Resources	Pollution	WQual S12	WQual S15	
428	Board	Water infiltrating where it lands	Creeks	Water Resources	Water Quantity	WQuan S3		
429	CAC	Deteriorating infrastructure	Creeks	Water Resources	Water Quantity	WQuan S5	WQuan S8	
430	CAC	Self-sustaining vs. required maintenance		Planning	Prioritization	Plan S6		
431	TAC	Topsoil management on development sites. Is research needed? Maintenance	Other	Water Resources	Erosion	WQual S1		
432	Board	Lake use: managing for a specific or a variety of uses and role of watershed district vs. lake association	Lakes	Planning	Partnership	Plan S9		
433	Board	changes in hydrology and bounce: timing and duration	Wetlands	Water Resources	Water Quantity	WQuan S1		
434	CAC	turbidity	Lakes	Water Resources	Pollution	WQual S13	WQual S14	
435	Bluff	Flashy flow	Creeks	Water Resources	Water Quantity	WQuan S6		
436	Purgatory	bring back grass gutters	Creeks	Water Resources	Pollution	WQual S13		
437	CAC	boundaries? Where do they start and end?	Wetlands	Data Collection	Inventory	DC S1		
438	TAC	Enforcing wetland buffer zones: signage of buffer areas to prevent damage	Wetlands	Regulation	Buffers	REG S1	WQual S11	
439	TAC	ID upstream storage possibilities and rate control	Creeks	Water Resources	Water Quantity	WQuan S1	WQuan S6	
440	Board	Explore ways to get things done, and don't overlook		Planning	Prioritization	Plan S6	Plan S9	
441	TAC	Reducing storm water in order to reduce groundwater usage: potential contamination	Groundwater	Water Resources	Pollution	WQual S13	WQual S18	
442	Board	How do we fund all the needed projects? Collaboration	Other	Planning	Partnership	Plan S9		
443	Board	Restoring creeks to more natural conditions. Stabilizing banks where possible.	Creeks	Water Resources	Habitat	WQual S7	WQual S2	
444	TAC	Lake management plan for plants /animals	Lakes	Water Resources	Habitat	WQual S8	DC S7	
445	Riley	Access: bike paths/walking paths	Wetlands	Planning	Recreation	EO S5		
446	Riley	Free flowing/lake level control	Creeks	Water Resources	Water Quantity	WQuan S8		
447	CAC	Wildlife health?	Lakes	Water Resources	Habitat	WQual S6	WQual S8	
448	Riley	Excessive goose population	Other	Water Resources	Pollution	WQual S13		
449	TAC	Salt impacts on aged pipes/infrastructure: Salt use needs to be reduced	Groundwater	Water Resources	Pollution	WQual S12		
450	CAC	cost today vs. future cost		Planning	Prioritization	Plan S6		
451	Purgatory	Healthy fish populations (red Rock): maintain	Lakes	Water Resources	Habitat	WQual S5		
452	Riley	Have a rating system to prioritize biggest problems/worst pollution issues	Other	Planning	Prioritization	Plan S6		
453	Bluff	More urban, shallow, not much flow through	Lakes	Water Resources	Water Quantity	WQuan S6	WQuan S3	
454	CAC	Issues: how money is determined for project; Prioritization; Bang for buck; cost benefit analysis; more public Education/ Outreach; partner with city and state-joint funding.	Other	Planning	Prioritization	Plan S6		
455	CAC	Wildlife and impact of damaged wetlands: birds, amphibians, dragonflies	Wetlands	Water Resources	Habitat	WQual S11	WQual S8	
456	CAC	Accountability		Planning	Evaluation	Plan S6	Plan S5	
457	TAC	No net loss (area, type) of wetlands: function and value of the wetland within district. Need mitigation sites	Wetlands	Regulation	Mitigation	WQuan S1	Reg S1	
458	Purgatory	Looking for connections to publicly owned land		Planning	Prioritization	Plan S6		
459	TAC	Can you justify what you are doing?		Planning	Prioritization	Plan S5	Plan S6	
460	Purgatory	Concerned about algae growth and how it limits access and recreational use (Red Rock): canoeing, paddle boats, fishing	Lakes	Planning	Recreation	EO S5	WQual S13	
461	Riley	Prioritize lake projects over creek	Other	Planning	Prioritization	Plan S6		
462	Board	Promoting greenways and corridors.	Other	Water Resources	Habitat	WQual S6		
463	Board	Better system and record of new wells: managing new water use. Educate public on what is happening with groundwater.	Groundwater	Education & Outreach	Awareness	EO S4	Ground S2	

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						Strategy 1	Strategy 2 (if applicable)	Strategy 3 (if applicable)
464	CAC	Priority: 1. Partners available? Money Available? 2. Matching priority to keep the 'best" resources in " best" shape		Planning	Prioritization	Plan S6	Plan S9	
465	Board	Collaboration with other agencies (stretch out money used in projects)		Planning	Prioritization	Plan S6	Plan S9	
466	CAC	sediment	Wetlands	Water Resources	Pollution	WQual S13	WQual S1	
467	TAC	Time sensitive Projects		Planning	Prioritization	Plan S6		
468	Board	Meeting educational needs w/limited resources	Other	Administration	Staff Capacity	Admin S2		
469	TAC	Enhancing flood storage capacity and promoting pretreatment of stormwater	Wetlands	Water Resources	Water Quantity	WQuan S1		
470	CAC	Fish ladders/barriers	Creeks	Water Resources	Habitat	WQual S4		
471	Board	identify changes in connectivity between wetlands and creeks	Wetlands	Water Resources	Water Quantity	WQuan S1		
472	CAC	Priority: 1. Partners available? Money Available? 2. Matching priority to keep the 'best" resources in " best" shape		Planning	Prioritization	Plan S6	Plan S9	
473	Riley	What are the ways you use to get information to people? Provide the "why" why is it important? How will it affect residents?	Other	Education & Outreach	Public Engagement	EO S6	EO S1	
474	Board	Changes in lake dynamics and stratification due to warming temperatures, both negative and positive feedback loops	Lakes	Planning	Climate Change	Plan S2		
475	TAC	Climate adaptation and education: how to fund long term.	Other	Planning	Climate Change	Plan S2		
476	Purgatory	Prioritize those with multiple benefits: infiltration, wildlife		Planning	Prioritization	Plan S6		
477	TAC	Public engagement and outreach: adopt a creek program; drainage mapping "local;" increase visibility of creeks	Creeks	Education & Outreach	Public Engagement	EO S6	EO S1	
478	Purgatory	immediate concerns shouldn't override long-term		Planning	Prioritization	Plan S6		
479	Board	lack of diversity in vegetation supports less wildlife and aquatic invertebrates	Wetlands	Water Resources	Habitat	WQual S3	WQual S8	
480	Purgatory	silver lake: cooking to form association	Lakes	Education & Outreach	Building Capacity	EO S8		
481	Purgatory	invasive vegetation	Lakes	Water Resources	Habitat	WQual S9	WQual S10	
482	TAC	Encourage lake associations/local ownership of resources: educate these groups; expectation for shallow lake environments- wont have the same outcomes/uses as deeper lake habitats	Lakes	Education & Outreach	Building Capacity	EO S8		
483	Board	Shoreline protection and improvement	Lakes	Regulation		REG S1		
484	TAC	Need to balance recreational usage to stop or reduce disconnect between residents, cities and district		Planning	Prioritization	Plan S6		
485	Board	Find ways to leverage resources: e.g- MWS, Adopt a Resource	Other	Education & Outreach	Building Capacity	EO S8		
486	CAC	Residents make illegal sand blankets and dump algaecide	Lakes	Education & Outreach	Awareness	EO S4	Reg S1	
487	TAC	Talk to potential partners early in the Planningor even research process- don't wait until after decisions are made. Lots of education.		Planning	Prioritization	Plan S6	Plan S9	
488	CAC	Issues: how money is determined for project; Prioritization; Bang for buck; cost benefit analysis; more public Education/ Outreach; partner with city and state-joint funding.	Other	Planning	Prioritization	Plan S6	Plan S9	
489	CAC	Threats: lack of funding; lack of public understanding; deteriorating roads/infrastructure.	Other	Education & Outreach	Public Engagement	EO S6		
490	CAC	What motivates someone to care about groundwater?	Groundwater	Education & Outreach	Stewardship	EO S7		
491	Riley	Seasonal creeks sediment inputs into the lakes: does that need control? Monitoring	Creeks	Data Collection	Resource Assessment	DC S7	DC S2	
492	Board	Difference between lake types and management: education and ecology	Lakes	Education & Outreach	Awareness	EO S1	EO S4	
493	CAC	Education of residents	Lakes	Education & Outreach		EO S1		
494	Purgatory	Settling sediments: how do we reduce sediment? When is removal of sediment appropriate?	Wetlands	Education & Outreach	Awareness	EO S4	WQual S1	
495	Board	Education on watering/irrigation, and needs of the landscape	Groundwater	Education & Outreach	Awareness	EO S4		

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496	CAC	Citizen misconception	Lakes	Education & Outreach	Awareness	EO S4		
497	Riley	What preventative measures can reduce future cost?	Other	Education & Outreach	Awareness	EO S4		
498	Purgatory	can wetlands take over lake? Plants?	Wetlands	Education & Outreach		EO S4		
499	Riley	Access walking and bike trails, not adding to erosion	Creeks	Planning	Recreation	EO S5	WQual S1	
500	Bluff	Use the walking paths frequently	Wetlands	Planning	Recreation	EO S5		
501	Purgatory	What is it I can do next creek	Creeks	Education & Outreach	Stewardship	EO S7		
502	Board	Engage landowners in responsible and sustainable water use	Groundwater	Water Resources	Groundwater	Ground S1		
503	Purgatory	work with cities on development		Planning	Prioritization	Plan S6	Plan S9	
504	Purgatory	To take care of upstream lakes first and make the downstream lakes wait is not fair		Planning	Prioritization	Plan S6		
505	CAC	Determine worst and best of each resource based on science: assessment strategy- Worst (rate) worst to best lake, worst to best creek, worst to best wetland, worst to best groundwater		Planning	Prioritization	Plan S6		
506	TAC	Pollutant loads		Planning	Prioritization	Plan S6		
507	Board	Addressing citizen desire for perceived equity		Planning	Prioritization	Plan S6		
508	Purgatory	Availability of partnering funds: municipal, state, federal, land owners		Planning	Prioritization	Plan S6		
509	CAC	How to improve with different resources and processes		Planning	Prioritization	Plan S6		
510	Riley	Prioritize lakes with public beaches over other private lakes	Other	Planning	Prioritization	Plan S6		
511	Purgatory	We need a formula to quantify the benefit from a project: a clear, measurable formula to determine benefit		Planning	Prioritization	Plan S6		
512	CAC	Erosion: who helps control it and how?	Creeks	Water Resources	Erosion	WQual S1		
513	CAC	stormwater	Wetlands	Water Resources	Pollution	WQual S13		
514	Purgatory	urban pollution/runoff to creek	Creeks	Water Resources	Pollution	WQual S13		
515	CAC	Recreation vs. water clarity	Lakes	Water Resources	Pollution	WQual S14	Plan S6	
516	Board	Algae in lakes	Lakes	Water Resources	Pollution	WQual S14		
517	Purgatory	Good water quality/healthy	Creeks	Water Resources	Pollution	WQual S14		
518	CAC	amount of development along creek	Creeks	Water Resources	Habitat	WQual S3	Reg S1	
519	TAC	Green space preservation: throughout the entire corridor; Greater incentive to incorporate natural resource benefits for developers	Creeks	Water Resources	Habitat	WQual S6	WQuan S5	
520	Board	More opportunities for pollinators habitat and corridors	Other	Water Resources	Habitat	WQual S6	WQuan S5	
521	Board	changes in connectivity due to development: green corridors	Wetlands	Water Resources	Habitat	WQual S6		
522	Purgatory	Green corridor with healthy ecosystem	Creeks	Water Resources	Habitat	WQual S6		
523	TAC	Invasive species (aquatic): prevention/early detection (zebra mussels, etc.); management and reduction; maximizing partnerships with counties to get financial and technical assistance; new invasives, public education on what is coming.	Lakes	Planning	Partnership	WQual S9	WQual S10	
524	TAC	Upland resources: management, including management of terrestrial invasives and managing pollutant release (tracking).	Other	Water Resources	Habitat	WQual S9	WQual S13	
525	CAC	Threats: lack of funding; lack of public understanding; deteriorating roads/infrastructure.	Other	Water Resources	Water Quantity	WQuan S5	WQuan S8	
526	Purgatory	Water level	Lakes	Water Resources	Water Quantity	WQuan S8		

Appendix D Envision Credits and Criteria

resourceful. naturally.
engineering and environmental consultants

BARR

Memorandum

To: File
From: Scott Sobiech, Erin Anderson and Greg Williams
Subject: Summary of Envision-based project prioritization tool
Date: November 18, 2016
Project: 23270051-016-400

During the initial stages of its Watershed Management Plan (Plan) refresh, the Riley Purgatory Bluff Creek Watershed District (RPBCWD) solicited stakeholder input on watershed management issues through a public engagement process. The results of the public engagement process identified “project prioritization” as an issue of high importance to stakeholders. Comments received at public meetings highlighted the difficulty in developing a clear and equitable method for project prioritization.

To address this concern, the RPBCWD developed a proposed project prioritization method based on the Envision Sustainability Framework (Envision). This prioritization method allows relative comparison of watershed management projects spanning a range of benefits and locations. This memorandum summarizes the proposed method for scoring projects based on multiple benefits and prioritizing those projects with consideration for logistical factors. This method is applicable to District projects; District programs and ongoing operations (e.g., education program) are not subject to this prioritization method.

Summary of Envision

The Envision™ rating system is a project assessment and guidance tool for sustainable infrastructure design developed by the Harvard Graduate School of Design, the American Society of Civil Engineers (ASCE), the American Public Works Association (APWA) and the American Council of Engineering Companies (ACEC). It is an objective framework of criteria and performance achievements that help users identify ways that sustainable approaches can be used to plan, design, construct, and operate infrastructure projects. Envision™ provides an opportunity for infrastructure owners and designers to be recognized for using a life cycle approach, working with communities, and using a restorative approach to infrastructure projects. Envision™ is also a useful tool in comparing project options that have different intangible benefits that can be hard to quantify through traditional means. Envision™ credits are divided into the following five categories:

- Quality of life
- Leadership
- Resource allocation
- Natural world
- Climate and risk

Using Envision, a project (proposed or constructed) is scored based on the degree to which the project achieves criteria applicable to each credit. Multiple criteria exist for each credit, resulting in a range of available scores for each credit. The more credits a project achieves, and the greater the degree to which they are achieved, the higher a project will score.

Modifications to Envision

The Envision rating system uses a holistic approach to sustainability, and is thus applicable to a range of infrastructure projects across several engineering and public works disciplines. The RPBCWD proposes a project prioritization method based on Envision, but modified in the following three ways:

1. Criteria for credits were modified into yes/no questions (1 point for yes, 0 points for no)
2. Criteria language was modified to more closely align with RPBCWD goals and strategies
3. Some additional criteria questions were added to account for RPBCWD goals and strategies (most within the natural world category)

The first modification initially created a single, yes/no criterion for each credit. This modification was made due for two reasons: 1) to simplify the scoring process, and 2) to reflect the level of project definition that can be reasonably expected at the feasibility level, when it is anticipated that most projects will be scored.

The second and third modifications adapt the Envision framework more specifically to the vision, mission, and goals of the RPBCWD. The credits were not modified from the original Envision framework. However, the criteria language was revised to more closely align with specific goals and strategies developed by the RPBCWD. The goals and strategies will be included in the refreshed Plan, and are directly tied to the stakeholder input received during the public engagement process. For some credits, the criteria include a single question with language that is either: 1) based on Envision language and revised to most accurately represent the application of the Envision credit to RPBCWD projects, or 2) based on language from the RPBCWD goals and strategies rephrased as a yes/no question. For some credits, additional criteria were added to reflect increased focus of the RPBCWD on the resource or practice associated with that credit. For example, the original Envision framework includes a single credit for “manage stormwater.” Four criteria were used to reflect the RPBCWD’s multiple stormwater management objectives.

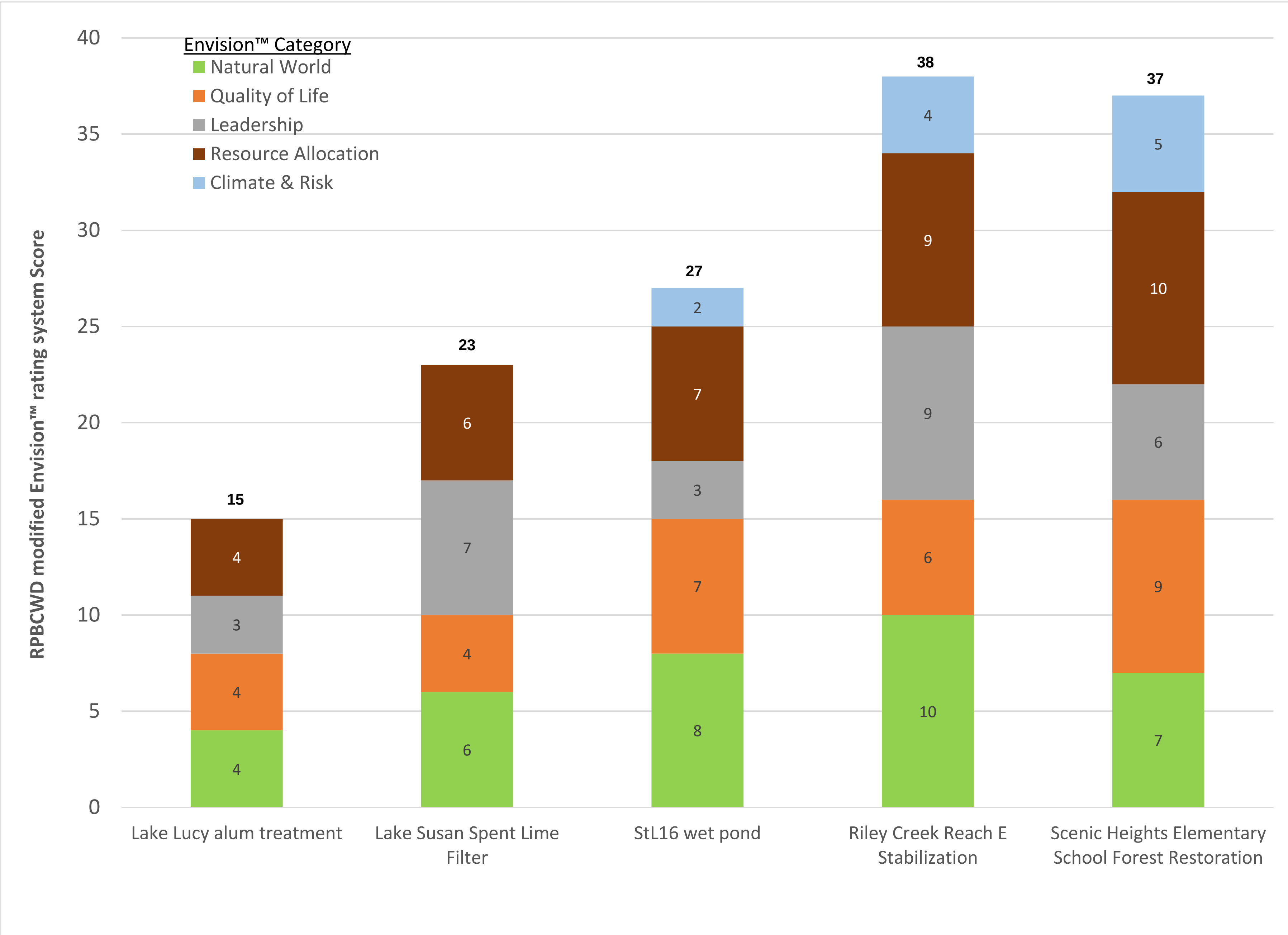
A list of the Envision credits and criteria questions developed for each credit are presented in a table included at the end of this memorandum. Most of the credits with multiple criteria questions are included within the natural world category. The criteria questions are phrased such that a “yes” is a positive response (i.e., a benefit); a “yes” answer earns 1 point. No points are earned for a “no” answer. In total, there are 56 credits and 81 possible points to be earned, distributed among the categories as follows:

Category	Credits	Possible Points
Quality of life	12	18
Leadership	9	10
Resource allocation	13	15
Natural world	15	30
Climate and risk	7	8
Total	**56**	**81**

To learn more about the final prioritization tool used by RPBCWD please see Section 4.0

ISI, inc.		Co-Benefits Profile using Envision Framework						
Category	**Credit**	**Question the team will ask about individual BMPs in the CIP:**	**Lucy Alum Treatment**	**Lucy Spent Lime**	**StL16 Wet Pond**	**Riley Creek Reach E**	**Scenic Heights Elementary School Forest Restoration**	**Draft RPBCWD Goals/Strategies**
Quality of Life	Improve community quality of life	Is the project aligned with community needs, goals, plans and issues (e.g., Comprehensive Plan)?						
		Has the affected community been meaningfully engaged in the project design process?	?	Y	Y	Y	Y	
		Is the project designed in such a way that improves existing community conditions and rehabilitates infrastructure assets?	Y	Y	N	N	Y	
	Stimulate sustainable growth and development	Does the project improve the community attractiveness for compatible businesses and industries, improve recreational opportunities, and generally improve the economic and social condition of the community						
	Develop local skills and capabilities	Does the project educate watershed residents about water resource management issues?						
		Does the project encourage residents to implement their own best management practices?						
		Does the project encourage residents to become watershed stewards (to implement best management practices and encourage others to do so)?						
	Enhance public health and safety	Has the design team assessed the project for health risk and made approriate changes to reduce risk to public and worker health?						
	Minimize noise and vibration	Has the project been designed to markedly reduce ambient noise and vibration to levels that improve community livability?						
	Minimize light pollution	Has the project team designed lighting components in a way that reduces or eliminates lights spillage into sensitive environments?						
	Improve community mobility and access	Does the project consider and include improvements to long-term transportation infrastructure efficiecncy, walkability, and livability.						
	Encourage alternative modes of transportation	Does the BMP also help the City address any Complete Streets policy or plan?	N	N	N	N		
	Improve site accessibility, safety and wayfinding	Detailed design determines if the BMP has educational signage about sensitive areas, natural assets, etc.	N	N				EO5
	Preserve historic and cultural resources	Detailed design determines if the BMP is context sensitive and builds on the area's history, culture and art	N	N				
	Preserve views and local character	Does the BMP preserve or enhance views in the the community landscape?	N	N	Y	Y	Y	
		Does the project incorporate natural materials and bioengineering for the maintenance and restoration of shorelines and streambanks where appropriate?	N	N	Y	Y	Y	
	Enhance public space	Is the BMP next to a recreational or pedestrian trail? (education value)	N	N	Y	Y	Y	EO5
		Does the project enhance established recreational use or public open spaces?	Y	Y	Y	Y	Y	
Leadership	Provide effective leadership and commitment	Does this BMP demonstrate a new tool in stormwater management (innovative, new idea, value of leading the pack)?	N	Y	N	N	N	WQP4
	Establish a sustainability management system	Has the project been assessed and optimized relative to achieving sustainability?						
	Foster collaboration and teamwork	Is their a perceived partnering opportunity (e.g., city, private entity)?	?	Y	Y	Y	Y	AD4, AD5, DC8, PL9, PL10, RG-G2, RG4,
		Is their a partner who is contributing funding to the project (e.g., city, private entity)?	?	Y	N	Y	Y	
	Provide for stakeholder involvement	Will stakeholder engagement be implemented during the design and construction of the BMP?	Y	Y	Y	Y	Y	EO1, EO4, EO6, EO9, PL11
	Pursue by-product synergy opportunities	Does the BMP make beneficial reuse of a waste product such as compost, wood mulch, spent lime?	N	Y	N	Y	Y	
	Improve infrastructure integration	Is the BMP designed to be low-impact and accommodate existing utilities, grading, roadways, trees, etc.?	Y	Y	N	Y	N	
	Plan for long-term monitoring and maintenance	Is there a plan, funding and responsible party identified for long-term O&M of the BMP ?	Y	Y	Y	Y	N	PL11
	Address conflicting regulations and policies	Does the project provide results which may reduce barriers to future sustainable projects?						
	Extend useful life	Is the project designed to be durable, flexible, and resilient?	N	N	N	Y	Y	
Resource Allocation	Reduce net embodied energy	Does this BMP minimize resource-intensive materials that are man-made and manufactured?	N	N	Y	Y	Y	
		Does the operation and maintenance of this BMP minimize reliance on resource-intensive materials (man-made and manufactured)?						
	Support sustainable procurement practices	Contracting and procurement will determine if these practices are used.	N					
	Use recycled materials	Does the BMP reuse materials such as mulch, compost, aggregates, recycled content materials?						
	Use regional materials	Does the BMP rely mostly on local materials, vegetation?	N	Y	Y	Y	Y	
	Divert waste from landfills	Does the BMP minimize the quantity of construction materials needing to be demolished and reconstructed at a future date beyond standard practice?						
	Reduce excavated materials taken off site	Does the BMP site appear to lend itself toward balancing cut and fill on-site?	N	N	Y	Y	Y	
	Provide for deconstruction and recycling	If the BMP is demolished and reconstructed at a future date, can materials be easily separated, recovered and recycled?						
	Reduce energy consumption	Does the BMP avoid ongoing pumping or electricity consumption during operation?	Y	Y	Y	Y	Y	
	Use renewable energy	Are there plans for renewable power generation at the BMP site? If electricity must be used for operation, is it from a renewable source?						
	Commission and monitor energy systems	Will the project be monitored for energy or resource consumption in an effort to optimize energy use, maintenance, or eventual replacement?						
	Protect fresh water availability	Does the project achieve a net positive impact repleneshing the quantity of fresh water surface and groundwater?						
		Does the project further the understanding of groundwater-surface water interaction?	N	N	N	N	N	GW3
	Reduce potable water consumption	Does the BMP implement potable water conservation or stormwater re-use to offset potable water demand?						
	Monitor water systems	Will performance of the BMP be monitored to optimize future operation and/or inform District decision-making?						DC7

ISI, inc.		Co-Benefits Profile using Envision Framework						
Category	Credit	Question the team will ask about individual BMPs in the CIP:	Lucy Alum Treatment	Lucy Spent Lime	StL16 Wet Pond	Riley Creek Reach E	Scenic Heights Elementary School Forest Restoration	Draft RPBCWD Goals/Strategies
Natural World	Preserve prime habitat	Does the project preserve or enhance habitat important to fish, waterfowl, and other wildlife?						WQ-G3
	Protect wetlands and surface water	Does the project preserve or enhance the quantity or function/value of District wetlands?						
		Does the project establish, preserve, or enhance buffer areas?	N	N	N	N	N	WQH9
	Preserve prime farmland	Does the BMP replace farm land?						
	Avoid adverse geology	Is the BMP sited to avoid karst conditions, wellhead protection areas?	N	N	N	N	N	
	Preserve floodplain functions	Does the BMP reduce impervious surface?						
		Does the project protect or enhance the ecological function of District floodplains to minimize adverse impacts?	N	N	N	Y	N	WQT1
	Avoid unsuitable development on steep slopes	Does the project minimize ongoing erosion and sedimentation ?						
		Does the project address an area of high erosion concern or risk?	N	N	Y	Y	Y	WQE2
	Preserve greenfields	Is the BMP a retrofit in a gray field or brownfield area?						
	Manage stormwater	Does the project reduce peak discharge rates?						WQT6
		Does the BMP provide any flood mitigation benefit?						
		Does the project reduce flood risk within the District?	N	N	N	N	N	WQT8
		Does the project reduce overall flow volume?						
		Does the project incorporate Low Impact Development (LID) practices						WQT7
	Reduce pesticide and fertilizer impacts	Does the BMP replace high-maintenance lawn with a low-maintenance naturalized landscape?						
	Prevent surface and groundwater contamination	Does the project positively influence more than one downstream water resources?						
		Does the project minimize the risk to groundwater quality?						
	Preserve species biodiversity	Does the project establish and preserve natural corridors for wildlife habitat and migration?						WQH4
		Does the project promote biologically diverse and appropriate plant and animal populations?						
	Control invasive species	Does the BMP project include removal of invasive species?	N	N	N	Y	Y	DC5, WQH2, WQH7, WQH8
		Does the project manage non-native aquatic invasive macrophytes to improve water quality and/or habitat in accordance with an approved lake vegetation management plan or as part of a rapid response control project?						
		Does the project minimize the spread or manage the adverse ecological impact of aquatic invasive species?	N	N	N	N	N	
	Restore disturbed soils	Does the project amend/restore disturbed soils on the project site to minimize erosion and promote vegetation?						
	Maintain wetland and surface water functions	Does the project address chloride loading/pollution	N	N	N	N	N	WQP1
		Does the project reduce phosphorus loading to, or concentrations within, District managed water resources? Separate watershed vs. in-lake treatment						
		Does the project reduce sediment loading to District managed water resources?	N	Y	Y	Y	N	WQP2
		Does the project reduce other pollutant (e.g., metals, bacteria) loading to District managed water resources?						
		Is the project included in a published feasibility study or plan (e.g., City study, UAA, WRAPS or TMDL implementation Plan)?	Y	Y	Y	Y	Y	WQP6
	Innovation	Does the project investigate treatment effectiveness of emerging practices?						
Climate & Risk	Reduce greenhouse gas emissions	Does the project consider mimization of greenhouse gas emissions?	N	N	N	N	N	
	Reduce air pollutant emissions	Does the construction, operation and maintenance of this BMP minimize use of fuel, electricity or resource-intensive materials (man-made and manufactured)?	N	N	Y	Y	Y	
	Assess climate threat	Has the BMP been sized and flow routing been designed to address the vulnerability and risk to nearby property during a severe weather event?	N	N	N	Y	N	DC4, PL2, PL3
		Has the project been assessed to determine the impact of climate change on project performance?	N	N	N	N	Y	PL2
	Avoid traps and vulnerabilities	Does operation, maintenance or replacement of the BMP avoid significant future electricity, fuel or man-made construction materials?	N	N	Y	Y	Y	PL3
	Prepare for long-term adaptability	Has the project been designed to accommodate impacts of potential climate change (through adaptive management or retrofit)?						PL3
	Prepare for short-term hazards	Has the project been designed to minimize the impact of natural or man-made hazards (in addition to managing stormwater)?						
	Manage heat island effects	Does the project reduce the amount of impervious surface or shade existing impervious surface?						
		Total RPBCWD modified Envision™ rating system Score	15	23	27	38	37	


40
35
30
25
20
15
10
5
0
Envision™ Category
Natural World
Quality of Life
Leadership
Resource Allocation
Climate & Risk
RPBCWD modified Envision™ rating system Score
15
4
3
4
4
23
6
7
4
6
27
2
7
3
7
8
38
4
9
9
6
10
37
5
10
6
9
7
Lake Lucy alum treatment
Lake Susan Spent Lime Filter
StL16 wet pond
Riley Creek Reach E Stabilization
Scenic Heights Elementary School Forest Restoration

RPBCWD Board Workshop: Draft Prioritization Framework Discussion

Erin Anderson Wenz, ENV SP, PE

October 24, 2016

Envision™

INSTITUTE FOR SUSTAINABLE INFRASTRUCTURE
ISI

Developed by:

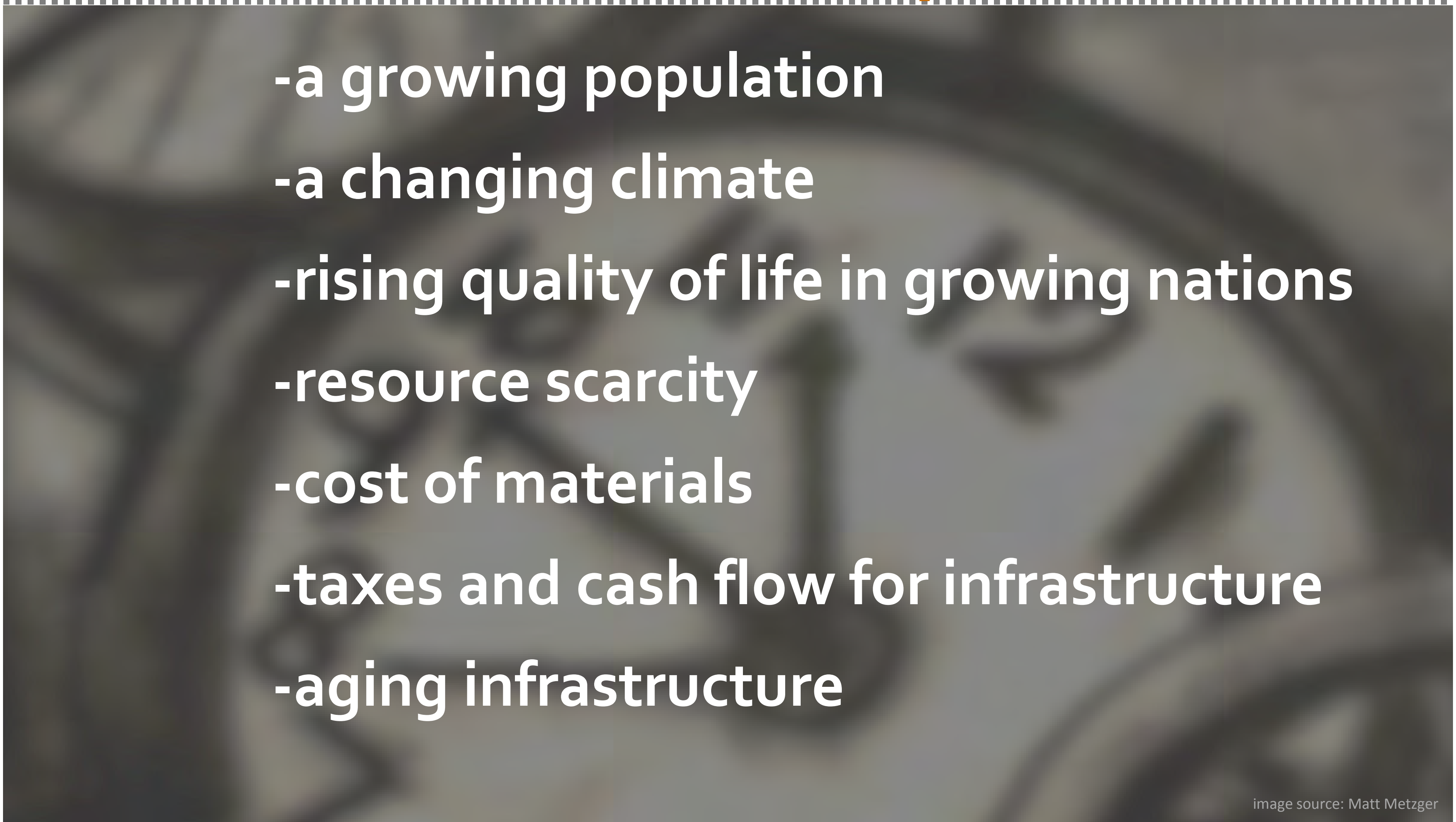
ZOFNASS PROGRAM FOR SUSTAINABLE INFRASTRUCTURE
Graduate School of Design Harvard University

APWA

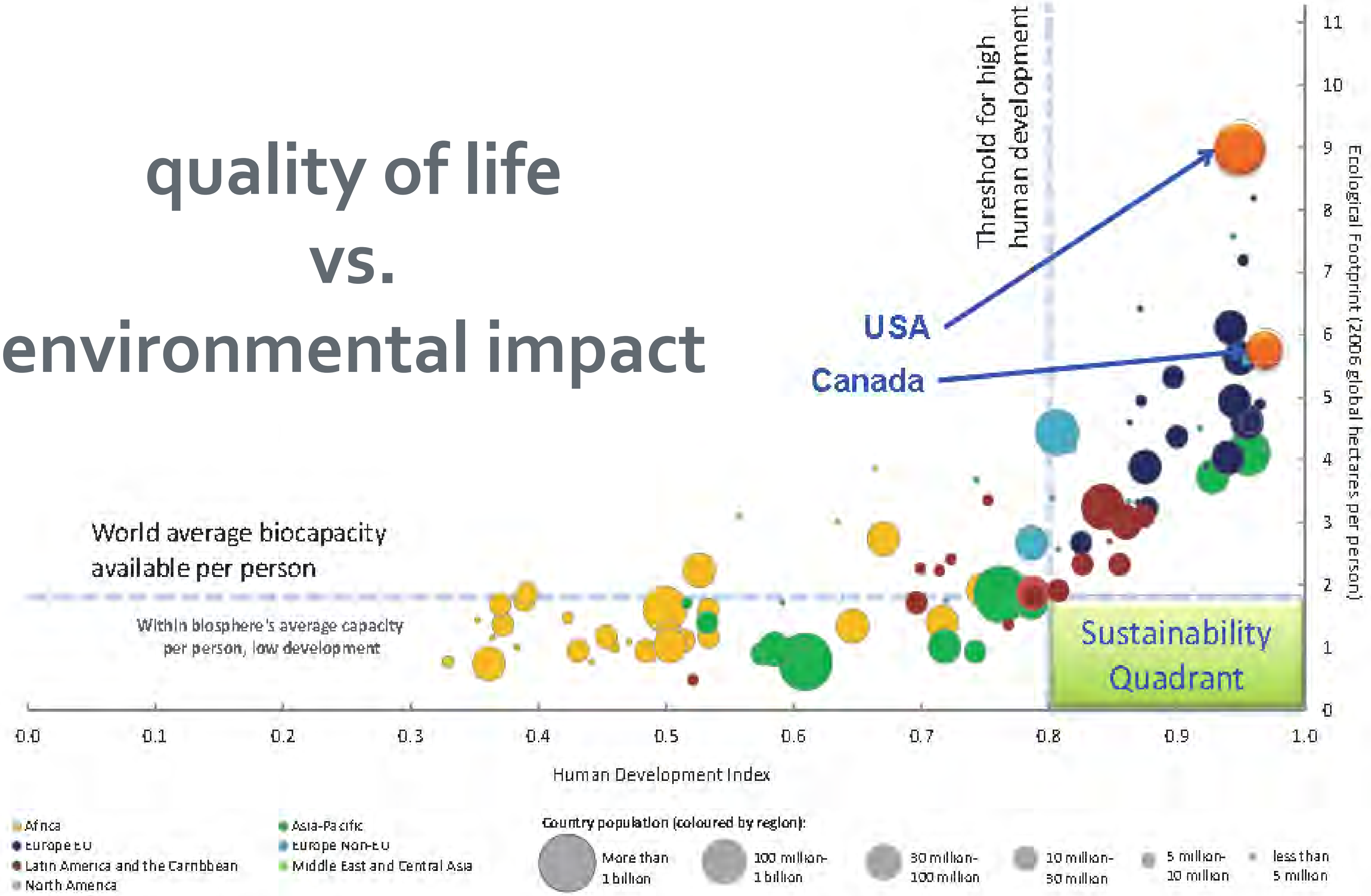
ACEC
American Council of Engineering Companies
100 Years of Excellence

ASCE AMERICAN SOCIETY OF CIVIL ENGINEERS

Infrastructure built today must also serve our needs in 20 to 50 years.



quality of life vs. environmental impact



Plotted by Irene Dhong, UFL ENV6932

Figure 6: Human development index vs. ecological footprint by country (Source: Living Planet Report 2006, World Wildlife Fund).

link to animated graphic

http://www.footprintnetwork.org/en/index.php/GFN/page/human_development_index_graphic

Envision™

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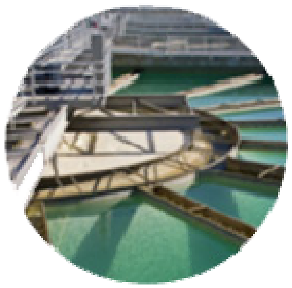
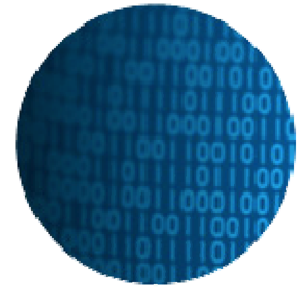
how might Envision™ be useful ?

- a shared definition of sustainability
- a checklist of design considerations for every infrastructure project
- a resource library
- encouragement for innovative infrastructure projects
- a way to place (relative) value on aspects of a project whose benefits are difficult to quantify by traditional methods

what types of infrastructure will Envision^{TM} rate?





ENERGY
- Geothermal
- Hydroelectric
- Nuclear
- Coal
- Natural Gas
- Oil/Refinery
- Wind
- Solar
- Biomass

WATER
- Potable water distribution
- Capture/Storage
- Water Reuse
- Storm Water
- Management
- Flood Control

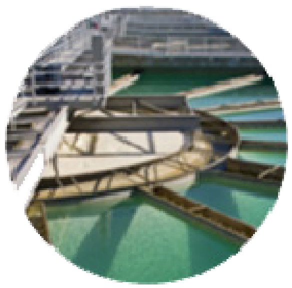
WASTE
- Solid waste
- Recycling
- Hazardous Waste
- Collection & Transfer

TRANSPORT
- Airports
- Roads
- Highways
- Bikes
- Pedestrians
- Railways
- Public Transit
- Ports
- Waterways

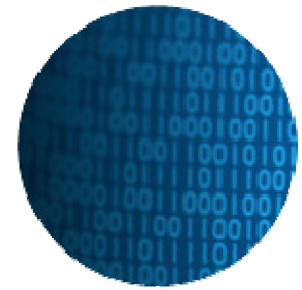
LANDSCAPE
- Public Realm
- Parks
- Ecosystem Services

INFORMATION
- Telecommunications
- Internet
- Phones
- Satellites
- Data Centers
- Sensors

what types of infrastructure will Envision™ rate?





ENERGY

Geothermal

Hydroelectric

Nuclear

Coal

Natural Gas

Oil/Refinery

Wind

Solar

Biomass

WATER

Potable water distribution

Capture/Storage

Water Reuse

Storm Water

Management

Flood Control

WASTE

Solid waste

Recycling

Hazardous Waste

Collection & Transfer

TRANSPORT

Airports

Roads

Highways

Bikes

Pedestrians

Railways

Public Transit

Ports

Waterways

LANDSCAPE

Public Realm

Parks

Ecosystem Services

INFORMATION

Telecommunications

Internet

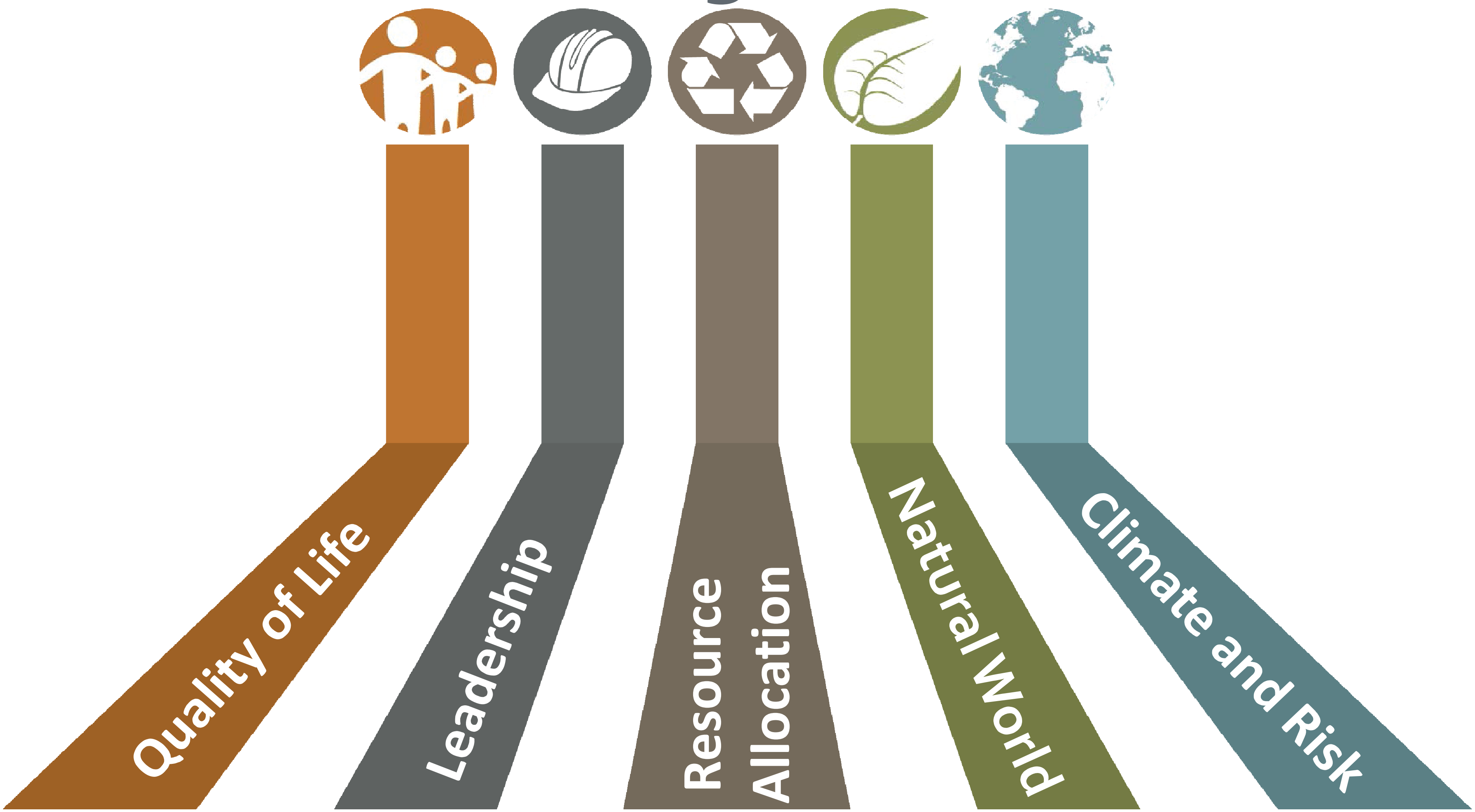
Phones

Satellites

Data Centers

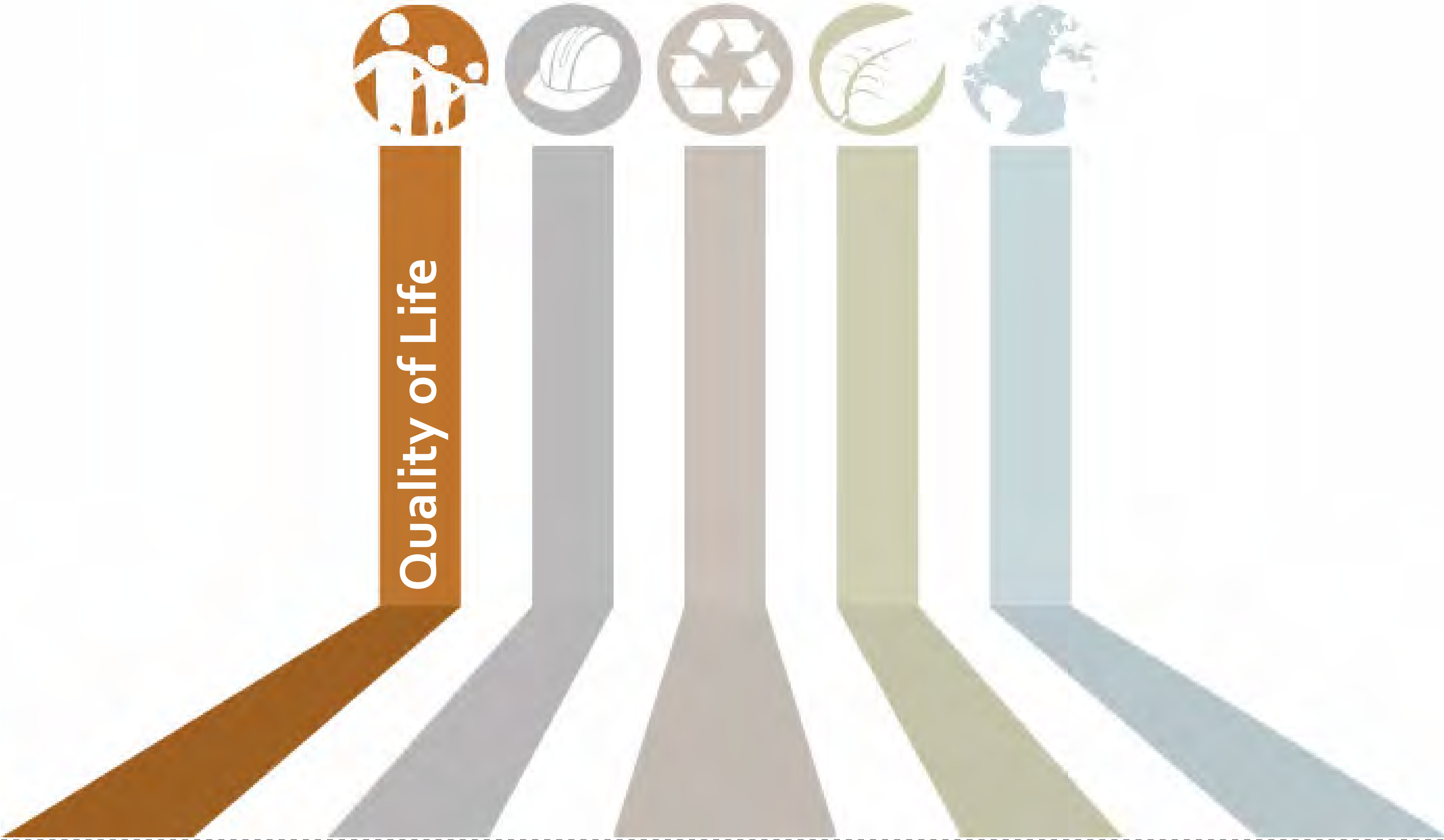
Sensors

Envision framework considers five categories



purpose, community, well-being

QUALITY OF LIFE



purpose, community, well-being

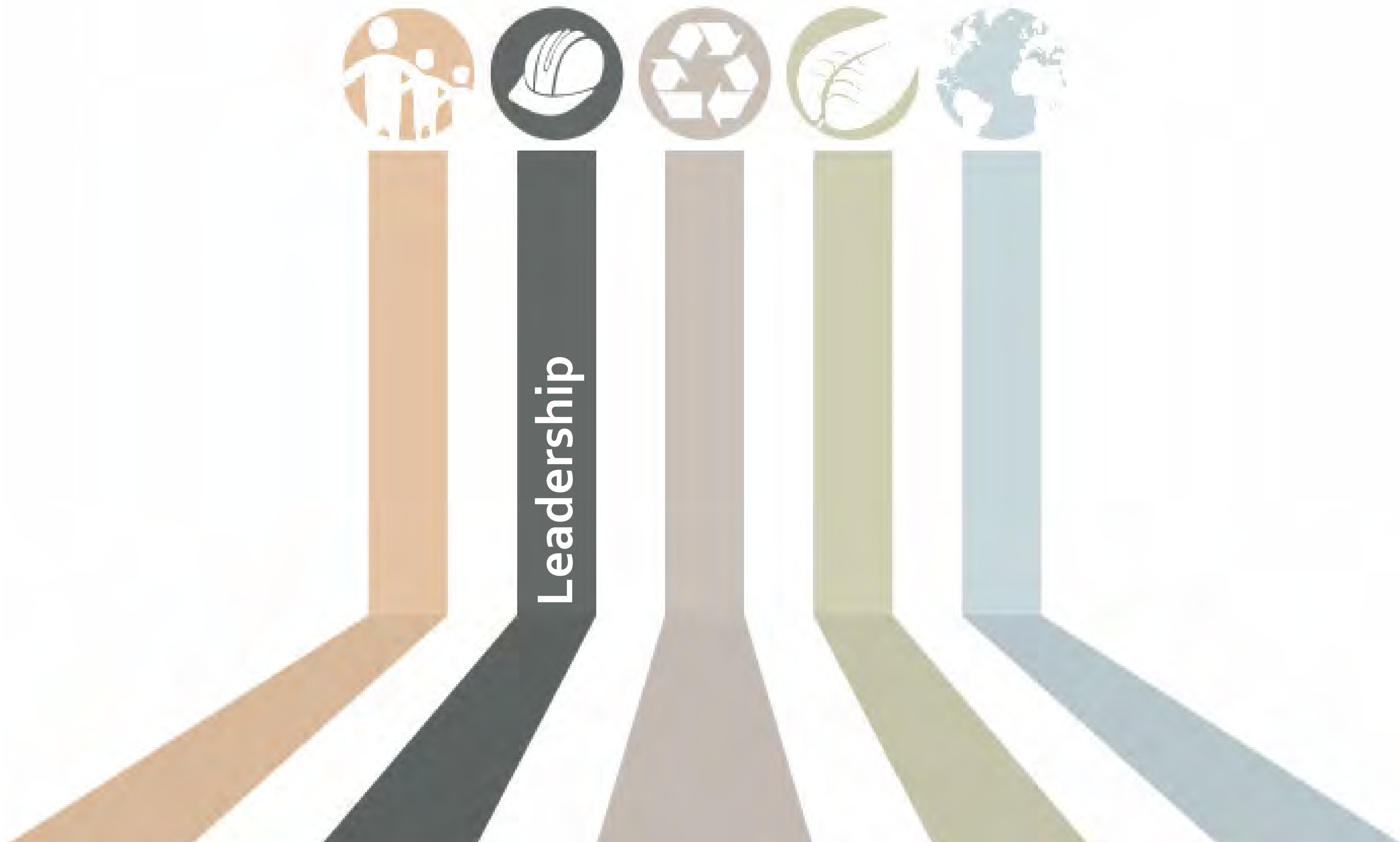
QUALITY OF LIFE

1	QUALITY OF LIFE	PURPOSE	QL1.1 Improve community quality of life
2			QL1.2 Stimulate sustainable growth and development
3			QL1.3 Develop local skills and capabilities
4		COMMUNITY	QL2.1 Enhance public health and safety
5			QL2.2 Minimize noise and vibration
6			QL2.3 Minimize light pollution
7			QL2.4 Improve community mobility and access
8			QL2.5 Encourage alternative modes of transportation
9			QL2.6 Improve site accessibility, safety and wayfinding
10		WELLBEING	QL3.1 Preserve historic and cultural resources
11			QL3.2 Preserve views and local character
12			QL3.3 Enhance public space

credits are like “building blocks”

LEADERSHIP

collaboration, management, planning



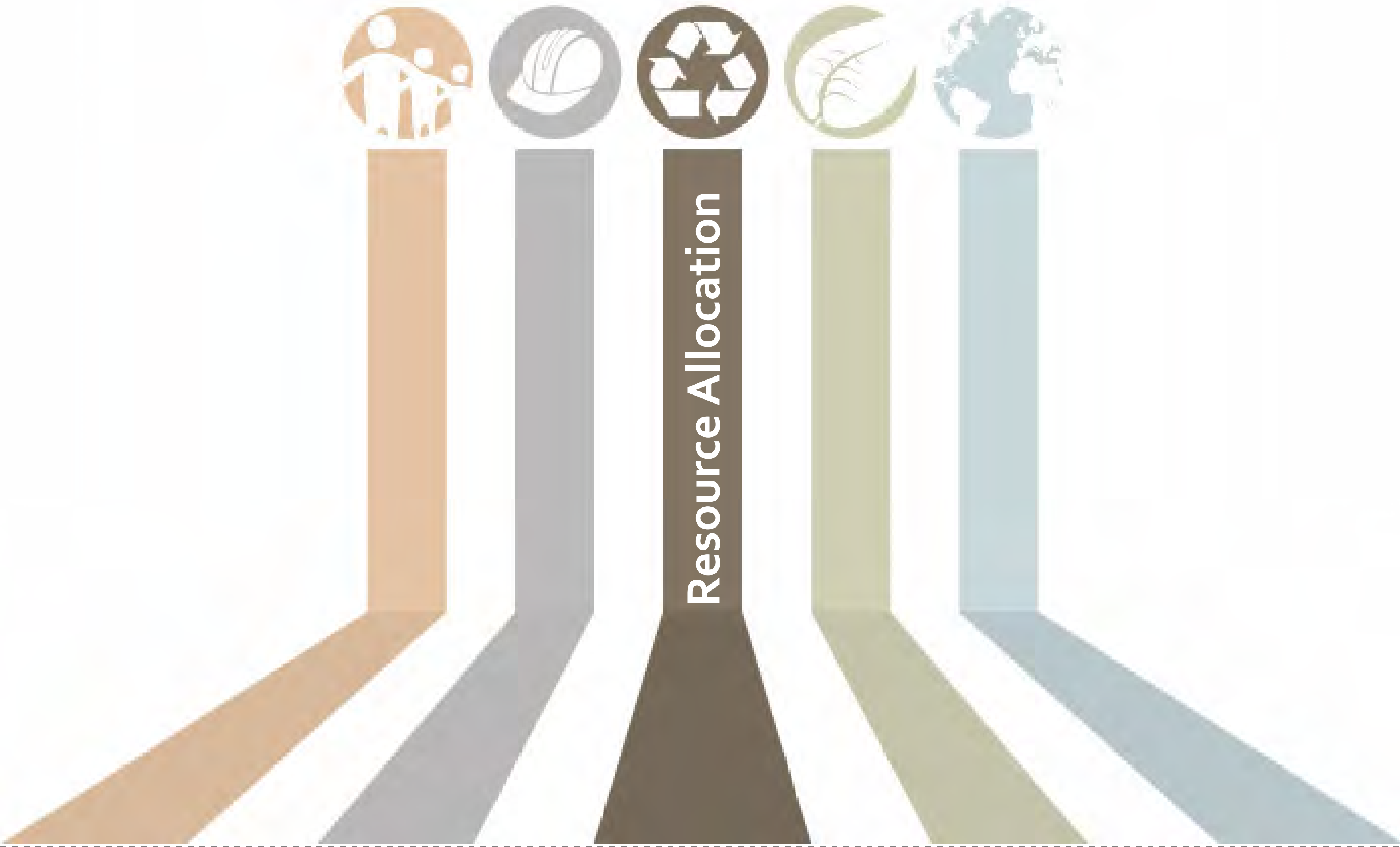
collaboration, management, planning

LEADERSHIP

13	LEADERSHIP	COLLABORATION	LD1.1 Provide effective leadership and commitment
14			LD1.2 Establish a sustainability management system
15			LD1.3 Foster collaboration and teamwork
16			LD1.4 Provide for stakeholder involvement
17		MNGMT	LD2.1 Pursue by-product synergy opportunities
18			LD2.2 Improve infrastructure integration
19		PLANNING	LD3.1 Plan for long-term monitoring and maintenance
20			LD3.2 Address conflicting regulations and policies
21			LD3.3 Extend useful life

materials, energy, water

RESOURCE ALLOCATION



materials, energy, water

RESOURCE ALLOCATION

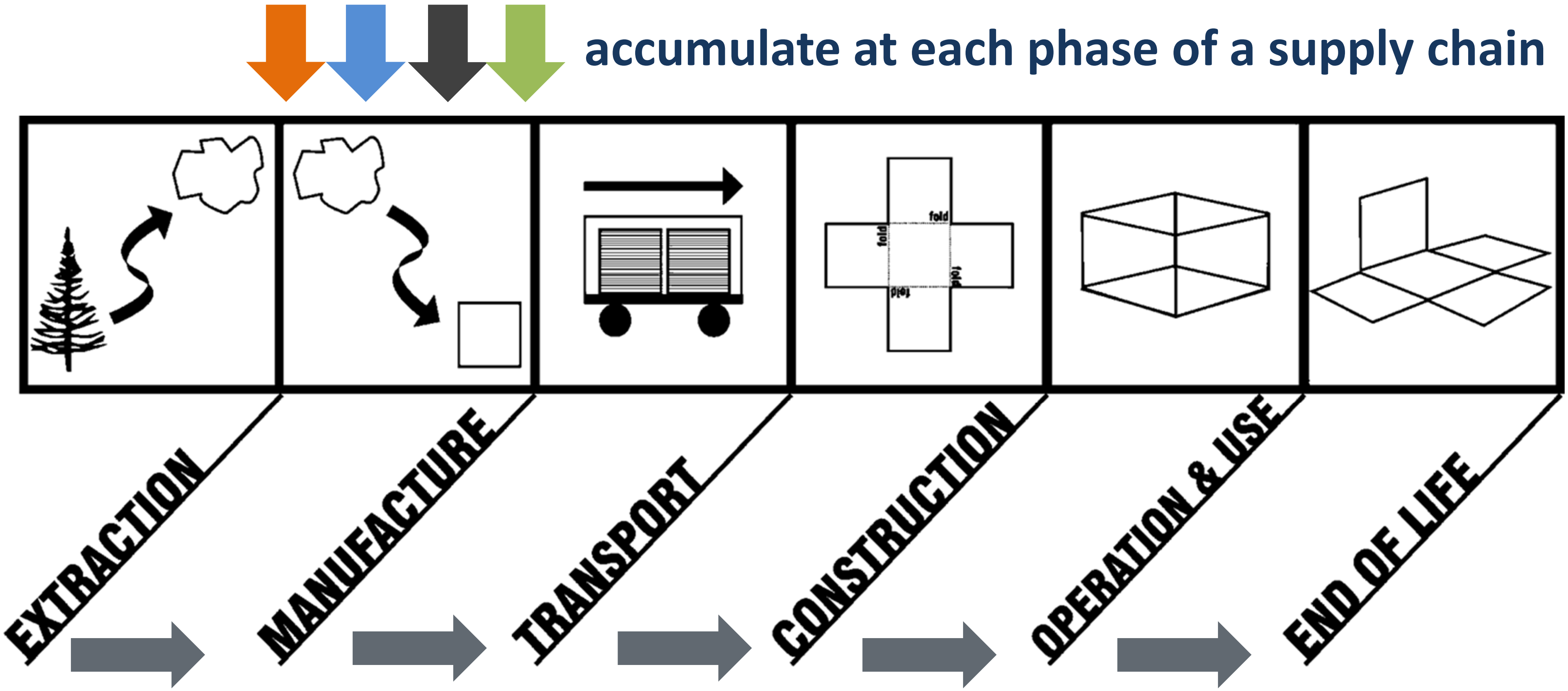
22	RESOURCE ALLOCATION	MATERIALS	RA1.1 Reduce net embodied energy
23			RA1.2 Support sustainable procurement practices
24			RA1.3 Use recycled materials
25			RA1.4 Use regional materials
26			RA1.5 Divert waste from landfills
27			RA1.6 Reduce excavated materials taken off site
28			RA1.7 Provide for deconstruction and recycling
29		ENERGY	RA2.1 Reduce energy consumption
30			RA2.2 Use renewable energy
31			RA2.3 Commission and monitor energy systems
32		WATER	RA3.1 Protect fresh water availability
33			RA3.2 Reduce potable water consumption
34			RA3.3 Monitor water systems

life cycle thinking

RESOURCE ALLOCATION

Energy, Water, Dollars, GHG, Impacts

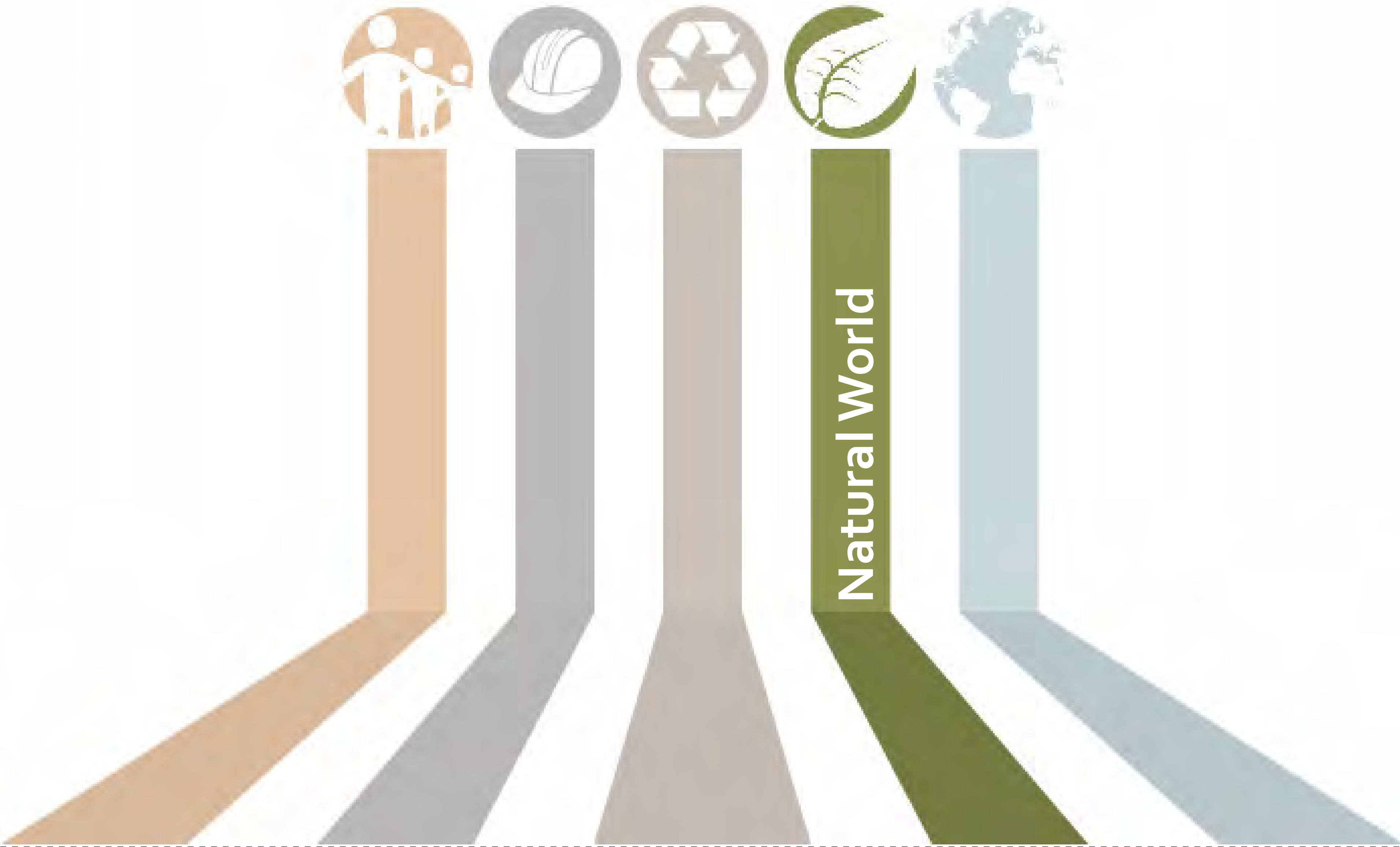
accumulate at each phase of a supply chain



Resources "flow" from upstream to downstream.

siting, land & water, biodiversity

NATURAL WORLD



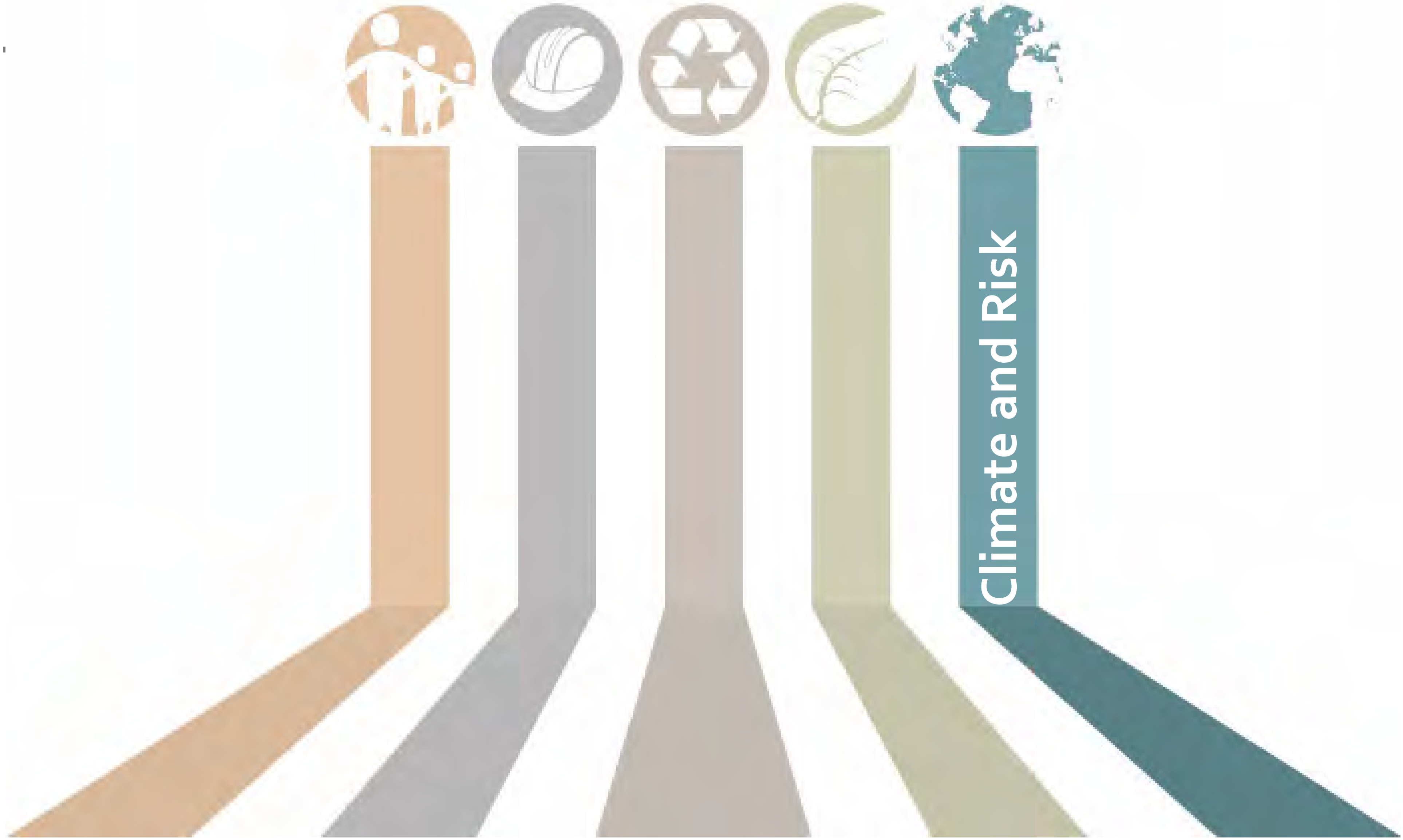
siting, land & water, biodiversity

NATURAL WORLD

35	NATURAL WORLD	SITING	NW1.1 Preserve prime habitat
36			NW1.2 Protect wetlands and surface water
37			NW1.3 Preserve prime farmland
38			NW1.4 Avoid adverse geology
39			NW1.5 Preserve floodplain functions
40			NW1.6 Avoid unsuitable development on steep slopes
41			NW1.7 Preserve greenfields
42		L&W	NW2.1 Manage stormwater
43			NW2.2 Reduce pesticide and fertilizer impacts
44			NW2.3 Prevent surface and groundwater contamination
45		BIODIVERSITY	NW3.1 Preserve species biodiversity
46			NW3.2 Control invasive species
47			NW3.3 Restore disturbed soils
48			NW3.4 Maintain wetland and surface water functions

emissions & resiliency

CLIMATE AND RISK



emissions & resiliency

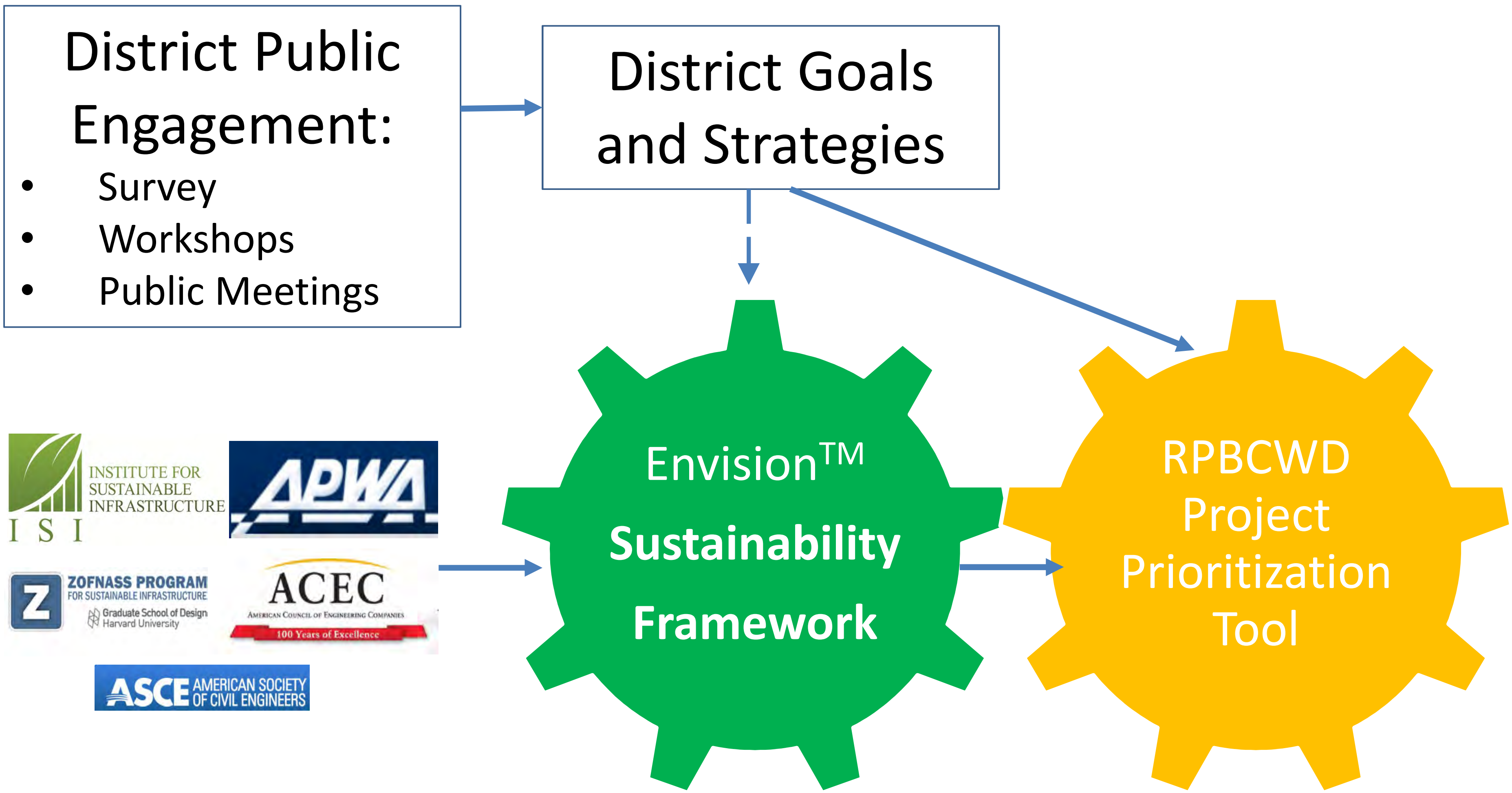
CLIMATE AND RISK

49	CLIMATE	Emission	CR1.1 Reduce greenhouse gas emissions
50			CR1.2 Reduce air pollutant emissions
51		Resilience	CR2.1 Assess climate threat
52			CR2.2 Avoid traps and vulnerabilities
53			CR2.3 Prepare for long-term adaptability
54			CR2.4 Prepare for short-term hazards
55			CR2.5 Manage heat islands effects

RPBCWD's Goals and Strategies and Envision™

- RPBCWD's Envision-based project prioritization tool is based off of a series of yes/no questions that cover all Envision credits.
- Many RPBCWD goals and strategies relate directly to Envision credits in the context of projects.
- Some do not (planning, data collection, administration)

RPBCWD's Draft Project Prioritization Framework



Some Envision credits are "higher level" than RPBCWD strategies and warranted some extra attention (and more possible points).

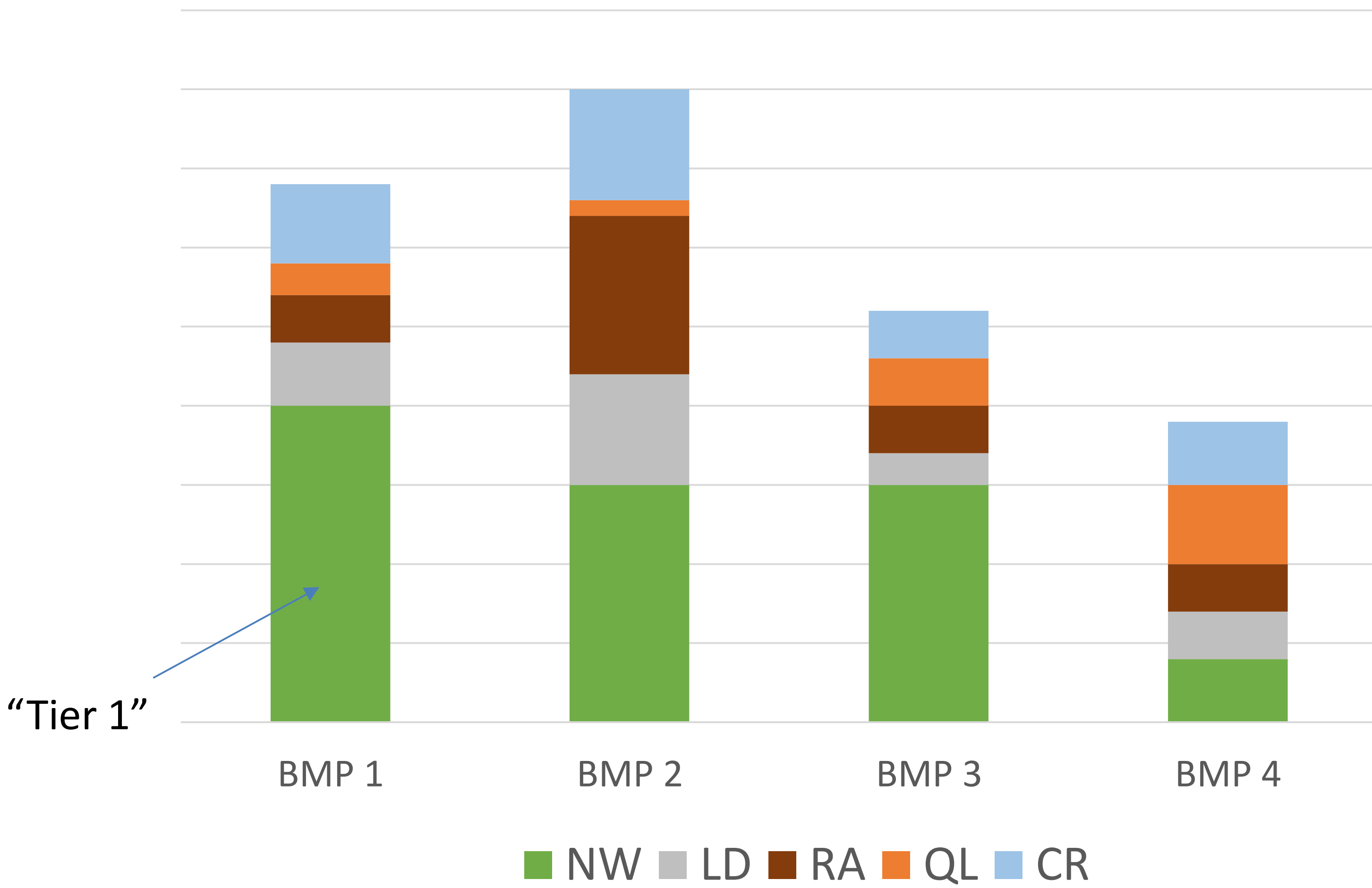
		District Strategy	Prioritization Questions
NW2.1	**Manage stormwater**	WQT6	Does the project reduce peak discharge rates?
		WQT8	Does the project reduce flood risk within the District?
		WQT6	Does the project reduce overall flow volume?
		WQT7	Does the project incorporate Low Impact Development (LID) practices

		District Strategy	Prioritization Questions
NW3.4	**Maintain wetland and surface water functions**	WQP1	Does the project address chloride loading/pollution
		WQP2	Does the project reduce phosphorus loading to, or concentrations within, District managed water resources? Separate watershed vs. in-lake treatment
		WQP2	Does the project reduce sediment loading to District managed water resources?
		WQP2	Does the project reduce other pollutant (e.g., metals, bacteria) loading to District managed water resources?
		WQP6	Is the project included in a published feasibility study or plan (e.g., City study, UAA, WRAPS or TMDL implementation Plan)?

Some Envision credits are not as applicable to RPBCWD strategies, and warranted some slight modifications (e.g. Manage Heat Island Effects).

		District Strategy	Prioritization Questions
CR2.5	**Manage heat island effects**	*No District strategy*	Does the project reduce the amount of impervious surface or shade existing impervious surface?

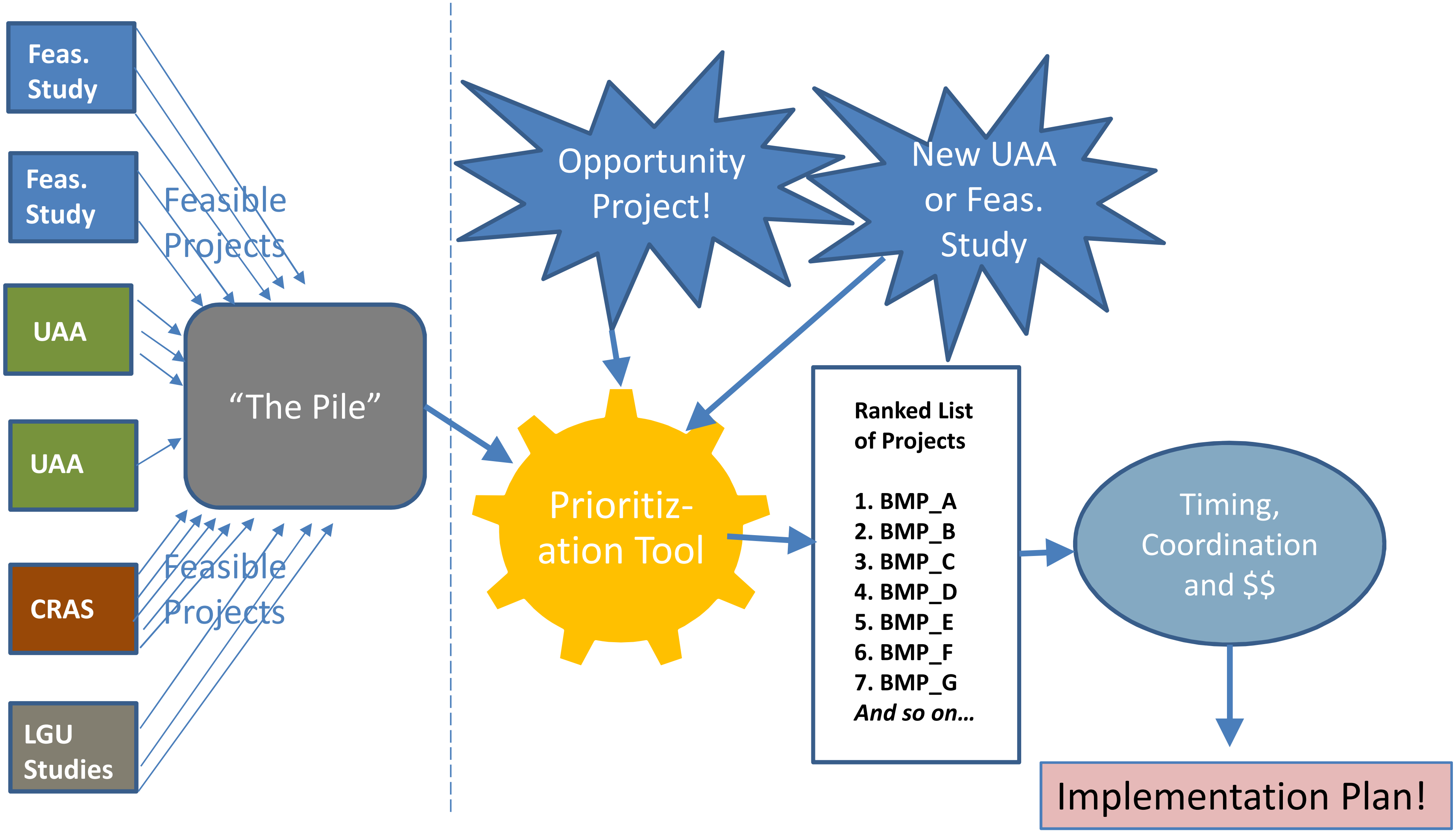
Example of RPBCWD Envision-Based Project Prioritization



RPBCWD's Goals and Strategies and Envision™

- RPBCWD's Envision-Based Project Prioritization Tool will not the following considerations that affect project timing decisions:
  - Logistical considerations (coordination with LGUs and with timing of other projects)
  - Budgetary considerations

Prioritization Process



Appendix E Capital Improvements Implementation Process

E1. Capital Improvements Implementation Process

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. A capital improvement is "a physical improvement that has an extended useful life." (Minn. Rules 8410.0020, subpart 3.)

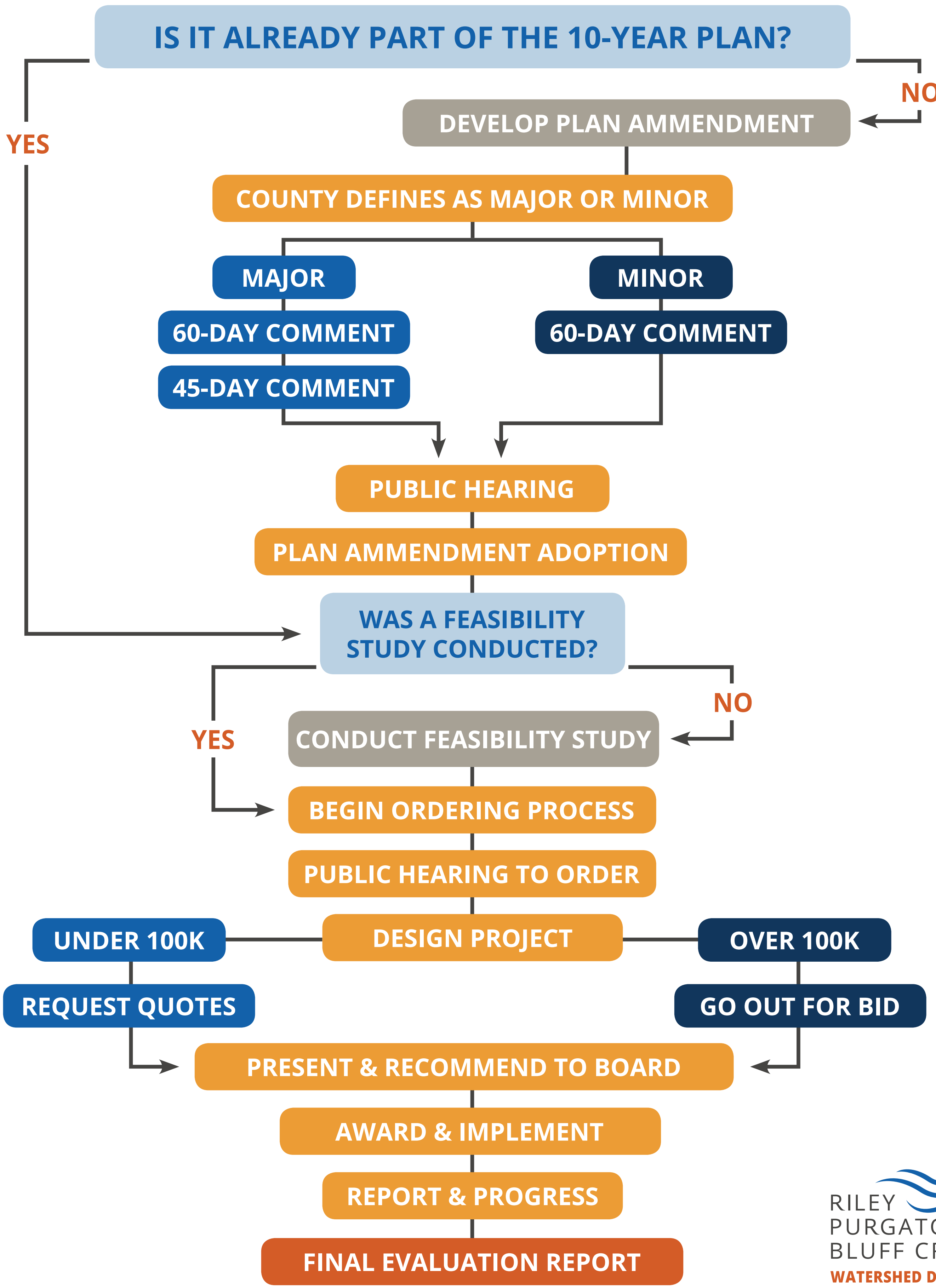
A project identified in the CIP may need further review as to technical feasibility, cost and financing, consistency with local needs and other policy considerations before a formal decision to proceed to construction is made. This appendix describes the development and evaluation steps that will occur, as needed, 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.

While RPBCWD will be the lead agency for implementing the activities, the District will seek partners and cooperate with Local Governmental Units (LGUs), agencies, property owners and organizations as opportunities arise. As projects become better-defined, so will the estimated project costs and responsibilities of the RPBCWD and the other participating agencies/organizations. The District will pursue collaborative and grant opportunities to reduce the portion of the total cost borne by the District.

E1.1 Procedures

Before implementing a capital project or committing levied funds to its design or construction, the District will perform feasibility work to identify an effective design concept; develop confidence that the property agreements, permits and approvals to build and maintain it can be obtained; and establish a project cost estimate. Pursuant to Minnesota Statutes §103B.251, the District then will provide notice of a public hearing before the Board of Managers. The Board will consider the presentation of District staff and engineer, as well as input offered by partners and interested parties. On the basis of that information, the Board will decide whether the project should be established. The general process the RPBCWD follows when looking to implement a capital project is shown schematically in Figure E1-1.

CAPITAL PROJECT IMPLEMENTATION SCHEMATIC



RILEY
PURGATORY
BLUFF CREEK
WATERSHED DISTRICT

In the course of feasibility work for a project, the District expects to maintain close coordination with the host LGU. LGU support for a project will be an important consideration in the District decision to advance a project and the District expects that, in all but the unusual case, 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 District will review the CIP on an ongoing basis throughout the implementation of the plan. This review will allow the District to reassess described projects from a technical perspective, but also will involve broader policy considerations such as shifts in District priorities, decisions as to annual budget and levy levels, and the prospect of state and federal grant funds or financing. For this reason, projects may be added to and deleted from the CIP from year to year, in accordance with the procedures described below.

The District will 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.

Every two years, the District will review its capital improvement program and its capital project priorities more comprehensively, on a District-wide and a subwatershed basis, to meet the requirements of Minnesota Rules 8410.0150, subpart 3.E. For this biennial review the District will transmit by June 30 of that year the most recent version of its 10-year CIP to Hennepin and Carver Counties and all of the cities within the District for a 30-day review and comment opportunity.

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

Riley Purgatory Bluff Creek Watershed District

Capital Improvement Program (projects > $100K)

<u>Project Guidance List</u>

1. <u>Is the Project in the Plan? If not, prepare plan amendment.</u>
2. <u>Feasibility Study:</u>
    a. Problem assessment; development of alternative solutions;
    b. Conceptual design of recommended/preferred alternative;
    c. Assessment of likelihood of obtaining property access, permits;
    d. Maintenance requirements;
    e. LGU support;
    f. Cost estimate, including operation and maintenance costs
3. <u>Project Ordering:</u>
    a. Informational meeting; stakeholders
    b. Notice of public hearing;
    c. LGU resolution of support;
    d. Cooperative agreement with project partners;
    e. Public hearing;
    f. Confirmation of project funding, budget authorization;
    g. Resolution to establish improvement project
4. <u>Project Design:</u>
    a. Detailed design, cost estimate;
    b. Specifications for bidding
5. <u>Property Access:</u>
    a. Temporary construction access license or easements;
    b. Permanent easement or fee title;
6. <u>Permits and Environmental Review:</u>
    a. EAW (mandatory or voluntary);
    b. Agency, LGU Permits
    c. Adoption of Final Design:

d. Presentation to Board of Managers;
e. Board approval and authorization to proceed to bid

7. <u>Bidding, Award of Contract</u>
    a. Solicitation of bids;
    b. Bid opening;
    c. Board review and award of contract;
    d. Contract execution;
    e. Notice to proceed
8. <u>Project Construction and Close-out</u>
    a. Construction observation
    b. Review request for information (RFIs) and submittals
    c. Process change orders
    d. Process payment applications
    e. Develop punch list
    f. Construction documentation summary

Appendix F Example Water Resource Report

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

Water Resources Report

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
2017 ANNUAL REPORT

protect. manage. restore.

Executive Summary

The Riley Purgatory Bluff Creek Watershed District (RPBCWD) had a successful water quality sampling season in 2017, completing a full year of sample collection and data analysis. This effort was made possible through multiple partnerships with municipalities and organizations based within the watershed. Overall, water quality across both creeks and lakes generally improved in 2017. The results from the 2017 sampling effort are presented in this report.

Lake Monitoring

During the 2017 monitoring season, 13 lakes were monitored across the District. In addition to the lakes sampled, Lake Idlewild was monitored by the city of Eden Prairie and was included in this analysis, even though it was classified as a high value wetland in 2015. Regular water quality lake sampling was conducted on each lake approximately every two weeks throughout the growing season (June-September). In addition to regular lake sampling, the District monitored water levels of these 14 waterbodies, assessed carp populations within the Riley and Purgatory Chain of Lakes, and assessed zooplankton and phytoplankton populations in five lakes. The District also monitored public access points and analyzed water samples for the presence of zebra mussels in these 14 waterbodies. No zebra mussel (adults or juveniles) or invasive zooplankton were found in any District lake. Herbicide treatments were conducted on Lake Ann, Lotus Lake, Lake Susan, Mitchell Lake, Red Rock Lake, Staring Lake, and Lake Riley. Brittle Naiad was discovered in Lake Ann and Lotus Lake in 2017.

Surface water samples were collected, analyzed, and compared to standards set by the Minnesota Pollution Control Agency (MPCA) to assess overall lake health. Figure 1 displays lakes sampled in 2017 that met or exceeded the MPCA lake water quality standards for Chlorophyll-a (Chl-a), Total Phosphorus (TP), and Secchi Disk depth during the growing season (June-September). The MPCA has specific standards for both ‘deep’ lakes (Lake Ann, Lotus Lake, Lake Riley, and Round Lake) and ‘shallow’ lakes (Duck Lake, Hyland Lake, Lake Idlewild, Lake Lucy, Mitchell Lake, Red Rock Lake, Rice Marsh Lake, Staring Lake, Lake Susan, and Silver Lake) (MPCA 2016). Lake Ann, Lake Idlewild, Red Rock Lake, and Rice Marsh Lake met all three MPCA standards in 2017; Rice Marsh (TP) and Red Rock (Chl-a) did not previously meet all the standards in 2016. Lotus Lake, Mitchell Lake, and Lake Susan all exceeded both the Chl-a and TP standards in 2017. These lakes did not meet these two standards in 2016 as well. In 2016, four lakes did not meet any MPCA standards, Hyland Lake, Mitchell Lake, Silver Lake, and Staring Lake. In 2017, only Hyland did not meet all three standards. All lakes within the Riley Chain of Lakes met the MPCA’s chloride chronic standard for class 2B water bodies in 2017.

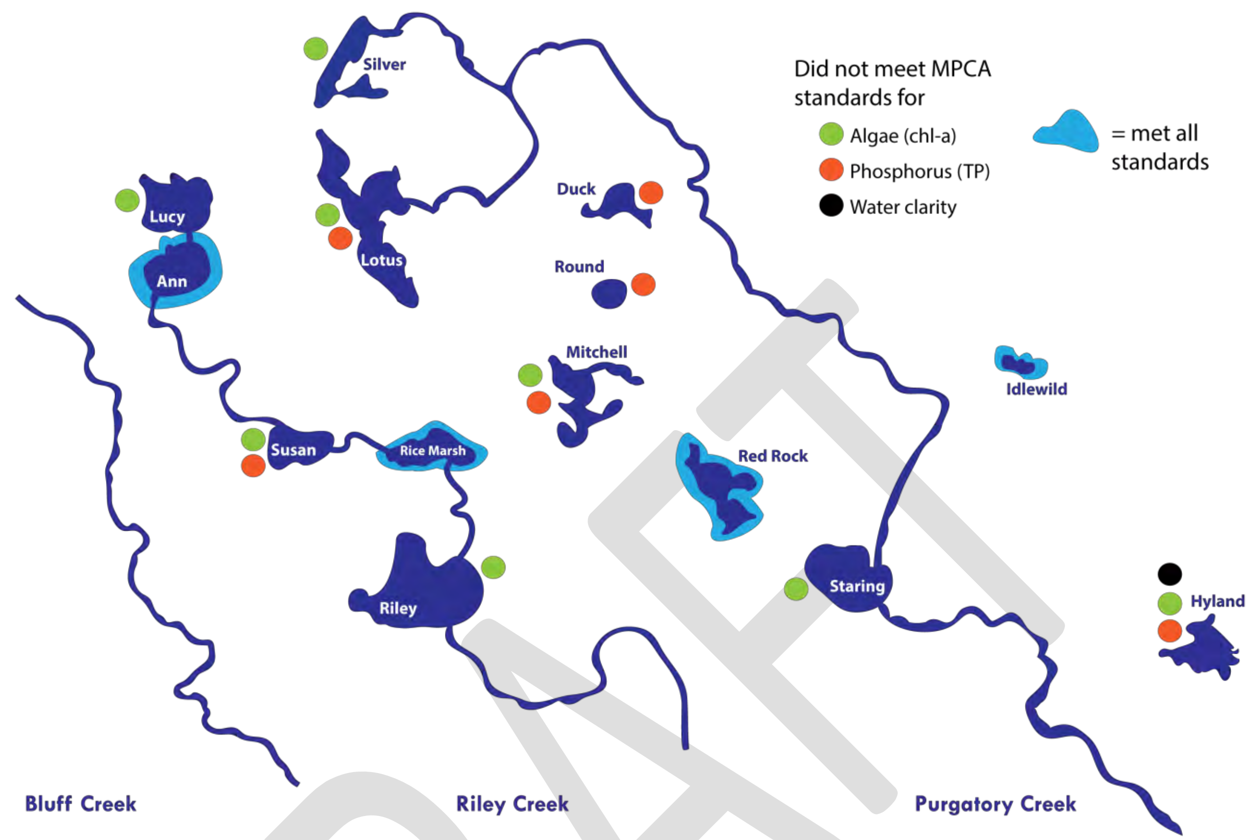


Figure 1 2017 Lake Water Quality

Summary of the lake water quality data collected in 2017 by the Riley Purgatory Bluff Creek Watershed District as compared to the Minnesota Pollution Control Agency Water Quality Standards. Chlorophyll-a (green), Total Phosphorus (orange), and Secchi Disk depth (black) were assessed during the growing season (June-September) for both 'deep' lakes or lakes >15 ft deep and < 80% littoral area (Lake Ann, Lotus Lake, Lake Riley, and Round Lake), and 'shallow' lakes or lakes <15 ft deep and >80% littoral area (Duck Lake, Hyland Lake, Lake Idlewild, Lake Lucy, Mitchell Lake, Red Rock Lake, Rice Marsh Lake, Staring Lake, Lake Susan, and Silver Lake). The corresponding dots next to each lake indicate which water quality standard was not met and the lakes surrounded by blue met all water quality standards.

Creek Monitoring

In 2017, the District collected water quality samples and performed data analysis on 21 different sampling sites along Riley Creek (six sites), Bluff Creek (five sites), and Purgatory Creek (ten sites). During the 2017 creek monitoring season (April-September) water chemistry and turbidity were regularly measured at the 18-regular water quality monitoring sites every two weeks. Water samples were collected to assess nutrient (TP and Chl-a) and total suspended sediment (TSS) concentrations. Creek flow was calculated from velocity measurements taken at consistent creek cross sections at each water quality monitoring location. Sections of upper Riley Creek and the Lotus Lake ravines were also walked and assessed using the Creek Restoration Action Strategy (CRAS) evaluation, which identifies stream reaches in the most need of restoration. Overall scores improved on Riley Creek and declined slightly on the Lotus Lake Ravines.

The summary for all three creeks is based on water quality parameters developed by the MPCA in 2014 for Eutrophication and TSS. The standards include some parameters the District has not yet incorporated into monitoring procedures. Therefore, this is the evaluation of the stream reaches that did not meet MPCA water quality standards using the current parameters measured by the District. The parameters measured during the summer growing season (April-September) and the associated MPCA water quality limits for streams located in the Central River Region include: Dissolved Oxygen (DO) daily minimum > 4mg/L, summer season average TP < 0.1mg/L, TSS < 10% exceedance of 30mg/L limit during the summer season, summer season average Chl-a <18ug/L, and summer season average pH < 9su and >6su (MPCA, 2016).

Overall water quality improved in from 2016 to 2017. A total of six stream water quality sites (R5, R3, R2, P5, P3, and P1) met all MPCA water quality standards in 2017 (Figure 2). Each stream varied in the number of water quality standards they did not meet; Bluff had ten, Riley had two, and Purgatory had seven. Bluff Creek remained the stream with the worst water quality, as previously seen in 2015 and 2016. Site B5 did not meet the most MPCA standards, DO, TSS and TP. Exceeding the TP water quality standard was the most violated water quality parameter in 2017 with 8 out of the 18-regular water quality monitoring sites not meeting the standard (summer average <0.1 mg/L). This, however, is down from 15 TP violations in 2015 and 11 in 2016. TSS violations were reduced to two in 2017, down from seven in 2016 and three in 2015. The dissolved oxygen minimum of 4mg/l was violated across four stream sites, Upper Purgatory Creek containing three of these sites.

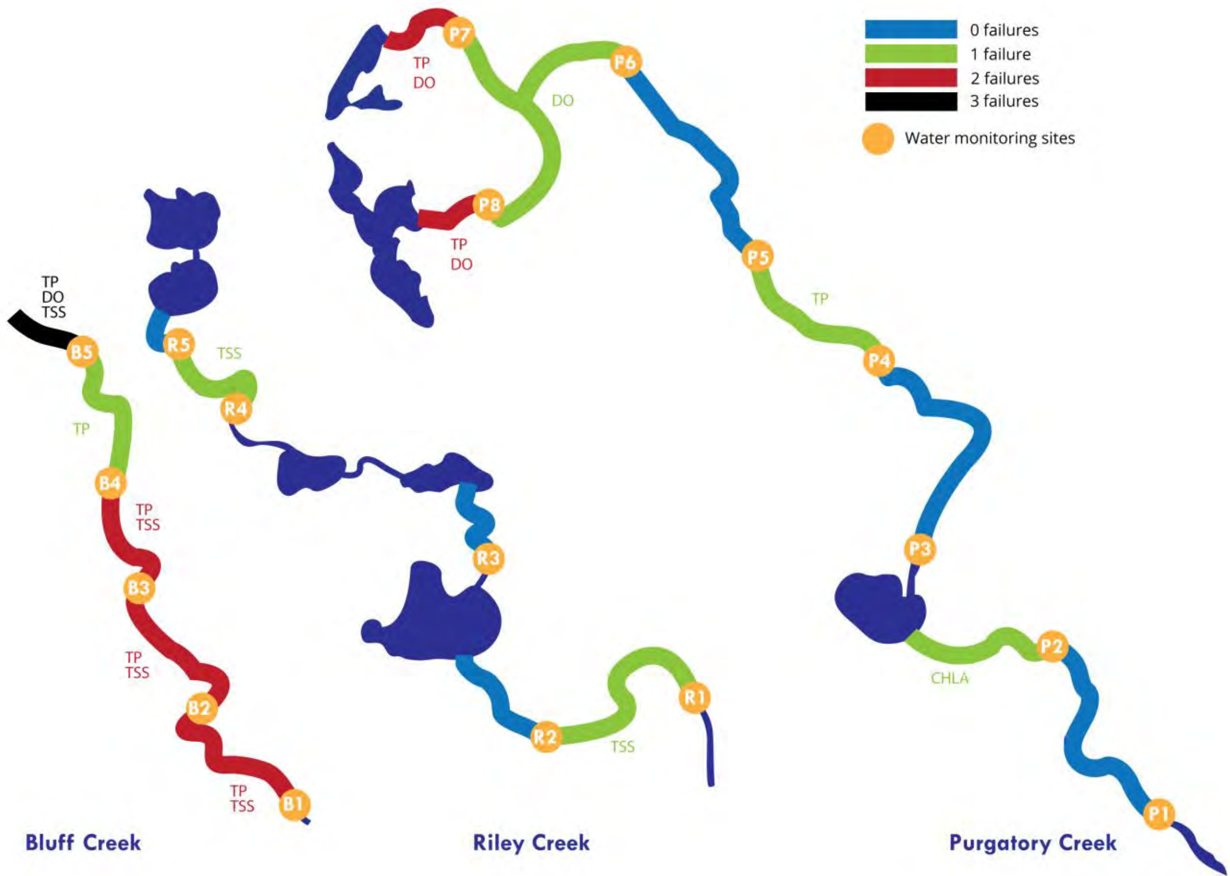


Figure 2 2017 Stream Water Quality

Summary of stream water quality data collected on Bluff Creek, Riley Creek, and Purgatory Creek in 2017 by the Riley Purgatory Bluff Creek Watershed District as compared to the Minnesota Pollution Control Agency (MPCA) Water Quality Standards. A total of 18 water monitoring locations (orange circles) were sampled and information gathered from the individual sites were applied upstream to the next monitoring location. The summer season (April-September) eutrophication and total suspended solids water quality standards used in this assessment included: Dissolved Oxygen (DO) daily minimum > 4mg/L, average Total Phosphorus (TP) < 0.1mg/L, Total Suspended Solids (TSS) < 10% exceedance of 30mg/L limit, average Chlorophyll-a (CHLA) <18ug/L, average pH < 9su and > 6su. The corresponding labels next to each stream section indicate which water quality standard was exceeded.

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Acronyms & Abbreviations

ac	Acre
BMP	Best Management Practice
cBOD	5-day Carbonaceous Biochemical Oxygen Demand
cf	Cubic feet
cfs	Cubic feet per second
Chl-a	Chlorophyll-a
Cl	Chloride
CRAS	Creek Restoration Action Strategy
CS	Chronic Standard
DO	Dissolved Oxygen
E. coli	*Escherichia coli*
EPA	Environmental Protection Agency
EWM	Eurasian Watermilfoil
ft	Foot/Feet
FWSS	Freshwater Scientific Services
GPS	Global Positioning System
ha	Hectare
IBI	Index of Biological Integrity
in	Inch
kg	Kilogram
L	Liter
lb	Pound
m	Meter
MCWD	Minnehaha Creek Watershed District
METC	Metropolitan Council
mg	Milligram
mL	Milliliter
MNDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MS	Maximum Standard
MS4	Municipal Separate Storm Sewer System
NA	Not Available
NCHF	North Central Hardwood Forest
NH_3	Ammonia
NO_2	Nitrite
NO_3	Nitrate
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
OHWL	Ordinary High-Water Level
ORP	Oxidation Reduction Potential
Ortho-P	Ortho-Phosphate
PAR	Photosynthetic Active Radiation
PCL	Purgatory Chain of Lakes
RCL	Riley Chain of Lakes
RPBCWD/District	Riley Purgatory Bluff Creek Watershed District
sec	Second
SRP	Soluble Reactive Phosphorus
TDP	Total Dissolved Phosphorus
TKN	Total Kjeldahl Nitrogen
TN	Total Nitrogen
TMDL	Total Maximum Daily Load
TPA	Total Phytoplankton Abundance
TP	Total Phosphorus

TSS	Total Suspended Solids
UMN	University of Minnesota-St. Paul Campus
WD	Watershed District
WIDNR	Wisconsin DNR
WMO	Watershed Management Organization
YOY	Young of Year

1 Introduction and Overview

The Riley Purgatory Bluff Creek Watershed District was established on July 31st, 1969, by the Minnesota Water Resources Board acting under the authority of the watershed law. The District is located in the southwestern portion of the Twin Cities Metropolitan Area. It consists of a largely developed urban landscape and encompasses portions of Bloomington, Chanhassen, Chaska, Deephaven, Eden Prairie, Minnetonka, and Shorewood (Figure 2.1-1). This total area for the watershed is close to 50 square miles located in both Hennepin and Carver Counties and includes three smaller subwatersheds: Riley Creek Watershed, Purgatory Creek Watershed, and Bluff Creek Watershed.

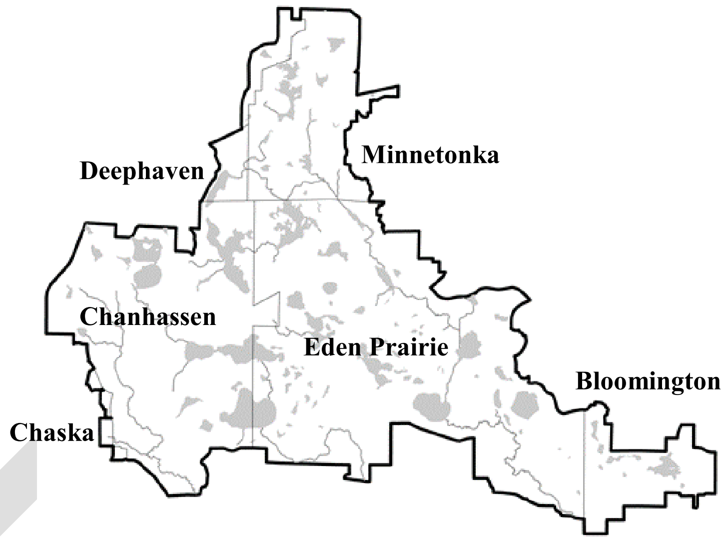

Figure 2.1-1 Riley Purgatory Bluff Creek Watershed District Boundary

Data collection and reporting are the foundation for the RPBCWD's work. Regular, detailed water quality monitoring provides the District with scientifically reliable information that is needed 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 de-list, protect, and improve the water bodies within the watershed. The purpose of this report is to summarize the water quality and quantity results collected over the past year, which can be used to direct the District in managing our water resources.

Table 2.1-1 District Water Resource Sampling Partnerships

Water Resource	RPBCWD	Three Rivers Park District	EP	UMN	METC
Duck Lake	■				
Hyland Lake	■	■			
Lake Ann	■				
Lake Idlewild	■		■		
Lake Lucy	■				
Lake Riley	■			■	
Lake Susan	■			■	
Lotus Lake	■				
Mitchell Lake	■		■	■	
Red Rock Lake	■		■		
Rice Marsh Lake	■				
Round Lake	■		■		
Silver Lake	■				
Staring Lake	■			■	
Bluff Creek	■				■
Purgatory Creek	■				■
Riley Creek	■		■		■

Through partnerships with the cities of Chanhassen and Eden Prairie (EP), Three Rivers Park District, the University of Minnesota (UMN), and the Metropolitan Council (METC), water quality data was collected on 13 lakes, one high value wetland (Lake Idlewild), and 21 creek sites in the District. The 21 creek sites include five on Bluff Creek, six on Riley Creek, and ten on Purgatory Creek. Lake McCoy and Neil Lake, which are within the watershed boundaries, have not been part of the District's sampling regime. Each partner was responsible for monitoring certain parameters of their respective lakes/streams and reporting their findings, allowing for more time and attention to be given to each individual water resource (Table 2.1-1).

Water quality and water quantity was monitored at each stream site during the field season (April-September) approximately twice a month. The METC also has continuous monitoring stations near the outlet of each creek as part of its long-term monitoring program which identifies pollutant loads entering the Minnesota River. In addition to water quality monitoring, creek walks were also conducted to gather more information about the current stream conditions in the District. This information was included in the Creek Restoration Action Strategy (CRAS), which was developed by the District to identify and prioritize future stream restoration sites (Section 4.4). Bank pin data was also collected near each of the water quality monitoring sites to measure generalized sedimentation and erosion rates across all three streams.

Lakes were also monitored bi-weekly during the summer growing season (June-September) for water quality. Lake levels were continuously recorded from ice out to ice in. Lake water samples were also collected in early summer and analyzed for the presence of zebra mussel veligers. Additionally, during every sampling event, boat launch areas and zebra mussel monitoring plates were scanned for adult zebra mussels. Zooplankton and phytoplankton samples were also collected on five lakes to assess the overall health of the population as it applies to fishery health and water quality. Plant surveys and herbicide treatments were also conducted to assess overall health of the plant community and to search/treat for invasive plants. Common Carp have also been identified as being detrimental to lake health and are continually monitored by the District. Winter monitoring occurred on the Riley Chain of Lakes (Lucy, Ann, Susan, Rice Marsh, and Riley), as well as four separate stormwater ponds in 2017. Extending the monitoring activities into the winter months can provide key insights into ways to improve water quality during the summer months. Winter monitoring also allows us to evaluate the influence of chloride levels in our lakes. The data collection and reporting events were tracked throughout the year and can be seen in Table 2.1-2. Data was not collected in March, November, and December due to unsafe ice conditions. In addition to lakes and streams, multiple stormwater ponds and other specialty projects were monitored to evaluate their effectiveness or contributing pollutant loads to the watershed.

Table 2.1-2 RPBCWD Monthly Field Data Collection Locations

Water Resource	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lake Ann	■	■		■	■	■	■	■	■	■		
Duck Lake				■	■	■	■	■	■	■		
Hyland Lake												
Lake Idlewild				■	■	■	■	■	■	■		
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 were placed on all lakes.

2 Methods

Water quality and quantity monitoring entails the collection of multi-probe sonde data readings, water samples, zooplankton samples, phytoplankton samples, zebra mussel veliger samples, and physical readings, as well as recording the general site and climactic conditions at the time of sampling. Listed in the following sections are the methods and materials, for both lake and stream monitoring, used to gather the water quality and quantity data during the 2017 field-monitoring season. Table 2.1-1 identifies many of the different chemical, physical, and biological variables analyzed to assess overall water quality.

Table 2.1-1 Sampling Parameters

Parameter	Analysis/ Observation	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
Phytoplankton	Wet Analysis	■			Organisms fluctuate due to environmental variables
Photosynthetic Active Radiation	Sonde	■			Measure of light available for photosynthesis
Turbidity	Sonde			■	Measure of light penetration in shallow water
Secchi disk depth	Observation	■	■		Measure of light penetration in deeper water
Transparency Tube	Observation			■	Measure of light penetration into shallow water
Zooplankton	Wet Analysis	■			Organisms fluctuate due to environmental variables
Zebra Mussel Veligers	Wet/Observation	■			Larval form of zebra mussels/plate checks (AIS)

2.1 Water Quality Sampling

The monitoring program supports the District's 10-year water management plan to delist waters from the MPCA's 303d Impaired Waters list. The parameters monitored during the field season help determine the sources of water quality impairments and provide supporting data that is necessary to best design and install water quality improvement projects.

Multi-probe sondes (Hach Water Quality Sondes, Lakes DS-5/ Streams MS-5) were used for collecting water quality measurements across both streams and lakes. Sonde readings measured include: temperature, pH, dissolved oxygen, conductivity, photosynthetic active radiation (PAR), oxidation reduction potential (ORP), and phycocyanin. Secchi disk depth readings were recorded at the same time as sonde readings were collected at all lake sampling locations. When monitoring stream locations, transparency, turbidity, and flow measurements (Flow Tracker) were collected as well. General site conditions related to weather and other observations were recorded as well. A list of the variety of parameters monitored during each sampling event can be seen in Table 2.1-1.

Table 2.1-1 Basic Water Quality Monitoring Activities

Pre-Field Work Activities	Calibrate Water Quality Sensors (sonde) Obtain Water Sample Bottles and Labels from Analytical Lab Prepare Other Equipment and Perform Safety Checks Coordinate Events with Other Projects and Other Entities
Summer Lake – Physical and Chemical	Navigate to Monitoring Location Read Secchi Disk Depth and Record Climatic Data Record Water Quality Sonde Readings at Meter Intervals Collect Water Samples from Top, Thermocline, and Bottom
Summer Lake – Biological	Collect Zooplankton Tow (pulling a net) from Lake Bottom to Top Collect Phytoplankton Tow (2m composite sample) Collect Zebra Mussel Veliger Tow (pulling a net) from Lake Bottom to Top at Multiple Sites
Winter Lakes	Navigate to Monitoring Location Record Ice Thickness Read Secchi Disk Depth and Record Climatic Data Record Water Quality Sonde Readings at one Meter Intervals Collect Water Samples from top, middle, and bottom
Streams – Physical and Chemical	Navigate to Monitoring Location Measure Total Flow by Measuring Velocity at 0.3 to 1 Foot Increments across Stream Record Water Quality Sonde Measurements Upstream of Flow Measurement in Middle of Stream Read Transparency Tube and Perform Turbidity Test Collect Water Samples from Middle of Stream Collect Climatic Data and Take Photos
Post-Field Work Activities	Ship Water Samples to Analytical Lab Enter Data, Perform Quality Control Checks, and Format Data for Database Clean and Repair Equipment Reporting and Summarizing Data for Managers, Citizens, Cities, and Others

At each lake monitoring location, multiple water samples are collected using a Van Dorn, or depth integration sampler, for analytical laboratory analysis. For Duck, Idlewild, Rice Marsh, Silver, and Staring Lakes, water samples were collected at the surface and bottom due to the shallow depths (2-3m). For all other lakes within the District, water samples were collected at the surface, middle, and bottom of the lake. Lakes are monitored at the same location on each sampling trip, typically at the deepest part of the lake. All samples are collected from whole meter depths except for the bottom sample, which is collected 0.5 meters from the lake bottom to prevent disrupting the sediment. The surface sample is a composite sample of the top two meters of the water column. The middle sample is collected from the approximate midpoint of the temperature/dissolved oxygen change (>1-degree Celsius change) or thermocline. Pictures and climatic data are collected at each monitoring site. Water quality information collected in the winter is collected using the same procedures as in the summer. Zooplankton samples were collected using a 63 micrometer Wisconsin style zooplankton net and Phytoplankton samples were collected using a 2m integrated water sampler on Lake Susan, Lotus Lake, Staring, Lake Riley, and Red Rock Lake. Zooplankton are collected by lowering the net to a depth of 0.5 meters from the bottom at the deepest point in the lake and raised slowly. Zebra mussel veliger samples were collected on all lakes using the same zooplankton sampling procedures but collected at three sites and consolidated before being sent to a lab for analysis. A Zeiss Primo Star microscope with a Zeiss Axiocam 100 digital camera was used to monitor zooplankton populations, scan for invasive zooplankton, and to calculate Cladoceran-grazing rates on algae.

Water quality samples collected during stream monitoring events were collected from the approximate middle (width and depth) of the stream in ideal flow conditions or from along the bank when necessary. Both water quality samples and flow monitoring activities were performed in the same section of the creek during each sampling event. Stream velocity was calculated at 0.3 to 1-foot increments across the width of the stream using the FloTracker Velocity Meter at each sampling location. If no water or flow was recorded, only pictures and climatic data were collected. The activities associated with the monitoring program are described in Table 2.1-1.

2.2 Analytical Laboratory Methods

RMB Environmental Labs, located in Detroit Lakes, MN, is the third-party company that is responsible for conducting the analytical tests on the water samples that were collected by the District Staff. The methods used by the laboratory to analyze the water samples for the specified parameters are noted in Table 2.2-1. Zebra mussel veliger and phytoplankton samples were also sent to RMB Labs for analysis.

Additional samples were sent to the Metropolitan Council (METC), St. Paul, MN. These samples included quality control duplicate samples and special water quality monitoring project samples. METC allows staff to bring samples in on a Friday which is not possible with RMB because samples must be shipped.

Table 2.2-1 RMB Environmental Laboratories Parameters and Methods Used for Analyses

Parameter	Standard Method
Alkalinity	EPA 310.2
Ammonia	EPA 350.1 Rev 2.0
Nitrogen, Nitrate & Nitrite	EPA 353.2 Rev 2.0
Chlorophyll-a	SM 10200H
Total Phosphorus	EPA 365.3
Orthophosphate	EPA 365.3
Chloride	SM 10200H

2.3 Lake Water Levels

In-Situ Level Troll 500, 15-psig water level sensors have been placed on most lakes throughout the watershed district to monitor water quantity and assess yearly and historical water level fluctuations. These sensors are mounted inside a protective PVC pipe that are attached to a vertical post and placed in the water. A staff gauge, or measuring device, is also mounted to the vertical post, and surveyed by District staff to determine the elevation for each level sensor. Once the water elevation is established, the sensor records continuous water level monitoring data every 15 minutes from ice out until late fall.

Lake level data is used for developing and updating the District's models, which are used for stormwater and floodplain analysis. Monitoring the lake water levels can also help to determine the impact that climate change may have on lakes and land interactions in the watershed. Lake level data is also used to determine epilimnetic zooplankton grazing rates (located in section 4.74.6). Lake level data is submitted to the Minnesota Department of Natural Resources (MNDNR) at the end of each monitoring season and historical data specific to each lake can be found on MNDNR website using the Lakefinder database. See Exhibit A for 2017 level sensor results. Lake Levels for 2016 are also provided for a year-to-year comparison. In both the Lakefinder database and in Exhibit A, the Ordinary High-Water Level (OHWL) is displayed so water levels can be compared to what is considered the "normal" water level for each lake. The OHWL is used by governing bodies like the RPBCWD for regulating activities that occur above and below this zone. National Oceanic and Atmospheric Administration (NOAA) precipitation data collected from the area was also included in Exhibit A to evaluate how rain events influenced lake levels. Rain data recorded at the Flying Cloud Drive Airport, Eden Prairie, MN is included alongside lake level data from Lakes in Hennepin County (including lake Riley). A combination of rain data from Meteorological Station Chanhassen WSFO and Chanhassen 1.0 ESE is included alongside lake level data from Lakes in Carver County.

In 2017, lake level measurements were collected on 13 lakes in the District and one high value wetland, Lake Idlewild (Table 2.3-1). Lake Ann experienced the greatest change over the 2017 season, decreasing 0.957ft from ice-out to the last day of recording (Nov. 6). Staring Lake had the largest range of fluctuation through the 2017 season, having a low elevation of 813.8ft, and a high of 816.1ft (2.3ft difference). On average, lake levels increased by 0.079ft over the 2017 season. With the exceptions of Lake Ann, Lake Lucy and Lake Susan, all lake water levels increased in elevation over the 2017 season. The average fluctuation range across all lakes was 1.4ft.

Table 2.3-1 Lake Water Levels Summary

The 2017 (March-November) and historical recorded lake water levels (ft) for all monitored lakes within the Riley Purgatory Bluff Creek Watershed District. 2017 data includes the overall change in water level, the range of elevation fluctuation, and the highest and lowest recorded levels (elevation). Historical data includes the highest and lowest historical recorded levels and the date they were taken.

	2017 Lake Water Level Data				Historical Lake Water Levels			
Lake	Seasonal Fluctuation	Fluctuation Range	High level	Low level	Highest Level	Date	Lowest Level	Date
Ann	-0.957	1.418	957.22	955.80	957.93	2/18/1998	952.80	9/28/1970
Duck	0.041	0.729	914.90	914.17	916.12	6/20/2014	911.26	11/10/1988
Hyland	0.236	1.224	817.02	815.80	818.68	8/11/1987	811.66	12/2/1977
Idlewild	0.087	1.363	854.64	853.28	860.78	3/29/1976	853.10	1/7/1985
Lotus	0.391	0.971	896.21	895.24	897.08	7/2/1992	893.18	12/29/1976
Lucy	-0.703	1.283	957.15	955.87	957.67	6/20/2014	953.29	11/10/1988
Mitchell	0.162	1.213	871.96	870.75	874.21	6/25/2014	865.87	7/25/1977
Red Rock	0.201	1.76	841.80	840.04	842.69	7/13/2014	835.69	9/28/1970
Rice Marsh	0.31	1.487	876.73	875.25	877.25	5/28/2012	872.04	8/27/1976
Riley	0.083	0.969	865.60	864.63	866.74	7/6/1993	862.00	2/1/1990
Round	0.743	2.259	881.08	878.82	884.26	8/17/1987	875.29	7/25/1977
Silver	0.73	1.263	899.75	898.48	901.03	6/20/2012	894.78	6/6/1972
Staring	0.062	2.276	816.10	813.83	820.00	7/24/1987	812.84	2/12/1977
Susan	-0.28	1.722	882.53	880.81	883.77	6/21/2014	879.42	12/29/1976
Average	0.079	1.424						

3 Water Quality Standards

In 1974, the Federal Clean Water Act set forth the requirements for states to develop water quality standards for surface waters. In 2014, specific standards were developed for eutrophication and TSS for rivers and streams. In Minnesota, the agency in charge of regulating water quality is the Minnesota Pollution Control Agency (MPCA). Water quality monitoring and reporting is a priority for the District to determine the overall health of the water bodies within the watershed boundaries. The District's main objectives are to prevent a decline in the overall water quality within lakes and streams and to prevent water bodies from being added to the 303d Impaired Water Bodies list (MPCA). The District is also charged with the responsibility to take appropriate actions to improve the water quality in water bodies that are currently listed for impairments.

There are seven ecoregions within Minnesota; the RPBCWD is within the Northern Central Hardwood Forest (NCHF) ecoregion. Rural areas in the NCHF are dominated by agricultural land and fertile soils characterize the ecoregion. For most water resources in the region, phosphorus is the limiting (least available) nutrient within lakes and streams, meaning that the available concentration of phosphorus often controls the extent of algal growth. The accumulation of excess nutrients (i.e. TP and Chl-a) in a waterbody is called eutrophication. This relationship has a direct impact on the clarity and recreational potential of our lakes and streams. Water bodies with high phosphorus concentrations and increased levels of algal production have reduced water clarity and limited recreational potential.

All lakes sampled in the district are considered Class 2B surface waters. The MPCA states that this class of surface waters should support the propagation and maintenance of a healthy community of cool or warm water sport or commercial fish and associated aquatic life, and their habitats. They should also be suitable for aquatic recreation of all kinds, including bathing. This class of surface water is not protected as a source of drinking water. For more detailed information regarding water quality standards in Minnesota, please see the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters for the Determination of Impairment, 305(b) Report, and 303 (d) List of Impaired Waters. These resources provide information to better understand the water quality assessment process and the reasoning behind their implementation.

3.1 Lakes

The MPCA has specific standards for both 'deep' lakes or lakes >15ft deep and < 80% of the total lake surface area able to support aquatic plants (littoral area), and 'shallow' lakes or lakes <15ft deep and >80% littoral area. Except for chlorides, summer growing season (June-September) averages of the parameters listed in Table 3.1-1 for each lake are compared to the MPCA standards to determine the overall state of the lake. The standards are set in place to address issues of eutrophication or excess nutrients in local water bodies. Water samples are collected and sent to an analytical lab to assess concentrations of TP, Chl-a, and chlorides. If result values are greater than the standards listed in Table 3.1-1, the lake is considered impaired. Secchi disk readings are collected to measure the transparency, or visibility, in each lake. A higher individual reading corresponds to increased clarity within the lake as the Secchi Disk was visible at a deeper depth in the water column.

Chlorides (Cl) are a concern during the winter when road salt is heavily used. It is often sampled over the winter and during early spring melting periods when salts are being flushed through our waterbodies. The Cl standard is the same for both deep lakes and shallow lakes. The table includes both the Cl chronic standard (CS) and a maximum standard (MS). The CS is the highest water concentration of Cl to which aquatic life, humans, or wildlife can be exposed to indefinitely without causing chronic toxicity. The MS is the highest concentration of Cl in water to which aquatic organisms can be exposed for a brief time with zero to slight mortality.

Table 3.1-1 MPCA Water Quality Standards for Shallow and Deep Lakes

Parameter	Shallow Lakes Criteria	Deep Lakes Criteria
Total Phosphorus (mg/L)	≤ 0.060	≤ 0.040
Chlorophyll-a (ug/L)	≤ 20	≤ 14
Secchi Disk (m)	≥ 1	≥ 1.4
Chloride Chronic Standard (mg/L)	230	230
Chloride Maximum Standard (mg/L)	860	860

3.2 Streams

Table 3.2-1 displays the new water quality parameters developed by the MPCA in 2014 for eutrophication and TSS. The new standards include some parameters the District has not yet incorporated into their monitoring procedures that may eventually be added in the future. All streams sampled in the district are considered Class 2B surface waters. The MPCA states that this class of surface waters should support the propagation and maintenance of a healthy community of cool or warm water sport or commercial fish and associated aquatic life, and their habitats. They should also be suitable for aquatic recreation of all kinds, including bathing. This class of surface water is not protected as a source of drinking water. For more detailed information regarding water quality standards in Minnesota, please see the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters for the Determination of Impairment, 305(b) Report, and 303 (d) List of Impaired Waters. These resources provide information to better understand the water quality assessment process and the reasoning behind their implementation.

Eutrophication pollution is measured based upon the exceedance of the summer growing season average (May-September) of TP levels and Chl-a (seston), five-day biochemical oxygen demand (cBOD, amount of DO needed by organisms to breakdown organic material present in a given water sample at a certain temperature over a five-day period), diel DO flux (difference between the maximum DO concentration and the minimum daily DO concentration), or summer average pH levels. Streams that exceed phosphorus levels but do not exceed the Chl-a (seston), cBOD, diel DO flux, or pH levels meet the eutrophication standard. The District added Chl-a to its sampling regime in 2015 to account for the polluted condition when Chl-a (periphyton) concentration exceeds 150mg/m² more than once in ten years. The daily minimum DO concentration for all Class 2B Waters cannot dip below 4mg/L to achieve the MPCA standard, which was used in the analysis for the Annual Report.

TSS is a measure of the amount of particulate (soil particles, algae, etc.) in the water. Increased levels of TSS can be associated with many negative effects including: nutrient transport, reduced aesthetic value, reduced aquatic biota, and decreased water clarity. For the MPCA standard, TSS concentrations are assessed from April through September and cannot exceed 30mg/L more than 10 percent of the time during that period.

Table 3.2-1 MPCA Water Quality Standards for Streams

MPCA Standard	Parameter	Criteria
Eutrophication	Phosphorus	≤ 100ug/L
	Chlorophyll-a (seston)	≤ 18ug/L
	Diel Dissolved Oxygen	≤ 3.5mg/L
	Biochemical Oxygen Demand	≥ 2mg/L
	pH Max	≤ 9su
	pH Min	≥ 6.5su
Total Suspended Solids	TSS	≤ 30mg/L

4 Water Quality Projects/Monitoring

To improve water quality within the watershed, the District conducts studies to root out key sources of pollution or other negative variables that impact our lakes and streams. Once identified, the District will often monitor these locations and eventually act to improve the water resource if the data confirms the suspicion. Below is a summary of each special project/monitoring and an overall summary of the water quality data the District has collected in 2017.

4.1 2017 Lakes Water Quality Summary

The 2017 growing season Chl-a mean concentrations for all lakes sampled within the District are shown in Figure 4.1-1. Four lakes sampled in 2017 within the District are categorized as 'deep' by the MPCA (>15ft deep, < 80% littoral area): Lake Ann, Lotus Lake, Lake Riley, and Round Lake. The MPCA standard for Chl-a in deep lakes (< 14ug/L) was met by Lake Ann and Round Lake, but levels were just under three times the standard in Lotus Lake and just above the standard for Lake Riley. The remainder of the lakes sampled in 2017 are categorized as 'shallow' by the MPCA (<15ft deep, >80% littoral area): Duck Lake, Hyland Lake, Lake Lucy, Mitchell Lake, Red Rock Lake, Rice Marsh Lake, Staring Lake, Lake Susan, and Silver Lake. Water quality metrics on Lake Idlewild, classified as a high-value wetland, were compared to MPCA shallow lake standards. The water quality standard for shallow lakes (< 20ug/L) was met by Duck Lake, Lake Idlewild, Red Rock Lake, and Rice Marsh Lake in 2017. Lake Lucy, Mitchell Lake, Silver Lake, and Staring Lake did not meet the standard, while Hyland Lake and Lake Susan more than doubled the MPCA standard. However, both Mitchell Lake and Silver Lake decreased in levels, just exceeding the MPCA standard (20.5ug/L and 20.68ug/L respectively). Overall, six of the 14 lakes sampled in 2017 met the MPCA Chl-a standards for their lake classification (one more than in 2016): Lake Ann, Duck Lake, Lake Idlewild, Red Rock Lake, Rice Marsh Lake, and Round Lake.

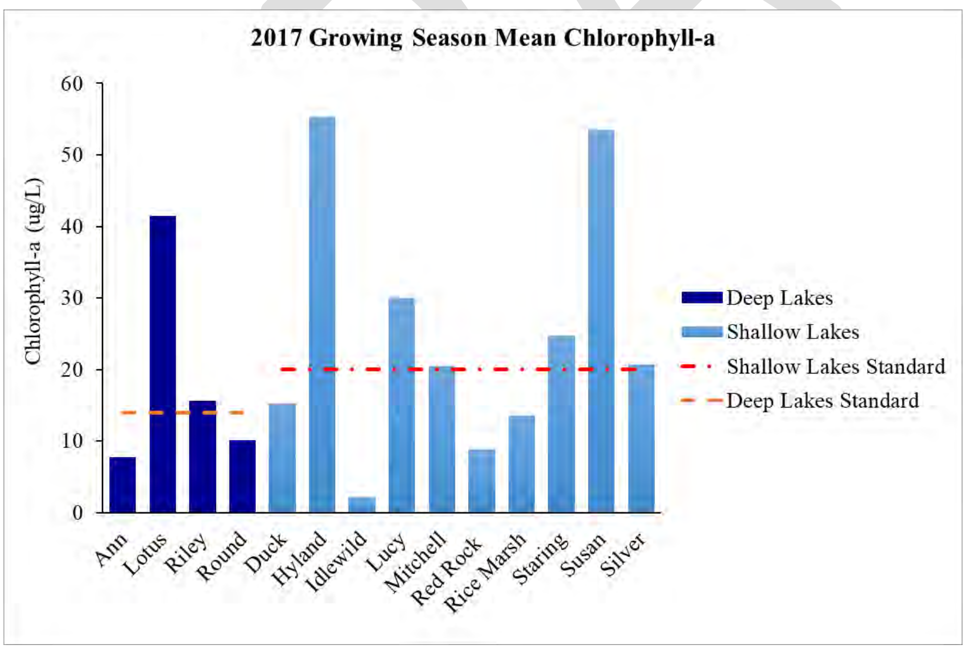

Figure 4.1-1 2017 Lake Growing Season Mean Chlorophyll-a

Lakes growing season (June-September) mean chlorophyll-a concentrations (ug/L) for shallow (lakes <15ft. deep, >80% littoral area-light blue bars) and deep lakes (lakes >15 ft. deep, <80% littoral area-dark blue bars) in the Riley Purgatory Bluff Creek Watershed District during 2017. The dashed lines represent the Minnesota Pollution Control Agency water quality standards for Chlorophyll-a for shallow (<20ug/L-orange dashed line) and deep lakes (<14ug/L-red dashed line).

The TP growing season averages for all lakes sampled within the District in 2017 are shown in Figure 4.1-2. The MPCA standard for TP in deep lakes (<0.040mg/L) was met by Lake Ann and Lake Riley. TP levels were above the standard in Lotus and Round Lake; Round Lake met the MPCA TP standard in 2016 (0.036mg/L) but increased to 0.049mg/L in 2017. Lake Riley was previously above the standard in 2015, but the aluminum sulfate treatment in early 2016 is attributable to it continuing to meet the standard, having met the standard in 2016 as well. For shallow lakes, the MPCA TP standard (<0.060mg/L) was met by Lake Idlewild, Lake Lucy, Red Rock Lake, Rice Marsh Lake, Staring Lake, and Silver Lake in 2017. In 2016, only three shallow lakes met the MPCA TP standard (Duck, Idlewild and Red Rock). Silver Lake, which had the highest total phosphorus concentrations in 2016 with 0.102mg/L, along with Staring lake and Rice Marsh Lake met the standard in 2017; these lakes did not meet the TP standard in 2016. Duck Lake, which met the standard in 2016 (0.049mg/L) did not meet the standard in 2017 (0.064mg/L). Lake Hyland, Mitchell Lake, and Lake Susan all decreased in TP, but no more than 0.007mg/L each. Overall, eight of the 14 lakes sampled met the MPCA total phosphorus standard for their lake classification in 2017: Lake Ann, Lake Idlewild, Lake Lucy, Red Rock Lake, Rice Marsh Lake, Lake Riley, Silver Lake, and Staring Lake. That is two additional lakes meeting the MPCA TP standards than in 2016.

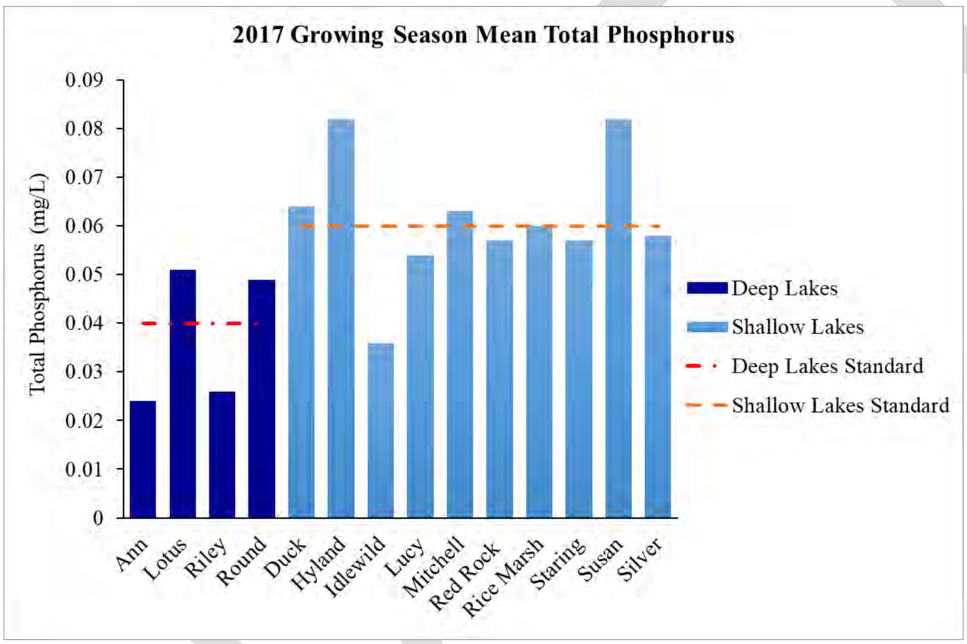

Figure 4.1-2 2017 Lakes Growing Season Mean Total Phosphorus

Lakes growing season (June-September) mean total phosphorus concentrations (mg/L) for shallow (lakes <15ft. deep, >80% littoral area-light blue bars) and deep lakes (lakes >15ft. deep, <80% littoral area-dark blue bars) in the Riley Purgatory Bluff Creek Watershed District during 2017. The dashed lines represent the Minnesota Pollution Control Agency water quality standards for Total Phosphorus for shallow (<0.060ug/L-orange dashed line) and deep lakes (<0.040ug/L-red dashed line).

The 2017 secchi disk growing season mean for all District lakes sampled is shown in Figure 4.1-3. The MPCA standard for secchi disk depth/water clarity for deep lakes (> 1.4m) was met by all deep lakes in the District (Ann, Lotus, Riley, and Round). Lake Riley had the largest change in clarity, measuring an average depth of 2.46m, a decrease of 0.43m from the average in 2016 (2.89m). This average secchi depth is still over a meter deeper than the MPCA standard. All other deep lakes had clarity readings similar-to numbers from 2016. For shallow lakes, nine of 10 lakes monitored achieved the MPCA secchi disk depth water quality standard (>1m). Hyland lake was the only lake to not meet the standard, although it was close, measuring an average of 0.93m. Mitchell Lake, Silver Lake and Staring Lake, which did not meet the standard in 2016, met it in 2017. Silver Lake previously had the poorest average secchi depth in 2016 at 0.73m, but it met the standard in 2017 (1.72m). Please note that only three secchi depths were measured on Idlewild during the season, July 25th, August 17th, and September 29th.

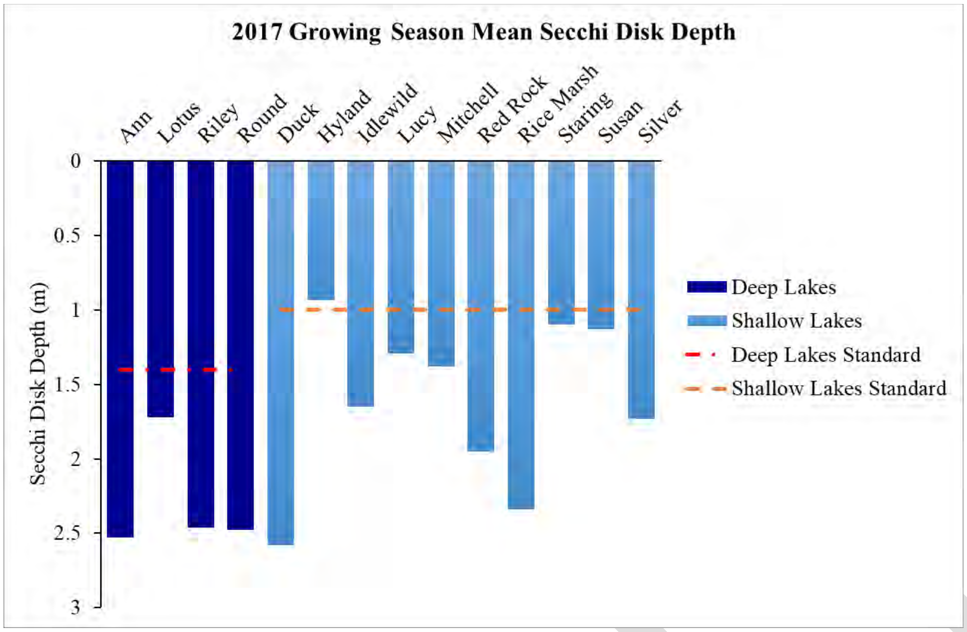

Figure 4.1-3 2017 Lakes Growing Season Mean Secchi Disk Depth

Lakes growing season (June-September) mean secchi disk depths (m) for shallow (lakes <15ft. deep, >80% littoral area-light blue bars) and deep lakes (lakes >15ft. deep, <80% littoral area-dark blue bars) in the Riley Purgatory Bluff Creek Watershed District during 2017. The dashed lines represent the Minnesota Pollution Control Agency water quality standards for secchi disk depths for shallow (>1m-orange dashed line) and deep lakes (>1.4m-red dashed line).

4.2 Alum Treatment on Lake Riley

In May of 2016, the District treated Lake Riley with the first dose of aluminum sulfate (Alum). Alum is a compound which works to reduce the growth of algae by trapping the nutrient phosphorus (the main food source of algae) in the lake sediments. The treatment was applied by injecting the alum into water several feet below the surface of the lake. Upon contact with water, alum becomes aluminum hydroxide (also called floc), a fluffy precipitate. As floc settles to the bottom of the lake it interacts with phosphorus, binding it, making it unusable by algae. This process also collects other particles suspended in the water column, helping to improve water clarity.

District staff have continued to monitor phosphorus levels on Lake Riley as a part of regular sampling, tracking the continued effectiveness of the treatment. Figure 4.2-1 illustrates total phosphorus (TP) levels two years prior to treatment, through the end of the 2017 growing season (17 months after the alum was applied). TP data was included from May 2014 to late September 2017 to highlight the abrupt changes in TP concentrations during that time. There was a large reduction in epilimnetic TP (upper layer of water in a thermally-stratified lake) after the treatment in May which led to Lake Riley achieving the MPCA standard over the summer growing season (June-September) in 2016. During the 2017 growing season, TP levels continued meeting the MPCA standard in the epilimnion; not only did the season average meet standards, but no single sampling event exceeded the standard. TP levels sampled in the hypolimnion (the bottom layer of water in a thermally-stratified lake) rose almost 0.6mg/L from May through September in 2015. In 2016, TP levels in the hypolimnion were drastically reduced after treatment and increased about 0.06mg/L through September. During the 2017 growing season, TP levels in the hypolimnion increased 0.16mg/L between May through September which was 0.1mg/L more than the previous year. Overall, this increase is still significantly less than what was observed in years before the alum treatment. In 2016, the decrease in TP led to reductions in summer averages of Chl-a (algae) concentrations, from 27.4ug/L in 2015 to 14.92ug/L. Additionally, secchi disk depth noticeably increased from 1.7m in 2015 to 2.89m in 2016. In 2017, a slight increase in TP affected these parameters. The average concentration of Chl-a was higher in 2017 (15.64 ug/L) than in 2016 (14.92ug/L). Water clarity fell slightly to an average of 2.46m in 2017 vs 2.89m in 2016. The 2017 nutrient results are still a significant improvement from those seen prior to the alum treatment.

The District will continue monitoring water clarity and nutrient levels in 2018, as it is a part of regular monitoring, but also to track the continued effectiveness of the alum treatment. Future monitoring will also indicate when a second dose of alum should be applied. More information about Lake Riley nutrient and water clarity data can be seen in the Fact Sheet located in Exhibit F.

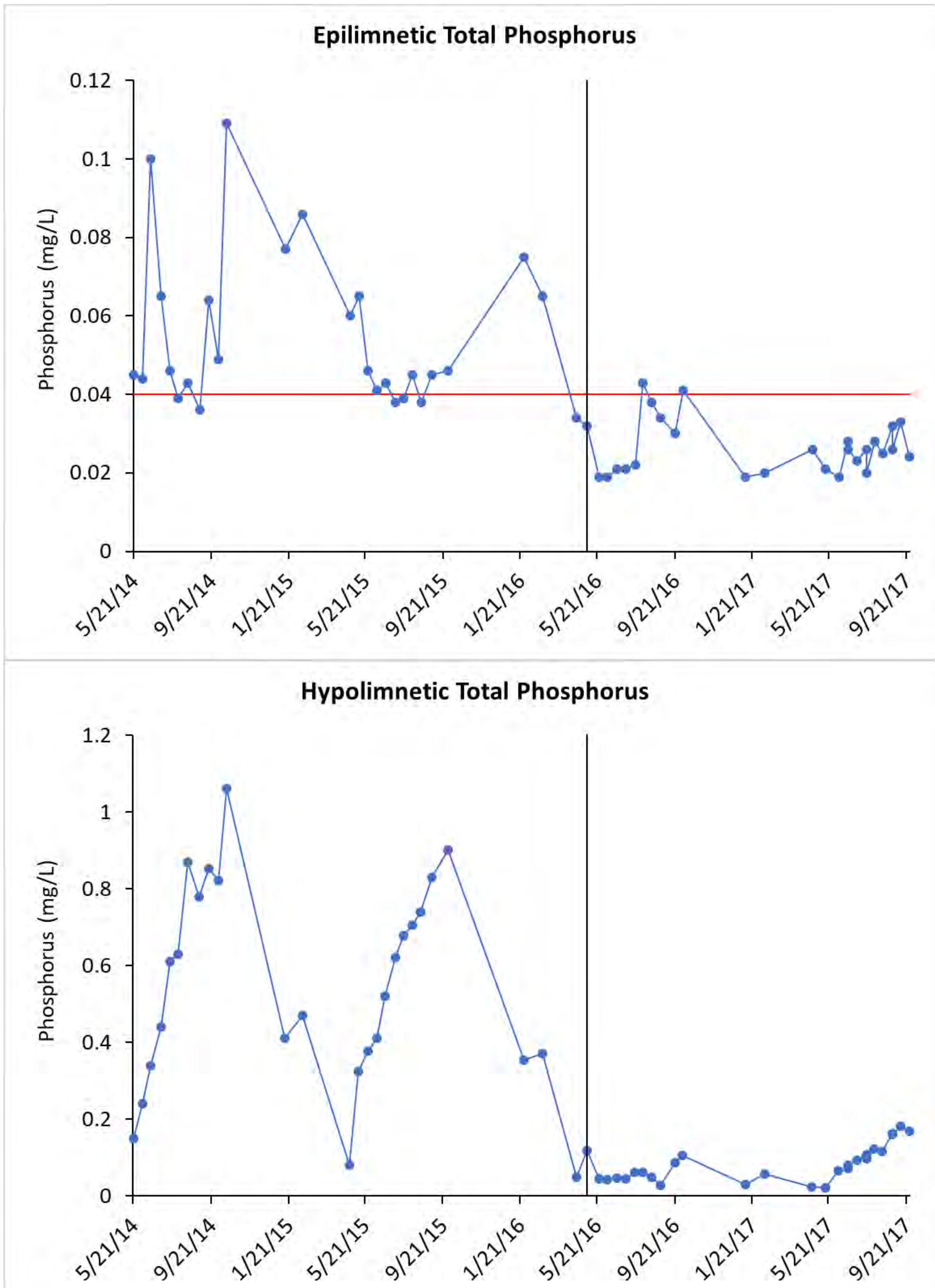

Figure 4.2-1 Lake Riley Total Phosphorus Levels pre- and post- Alum Treatment

Total phosphorus levels (TP) in Lake Riley between May 21, 2014 and September 26, 2017. The graphs reflect levels before and after the aluminum sulfate (Alum) treatment carried out in May of 2016 (indicated by vertical bar). The upper graph displays TP levels (mg/L) measured from 2m composite samples taken at the surface of the lake. The MPCA water quality standard for TP is represented in the upper graph by the horizontal red line (0.04mg/L). The lower graph displays the TP levels (mg/L) measured from samples taken 0.5-1m above the sediment in the deepest point of the lake.

4.3 Powers Blvd Riley Creek Crossing

In 2013, a Use and Attainability Analysis (UAA) identified Lake Susan Park Pond as a significant contributing source of nutrient pollution to Lake Susan. In 2015 and 2016, staff conducted sampling on Lake Susan Park Pond and at the Lake Susan Park Pond outlet to confirm the UAA findings. Results indicated the pond was contributing nutrient pollution, but at a lesser level then indicated by the UAA. In 2017, the District proposed actions to improve the water quality in Lake Susan through implementing the Lake Susan Park Pond Treatment and Stormwater Reuse Enhancement Project. As part of the project, staff placed an automated water-sampling unit on Riley Creek at the culvert passing under Powers Blvd, just upstream of Lake Susan and Lake Susan Park Pond. This was done to better capture and understand rain event nutrient loading from upstream sources, giving further direction to the proposed Lake Susan Park Pond Project. Analyzing the "first flush" of a storm event is important because these events are when water pollution entering storm drains in areas with high proportions of impervious surfaces is typically more concentrated compared to the remainder of the storm. Water samples were analyzed for total dissolved phosphorus (TDP), total phosphorus (TP), total suspended solids (TSS), and Chlorophyll-a (Chl-a). The automated water-sampling unit also estimated flow of the creek at that point.

In 2017, total phosphorus levels at the sampling site during storm events were high compared to the MPCA standard. As seen in Table 4.3-1, the average TP across 10 samples was 0.681mg/L, more than 6 times the MPCA eutrophication water quality standard for class 2B streams (≤ 0.1mg/L TP). The highest TP reading was 1.62mg/L (Figure 4.3-1). The TDP average across the sampling events was 0.034mg/L and the highest measurement was 0.066mg/L (Figure 4.3-1; Table 4.3-1). TSS concentrations at the sampling site were also high. The average amount of TSS across the 10 samples taken was 659.5mg/L (Table 4.3-1). To achieve the MPCA TSS stream water quality standard, a stream may not exceed 30mg/L TSS more than 10% of the time. One of ten samples taken in 2017 fell below 30mg/L TSS which was an initial grab sample at the start of the monitoring season (Figure 4.3-2). Eight Chl-a samples were taken from the site. Apart from one sample, which had 289ug/L Chl-a, all samples contained less than the MPCA eutrophication water quality standard of ≤ 18ug/L Chl-a (Table 4.3-1). It is important to remember that these samples are targeted samples, representative of the initial flush of water and pollutants that occurs during a rain event, and do not represent season-long pollutant levels in Riley Creek.

Table 4.3-1 2017 Powers Blvd Riley Creek Crossing Nutrient Summary

Powers Blvd Riley Creek Crossing Total Dissolved Phosphorus (mg/L), Total Phosphorus (mg/L), Chlorophyll-a (ug/L), and Total Suspended Solids (mg/L) concentrations (max, min, and average) from 2017 automated, flow-paced samples. The table also includes the Minnesota Pollution Control Agency water quality standards.

Parameter	# of samples	Minimum	Maximum	Average	MPCA Water Quality Standards
TP (mg/L)	10	0.104	1.620	0.681	≤ 0.1mg/L
TDP (mg/L)	10	0.003	0.066	0.034	-
Chl-a (ug/L)	8	1.78	289.00	41.04	≤ 18ug/L
TSS (mg/L)	10	4	2300	659.5	≤ 30mg/L

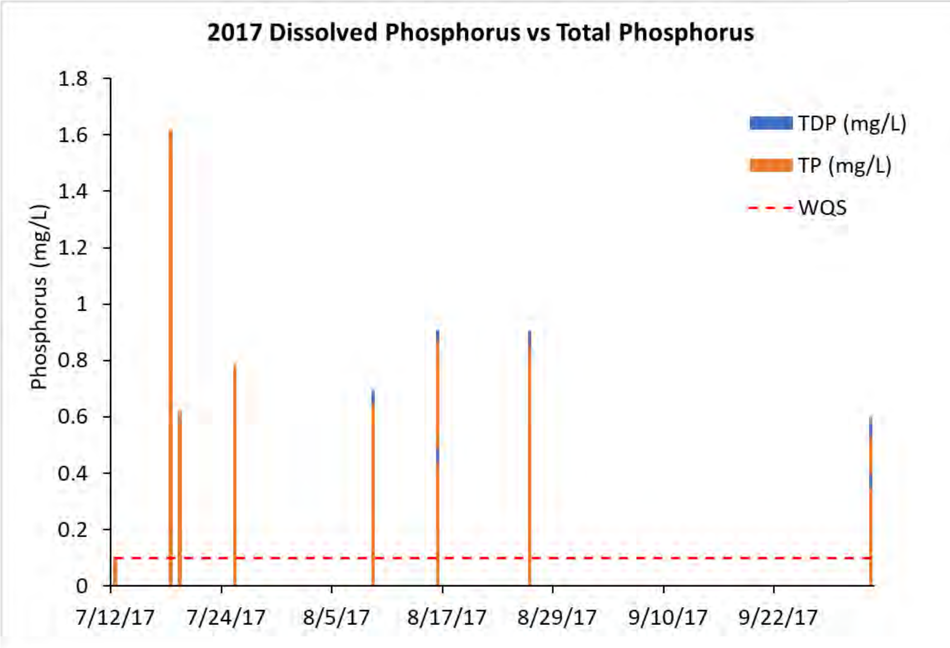

Figure 4.3-1 2017 Powers Blvd Riley Creek Crossing Total Dissolved Phosphorus and Total Phosphorus

The Total Dissolved Phosphorus (TDP) and Total Phosphorus (TP) concentrations (mg/L) from Riley Creek under Powers Blvd from 2017 automated, level triggered, flow-paced samples. Dashed line represents the Minnesota Pollution Control Agency standard for TP in class 2B creeks (≤ 0.1mg/L).

Figure 4.3-2 2017 Powers Blvd Riley Creek Crossing Total Suspended Solids

Total Suspended Solids (TSS) concentrations (mg/L) from Riley Creek under Powers Blvd from 2017 automated, level triggered, flow-paced samples. Dashed line represents the Minnesota Pollution Control Agency standard for TSS in class 2B creeks (≤ 30mg/L TSS no more than 10% of the time).

4.4 Creek Restoration Action Strategy

The RPBCWD developed the Creek Restoration Action Strategy (CRAS) to prioritize creek reaches, sub-reaches, or sites, in need of stabilization and/or restoration. The District has identified eight categories of importance for project prioritization including: infrastructure risk, erosion and channel stability, public education, ecological benefits, water quality, project cost, partnerships, and watershed benefits. These categories were scored using methods developed for each category based on a combination of published studies and reports, erosion inventories, field visits, and scoring sheets from specific methodologies. Final tallies of scores for each category, using a two-tiered ranking system, were used to prioritize sites for restoration/remediation. More information on the CRAS can be found on the District's website: www.rpbcwd.org. The CRAS was finalized/adopted in 2015 and was updated in April of 2017. A severe site list was developed which includes subreaches from all three creeks (Table 4.4-1).

Table 4.4-1 Severe Reaches Identified by the Creek Restoration Action Strategy

Stream	Tier II Rank	Tier I Rank	Reach	Subreach	Location
Purgatory	1	9	P7	P7E	Covington Road to Pond in Covington Park
Riley	2	2	R2	R2E	Middle 1/3 between Dell Road and Eden Prairie Road
Bluff	3	5	BT3	BT3A	Audubon Road to Pioneer Trail
Purgatory	4	4	P1	P1E	1,350 feet DS of Pioneer Trail to Burr Ridge Lane
Bluff	5	1	B1	B1D	475 feet US of Great Plains Blvd to Great Plains Blvd
Bluff	6	7	B3	B3A	750 feet DS of Railroad to 860 feet DS of Railroad
Bluff	7	10	B3	B3C	1,675 feet US of Audubon Road to Lyman Blvd
Bluff	8	6	R2	R2D	Upper 1/3 between Dell Road and Eden Prairie Road
Bluff	9	3	B5	B5C	Galpin Blvd to West 78th Street
Bluff	10	8	B5	B5B	985 feet US of Galpin Blvd to Galpin Blvd

Note: US = Upstream; DS = Downstream

As part of CRAS, stream reaches are walked on a rotational basis after the initial assessment was completed. This will allow staff to evaluate changes in the streams and update the CRAS accordingly. In 2017 staff walked Reach 3 of Riley Creek and the three Lotus Lake ravines on the west side of the lake. These sites were especially in need of a full assessment as previous scores were calculated based upon pictures and past studies. Staff conducted Modified Pfankuch Stream Stability Assessments, MPCA Stream Habitat Assessments (MSHA), took photos, and recorded notes of each subreach to assess overall stream conditions. In addition to creek walks, staff also checked bank pins which were installed in 2015 near all the regular water quality sites. The bank pins were installed in "representative" erosion sites to evaluate general erosion rates for each reach. Changes to the CRAS based upon 2017 creek walks can be seen in Exhibit E and in our Fact Sheets in Exhibit F.

Riley Creek-Rice Marsh Lake to Lake Riley-Reach 3-Subreach A/B/C/D/E
All subreaches assessed in 2017 changed CRAS categories (severe/poor/moderate/good) except for R3C. Previous CRAS scores were based on desktop assessments which explains the number of changes. R3A was split into two subreaches (R3A-Rice Marsh to 80ft downstream of Highway 212; and R3B-80ft downstream of Highway 212 to North of Bearpath golf course) forming a total of 5 subreaches within Reach R3. Reaches R3A, R3B, and R3D all scored lower using the Tier I assessment and were mostly influenced by reduced Pfankuch scores which had been overestimated based on past reviews. Subreach R3E was the only subreach to score higher which was cause by an increased Pfankuch score due to considerable erosion, mowing to stream edge (lack of riparian zone), lack of instream habitat, and a severely eroding stormwater culvert. Tier II scores remained similar to what was observed in 2016. A summary of the score changes can be seen in **Error! Reference source not found.**.

Purgatory Creek-Lotus Ravines-PT2A/B/C/D, PT3A, PT4A

Figure 4.4-1 Degraded Stormwater Culvert PT2B

Subreach PT2A is a wetland complex and should not have been scored in the previous assessment. PT2B Tier I score shifted from good to poor because of large amounts of sediment covering all instream habitat. Large erosion areas also existed along the entirety of the subreach including the severely eroded stormwater culvert seen in Figure 4.4-1. PT2C shifted from moderate to good overall because the city of Chanhassen completed a large restoration project that had been successful in stabilizing the subreach. Subreach PT2D and both the middle and southern ravine scores changed from good to moderate which was mostly based upon the more abundant erosion areas present that were missed upon reviewing old photos. A summary of the score changes can be seen in **Error! Reference source not found.**.

Table 4.4-2 2017 Creek Restoration Action Strategy Updates

Tier I and Tier II scores for the Creek Restoration Action Strategy for 2016 and the corresponding updates from 2017 for all subreaches within Reach 3 of Riley Creek and the three Purgatory Creek – Lotus Lake Ravines.

Reach	Subreach	Location	2016 Tier I Scores	2017 Tier I Scores	2016 Tier II Scores	2017 Tier II Scores
PT2	PT2A	Powers Blvd to 1,000 feet DS	12	n/a	28	n/a
PT2	PT2B	1,000 feet DS of Powers Blvd to Kerber Blvd	12	18	28	36
PT2	PT2C	Kerber Blvd to Carver Beach Road	16	12	36	28
PT2	PT2D	Carver Beach to Lotus Lake	12	16	24	26
PT3	PT3A	Kerber Pond to Lotus Lake	8	14	18	30
PT4	PT4A	Santa Fe Trail to Lotus Lake	8	14	18	24
R3	R3A	Rice Marsh Lake to 85 feet DS of 212	18	14	26	26
R3	R3B	85 feet DS of 212 to Northern Portion of Bearpath Country Club	18	14	26	22
R3	R3C	Northern Portion of Bearpath Country Club to 260 feet US of Bearpath Trail Bridge	16	14	22	20
R3	R3D	260 feet Us of Bearpath Trail Bridge to 250 feet DS of Bearpath Trail Bridge	16	12	22	18
R3	R3E	250 feet DS of Bearpath Trail Bridge to Lake Riley	16	18	24	28

Note: Orange = Poor; Yellow = Moderate; Blue = Good. US = Upstream; DS = Downstream

In addition to creek walks, staff have also checked bank pins yearly since they were installed in 2015 near all the regular water quality sites. The bank pins were installed at "representative" erosion sites to evaluate erosion rates for each reach. Staff measured the amount of exposed bank pin or sediment accumulation if buried in 2016 and 2017 (Table 4.4-3). From this, staff can quantify estimates of lateral bank recession rates. Engineering firm Wenck Associates, Inc. also installed bank pins at 11 sites on lower Riley Creek (south of Lake Riley) and Purgatory Creek (south of Riverview Road) in 2008 and 2010, to monitor bank loss and quantify lateral recession rates (Wenck, 2017). Monitoring of bank loss/change began in December of 2011. From their monitoring results, Wenck was able to track the potential effectiveness of upstream bank repairs on bank-loss-reduction at the Purgatory Creek sites. Results from monitoring the Riley Creek bank pins informed Wenck's recommendation to the City of Eden Prairie to prioritize several reaches for stabilization. District staff will continue to monitor the bank pins/bank loss at our 18 regular monitoring sites, as well as replace any pins which were not found in 2017.

Table 4.4-3 2016-2017 Bank Pin Data

Lateral creek bank loss per year as well as the estimated bank volume loss for a one-yard section of streambank at each of the 18 regular creek monitoring sites. Bank heights used to calculate the volume of bank loss were based off bank heights measured during installation in 2015. Negative values denote areas of bank where there was more sediment deposition, and empty cells denote sites where pins were not found. *Staff were unable to locate the bank pins at site R1 in 2016; losses in 2017 at R1 are estimated two-year losses (2015-2017).

	Average Lateral Loss (in/year)		Estimated bank loss per one-yard stretch of creek (ft3)	
Site	2016	2017	2016	2017
R5	2.85	1.08	4.16	3.22
R4	0.63	1.08	0.67	1.15
R3	4.24	4.05	4.87	4.65
R2	1.36	-0.04	0.48	-0.01
R1	--	4.50*	--	6.64*
P8	0.63	-1.64	0.10	-0.12
P7	3.57	3.37	2.97	1.76
P6	4.25	1.23	2.47	0.85
P5	1.18	3.82	0.89	2.86
P4	3.25	2.79	1.62	1.40
P3	3.02	1.07	2.42	0.86
P2	0.60	0.75	0.45	0.56
P1	1.52	7.11	1.52	7.11
B5	1.14	0.49	1.72	0.90
B4	4.42	10.16	7.75	25.84
B3	2.15	2.79	4.35	5.38
B2	7.93	2.07	3.14	0.82
B1	1.35	4.43	0.65	8.59

4.5 Chloride Monitoring

Chloride (Cl) levels in our water bodies are becoming of greater concern within the state of Minnesota. It takes only one teaspoon of road salt to permanently pollute five gallons of water, as chlorides do not break down over time. At high concentrations, Cl can also be harmful to fish, aquatic plants, and other aquatic organisms. The MPCA Cl Chronic Standard (CS, highest water concentration of Cl to which aquatic life, humans, or wildlife can be exposed to indefinitely without causing chronic toxicity) is 230mg/L for class 2B surface waters (all waters sampled within the district, excluding storm water holding ponds). The MPCA Cl Maximum Standard (MS, highest concentration of Cl in water to which aquatic organisms can be exposed for a brief time with zero to slight mortality) is 860mg/L for class 2B surface waters.

The District has been monitoring salt concentrations in our lakes and ponds since 2013 and will continue monitoring efforts to identify high salt concentration areas and to assess temporal changes in salt concentrations. In 2017, the District monitored the Riley Chain of Lakes (Lake Ann, Lake Lucy, Lake Susan, Rice Marsh Lake, and Lake Riley) and a chain of ponds that drains the City of Eden Prairie Center to Purgatory Creek. During sampling, staff collected a surface 2m composite and a bottom water sample to be analyzed for Cl. Every sample taken from the RCL since 2013 has fallen below the MPCA CS of 230mg/L (Figure 4.5-1). Cl levels have stayed consistent within the lakes year-to-year.

Figure 4.5-2 shows Cl levels within the four stormwater ponds, which includes all sampling events since 2013. In the spring of 2015, staff were no longer able to take accurate water samples on Pond A due to low water levels, so, sampling began on Pond B, directly upstream. Most samples taken from Eden Pond greatly exceed the class 2B CS, some exceeding the class 2B MS. Except for two sampling events, all samples taken from Pond K exceed the class 2B MS, although, there has been a noticeable drop in Cl levels each year since sampling began. It is important to note that these stormwater ponds are not classified as class 2B surface waters by the MPCA; the CS is given in the figure to demonstrate how much higher Cl levels accumulating within these ponds are before water moves into Purgatory creek. Staff will switch to monitoring the Purgatory Chain of Lakes in 2018 which will include: Lotus, Silver, Duck, Round, Mitchell, Red Rock, Staring, and Hyland Lake. The stormwater ponds draining Eden Prairie will also be monitored in 2018. Once-a-month Cl sampling may be added to the District's growing season lake and stream sampling SOP's to track levels throughout the summer months.

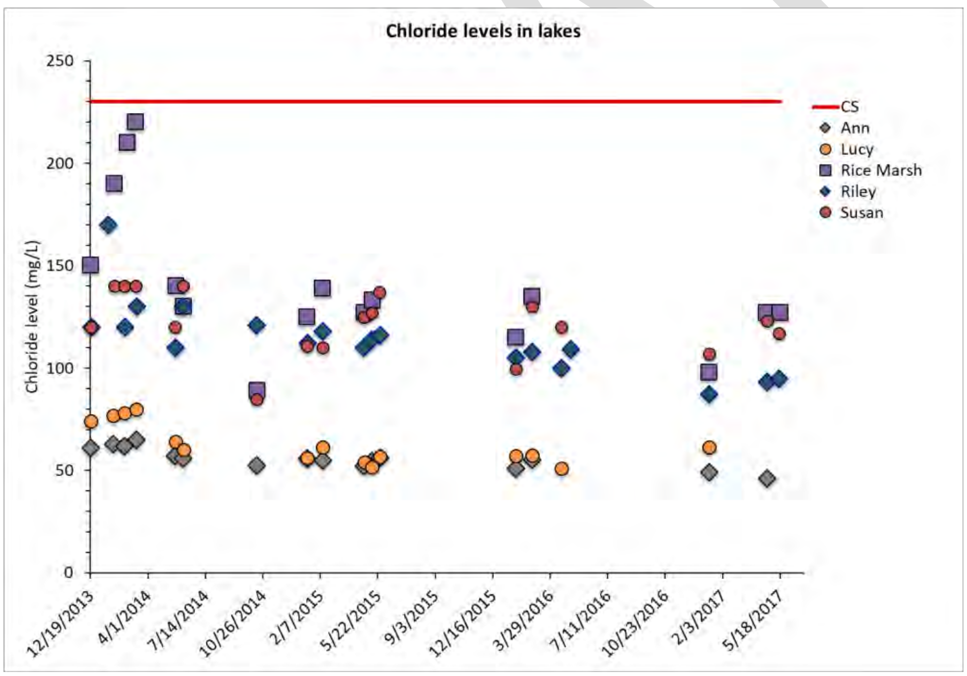

Figure 4.5-1 2013-2017 Chloride Levels within the Riley Chain of Lakes

All chloride sampling results (mg/L) on the Riley Chain of Lakes from 2013-2017. The MPCA chloride chronic standard for class 2B waters (230mg/L) is indicated by the red line.

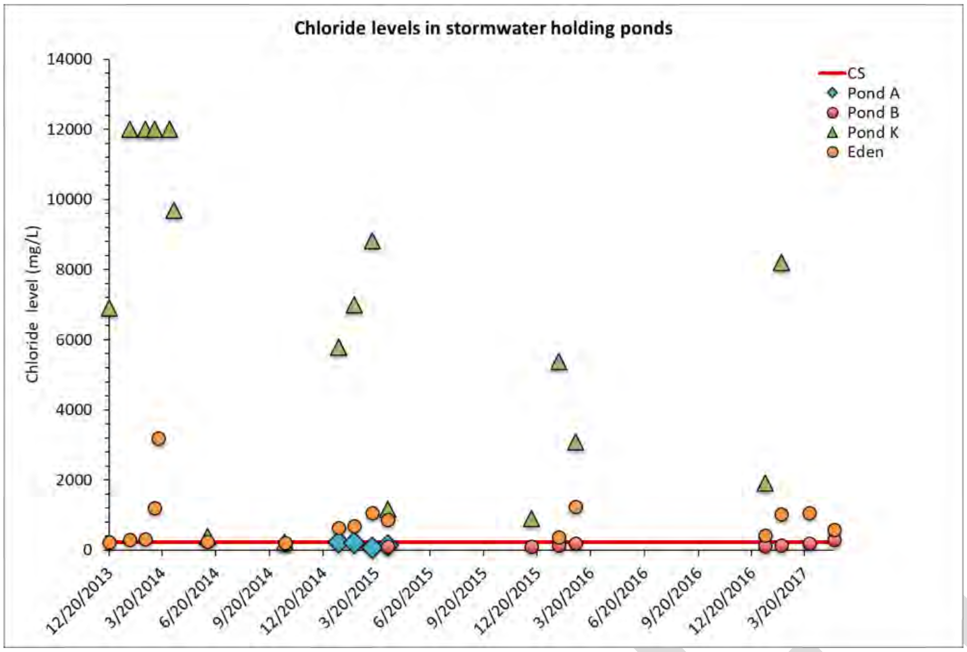

Figure 4.5-2 2013-2017 Chloride Levels within Stormwater Ponds

All chloride results (mg/L) on stormwater ponds draining the City of Eden Prairie Center to Purgatory Creek from 2013-2017. The MPCA chloride chronic standard (230mg/L) for class 2B waters indicated by the red line.

4.6 Nitrate Monitoring

The toxicity of nitrate to aquatic organisms has been a growing concern in MN over the last decade. Nitrate (NO_3), the most available form of nitrogen for use by plants, can accumulate in lakes and streams since aquatic plant growth is not limited by its abundance. While nitrate has not been found to directly contribute to eutrophication of surface waters (phosphorus is the main cause of eutrophication) and is not a MPCA water quality standard, studies have found that nitrate can cause toxicity in aquatic organisms. On November 12th, 2010, the MPCA released the Aquatic Life Water Quality Standards Technical Support Document for Nitrate: Technical Water Quality Standard Amendments to Minn. R. chs. 7050 and 7052 (still in the draft stage for external review) to address concerns of the toxicity of nitrate in freshwater systems and develop nitrate standards for class 2B and 2A systems. Sources of excess nitrate in freshwater systems are linked to human activities that release nitrogen into water. The draft chronic standard (CS) of 4.9mg/L nitrate-N.

During sampling, staff collects a surface 2m composite, a sample at the thermocline of the lake, and a bottom water sample to be analyzed for nitrate+nitrite and ammonia+ammonium. Three Rivers Park District conducts water sampling on Hyland Lake and shares data with the District. Their lab tests do not specifically test for nitrogen as nitrate+nitrite or ammonia, therefore, nitrogen data on Hyland has been omitted. The District monitors for nitrates in lakes as a part of its regular sampling regime. The District tests for nitrates in the form of nitrate+nitrite (the combined total of nitrate and nitrite, Table 4.6-1). This lab also tests for ammonia in the form of ammonia+ammonium (Figure 4.6-1). As seen in Table 2.1-1, all the lakes in the District met the draft nitrate CS. It is also important to note that the lab equipment used to test for nitrate has a lower limit of 0.03mg/L. Therefore, it is possible that some of the samples contained less than 0.03mg/L nitrate; because of this, actual average nitrate levels in District lakes may be lower than what measured (Table 4.6-1).

Table 4.6-1 2017 Lakes Summer Average Nitrate+Nitrite

2017 growing season (June-September) average nitrate+nitrite levels for District lakes. The MPCA proposed chronic standard (CS) is included in the table (orange). Lower limit of lab analysis of nitrate+nitrite is 0.03mg/L, some of these averages may be lower than indicated.

Lake	Average Nitrate+Nitrite (mg/L)
CS	**4.9**
Ann	0.030
Duck	0.030
Lotus	0.030
Lucy	0.030
Rice Marsh	0.030
Riley	0.031
Silver	0.030
Staring	0.030
Susan	0.037
Idlewild	<0.05
Mitchell	<0.05
Red Rock	<0.05
Round	<0.05

Ammonia (NH_3), a more toxic nitrogen-based compound, is also of concern when discussing toxicity to aquatic organisms. It is commonly found in human and animal waste discharges, as well as agricultural fertilizers in the form of ammonium nitrate. When ammonia builds up in an aquatic system, it can accumulate in the tissues of aquatic organisms and eventually lead to death. The MPCA does have standards for assessing toxicity of ammonia; the CS of ammonia in class 2B is 0.04mg/L. Lab water sample testing measures for ammonia in the form of ammonia+ammonium. In lakes and streams, ammonium (NH_4) is usually much more predominant than ammonia under normalized pH ranges. Ammonium is less toxic than ammonia, and not until pH exceeds 9 will ammonia and ammonium be present in about equal quantities in a natural water system (as pH continues to rise beyond 9, ammonia becomes more predominant than ammonium). Figure 4.6-1 shows ammonia+ammonium average levels in each lake during the growing season. These numbers are not of concern at this point seeing that pH levels were normal throughout the 2017 growing season and because lab testing measures the combination of ammonia and ammonium. This suggesting that most of nitrogen found in these tests was from the less toxic compound ammonium.

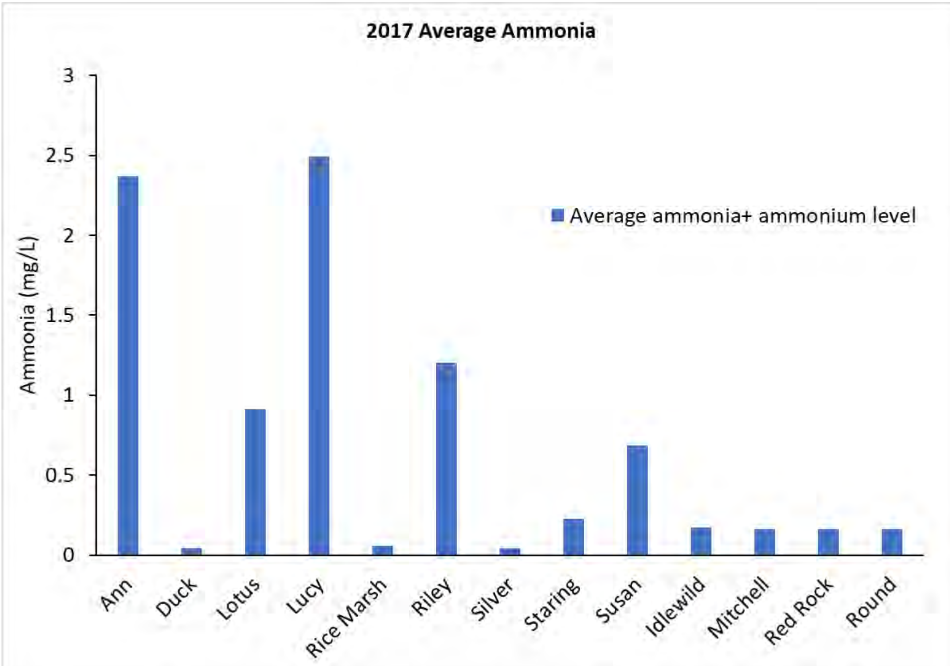

Figure 4.6-1 2017 Lakes Summer Average Ammonia+ Ammonium

The figure includes the average levels of ammonia+ammonium from samples taken on each lake during regular sampling within the growing season (June-September).

4.7 Zooplankton and Phytoplankton

In 2017, five lakes were sampled for both zooplankton and phytoplankton: Lake Riley, Rice Marsh Lake, Lake Susan, Lotus Lake, and Staring Lake. Zooplankton play an important role in a lake's ecosystem, specifically in fisheries and bio control of algae. Healthy zooplankton populations are characterized by having balanced densities (number per m^2) of three main groups of zooplankton: Rotifers, Cladocerans, and Copepods. The Sedgwick-Rafter Chamber (SRC) was used for zooplankton counting and species identification. A two mL sub-sample was prepared in which all zooplankton were counted and identified to the genus and/or species level. The sample was scanned at 10x magnification to count and identify zooplankton using a Zeiss Primo Star microscope. Cladocera images were taken using a Zeiss Axiocam 100 digital camera and lengths were calculated in Zen lite 2012. The District analyzed zooplankton populations for the following reasons:

1. Epilimnetic Grazing Rates (Burns 1969): The epilimnion is the uppermost portion of the lake during stratification where zooplankton feed. Zooplankton can be a form of bio control for algae that may otherwise grow to an out-of-control state and therefore influence water clarity.
2. Population Monitoring (APHA, 1992): Zooplankton are a valuable food source for planktivorous fish and other organisms. The presence or absence of healthy zooplankton populations can determine the quality of fish in a lake. Major changes in a lake (removal of common carp, winter kill, large scale water quality improvement projects, etc.) can change zooplankton populations drastically. By insuring that the lower parts of the food chain are healthy, we can protect the higher ordered organisms.
3. Aquatic Invasive Species Monitoring: Early detection of water fleas is important to ensure these organisms are not spread throughout the District. These invasive species outcompete native zooplankton for food and grow large spines which make them difficult for fish to eat.

The Sedgwick-Rafter Chamber (SRC) was used for phytoplankton counting and species identification. A one mL aliquot of the sample was prepared using a Sedgewick Rafter cell. Phytoplankton was identified to genus level. The sample was scanned at 20x magnification to count and identify phytoplankton species using a Carl Zeiss Axio Observer Z1 inverted microscope equipped with phase contrast optics and digital camera. Higher magnification was used as necessary for identification and micrographs. The District analyzed phytoplankton populations for the following reasons:

1. Population Monitoring: Phytoplankton are the base of the food chain in freshwater systems and fluctuate throughout the year. By insuring that the lower parts of the food chain are healthy, we can protect the higher ordered organisms such as macroinvertebrates and fish.
2. Toxin Producers and Algae Blooms: Some phytoplankton produce toxins that can harm animals and humans, or cause water to have a fowl taste or odor (*Microcystis, Aphanizomenon, Dolichospermum, Planktothrix, and Cylindrospermopsis).* Monitoring these organisms can help us take the proper precautions necessary and identify possible sources of pollution.

Lake Riley

In 2017, all three groups of zooplankton were captured in Lake Riley (Exhibit C), however only 4.3% of the population was comprised of Cladocerans. As expected, rotifers were the most abundant zooplankton sampled across all sampling dates (Figure 4.7-1). Similar to 2016, the number of rotifers identified in 2017 was highest during the first spring sampling event at 2.8 million, before declining to around 800 thousand for the remainder of the year. Copepod numbers followed a similar seasonal trend as seen with the rotifers. Cladoceran numbers remained low across all sampling dates; the highest number was recorded in April (193 thousand) and the lowest in August (17 thousand). Total Cladoceran counts in 2017 were very similar to numbers seen in 2016 (around 450 thousand) which is slightly lower than Cladoceran numbers seen in 2015. The slight reduction may be due to the increase in water clarity because of the alum treatment, causing increased predation although zooplankton populations can fluctuate for many reasons. The most predominant Cladoceran found in Riley was *Daphnia galeata mendotae* which was found across all sample dates.

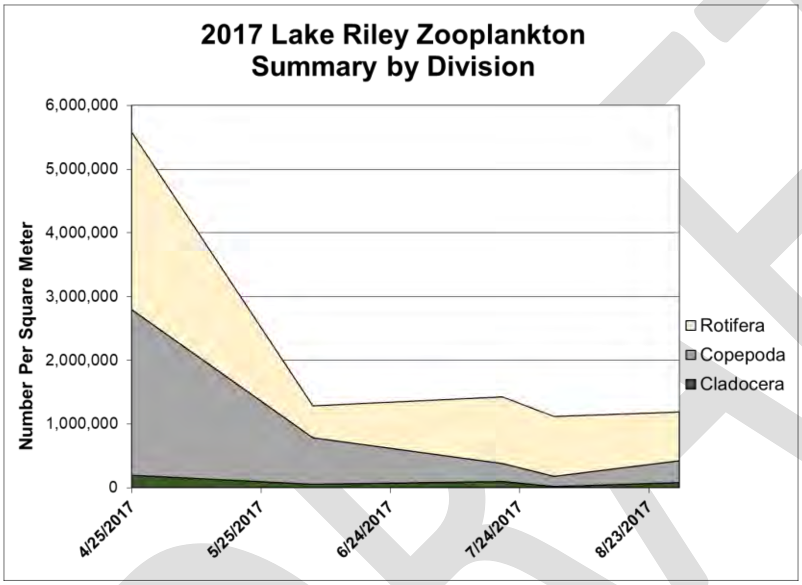

Figure 4.7-1 2017 Lake Riley Zooplankton Counts (#/m²)

Cladocera consume algae and have the potential to improve water quality if they are abundant in numbers. The estimated epilimnetic grazing rates of Cladocera observed were very similar-to and followed a similar seasonal trend to what was seen in 2016 but were down from rates observed in 2015. Early spring grazing rates were relatively stable peaking at 22% in June before bottoming out at 2% in August (Figure 4.7-2). The highest June grazing rates were linked to the presence of *Daphnia galeata mendotae* and optimal water temperatures for grazing, which were around 20 degrees Celsius.

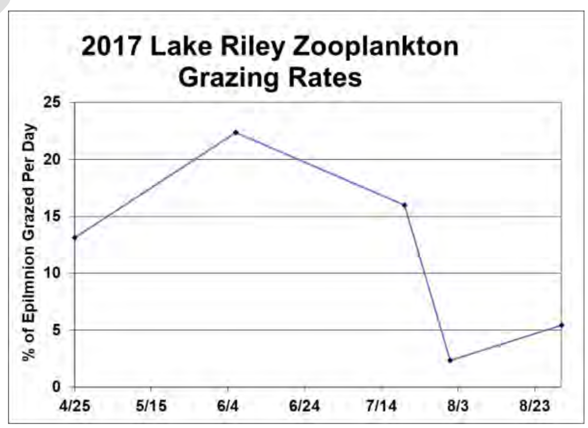

Figure 4.7-2 2017 Lake Riley Epilimnetic Grazing Rates

During the summer of 2017, staff collected three phytoplankton samples on Lake Riley (Exhibit D). The seasonal abundance of phytoplankton is presented in Figure 4.7-3. In mid-July, *Aphanizomenon sp*. made up 25% of the total phytoplankton abundance (TPA). During the early August sample event, Cyanobacterial species all together were 65% of the TPA. The cyanobacterial species *Aphanizomenon sp.* was a dominant species in the sample (55% of TPA).

Aphanizomenon sp. also comprised 42% of total phytoplankton abundance in late August. *Aphanizomenon sp.* is known as a possible toxin producer that may potentially produce cylindrospermopsin, anatoxins, and saxitoxins. These toxic compounds can pose serious threats to human and environmental health via contamination of drinking water, recreational exposure to waterborne toxins and possible accumulation of toxins in the food-web. *Rhodomonas sp.* or green algae (Class Cryptophyceae) was also dominant across all sampling events.

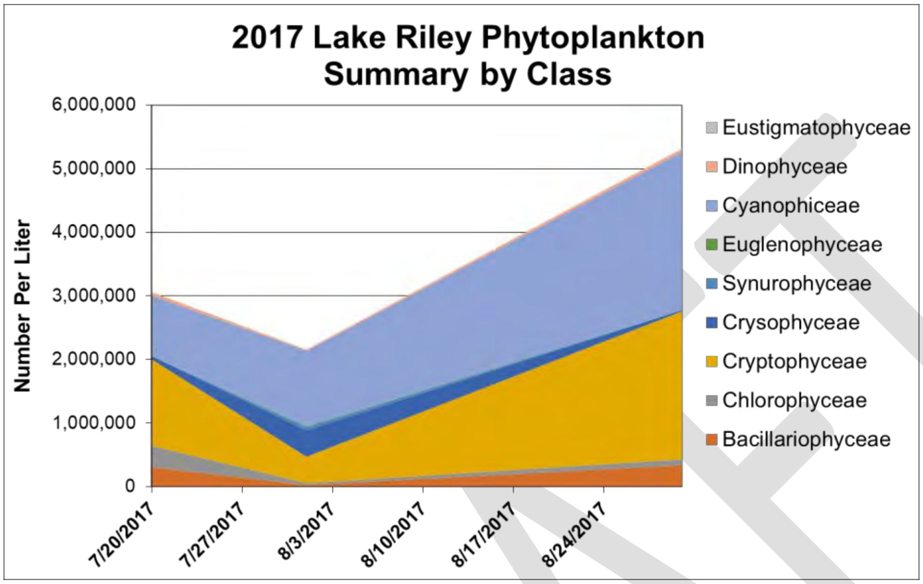

Figure 4.7-3 2017 Lake Riley Phytoplankton Abundance (#/L) by Class.

Lotus Lake

In 2017, all three groups of zooplankton were present in Lotus Lake (Exhibit C). Rotifers were the most abundant zooplankton sampled across all sampling dates (Figure 4.7-4). April rotifer numbers were very high (14.8 million) before oscillating between two and four million for the remainder of the year. Copepod numbers remained relatively level throughout the year averaging near one million across the sample dates. Cladoceran numbers were flat for most of the year (around 180 thousand) before increasing to nearly 700 thousand on the last sampling date in August. This increase was attributed to an increase in the larger Cladocera *Daphnia retrocurva* which was the most abundant Cladocera sampled in 2017. *Daphnia retrocurva* is known for its large curved helmet it develops in late spring-to-summer to reduce predation by planktivorous fish and invertebrates.

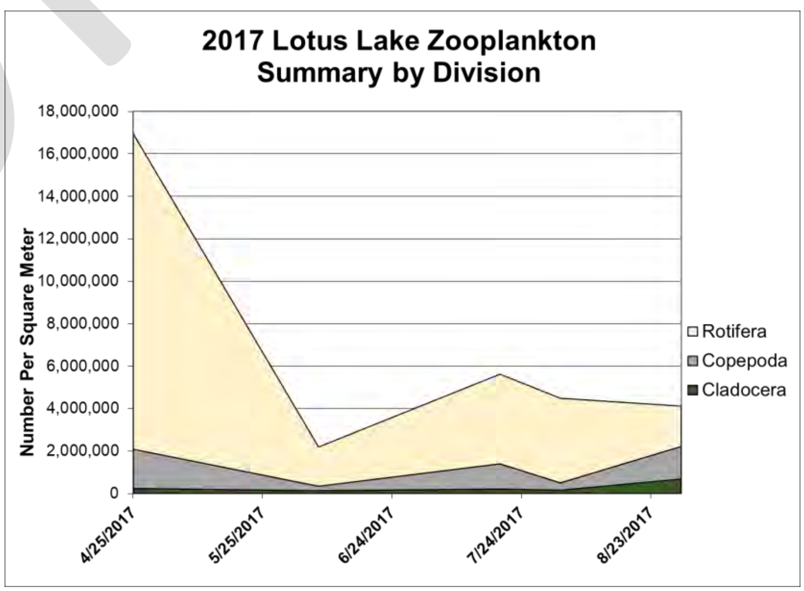

Figure 4.7-4 2017 Lotus Lake Zooplankton Counts (#/m²)

Large Cladocera consume algae and, if enough are present in a lake, they have the potential to improve water quality. The estimated epilimnetic grazing rates observed in 2017 ranged from 9% to 39% (Figure 4.7-5). As expected, grazing rates followed a similar trend to what was seen in the population fluctuations; the largest grazing rate occurred on August 30th when the spike in *Daphnia retrocurva* numbers occurred.

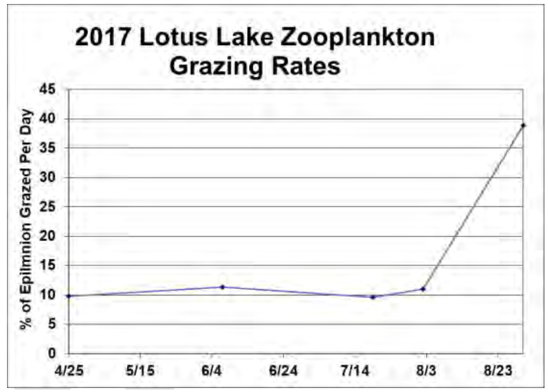

Figure 4.7-5 2017 Lotus Lake Epilimnetic Grazing Rates

During the summer of 2017, staff collected five phytoplankton samples on Lake Riley (Exhibit D). Abundance of phytoplankton across all sampling dates is presented in Figure 4.7-6. In early June the phytoplankton community was dominated by the green algae *Rhodamonas sp.* (43% from TPA) and green *Oocystis sp.* (31 % TPA). The cyanobacterial species *Dolichospermum* (previously *Anabaena sp.*), *Woronichinia sp*., and *Aphanizomenon sp*. were also observed in the sample. Both *Aphanizomenon* and *Dolichospermum* are known as potential toxin producers. *Dolichospermum* are a potential microcystin, anatoxin-a, saxitoxins and cylindrospermopsin producer. *Aphanizomenon* are a potential cylindrospermopsin, anatoxins, and Saxitoxins producer. Woronichinia are potential producers of microcystins. Only *Aphanizomenon sp.* increased in the late June sample while the others remained stable. *Chrysochromulina* and *Oocistis* sp. (Class Chlorophyceae) dominated the TPA in the June sample, making up 61% of the TPA. In July the cyanobacterial species *Aphanizomenoon sp*. bloomed and was dominant in the sample (57% TPA). The bloom should appear like grass clippings (leaf like aggregates) on the water, due to the aggregation of thousands of individuals. During the early August sample, Cyanobacterial species all together made up 73% of the TPA. The cyanobacterial species *Aphanizomenon sp.* was a dominant species in the sample (56% of TPA) which was reduced to 35% TPA during the late August sample.

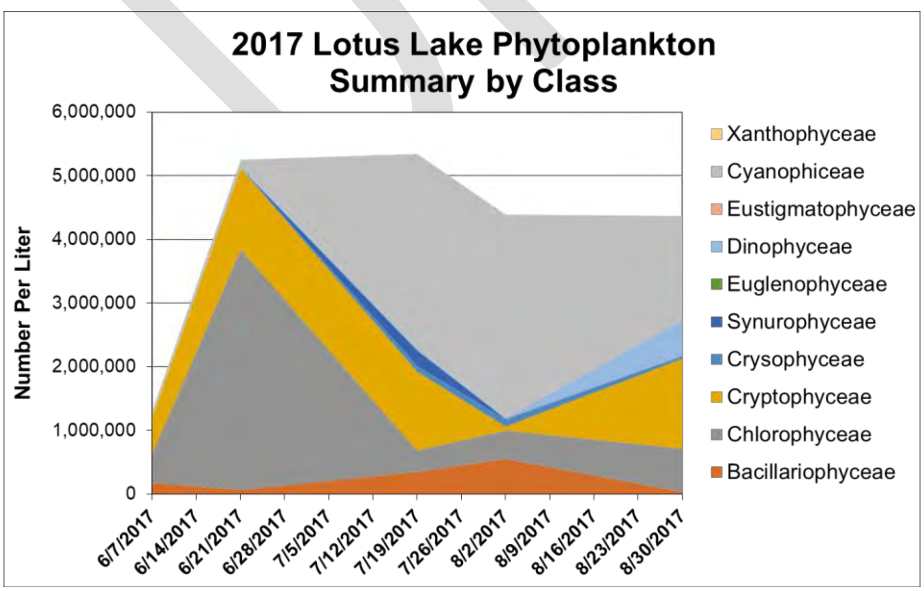

Figure 4.7-6 2017 Lotus Lake Phytoplankton Abundance (#/L) by Class.

Lake Susan

Rotifers were the most abundant zooplankton captured in 2017 in Lake Susan (Exhibit C). The rotifer population was variable over the sampling events with the highest concentration occurring in April (4.8 million organisms). Copepod numbers were also highest during the spring sampling event (1.5 million) but remained stable across the remainder of the year, averaging around 400 thousand (Figure 4.7-7). Overall, Cladocera numbers were low, under 91 thousand individuals per sampling event, except for the spring sample which had 409 thousand organisms. The lowest Cladocera population was recorded in early August when only 28 thousand individuals were captured. The most abundant Cladocera captured in Lake Susan was *Daphnia galeata mendotae*.

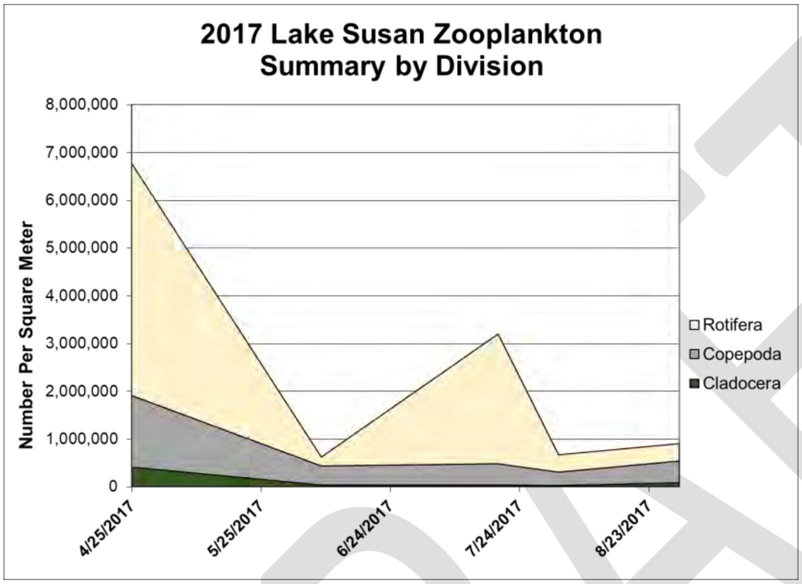

Figure 4.7-7 2017 Lake Susan Zooplankton Counts

The estimated epilimnetic grazing rates upon algae observed in 2017 were very low, ranging from 0.3% to 4.2% (Figure 4.7-8). This is mainly due to the very limited number of Cladocera present. The highest grazing rate was observed in April (4.2%) when *Daphnia galeata mendotae* were more numerous in the zooplankton community. During the last sampling event, *Leptodora kindtii* were captured, which has been uncommon. Leptodora, the largest planktonic Cladoceran, occurs in a wide range of conditions, including clear, oligotrophic lakes, as well as eutrophic lakes.

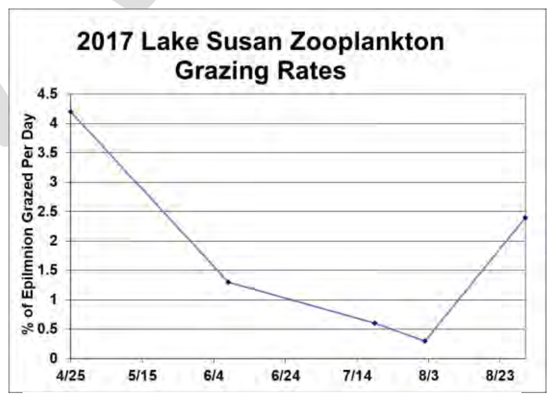

Figure 4.7-8 2017 Lake Susan Epilimnetic Grazing Rates

During the summer of 2017, staff collected four phytoplankton samples on Lake Susan (Exhibit D). Abundance of phytoplankton by Class are presented in Figure 4.7-9. Across all sampling dates, cyanobacterial species were the dominant phytoplankton available. The cyanobacterial species *Cylindrospermopsis, raciborskii,* and *Aphanizomenoon sp.* began blooming in early July and an extremely large bloom of *Cylindrospermopsis raciborskii* occurred in early August (96% TPA). *Cylindrospermopsis sp.* remained at high concentrations (42% TPA) in late August. However, *Chlamidomonas sp.* was among the common species in the sample (nearly 19% of TPA). Higher abundance of *Chlamidomonas* may indicate increased organic pollution. Chlamydomonas together with *Criptomonas*, and *Tetraselmis* produce cucumberlike, fishy, or "skunklike" odorous compounds.

Aphanizomenon may produce cylindrospermopsin, anatoxins, and saxitoxins. *Cylindrospermopsis* is a well-studied species due to the production of toxins like cylindrospermopsin and anatoxin; it was also shown to produce paralytic shellfish poisoning (PSP) toxins. These toxic compounds can pose serious threats to human and environmental health via contamination of drinking water, recreational exposure to waterborne toxins and possible accumulation of toxins in the food-web.

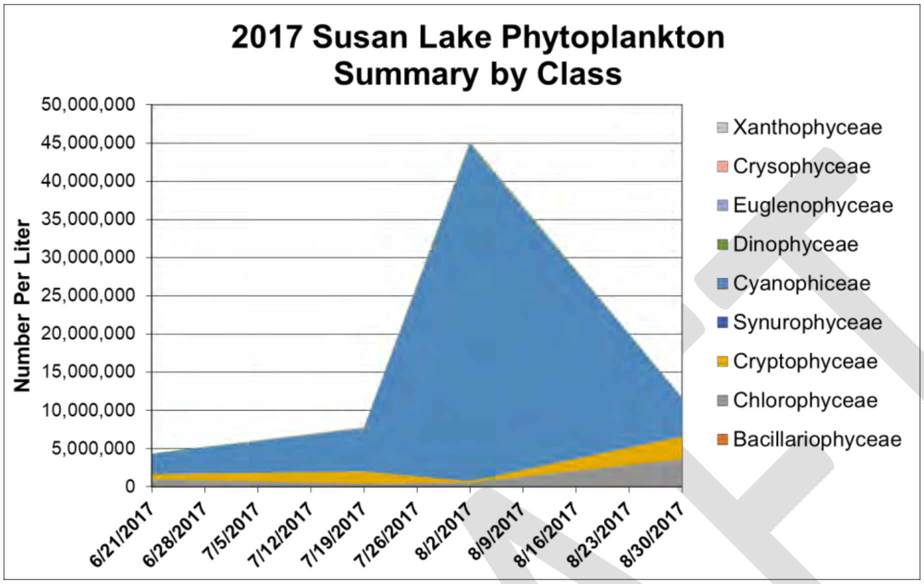

Figure 4.7-9 2017 Lake Susan Phytoplankton Abundance (#/L) by Class.

Rice Marsh Lake

In 2017, all three groups of zooplankton were captured in Rice Marsh Lake (Exhibit C), in which 27% of the population was comprised of Cladocerans. As expected, rotifers were the most abundant zooplankton sampled across all sampling dates, except during the late August sample when many *Bosmina longirostris* were captured (Figure 4.7-10). All zooplankton groups were at their highest abundance during the first sampling event in August. All other dates yielded far lower densities. Cladoceran numbers remained relatively low during the first two sampling dates, averaging 223 thousand; larger populations were captured during the last two sampling periods, averaging 1.6 million. Across all sampling dates the Cladoceran community was dominated by small-bodied zooplankton, consisting of mainly *Bosmina longirostris* and *Ceriodaphnia sp*.

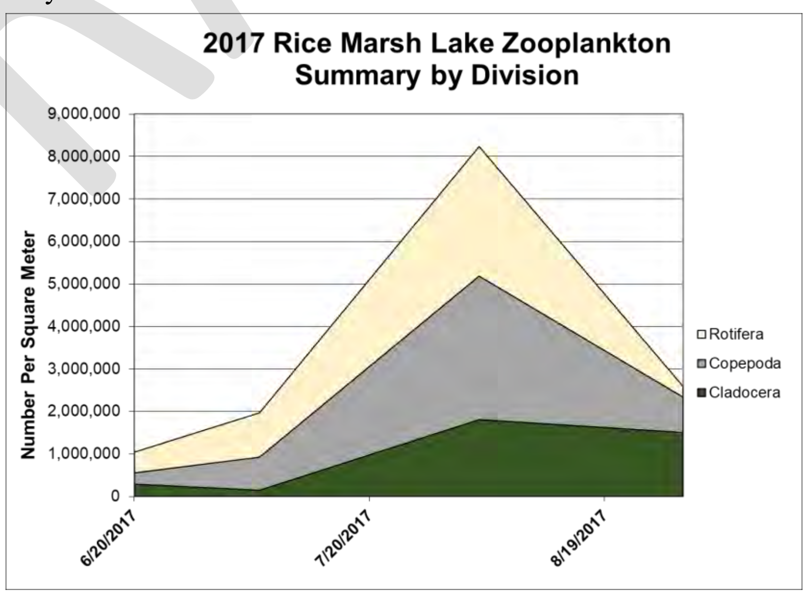

Figure 4.7-10 2017 Rice Marsh Lake Zooplankton Counts (#/m²)

The estimated epilimnetic grazing rates of Cladocera observed in 2017 ranged from 3.9% to 32% on Rice Marsh Lake (Figure 4.7-11). April and June grazing rates were relatively low before peaking at 32% in early August. The highest August grazing rate was linked with the high number of *Bosmina longirostris* and *Ceriodaphnia sp*. present. The most common Cladocera present was *Bosmina longirostris* which are commonly found in bog lakes such as Rice Marsh Lake.

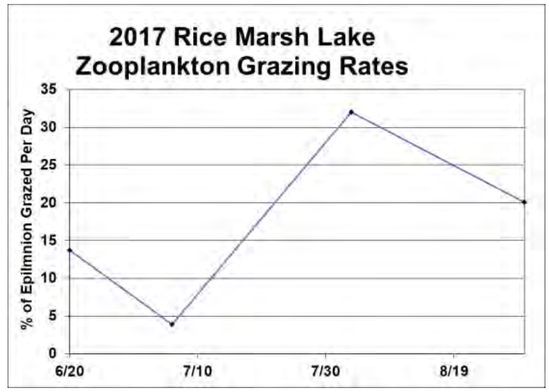

Figure 4.7-11 2017 Rice Marsh Lake Epilimnetic Grazing Rates

During the summer of 2017, staff collected four phytoplankton samples on Rice Marsh Lake (Exhibit D). Abundance of phytoplankton by Class for Rice Marsh Lake is presented in Figure 4.7-12. Across all sampling events the phytoplankton community was dominated by the green algae *Rhodamonas sp.* (Class Cryptophyaceae). The only exception occurred in early June when the community was dominated by the *Aulacoseira sp.* (57% TPA) or diatoms (Class Bacillariophyceae). Cyanobacteria species remained consistent across the summer averaging 233 thousand individuals per sampling event.

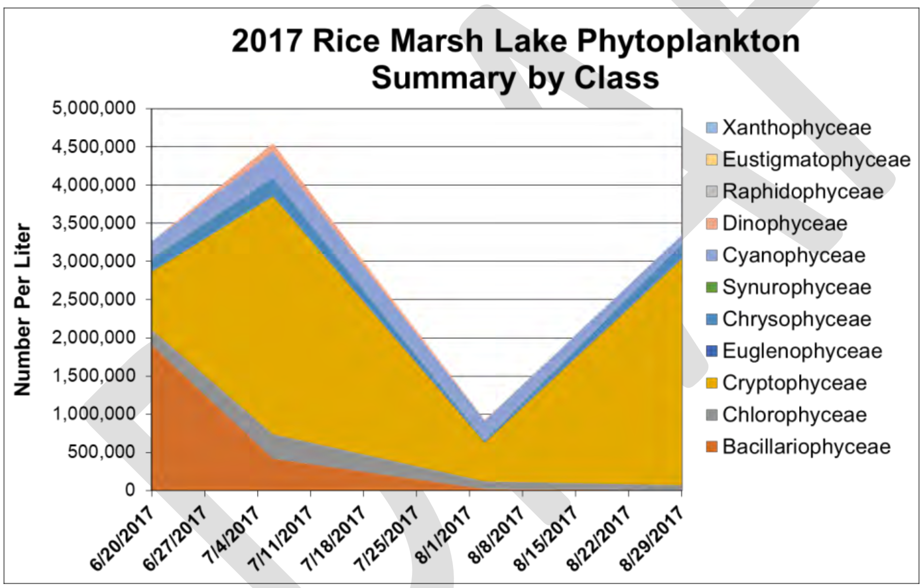

Figure 4.7-12 2017 Rice Marsh Lake Phytoplankton Abundance (#/L) by Class.

Staring

In 2017, all three groups of zooplankton were present in Staring Lake (Exhibit C). Rotifers were the most abundant zooplankton sampled in the 2017 (Figure 4.7-13). April rotifer numbers were high (over 3.1 million) before a decline to 1.6 million in June, and an average of 243 thousand for the remainder of the year. Copepod numbers were relatively flat across the first three sampling dates, averaging around one million before declining for the last two sampling periods. Cladoceran numbers remained relatively stable across all sampling dates except for the June sample which more than doubled the populations seen for the remainder of the year at 1.4 million individuals. The most abundant Cladocera were *Bosmina longirostris* which are common in lakes and ponds across the United States.

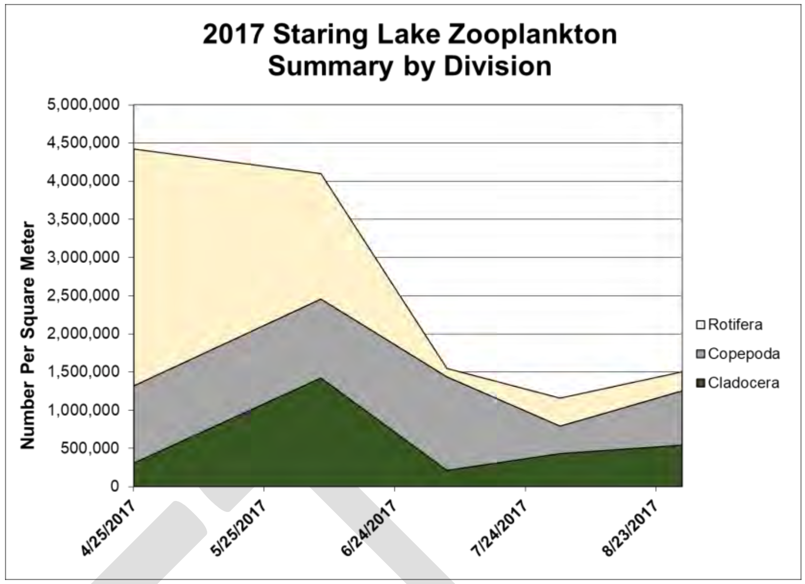

Figure 4.7-13 2017 Staring Lake Zooplankton Counts (#/m²)

Large Cladocera consume algae and may have the potential to improve water quality when present in large densities. The estimated epilimnetic grazing rates observed in 2017 ranged from 4.5% to 92% (Figure 4.7-14). The max grazing rate corresponded with the population spike in Cladocera seen in June. The grazing rates were variable across the remaining sampling dates.

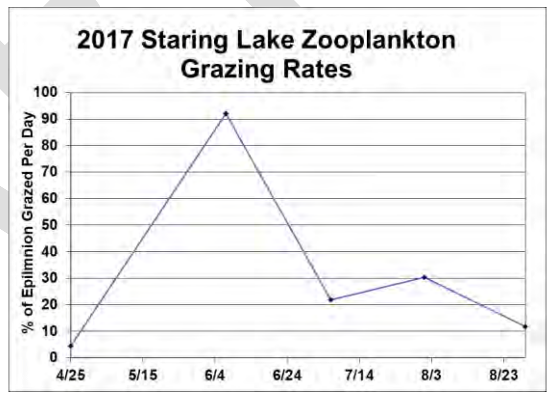

Figure 4.7-14 2017 Staring Lake Grazing Rates

During the summer of 2017, staff collected four phytoplankton samples on Staring Lake (Exhibit D). Abundance of phytoplankton by Class are presented in Figure 4.7-15. Cyanobacteria concentrations were very high across all sampling dates. *Aphanozomenon sp.*, *Microcystis wesenbergii*, and *Cylindrospermopsis* sp. were the most common. All these species can produce harmful toxins. Class Cryptophyceae and Chlorophyceae were also common across all sampling dates.

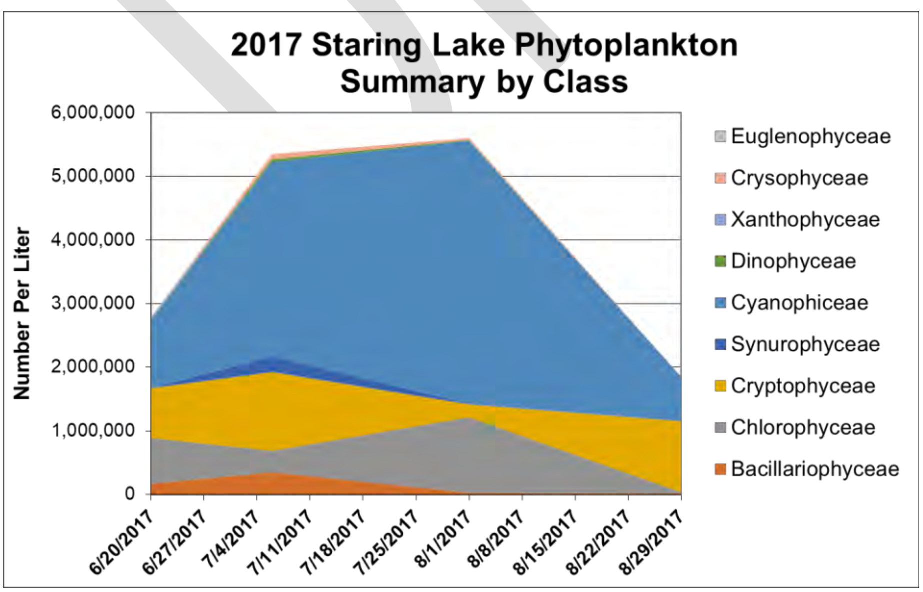

Figure 4.7-15 2017 Staring Lake Phytoplankton Abundance (#/L) by Class.

4.8 Lotus Lake and Hyland Lake Fish Kill

On May 12th, 2017, while conducting a regular check of District lake level sensors, RPBCWD staff observed several dead bluegills and crappies on Hyland lake around the boat launch. Additionally, on June 5th, 2017, staff noticed some dead bluegills and crappies near the boat ramp of the Lotus Lake public boat access while conducting regular water quality monitoring (Figure 4.8-1). The fish found had been dead for at least a few days and a majority were whole. Most of the fish were of catchable size with very few small fish visible, however smaller fish are scavenged more easily and could have been removed. Surface water temperatures on Lotus had warmed 3.09 degrees Celsius from the previous month's sampling date (5/16/2017) on Lotus.

Figure 4.8-1 Deceased Crappie Observed on Lotus Lake 6/5/2017

These fish kills were likely due to rapidly rising water temperatures combined with increased stress. Fish kills can occur on different area lakes when water temperatures warm in May and June following spawning activity. In the past, pathology investigations have identified a bacterial infection *Flexibacter columnaris* as a reason for previous fish kills. The University of Minnesota had previously collected fish samples from Lotus Lake in 2016 to determine if the bacterial infection is a secondary cause or a primary cause, but the results were inconclusive due to desiccation. Staff reported the 2017 fish kills to the University of Minnesota Fish Kill Reporting Map. See information below about *F. colmnaris* provided by the MNDNR:

A common fish disease caused by the bacterium *Flexibacter columnaris* can occur in local lakes. This pathogen can cause large kills of fish, particularly crappies, sunfish, and bullheads. Often only one fish species is affected (if more than one species is affected, the fish are generally the same size); frequently smaller, less hardy fish make up most of mortalities observed. Die-offs happen for a short period (typically 1-7 days) in spring and early summer. Effects of the bacterium are non-existent at other times of the year. Temperature conditions determine the timing and severity of infections and die-off. Fish disease caused by other bacteria species can happen under similar water conditions.

The *columnaris* bacterium exists naturally in lakes and can cause disease during conditions stressful to fish. The primary fish stresses triggering *columnaris* infection are rapid springtime increases in water temperature, coupled with spawning activity and low energy reserves from the previous winter. Fish infected with or killed by *Flexibacter columnaris* show signs of eroded fin edges, skin lesions, eroded gill tissue, and a grey-white to yellow skin slime. External symptoms might not be obvious. Fish succumbing to the disease or secondary infections often results in a noticeable fish kill. *Columnaris* disease-caused kills occur in many Minneapolis-St. Paul area lakes and can occasionally affect several thousand fish. On some lakes, kills occur every year. Almost always, fish losses are small relative to numbers of the lake's total population. In observing and investigating many fish kills, MNDNR Fisheries have seen little, if any, noticeable changes in angler success attributable to *columnaris*-related die-offs. No practical antibiotic treatment exists for treating lake areas affected by this naturally occurring, common bacterium. Live fish infected with *Flexibacter columnaris* are edible. Fish caught having *columnaris* should be skinned and prepared as desired, make sure the fish is cooked to a temperature of at least 140 degrees F for at least five minutes.

4.9 Lake Susan Spent-Lime Treatment System

Lake Susan is an 88-acre lake next to Lake Susan Park. It is an important resource in the city of Chanhassen and the Riley Purgatory Bluff Creek Watershed District. The lake is a popular recreational water body used for boating and fishing. Lake Susan is connected to four other lakes by Riley Creek. It receives stormwater runoff from 66 acres of land around it, and from two upstream lakes. The stormwater entering the lake carries debris and pollutants, including the nutrient phosphorus. Phosphorus is a nutrient that comes from sources such as erosion, fertilizers, and decaying leaves and grass clippings. Excess phosphorus can cause cloudy water and algal blooms in lakes. Removing phosphorus from stormwater is a proven way to improve the water quality of lakes and streams.

Figure 4.9-1 Spent Lime Treatment System

A spent-lime filtration system was constructed at a culvert of a tributary stream draining a wetland on the south-west corner of Lake Susan (Figure 4.9-1). Based on a system performance at the one other site in the Twin Cities area, the system was anticipated to remove approximately 45 pounds of phosphorus annually from water entering the lake. This would result in improved water quality and recreational opportunities. Spent-lime is calcium carbonate that comes from drinking-water treatment plants as a byproduct of treating water. Instead of disposing of it, spent-lime can be used to treat stormwater runoff. When nutrient-rich water flows through the spent-lime system, the phosphorus binds to the calcium. The water flows out of the spent-lime system, leaving the phosphorus behind.

In 2016, staff collected water samples at the spent-lime treatment system to assess the treatment effectiveness of the unit. Overall, results varied considerably across all sampling dates. With this type of treatment system as seen in other locations, we would expect to see reductions in phosphorus and suspended solids, however, for the first year of monitoring this largely did not occur. In 2016 it was determined that the major source of the variable results was that the unit may have been short circuiting through the cleanout access points and various other areas when water conditions were high. As with most new treatment systems, often things need to be tested and altered slightly to achieve the greatest removal efficiencies. Barr Engineering hired a contractor to modify the system to minimize the potential for short circuiting and top-off the spent lime. Following the modifications, the system was put online for the summer of 2017.

In 2017, RPBCWD staff sampled the unit weekly during the summer and into the fall. The results were again highly variable, similar-to what was seen in 2016. Of the 17 total phosphorus sampling dates, 10 had reductions (Figure 4.9-1). The largest reduction occurred in early August; TP was reduced by 0.127 mg/l which is equal to a 14% reduction. In a lab setting, the spent-lime within the system was removing 20-30%, a rate of removal that could occur in the field under optimal conditions. Across seven sampling events, the results indicated an increase in TP at the outlet, which cannot occur as the phosphorus should be binding with the available calcium. The phosphorus should be locked in the system and phosphorus levels should be reduced.

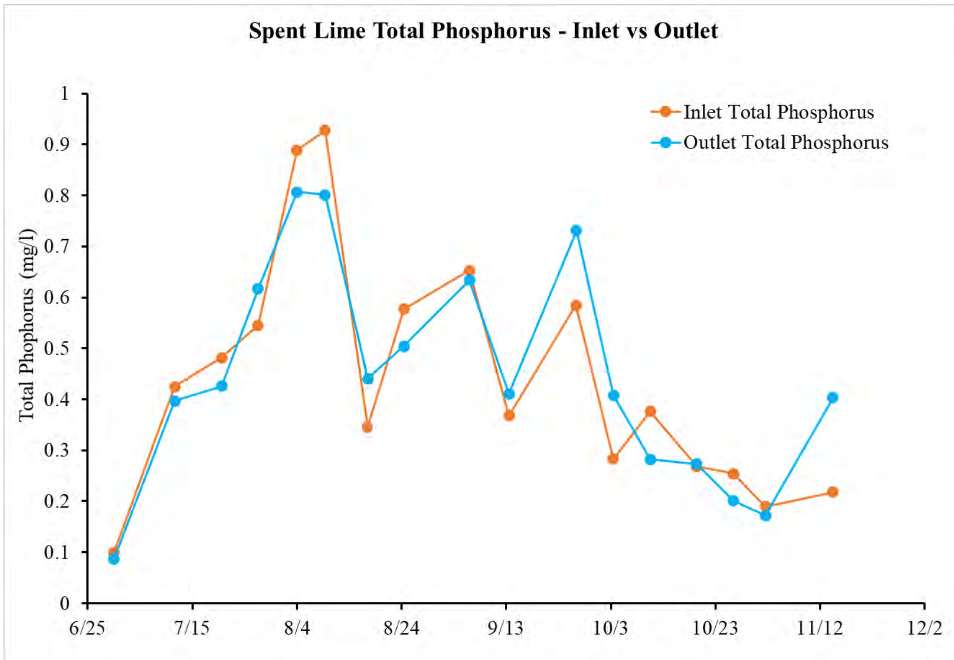

Figure 4.9-2 2017 Spent Lime Total Phosphorus (mg/L) - Inlet vs Outlet

District staff and Barr Engineering met to discuss options moving forward to improve the phosphorus removal performance of the system. One plausible explanation discussed for the variable results was that stream water was entering the sampling location, hence compromising our monitoring location at the outlet. If this was the case, sample results would not reflect the filtering capacity of the system. The spent-lime system has a backflow preventer valve system between it and the stream to deter this from occurring, however, the flap might not be sealing property, or debris may be causing stream water to contaminate the sample area. To address this issue, staff will take future samples at a different location. In 2017, sampling ports were installed at various locations within the spent-lime. Monitoring these locations will allow us to see removals throughout the spent lime layers and will let us know removal efficiencies. If it is determined that limited removal is occurring, the spent lime will further be tested in the lab to assess dry/wet periods and its effect on phosphorus removals. We will continue to monitor the pH of the system to ensure water contact time with the spent lime is optimized for maximum removal efficiency.

4.10 Rice Marsh Lake Stormwater Inputs

The District wanted to better capture and understand rain event nutrient loading into Rice Marsh Lake from the residential and business area northwest of the lake. This area was identified as a potential site for a water quality improvement project. However, more information on nutrient loading was needed to assess whether a project was needed. In August of 2016, District staff deployed an automated water-sampling unit at a storm drain pipe access point on Dakota Lane. They redeployed this unit again at this point in 2017. This pipe drains to a stormwater pond which then drains into Rice Marsh Lake. Analyzing the “first flush” of a storm event is important because these events are when water pollution entering storm drains in areas with high proportions of impervious surfaces is typically more concentrated compared to the remainder of the storm. Water samples were analyzed for TDP, TP, TSS, and Chl-a. The automated water-sampling unit also tracked flow of water in the storm drain pipe at that point. In conjunction with the unit samples taken during/after a rain event, staff collected post-rain samples from the pond.

In 2017, the amount of TP moving through the culvert after a rain event was high, as seen in figure 4.10-1. Five of 14 samples taken had TP levels exceeding the ceiling of the MPCA standard for stormwater ponds (0.1mg/L-0.25mg/L), the highest being 0.43mg/L. The rest of the samples all exceed the floor of the standard (Figure 4.10-1). TP levels in the pond were lower, none exceeding the ceiling of the MPCA TP water quality standard (Figure 4.10-2); all but two samples did however exceed the floor of the standard. Relative to TP measurements, TDP readings were low, the highest in-drain reading measuring 0.07mg/L, and the highest pond reading measuring 0.063mg/L (Figure 4.10-1, Figure 4.10-2). TSS was also quite high in samples taken from the stormwater drain pipe. Seven of the 14 samples had TSS levels higher than 30mg/L (MPCA standard for TSS in District creeks is <10% of the time exceedance of 30mg/L TSS, Figure 4.10-3). There is no water quality standard for water in a stormwater pond, but all samples collect from the pond had TSS levels below 30mg/L (Figure 4.10-4). These results indicate the stormwater pond is reducing the amount of nutrients entering Rice Marsh Lake from these inputs. However, removing more nutrients from the water before it enters the pond via a treatment system or BMP could potentially lead to a greater increase in water quality of the lake.

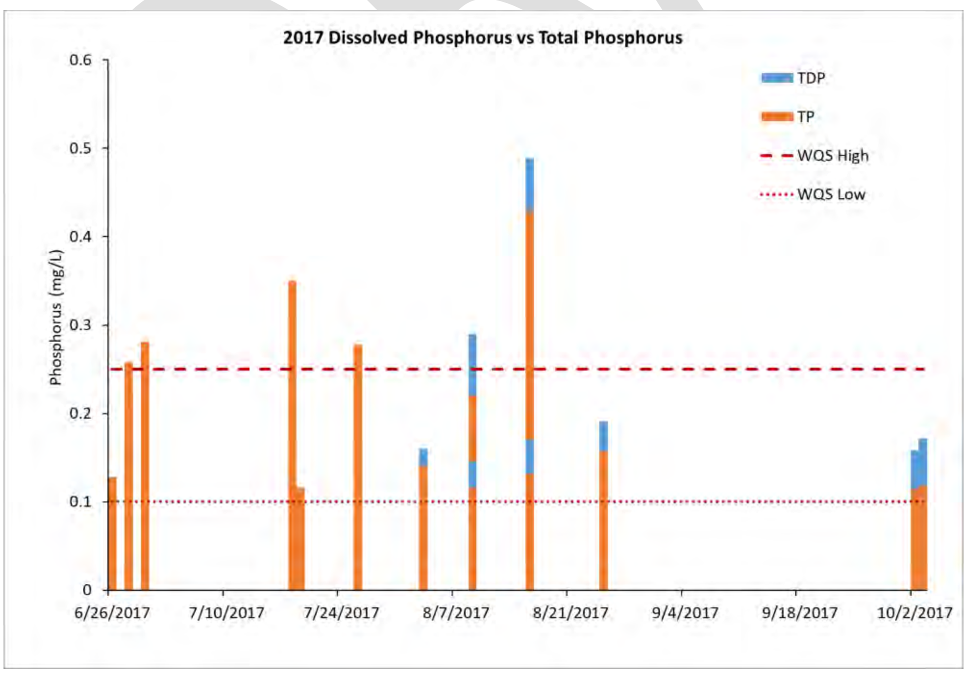

Figure 4.10-1 2017 Stormwater Dissolved Phosphorus and Total Phosphorus Inputs to Rice Marsh Lake

Total Dissolved Phosphorus (TDP) and Total Phosphorus (TP) concentrations (mg/L) from the stormwater draining into the pond at the northwest end of Rice Marsh Lake. Dashed lines represent the Minnesota Pollution Control Agency TP Standards for stormwater ponds (0.1mg/L-0.25mg/L).

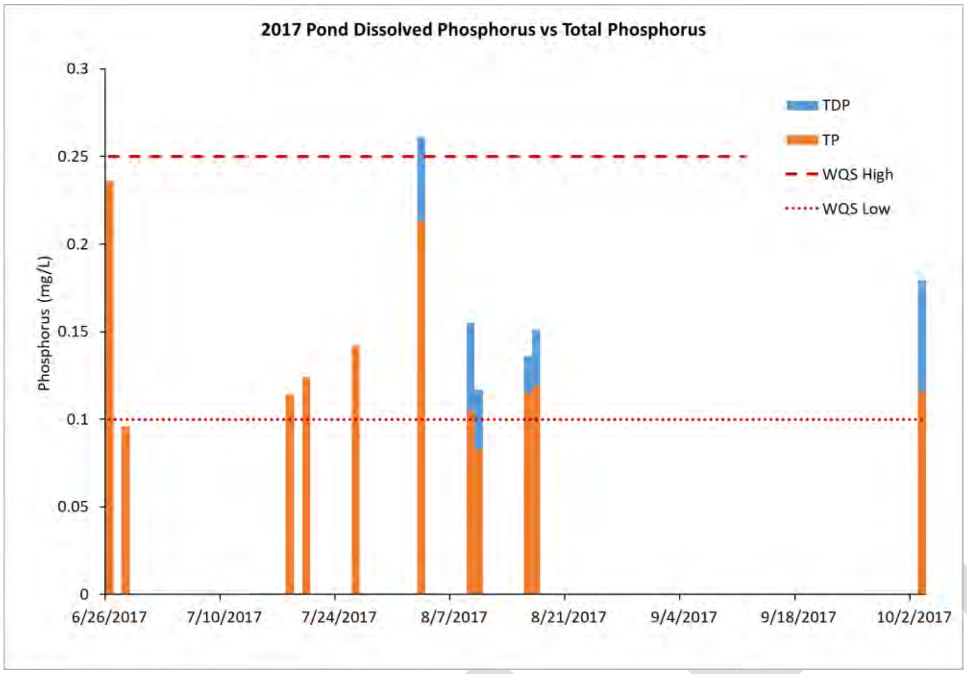

Figure 4.10-2017 Stormwater Pond Dissolved Phosphorus and Total Phosphorus Inputs to Rice Marsh Lake

Total Dissolved Phosphorus (TDP) and Total Phosphorus (TP) concentrations (mg/L) from the stormwater pond draining into the northwest corner of Rice Marsh Lake. Dashed lines represent the Minnesota Pollution Control Agency TP standards for stormwater ponds (0.1mg/L-0.25mg/L).

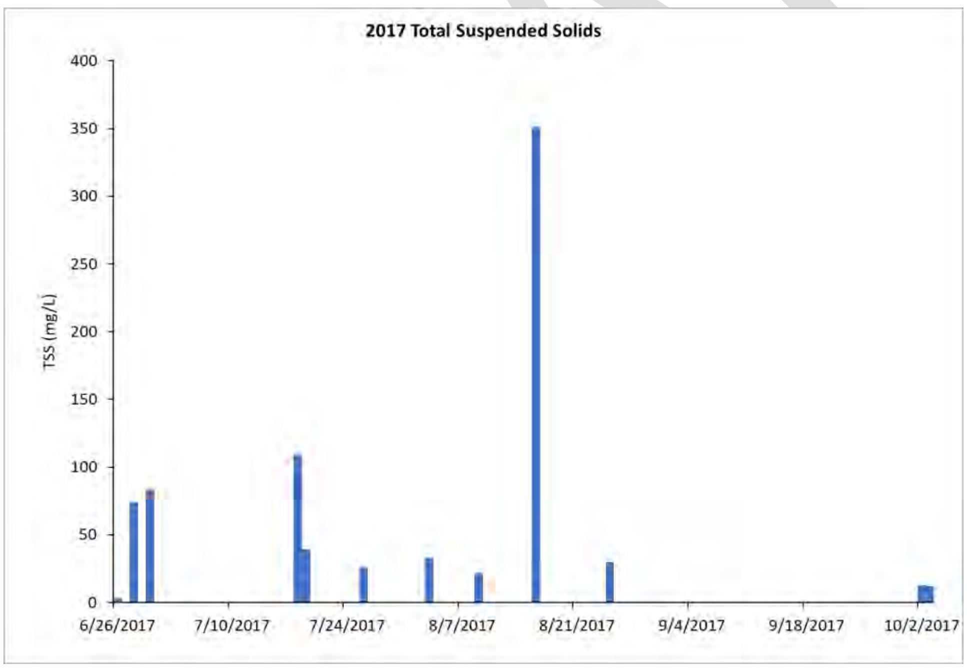

Figure 4.10-3 2017 Stormwater Total Suspended Solids Input to Rice Marsh Lake

Total Suspended Solids (TSS) concentrations (mg/L) from the stormwater draining into the pond at the northwest corner of Rice Marsh Lake.

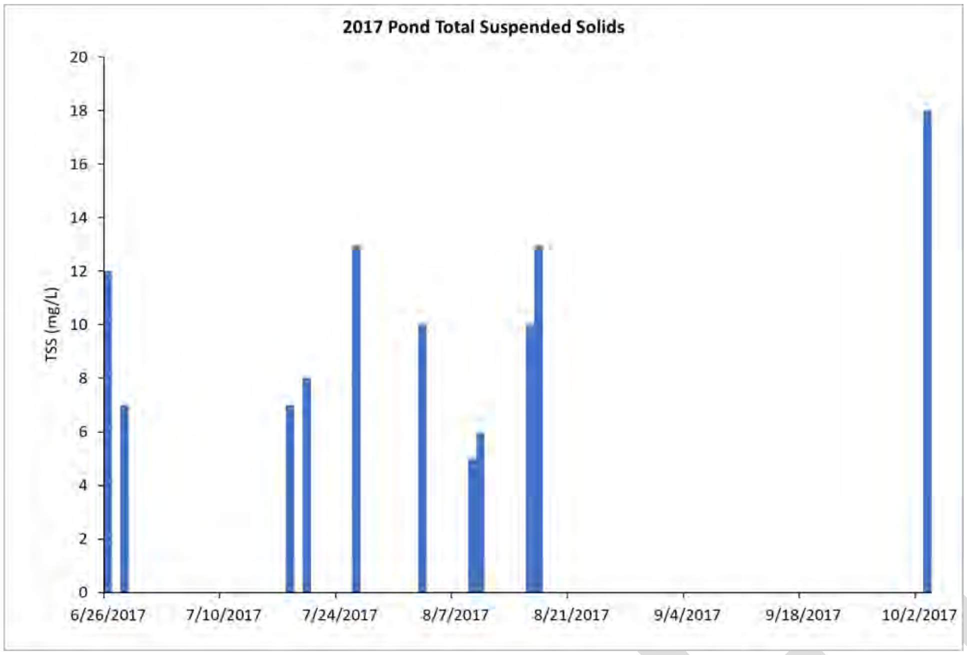

Figure 4.10-4 2017 Stormwater Pond Total Suspended Solids Inputs to Rice Marsh Lake

Total Suspended Solids (TSS) concentrations (mg/L) from the stormwater pond draining into the northwest end of Rice Marsh Lake.

5 Aquatic Invasive Species

5.1 AIS Management

Due to the increase in spread of Aquatic Invasive Species (AIS) throughout the state of Minnesota, staff completed an AIS early detection and management plan in 2015. As part of the plan, an AIS inventory for all waterbodies within the District was completed and a foundation was set up to monitor invasive species that are currently established within District waters (Table 5.1-1). Early detection is critical to reduce the negative impacts of AIS and to potentially eliminate an invasive species before it becomes fully established within a waterbody. Effective AIS management of established AIS populations will also reduce negative impacts and control their further spread. The RPBCWD AIS plan is adapted from the Wisconsin Department of Natural Resources (WIDNR), Minnehaha Creek Watershed District (MCWD), and the Minnesota Department of Natural Resources (MNDNR) Aquatic Invasive Species Early Detection Monitoring Strategy. The goal is to not only assess AIS that currently exist in RPBCWD waterbodies, but to be an early detection tool for new infestations of AIS. Figure 5.1-1 identifies what AIS monitoring/management occurred in 2017 excluding common carp management.

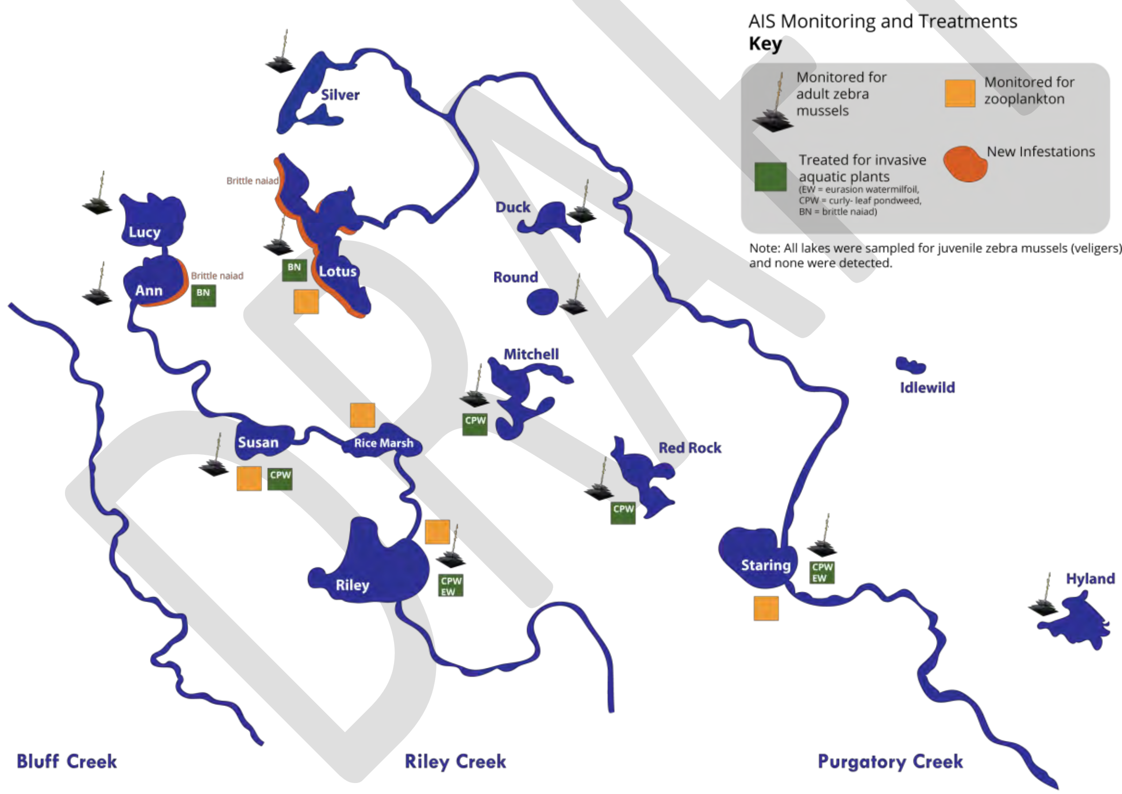

Figure 5.1-1 2017 Aquatic Invasive Species Sampling

Aquatic Invasive Species work conducted in 2017 within the Riley-Purgatory-Bluff Creek Watershed District. Zebra mussel plate symbol indicates some combination of the installation of plates at public boat accesses and bi-weekly public boat launch scans. Lakes that received zooplankton and phytoplankton sampling are identified by orange squares and lakes that received herbicide treatments are identified by green squares (CPW=curly-leaf pondweed; BN=Brittle Naiad; EW=Eurasian watermilfoil). The orange outlines around Lake Ann and Lotus Lake indicate that Brittle Naiad was discovered there in 2017. All lakes received juvenile mussel sampling; none were found. This map excludes carp management.

Table 5.1-1 Aquatic Invasive Species Infested Lakes

Lake Names	Infested Waters	Brittle Naiad	Eurasian Watermilfoil	Curlyleaf Pondweed	Purple Loosestrife	Common Carp
Ann	x	X	x	x	x	x
Lotus	x	X	x	x		x
Lucy	x		x	x	x	x
Red Rock	x		x	x	x	
Rice Marsh	x			x	x	x
Riley	x		x	x	x	x
Silver	x			x	x	
Staring	x	x	x	x		x
Susan	x		x	x	x	x
Duck	x			x	x	
Mitchell	x		x	x	x	
Round	x	x	x	x		
Hyland	x			x		

X – Indicates new infestation.

5.2 Aquatic Plant Management

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 evaluate temporal changes in vegetation community, identify the presence of new AIS within water bodies, and they can assess the effectiveness of herbicide treatments. Aquatic plant surveys have been conducted on a rotational basis within RPBCWD to ensure all lakes have received adequate assessments. As projects arise, or issues occur, additional plant surveys are conducted to aid in the decision-making process. Herbicide treatments have been shown to reduce and control aquatic invasive plants to a manageable level, which may in turn allow for native plants to increase in abundance. The District will continue to monitor the aquatic plant communities within our lakes and use herbicide treatments to manage aquatic invasive plants to sustain healthy aquatic communities into the future. In early May of 2017, herbicide treatments were carried out on Mitchell Lake, Red Rock Lake, Lake Riley, Staring Lake, and Lake Susan for curly leaf pondweed. Herbicide treatments were also carried out on Riley and Staring for Eurasian watermilfoil in mid-summer and early fall, as well as on Ann and Lotus for Brittle Naiad.

Eurasian watermilfoil (EWM) is a species native to Europe and Asia that has been introduced to the United States. The concern with this species is that it can form dense mats that outcompete native species and interfere with recreational activities such as boating, swimming, and fishing. Since the infestation of EWM in Staring Lake in 2015, the District has been working with James Johnson from the Freshwater Scientific Services (FWSS) and has developed a mechanical and chemical rapid response strategy to potentially eliminate the plant from the lake. The strategy of hand-pulling followed by a fall herbicide treatment has been successfully used to control new infestations of EWM on Weaver Lake (Hennepin Co.) and Lake Charlotte (Wright Co.). After surveying for EWM surveying during October of 2015, a combination of mechanical removal and herbicide treatments took place on Staring (treatment of 9.1ac).

A granular 3,5,6-trichloro-2-pyridinyloxyacetic acid herbicide was applied up to the maximum rate of 67.5 pounds per acre foot to eliminate plants too deep to pull.

The herbicide treatment in 2015 was successful as no EWM was discovered in the treatment areas in 2016. That said, during the first two scans or the 2016 summer, 30 plants were discovered across the lake (Figure 5.2-1 – Panel A). RPBCWD staff hand pulled these plants (Figure 5.2-1 – Panel A). The same herbicide was then applied to Staring Lake, treating 6.5ac (one site at the northwest end, and another at the east end of the Lake). This treatment targeted deep plants that were not pulled (Figure 5.2-1 – Panel A). Johnson and RPBCWD staff each performed one last scan in the fall and identified an additional 20 plants (Figure 5.2-1 – Panel B), after which RPBCWD staff mechanically removed all plants except two deep plants that were topped and marked for removal/treatment in 2017.

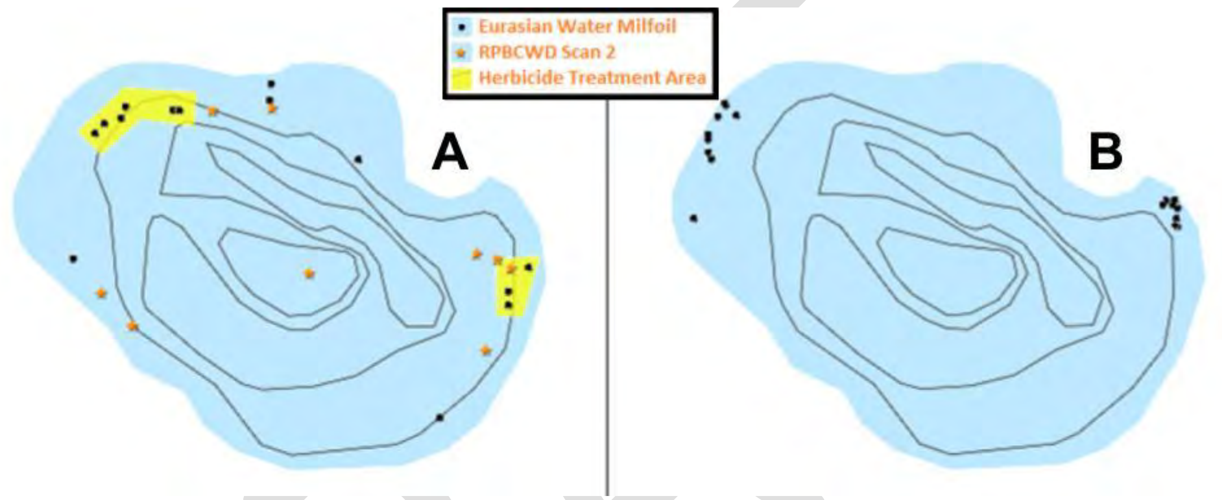

Figure 5.2-1 2016 Staring Lake Eurasian Watermilfoil Scans and Treatment

Eurasian watermilfoil scans/mechanical removals and mid-July herbicide treatment (yellow polygons-A) on Staring Lake in 2016. The initial scan conducted by James Johnson Freshwater Scientific Services on July 1st, 2016, are represented by the black dots. Scan and mechanical removal by RPBCWD staff on July 18th, 2016 is represented by the stars. Scan and mechanical removal on map B was conducted by FWSS on September 19th, 2016 and RPBCWD on October 1st, 2016.

RPBCWD staff conducted two scans during the 2017 season. During the first scan, which took place on July 28th, 2017, staff located several EWM plants, as well as a large cluster of plants at the west end of the lake; two floating plant fragments were also found along the south-southwest edge. Staff removed most of these plants and marked the large cluster in the eastern end of the lake for herbicide treatment (Figure 5.2-2). In the late summer of 2017, PLM Lakes and Land Management Corp applied herbicide to a two-acre area encompassing the large cluster of EWM plants. A second scan took place on September 7th, 2017, in which District staff located and mechanically removed 151 individual EWM plants from the northwest corner of the lake (Figure 5.2-2). The abundance of plants found on Staring in 2017 indicates that EWM is now well established within the lake. Staff will continue to monitor and remove plants in 2018 and further assess future actions at the end of the year.

Figure 5.2-2 2017 Staring Lake Eurasian Watermilfoil Infestation Areas

Eurasian watermilfoil scans carried out by RPBCWD staff on Staring Lake in 2017. The red markers indicate plants/clusters of plants marked by staff (the large group of markers at the east side of the lake were marked to be treated with herbicide; 2 ac). The blue markers indicate plants/clusters of plants marked and removed mechanically by staff.

On September 26, 2017, during a routine boat launch AIS inspection, staff observed brittle naiad (*Najas minor*) located on both sides of the public boat access on the south side of Lotus Lake. Brittle Naiad is a species native to Europe, western Asia, and northern Africa that has been introduced to the United States. The concern with Brittle Naiad is that it can form dense mats that can outcompete native plants. These dense communities can disrupt fish and waterfowl habitat, choking out plants which animals depend on for survival and potentially decreasing dissolved oxygen levels upon its decomposition. With that said, brittle naiad is a very new AIS and not much is known about its effects especially in Minnesota. Brittle naiad is a fairly resilient plant; it can survive in some polluted and eutrophic waters and can reproduce by fragmentation. Staff reported the occurrence of brittle naiad to Aquatic Invasive Species Specialist Keegan Lund of the MN DNR. Staff extended the inspection to a full scan of the lake, mapping the position of every observed brittle naiad occurrence with a handheld GPS. An effective treatment area was determined from the GPS points (Figure 5.2-3). That fall, PLM Lakes and Land Management Corp applied herbicide to treat for brittle naiad in the lake within the affected areas (area totaling 2.42ac, Figure 5.2-3). Brittle naiad was also found at one location on Lake Ann the previous month during a regular vegetation survey conducted by FWSS (August 2nd, Figure 5.2-4). Only a small cluster of plants were discovered across the lake; these plants were treated immediately with hopes to eliminate the plant before it could become established. A 0.25ac treatment plot was designated and treated with herbicide (Figure 5.2-4).

Figure 5.2-3 2017 Lotus Lake Brittle Naiad Treatment Areas

The red polygons indicate the areas treated with herbicide during the fall of 2017 for brittle naiad. The total area treated was 2.42ac.

Figure 5.2-4 2017 Lake Ann Brittle Naiad Treatment Area

The red polygon indicates the 0.25ac brittle naiad herbicide treatment area during late summer of 2017.

5.3 Common Carp Management

The RPBCWD, in cooperation with the University of Minnesota (UMN), 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 (Bajer, 2014), and the Purgatory Creek Carp Management Plan drafted in 2015 (Sorensen, 2015), the District took over monitoring duties from the University in 2015. Adult carp are monitored by conducting, three, 20-minute electrofishing transects per lake, three times between late July and October. If the total biomass estimate of carp is above 100kg/h, the District would need to consider hiring commercial fisherman to conduct winter seining. Young of the year (YOY) carp are monitored by conducting 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.

Figure 5.3-1 Purgatory Chain of Lakes Northern Pike – 41.4 inches

District staff completed fyke net surveys on all lakes within the RCL, as well as lakes within the Purgatory Chain of Lakes (PCL), including Lotus Lake, Staring Lake, the Upper Purgatory Creek Recreational Area (UPCRA), and the Lower Purgatory Recreation Area (LPCRA). As is true with many lakes during late summer located within the twin cities metro area, the RCL and PCL inshore fish community was dominated by bluegill sunfish and bullhead species. In 2017, Lake Riley had the highest number of bluegills captured averaging 342.8 fish per net, while an average of only 53.2 bluegills/net were captured on Staring Lake. In 2016 bluegill numbers/net in Staring Lake were the highest at 2,142 fish. The discrepancy between years may be explained by the natural fluctuation in bluegill populations but may also be related to the water levels when the fyke nets were set. In 2016 the water level was higher and allowed the nets to fish more effectively than in 2017. Many other Centrarchid species, including pumpkinseed sunfish and black crappie, were also very common across all lakes. Larger predator fish including northern pike and largemouth bass were frequently captured via fyke netting. A full summary table of the fish captured for each lake can be found in Exhibit B. In 2017 no YOY carp were captured in any of the lakes during fyke net surveys. Three YOY carp were captured during fyke netting on the Lower Purgatory Recreation Areas, suggesting minimal recruitment has occurred since 2015. The lack of young individuals captured indicates that 2017 was a very poor recruitment year for common carp overall. Bluegill catch rates within the LPCRA and UPCRA were similar to what was observed in the lakes sampled in 2017. In addition, the bluegill size structure combined with the limited winter monitoring conducted on the system, indicates that the past winters have not resulted in a winterkill.

PCL lakes (Staring and Lotus) and the Purgatory Recreation Area were surveyed via electrofishing in 2017. Due to the higher number of adults captured on Lotus Lake in 2016 (107.43 kg/ha), it was again sampled during the 2017 field season. In the 2017 assessment of Lotus Lake, the estimated total carp biomass was under the carp threshold (100 kg/ha) with an estimate of 68.75 kg/ha (Table 5.3-1). This can be attributed to the variability of the number of carp captured electrofishing from year to year. With no YOY carp captured combined with the lower adult carp biomass estimate deem the resident carp population in Lotus Lake of limited concern. In 2016 Staring Lake had common carp biomass estimates above the set threshold developed by the UMN (141 kg/h). Most of these fish were from the 2013/2015-year class with very few large adults captured. In 2017 the carp biomass estimate was below the UMN threshold at 61.7 kg/ha (Table 5.3-1). The Lower Purgatory Recreational Area was electrofished one time for 1.33 hours, which yielded a biomass estimate of 33.7 kg/ha. This was similar to 2016 which had an estimate of 35 kg/ha. These fish consisted entirely of individuals from the 2013/2015-year class, as seen in Staring Lake. Additionally, only two YOY carp were captured via electrofishing. The UPCRA again vastly exceeded the recommended biomass threshold in 2017 (245.2 kg/ha) and had an estimate similar to what was seen in 2016 (287 kg/ha). Normally, the upper rec area is disconnected from the lower rec area by a berm that splits the two. However, there was a breach in the berm in 2016 allowing for the system to be connected for most of 2017. Since the upper rec area is essentially the top of the system (fish cannot get to Silver Lake and Lotus) and has a deep-water refuge, fish moved to this location. Due to the shallowness of the system, winter seining would have limited effectiveness at capturing carp. Staff will investigate the possibility of conducting an open water seine this spring to reduce carp numbers in the upper rec area. Due to the low number of carp captured in Staring Lake, winter seining may yield limited success. Overall, 16 carp were tagged with implant-style VHF transmitters, twelve fish in Staring and four in the Purgatory Recreation Area. This will allow staff to locate when and where in the lake the carp are schooling.

Table 5.3-1 2017 Common Carp Biomass Estimates for the Riley and Purgatory Chains of Lakes

	Lake	Fish per Hour	Density per Hectare	Average Weight (kg)	Carp Biomass (kg/h)
Riley Chain	*Ann	0	0	0	0
	Lucy	3	17.17	4.53	77.83
	Rice Marsh Lake	1.33	9.32	6.08	56.62
	Susan	1.67	10.89	2.20	23.93
	Riley	0.33	4.61	3.19	14.72
	Lake Susan Park Pond	57.47	273.71	1.46	403.82
Purgatory Chain	Lotus	3.67	20.31	3.39	68.75
	Staring	9.76	48.99	1.26	61.66
	Lower Purgatory	8.27	41.99	0.80	33.70
	Upper Purgatory	26.62	128.40	1.91	245.17

*No adults (>300 mm) captured

Floating Trap Net

In the spring of 2017, staff placed a large floating trap net below the barrier in Purgatory Creek during peak spawning runs to capture carp as an experimental gear (Figure 5.3-2). Placing the net below the barrier did reduce fowling of the net by debris, however when the barrier had to be removed, the pulse of water did top the net or scour below it in some cases. This net was checked daily; fish were sorted, releasing natives and removing carp. The barrier was opened on March 3rd to allow northern pike to move up into the recreational area to spawn and return to Staring Lake. The barrier was closed on April 4th as temperatures exceeded 10 degrees Celsius on multiple days prior. The floating trap net was deployed April 11th to capture fish for education and outreach events and gauge carp movement. The City of Eden Prairie opened, cleaned, and closed the fish barrier multiple times this spring and late summer due to high water levels in the Purgatory Recreational Area, and eventually started cleaning it every Friday. Fish species captured included northern pike, black

Figure 5.3-2 Large Floating Trap Net Deployed in Purgatory Creek

crappie, freshwater drum, bigmouth buffalo, bluegills, largemouth bass, and black bullheads. The first carp was captured on April 21st and the total amount of carp removed was 139. We had hoped a larger number of fish would have been captured by the trap net, but as an experimental gear we were unsure of how many would be captured. At one point, an estimated 300-500 carp were trapped between the fish barrier and the net, however the net became overcome by a large rain event and the fish escaped by the time we could arrange the use of a backpack electrofisher. Staff will apply to again utilize the net next year and target these concentrations of fish with an electrofishing backpack.

Figure 5.3-3 Lake Susan Park Pond Common Carp

Lake Susan Park Pond Fish Assessment

As a continuation of last year's sampling, Riley Purgatory Bluff Creek Watershed District Staff added Lake Susan Park Pond to its regular monitoring schedule to assess the overall fish community and the abundance of common carp within the pond. Lake Susan Park Pond is a small (approximately 5.09ac) stormwater pond located on the northwest side of the lake. The pond's outlet is located at its southeast side and drains to Riley Creek which eventually enter Lake Susan approximately 623ft downstream. It was thought that Lake Susan Park Pond might be acting as a carp nursery, contributing to the carp population within Lake Susan.

Table 5.3-2 Lake Susan Park Pond Fyke Net Results

Species	Number of fish caught in each category (inches)									
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total	Fish/Hour
black bullhead		1		1					2	0.4
black crappie	46	19							65	13
bluegill	218	43							261	52.2
common carp						1			1	0.2
golden shiner	1	4							5	1
green sunfish	10	1							11	2.2
hybrid sunfish		1							1	0.2
northern pike						1	1		2	0.4
pumpkinseed	3								3	0.6
yellow bullhead		2	3	1					6	1.2
yellow perch	10								10	2

Adult carp had been visually observed within the pond and attempting to access the pond from Lake Susan at the pond outlet during high flow events. A total of four electrofishing surveys were conducted on the pond in which the entire pond was sampled.

Five fyke nets were set and pulled on the pond. In total, eleven species of fish were captured, all of which are species found within Lake Susan (Table 5.3-2). Fyke netting yielded no YOY carp which suggests that limited recruitment is occurring. The most abundant fish sampled was the bluegill sunfish (261 fish) which limit carp recruitment via egg predation (Table 5.3-2). Movement of fish in and out of the pond does occur in the southeast outlet to Riley Creek, however it is limited due to the culvert size, undercutting occurring below the culvert, and because of the high velocities during flow regimes high enough for fish to pass the culvert.

In 2016 one, 30-minute transect was conducted which yielded six large common carp. Calculating a carp biomass estimate for the pond using methods developed by the UMN yielded a biomass estimate of 90.5 kg/ha (Table 5.3-1). In 2017, four surveys were conducted which yielded a combined total of 243 adult carp captured and a biomass estimate of 403.82 kg/ha. Of this total, 153 carp were captured during the 10/5/2017 date when water levels were higher, and fish could easily be trapped against the shoreline brush. The UMN assessment method was developed for lakes within the watershed and not ponds, so biomass estimates should be used with caution. This said, LSPP has some characteristics similar-to shallow lake standards, including a depth of 13 feet. The biomass threshold for a lake is 100 kg/h, meaning the fish densities for the pond are alarmingly above this level and could considerably impact the water quality of the pond. Additionally, Lake Susan Park Pond is a small pond which could see a greater impact from a smaller density of carp than would be observed in lakes.

The results from electrofishing suggest that in 2017, Lake Susan Park Pond is not a significant source of recruitment for the carp population in Lake Susan (no YOY captured). The large number of adults caught is a concern for the potential of the pond becoming a nursery. However, the number of bluegills captured, coupled with the small size of the pond and the low likelihood of a winterkill due to groundwater connectivity, reduces this concern. The large number of adult carp found suggest that fish from the RCL are concentrating in the pond due to the instinct to swim upstream. After entering the pond during high flow events, the fish become trapped in the pond in numbers that may eventually degrade water quality. Fish within the pond seemed to be more easily captured than in area lakes. There was a reduction of the number of fish captured with each subsequent survey, suggesting that fish within the pond may be fished down utilizing electrofishing only. Additionally, with the proposed project which includes LSPP culvert replacement (extending its length) and surrounding stabilization, carp movement into the pond may be further hindered. The District will continue to monitor the pond to ensure LSPP does not become an issue for the RCL of lakes.

5.4 Zebra Mussel Monitoring

The District continued to monitor for adult and veliger zebra mussels in 2017. The District conducted veliger sampling from June to July on 13 lakes and a high-value wetland to detect the presence of zebra mussels. Each lake was sampled once, apart from Lake Riley and Lotus Lake, each of which were sampled twice due to the amount of summer traffic on these lakes. RMB processed the samples and found no zebra mussel veligers across all lakes.

Adult zebra mussel presence was assessed using monitoring plates that were hung from all public access docks and private docks of residents participating in the Adopt-a-Dock program. Monitoring plates were checked monthly and no mussels were found across all lakes during the 2017 open water season. Additionally, public accesses were scanned for approximately ten minutes during each regular water quality sampling period (bi-weekly). Staff visually searched rocks, docks, sticks, and vegetation for adult zebra mussels. No adult zebra mussels were found utilizing this technique in 2017. Brittle naiad was discovered during one of these regular boat launch checks, highlighting the importance of such scans and their continuation.

6 Lake and Creek Fact Sheets

The Riley Purgatory Bluff Creek Watershed District has included in this report informational fact sheets for the lakes and creeks that were monitored during the 2017 sampling season (See Exhibit F). The lake fact sheets include: Lake Ann, Duck Lake, Hyland Lake, Lake Idlewild (high value wetland), Lotus Lake, Lake Lucy, Mitchell Lake, Red Rock Lake, Rice Marsh Lake, Lake Riley, Round Lake, Silver Lake, Staring Lake, and Lake Susan. The creek fact sheets include: Bluff Creek, Purgatory Creek, and Riley Creek.

Each lake fact sheet includes a summary of the historical water quality data collected as related to the MPCA water quality parameters: Secchi Disk depth, Total Phosphorus, and Chlorophyll-a. Each creek fact sheet includes a summary of the most current Creek Restoration Acton Strategy assessment, which includes the analysis of infrastructure risk, water quality, stream stability/erosion, and habitat. Lake or creek characteristics, stewardship opportunities, and information about what the District is doing in and around local water bodies is also described in each fact sheet.

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8 Exhibits

Exhibit A	2016 & 2017 Lake Level Sensor Graphs
Exhibit B	2017 Fyke Net Summary Data
Exhibit C	2017 Zooplankton Summary Data
Exhibit D	2017 Phytoplankton Summary Data
Exhibit E	2017 Creek Assessments
Exhibit F	2017 Lake and Creek Fact Sheets

Exhibit A

2016 & 2017 Lake Level Sensor Graphs

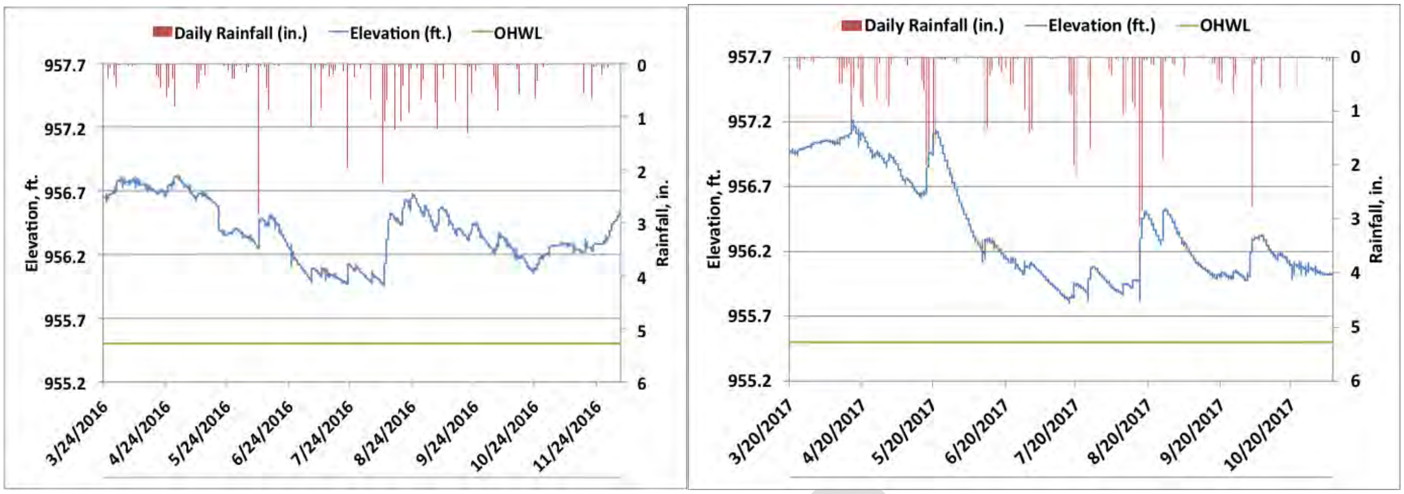


Figure A-1. **Lake Ann** level elevation data (ft.) for 2016 and 2017 along with the lake's ordinary high-water level (OHWL). Daily rainfall (in.) is displayed along the top of the graph (NOAA).

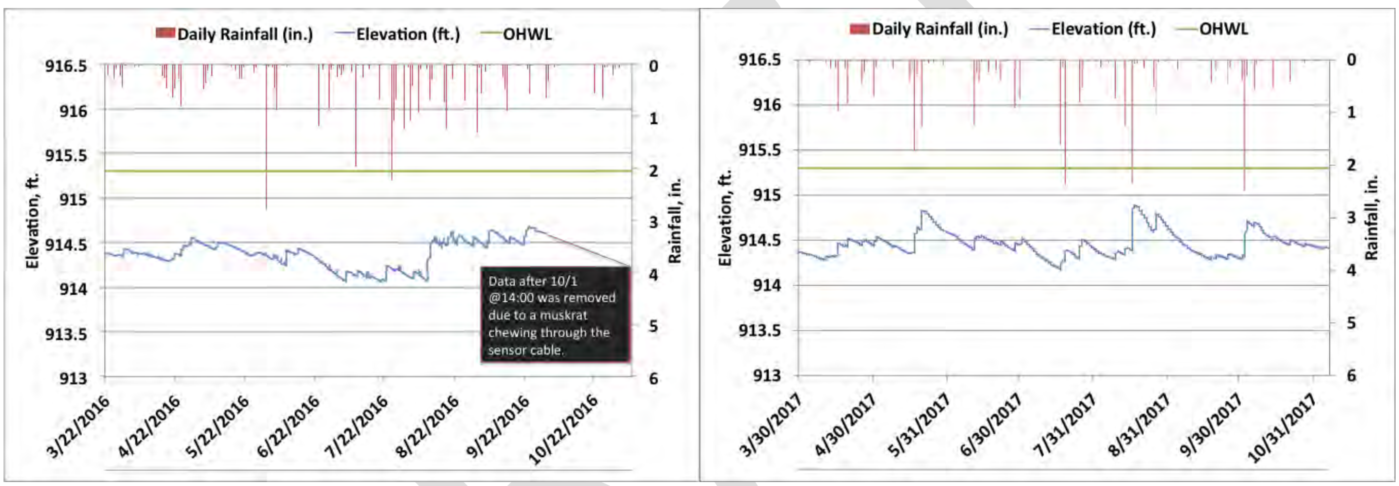


Figure A-2**. Duck Lake** level elevation data (ft.) for 2016 and 2017 along with the lake's ordinary high-water level (OHWL). Daily rainfall (in.) is displayed along the top of the graph (NOAA).

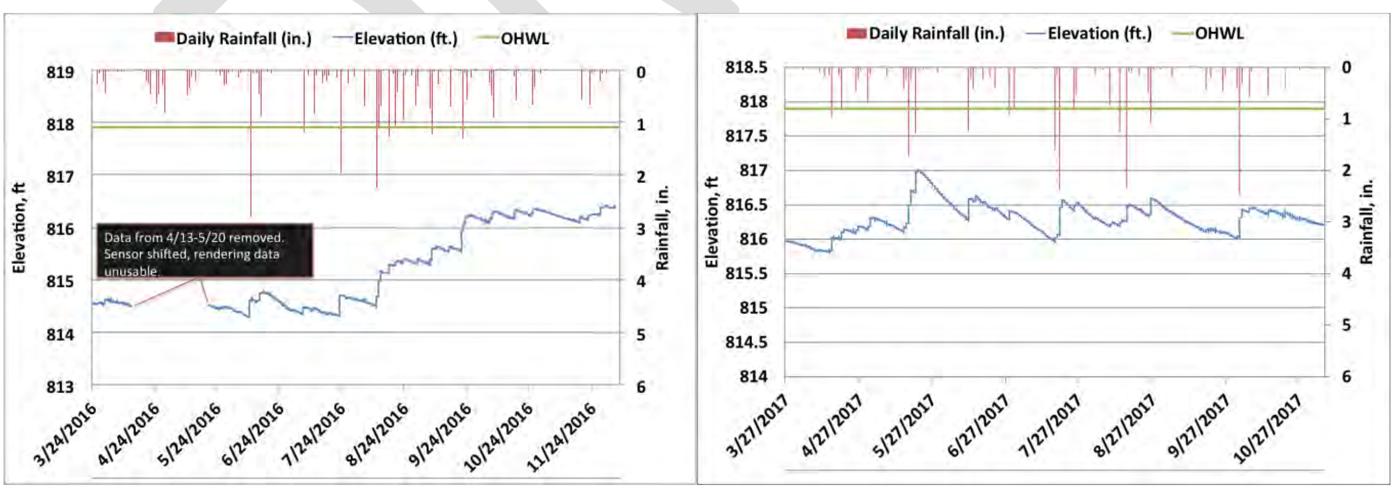


Figure A-3. **Hyland Lake** level elevation data (ft.) for 2016 and 2017 along with the lake's ordinary high-water level (OHWL). Daily rainfall (in.) is displayed along the top of the graph (NOAA).

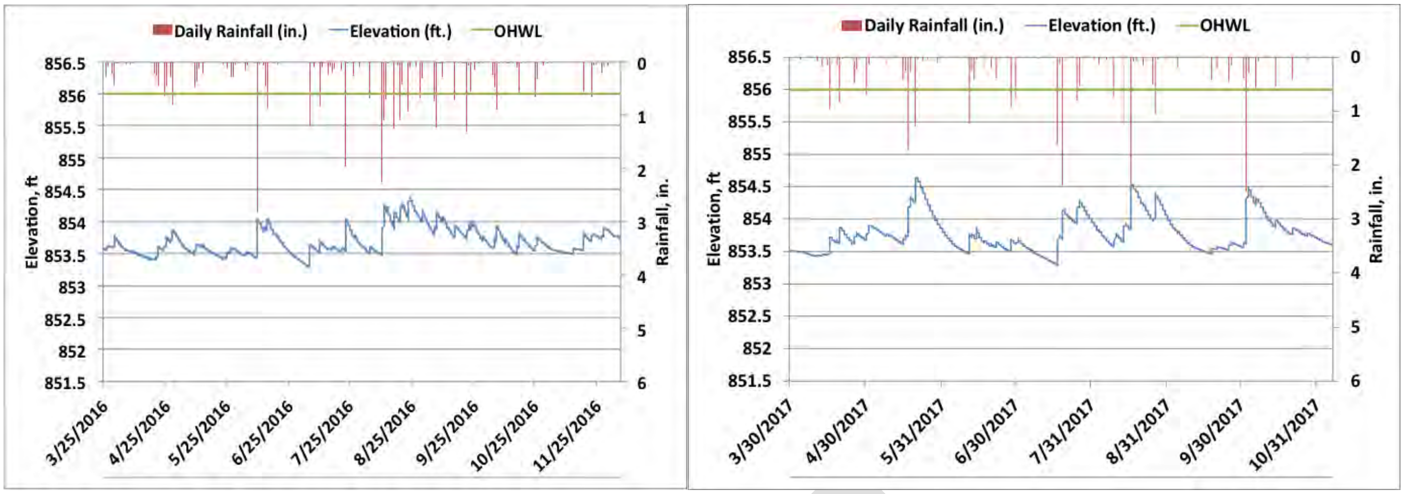


Figure A-4. **Lake Idlewild** level elevation data (ft.) for 2016 and 2017 along with the lake's ordinary high-water level (OHWL). Daily rainfall (in.) is displayed along the top of the graph (NOAA).

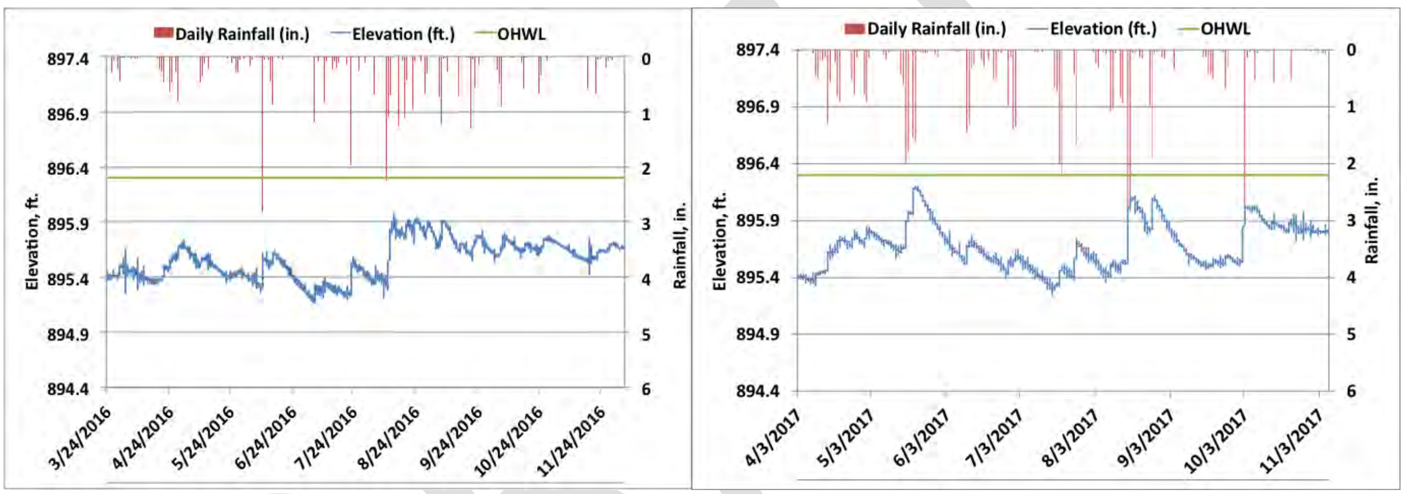


Figure A-5. **Lotus Lake** level elevation data (ft.) for 2016 and 2017 along with the lake's ordinary high-water level (OHWL). Daily rainfall (in.) is displayed along the top of the graph (NOAA).

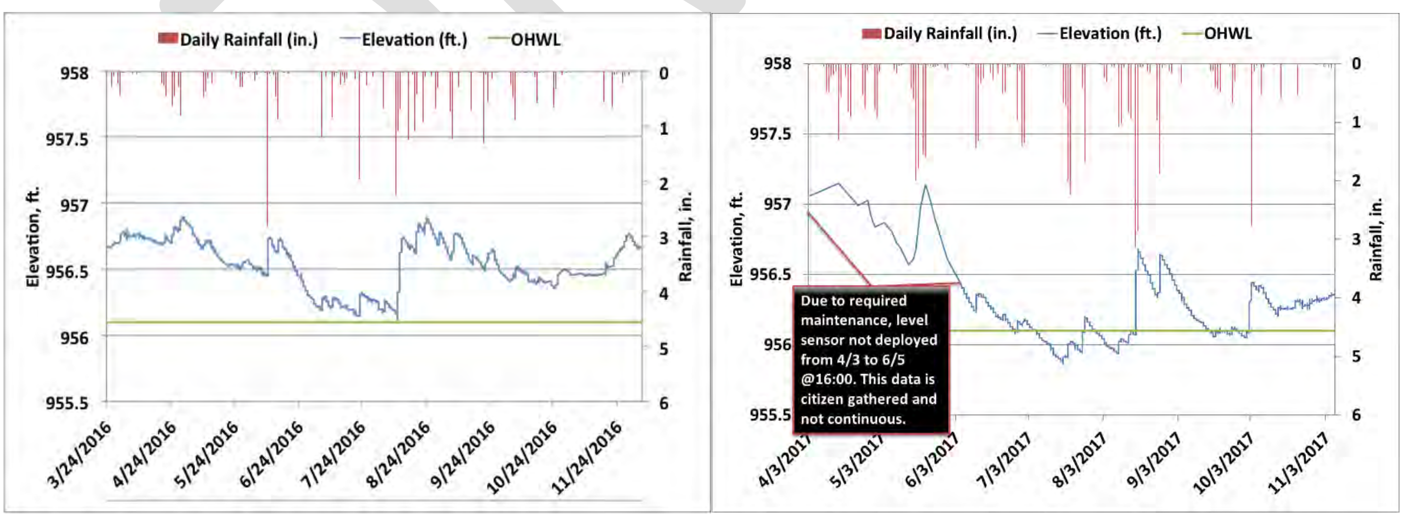


Figure A-6. **Lake Lucy** level elevation data (ft.) for 2016 and 2017 along with the lake's ordinary high-water level (OHWL). Daily rainfall (in.) is displayed along the top of the graph (NOAA).

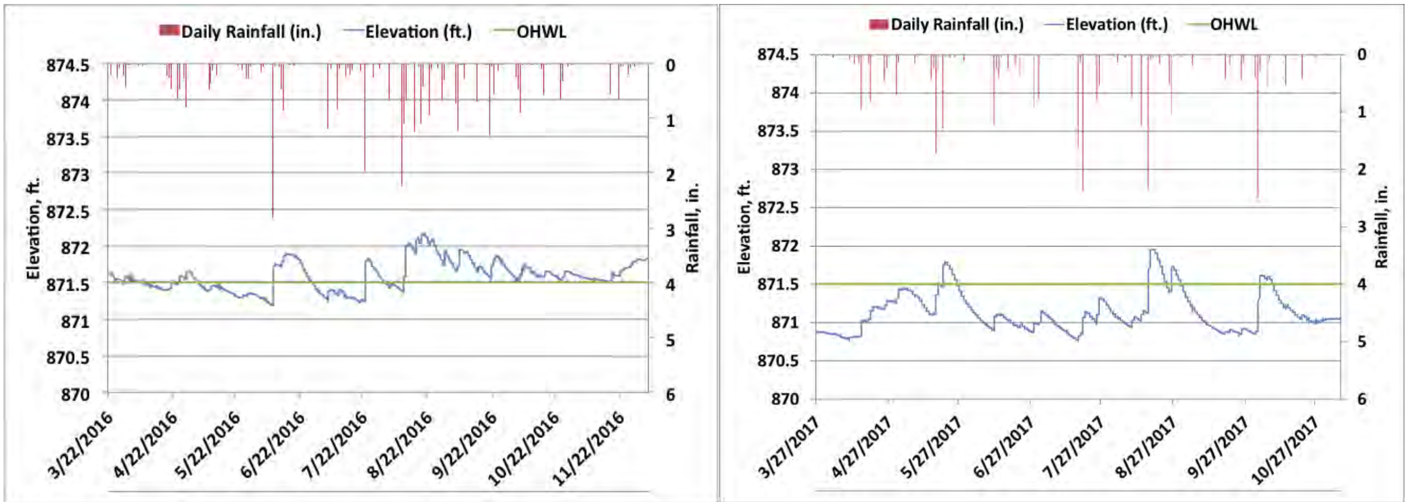


Figure A-7. **Mitchell Lake** level elevation data (ft.) for 2016 and 2017 along with the lake's ordinary high-water level (OHWL). Daily rainfall (in.) is displayed along the top of the graph (NOAA).

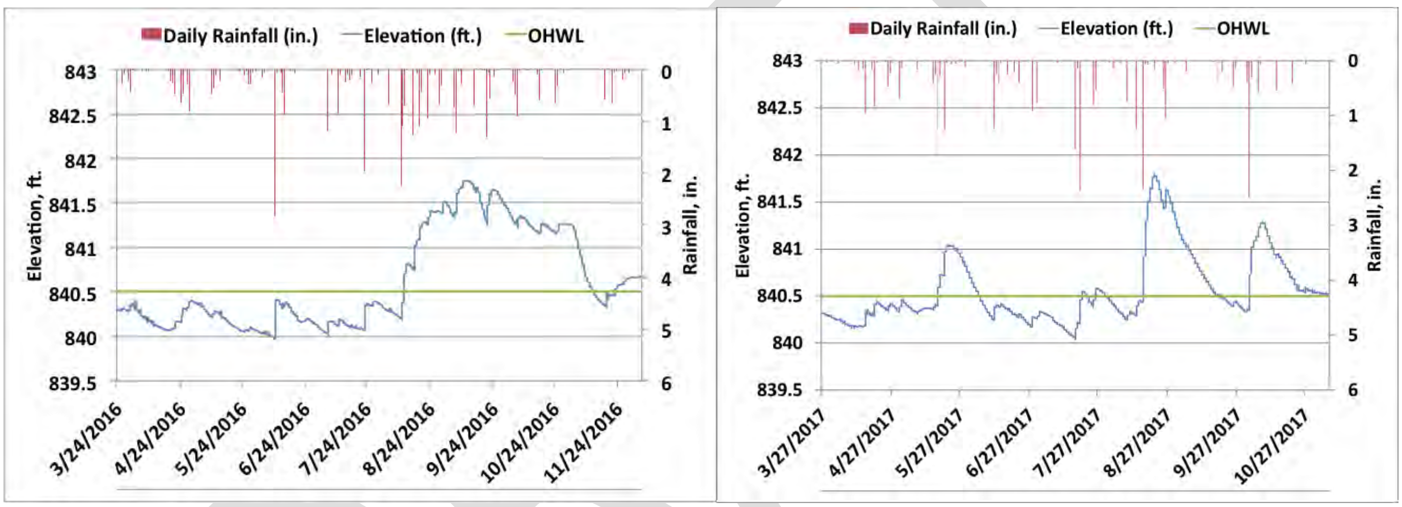


Figure A-8. **Red Rock Lake** level elevation data (ft.) for 2016 and 2017 along with the lake's ordinary high-water level (OHWL). Daily rainfall (in.) is displayed along the top of the graph (NOAA).

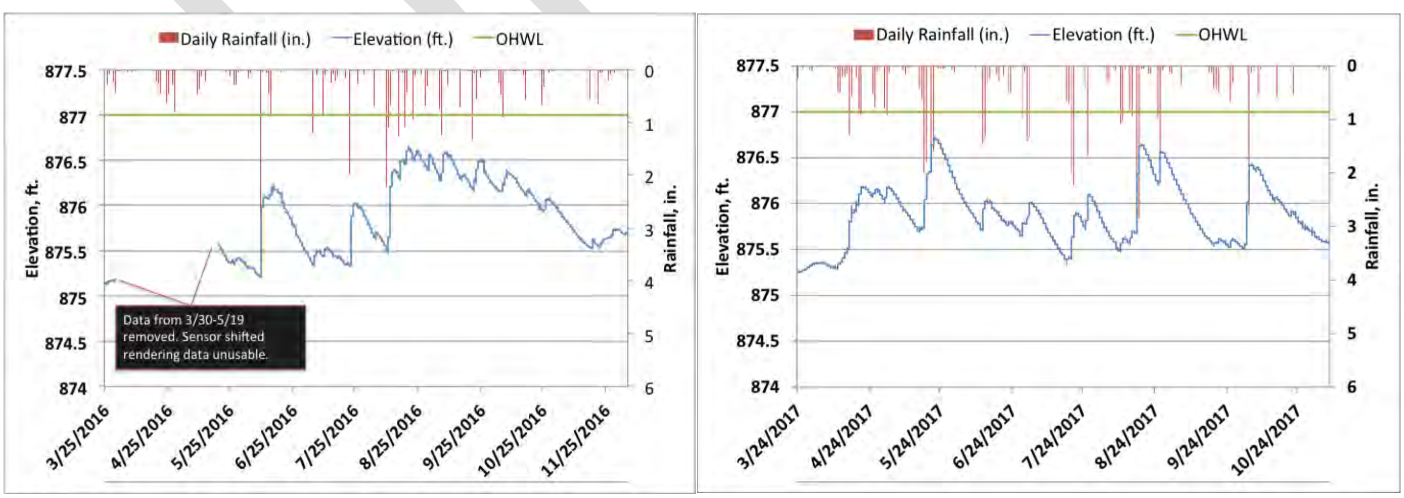


Figure A-9. **Rice Marsh Lake** level elevation data (ft.) for 2016 and 2017 along with the lake's ordinary high-water level (OHWL). Daily rainfall (in.) is displayed along the top of the graph (NOAA).

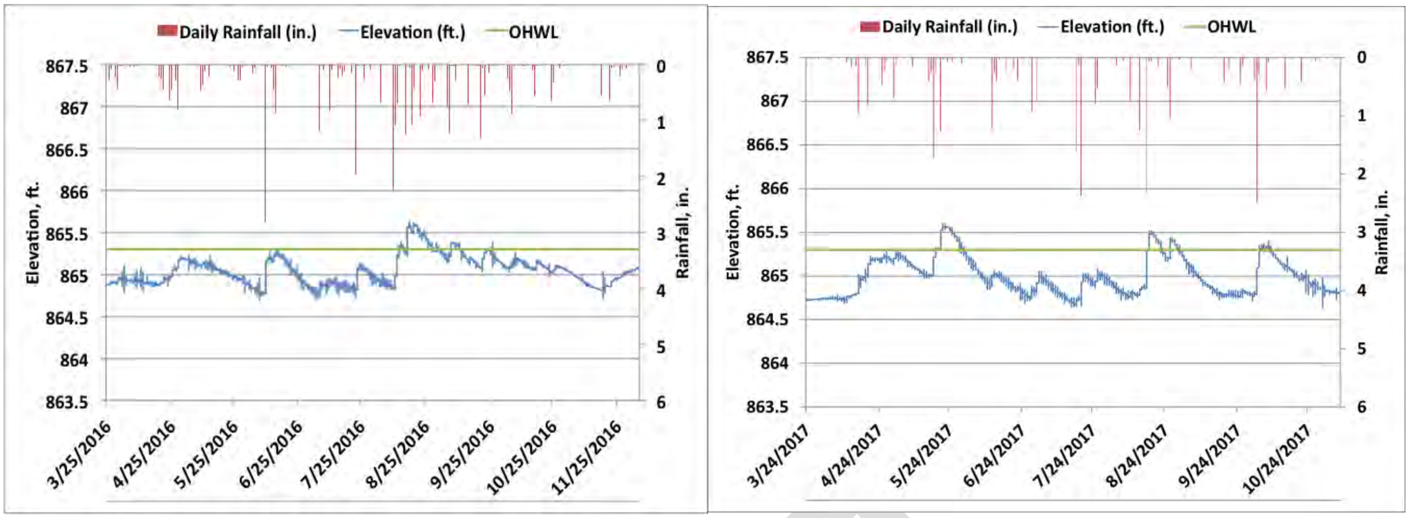


Figure A-10. **Lake Riley** level elevation data (ft.) for 2016 and 2017 along with the lake's ordinary high-water level (OHWL). Daily rainfall (in.) is displayed along the top of the graph (NOAA).

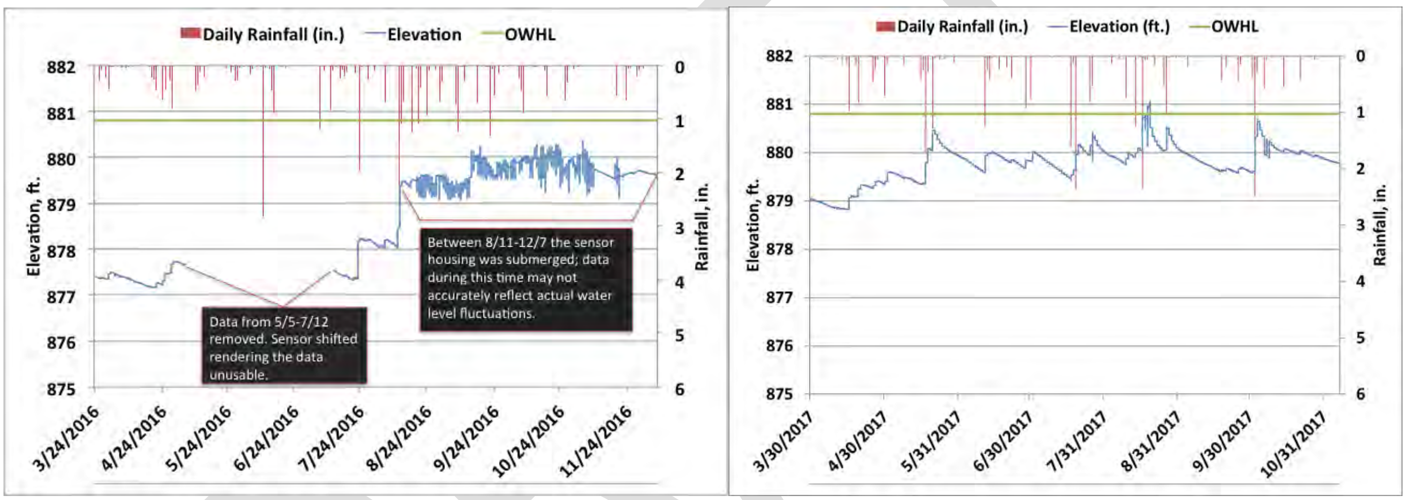


Figure A-11. **Round Lake** level elevation data (ft.) for 2016 and 2017 along with the lake's ordinary high-water level (OHWL). Daily rainfall (in.) is displayed along the top of the graph (NOAA).

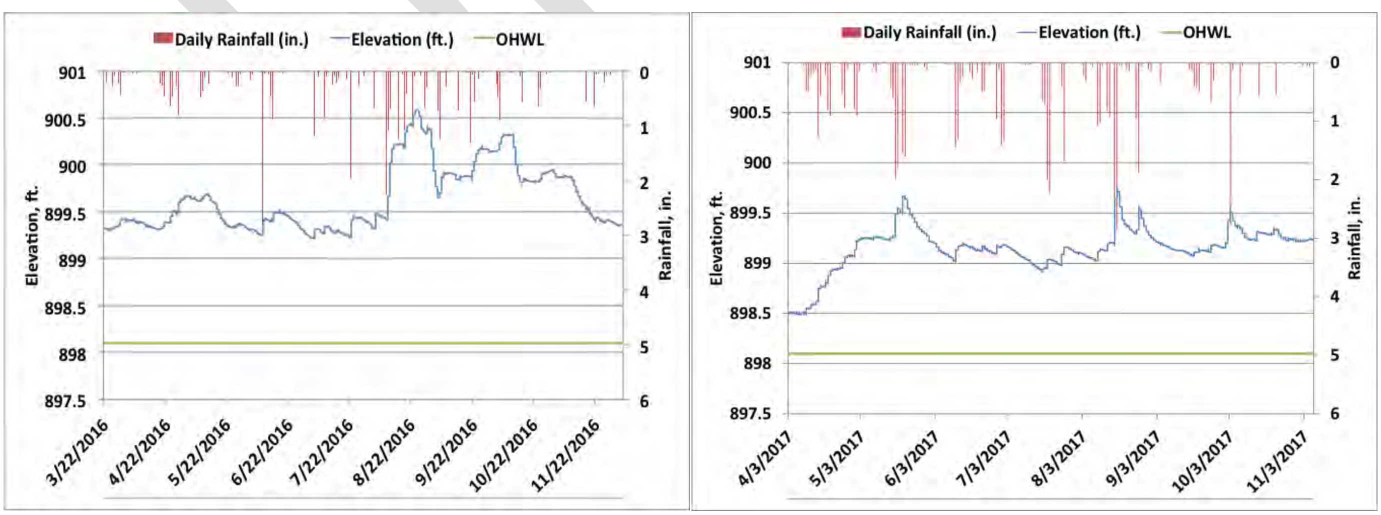


Figure A-12. **Silver Lake** level elevation data (ft.) for 2016 and 2017 along with the lake's ordinary high-water level (OHWL). Daily rainfall (in.) is displayed along the top of the graph (NOAA).

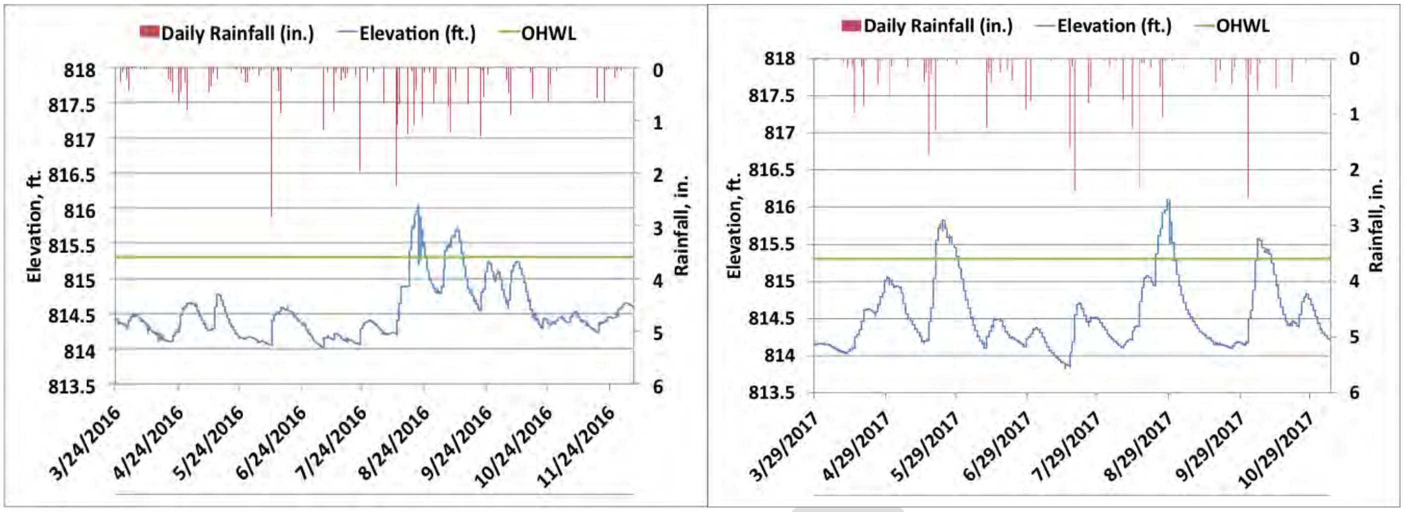


Figure A-13. **Staring Lake** level elevation data (ft.) for 2016 and 2017 along with the lake's ordinary high-water level (OHWL). Daily rainfall (in.) is displayed along the top of the graph (NOAA).

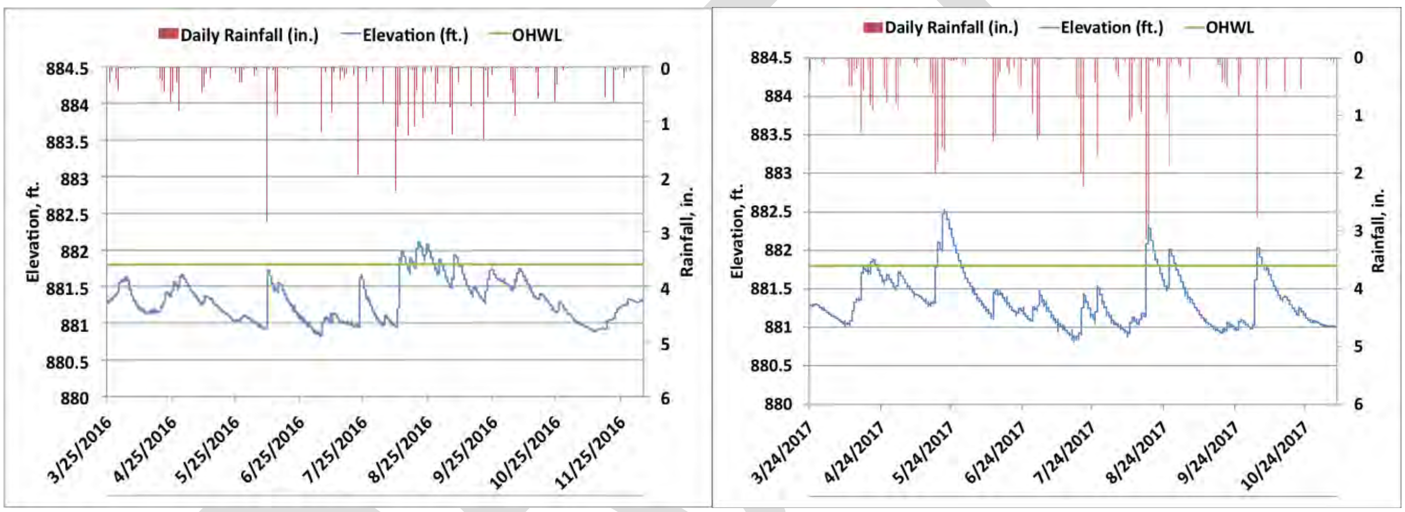


Figure A-14**. Lake Susan** level elevation data (ft.) for 2016 and 2017 along with the lake's ordinary high-water level (OHWL). Daily rainfall (in.) is displayed along the top of the graph (NOAA).

Exhibit B

2017 Fyke Net Summary Data

Table B1: 2017 **Lake Ann** fyke net data

Species	Number of fish caught in each category (inches)								
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total	Fish/Net
black bullhead										
black crappie		7							7	1.4
bluegill	1170	410							1580	316
common carp										
golden shiner	1	1							2	0.4
green sunfish	6	6							12	2.4
hybrid sunfish		3							3	0.6
largemouth bass	4				1				5	1
northern pike				1	1				2	0.4
pumpkinseed	111	5							116	23.2
walleye										
white sucker										
yellow bullhead	3	8	28	7					43	8.6
yellow perch	6	1							7	1.4

Table B2: 2017 **Lake Lotus** fyke net data

Species	Number of fish caught in each category (inches)									
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total	Fish/Net
black bullhead										
black crappie	3	26	1						30	6
bluegill	180	188							368	73.6
common carp							2		2	0.4
golden shiner		2							2	0.4
green sunfish										
hybrid sunfish										
largemouth bass			1	1					2	0.4
northern pike								2	2	0.4
pumpkinseed		1							1	0.2
walleye				1	9	4			14	2.8
white sucker										
yellow bullhead			3	8					11	2.2
yellow perch										

Table B3: 2017 **Lake Lucy** fyke net data

Species	Number of fish caught in each category (inches)									
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total	Fish/Net
black bullhead				1					1	0.2
black crappie	1	19	6						26	5.2
bluegill	452	137							589	117.8
common carp										
golden shiner										
green sunfish	25								25	5
hybrid sunfish	3	1							4	0.8
largemouth bass	1	1							2	0.4
northern pike					1	1			2	0.4
pumpkinseed	65	19							84	16.8
walleye										
white sucker										
yellow bullhead		11	36	3					50	10
yellow perch	1								1	0.2

Table B4: 2017 **Lower Purgatory Creek Recreational Area** fyke net data

Species	Number of fish caught in each category (inches)									
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total	Fish/Net
black bullhead	39	168	11	4					222	44.4
black crappie	19	12							31	6.2
bluegill	773	30							803	160.6
common carp	2		1	8	12	1			24	4.8
golden shiner	7	1							8	1.6
green sunfish	77	1							78	15.6
hybrid sunfish	4								4	0.8
largemouth bass	3	1							4	0.8
northern pike										
pumpkinseed	84								84	16.8
walleye										
white sucker										
yellow bullhead		6	2						8	1.6
yellow perch	8	26							34	6.8

Table B5: 2017 **Upper Purgatory Creek Recreational Area** fyke net data

Species	Number of fish caught in each category (inches)									
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total	Fish/Net
black bullhead	67	153	2						222	44.4
black crappie	48	13	2						63	12.6
bluegill	564	16							580	116
common carp				11	3				14	2.8
golden shiner										
green sunfish	24	1							25	5
hybrid sunfish	12								12	2.4
largemouth bass										
northern pike										
pumpkinseed	84								84	16.8
walleye										
white sucker			2						2	0.4
yellow bullhead	1	13	9						23	4.6
yellow perch	11	4							15	3

Table B6: 2017 **Rice Marsh Lake** fyke net data

Species	Number of fish caught in each category (inches)									
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total	Fish/Net
black bullhead		2	2	1					5	1
black crappie	1	71	2						74	14.8
bluegill	360	140							500	100
common carp					1				1	0.2
golden shiner										
green sunfish										
hybrid sunfish	1	1							2	0.4
largemouth bass	5	1			1				7	1.4
northern pike		1			1	2		1	5	1
pumpkinseed	15	12							27	5.4
walleye										
white sucker										
yellow bullhead	1	14	77	14					106	21.2
yellow perch		1							1	0.2

Table B7: 2017 **Lake Riley** fyke net data

Species	Number of fish caught in each category (inches)									
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total	Fish/Net
black bullhead				2					2	0.4
black crappie	1	17	3						21	4.2
bluegill	1359	355							1714	342.8
common carp										
golden shiner										
green sunfish										
hybrid sunfish										
largemouth bass	1	1			1	1			4	0.8
northern pike						1	2		3	0.6
pumpkinseed	16	8							24	4.8
walleye		1			2		2		5	1
white sucker										
yellow bullhead	1	11	41	22					75	15
yellow perch										

Table B8: 2017 **Staring Lake** fyke net data

Species	Number of fish caught in each category (inches)									
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total	Fish/Net
black bullhead										
black crappie		13	5						18	3.6
bluegill	226	40							266	53.2
common carp				2	3				5	1
golden shiner										
green sunfish	26								26	5.2
hybrid sunfish										
largemouth bass										
northern pike								1	1	0.2
pumpkinseed	10								10	2
white crappie										
walleye										
white sucker					1				1	0.2
yellow bullhead		4							4	0.8
yellow perch	1								1	0.2

Table B9: 2017 **Lake Susan** fyke net data

Species	Number of fish caught in each category (inches)									
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total	Fish/Net
black bullhead	1								1	0.2
black crappie		122	6						128	25.6
bluegill	504	339							843	168.6
common carp					1	1			2	0.4
golden shiner										
green sunfish	13	2							15	3
hybrid sunfish		1							1	0.2
largemouth bass					3				3	0.6
northern pike								1	1	0.2
pumpkinseed	26	4							30	6
walleye						1			1	0.2
white sucker					1	1			2	0.4
yellow bullhead	1	14	91	23					129	25.8
yellow perch	1	2							3	0.6

Exhibit C

2017 Zooplankton Summary Data

Table C1: 2017 **Lake Riley** Zooplankton Counts (#/m²)

LAKE RILEY

DIVISION	TAXON	4/25/2017 #/m2	6/6/2017 #/m2	7/20/2017 #/m2	8/1/2017 #/m2	8/30/2017 #/m2
CLADOCERA	*Bosmina longirostris*	7,604	7,206	0	0	13,528
	Ceriodaphnia sp.	0	0	0	0	0
	Chydorus sphaericus	0	0	0	0	0
	Daphnia ambigua/parvula	0	0	0	0	0
	Daphnia galeata mendotae	152,081	50,443	38,683	8,400	40,585
	Daphnia pulex	26,614	0	38,683	0	0
	Daphnia retrocurva	0	0	23,210	0	27,056
	Diaphanosoma leuchtenbergianum	3,802	0	0	8,400	0
	Immature Cladocera	3,802	0	0	0	0
	Kindtti	0	0	0	0	0
	CLADOCERA TOTAL	**193,904**	**57,649**	**100,577**	**16,800**	**81,169**
COPEPODA	*Cyclops sp. / Mesocyclops sp.*	414,422	187,361	85,104	50,399	13,528
	Diaptomus sp.	136,873	64,856	15,473	8,400	101,461
	Nauplii	2,053,099	475,608	177,944	100,798	229,979
	Copepodid	0	0	0	0	0
	COPEPODA TOTAL	**2,604,394**	**727,824**	**278,521**	**159,597**	**344,968**
ROTIFERA	*Asplanchna priodonta*	15,208	144,124	317,205	0	0
	Brachionus sp.	0	0	7,737	0	0
	Filinia longiseta	19,010	0	0	0	0
	Lecane sp.	0	0	0	0	0
	Monostyla sp.	0	0	0	0	169,102
	Keratella cochlearis	1,809,769	187,361	317,205	713,987	412,609
	Keratella quadrata	828,844	7,206	7,737	0	6,764
	Kellicottia sp.	72,239	79,268	0	0	0
	Polyarthra vulgaris	22,812	79,268	123,787	16,800	6,764
	Trichocerca cylindrica	0	0	0	0	0
	Trichocera similis	0	0	0	0	0
	Trichocerca multicrinis	0	0	15,473	0	0
	Conochilus sp.	11,406	0	255,311	125,998	0
	Noltholca	3,802	0	0	0	0
	UID Rotifer	0	0	0	83,998	169,102
	ROTIFERA TOTAL	**2,783,089**	**497,227**	**1,044,454**	**940,783**	**764,342**
	TOTALS	**5,581,387**	**1,282,700**	**1,423,553**	**1,117,179**	**1,190,479**

Table C2: 2017 **Staring Lake** Zooplankton Counts (#/m²)

STARING

DIVISION	TAXON	4/25/2017 #/m2	6/7/2017 #/m2	7/6/2017 #/m2	8/1/2017 #/m2	8/29/2017 #/m2
CLADOCERA	*Bosmina longirostris*	93,371	1,188,534	30,107	64,546	87,535
	Ceriodaphnia sp.	0	49,869	80,285	177,502	175,070
	Chydorus sphaericus	199,474	41,557	40,142	112,956	80,241
	Daphnia ambigua/parvula	0	0	0	0	0
	Daphnia galeata mendotae	12,732	124,671	30,107	32,273	87,535
	Daphnia pulex	0	16,623	0	0	0
	Daphnia retrocurva	0	0	0	0	29,178
	Diaphanosoma leuchtenbergianum	0	0	30,107	48,410	87,535
	Immature Cladocera	0	0	0	0	0
	Kindtti	0	0	0	0	0
	CLADOCERA TOTAL	**305,577**	**1,421,254**	**210,748**	**435,687**	**547,095**
COPEPODA	*Cyclops sp. / Mesocyclops sp.*	560,225	124,671	200,712	32,273	167,776
	Diaptomus sp.	21,221	16,623	140,498	48,410	87,535
	Nauplii	432,901	897,634	873,097	274,321	437,676
	Copepodid	0	0	10,036	0	14,589
	COPEPODA TOTAL	**1,014,348**	**1,038,928**	**1,224,344**	**355,004**	**707,576**
ROTIFERA	*Asplanchna priodonta*	59,418	556,865	10,036	16,137	29,178
	Brachionus sp.	4,244	0	0	16,137	0
	Filinia longiseta	190,986	66,491	0	0	0
	Lecane sp.	4,244	0	0	0	0
	Monostyla sp.	0	91,426	70,249	96,819	43,768
	Keratella cochlearis	2,737,465	0	30,107	209,775	51,062
	Keratella quadrata	25,465	0	0	0	0
	Kellicottia sp.	59,418	216,097	0	0	0
	Polyarthra vulgaris	21,221	656,603	0	32,273	116,714
	Trichocerca cylindrica	0	0	0	0	0
	Trichocera similis	0	0	0	0	0
	Trichocerca multicrinis	0	0	0	0	7,295
	Conochilus sp.	0	49,869	0	0	0
	UID Rotifer	0	0	0	0	0
	ROTIFERA TOTAL	**3,102,460**	**1,637,351**	**110,392**	**371,140**	**248,016**
	TOTALS	**4,422,385**	**4,097,532**	**1,545,483**	**1,161,831**	**1,502,688**

Table C3: 2017 **Lotus Lake** Zooplankton Counts (#/m²)

LOTUS LAKE

DIVISION	TAXON	4/25/2017 #/m2	6/7/2017 #/m2	7/19/2017 #/m2	8/2/2017 #/m2	8/30/2017 #/m2
CLADOCERA	*Bosmina longirostris*	135,282	15,915	71,797	42,441	99,472
	Ceriodaphnia sp.	0	0	0	0	0
	Chydorus sphaericus	39,789	7,958	53,847	14,147	0
	Daphnia ambigua/parvula	0	0	0	0	0
	Daphnia galeata mendotae	55,704	103,451	17,949	7,074	33,157
	Daphnia pulex	0	0	0	0	0
	Daphnia retrocurva	0	7,958	26,924	35,368	477,465
	Diaphanosoma leuchtenbergianum	0	0	35,898	70,736	72,946
	Immature Cladocera	0	0	0	0	0
	Kindtti	0	0	0	0	0
	CLADOCERA TOTAL	**230,775**	**135,282**	**206,415**	**169,765**	**683,040**
COPEPODA	*Cyclops sp. / Mesocyclops sp.*	572,958	0	116,669	134,398	145,892
	Diaptomus sp.	71,620	39,789	242,313	42,441	106,103
	Nauplii	1,221,514	183,028	834,635	148,545	1,279,871
	Copepodid	0	0	0	7,074	0
	COPEPODA TOTAL	**1,866,092**	**222,817**	**1,193,618**	**332,457**	**1,531,866**
ROTIFERA	*Asplanchna priodonta*	19,894	23,873	0	0	0
	Brachionus sp.	0	0	0	0	0
	Filinia longiseta	31,831	15,915	0	84,883	0
	Lecane sp.	0	0	0	0	0
	Monostyla sp.	0	0	0	0	0
	Keratella cochlearis	13,591,832	55,704	2,611,600	2,886,010	762,617
	Keratella quadrata	7,958	23,873	17,949	0	0
	Kellicottia sp.	1,169,789	0	376,932	219,280	1,094,190
	Polyarthra vulgaris	0	0	62,822	28,294	6,631
	Trichocerca cylindrica	0	0	0	0	0
	Trichocera similis	0	0	0	0	0
	Trichocerca multicrinis	0	0	8,975	49,515	0
	Conochilus sp.	23,873	1,734,789	26,924	35,368	0
	UID Rotifer	0	0	1,130,796	671,988	53,052
	ROTIFERA TOTAL	**14,845,177**	**1,854,155**	**4,235,997**	**3,975,337**	**1,916,491**
	TOTALS	**16,942,044**	**2,212,254**	**5,636,030**	**4,477,559**	**4,131,397**

Table C4: 2017 **Lake Susan** Zooplankton Counts (#/m²)

LAKE SUSAN

DIVISION	TAXON	4/25/2017 #/m2	6/8/2017 #/m2	7/19/2017 #/m2	8/2/2017 #/m2	8/30/2017 #/m2
CLADOCERA	*Bosmina longirostris*	49,736	3,758	0	0	11,318
	Ceriodaphnia sp.	0	0	0	0	0
	Chydorus sphaericus	27,631	0	0	0	0
	Daphnia ambigua/parvula	0	0	0	0	0
	Daphnia galeata mendotae	331,573	33,820	11,052	0	22,635
	Daphnia pulex	0	0	0	0	0
	Daphnia retrocurva	0	0	0	0	28,294
	Diaphanosoma leuchtenbergianum	0	0	33,157	28,471	22,635
	Immature Cladocera	0	0	0	0	0
	Kindtti	0	0	0	0	5,659
	CLADOCERA TOTAL	**408,940**	**37,578**	**44,210**	**28,471**	**90,541**
COPEPODA	*Cyclops sp. / Mesocyclops sp.*	629,988	90,188	71,841	21,353	107,518
	Diaptomus sp.	27,631	41,336	71,841	21,353	11,318
	Nauplii	828,932	263,048	298,416	234,886	333,872
	Copepodid	16,579	0	0	0	0
	COPEPODA TOTAL	**1,503,130**	**394,572**	**442,097**	**277,593**	**452,707**
ROTIFERA	*Asplanchna priodonta*	93,946	11,273	0	0	0
	Brachionus sp.	0	0	0	0	0
	Filinia longiseta	0	0	176,839	64,060	0
	Lecane sp.	0	0	0	0	0
	Monostyla sp.	0	0	0	0	0
	Keratella cochlearis	4,459,654	105,219	486,307	213,533	260,307
	Keratella quadrata	138,155	0	5,526	0	0
	Kellicottia sp.	132,629	33,820	0	0	11,318
	Polyarthra vulgaris	38,683	41,336	16,579	0	11,318
	Trichocerca cylindrica	0	0	0	0	0
	Trichocera similis	0	0	0	0	0
	Trichocerca multicrinis	0	0	0	14,236	5,659
	Conochilus sp.	0	0	22,105	21,353	0
	UID Rotifer	0	0	2,006,015	49,824	79,224
	ROTIFERA TOTAL	**4,863,068**	**191,649**	**2,713,371**	**363,006**	**367,825**

TOTALS	**6,775,138**	**623,799**	**3,199,678**	**669,070**	**911,074**

Table C5: 2017 **Rice Marsh Lake** Zooplankton Counts (#/m²)

RICE MARSH

DIVISION	TAXON	6/20/2017 #/m2	7/6/2017 #/m2	8/3/2017 #/m2	8/29/2017 #/m2
CLADOCERA	*Bosmina longirostris*	0	8,223	1,213,822	1,358,918
	Ceriodaphnia sp.	278,521	49,338	505,759	24,934
	Chydorus sphaericus	0	82,230	44,254	62,336
	Daphnia ambigua/parvula	9,947	0	18,966	0
	Daphnia galeata mendotae	9,947	0	0	0
	Daphnia pulex	0	0	0	0
	Daphnia retrocurva	0	0	0	0
	Diaphanosoma leuchtenbergianum	0	8,223	25,288	12,467
	Immature Cladocera	0	0	0	43,635
	Kindtti	0	0	0	0
	CLADOCERA TOTAL	**298,416**	**148,014**	**1,808,089**	**1,502,290**
COPEPODA	*Cyclops sp. / Mesocyclops sp.*	0	32,892	208,626	130,905
	Diaptomus sp.	0	32,892	82,186	37,401
	Nauplii	258,627	707,178	2,977,656	660,758
	Copepodid	0	0	113,796	0
	COPEPODA TOTAL	**258,627**	**772,963**	**3,382,264**	**829,065**
ROTIFERA	*Asplanchna priodonta*	9,947	0	132,762	0
	Brachionus sp.	0	0	139,084	0
	Filinia longiseta	0	0	44,254	0
	Lecane sp.	0	0	6,322	0
	Monostyla sp.	0	24,669	37,932	6,234
	Keratella cochlearis	79,577	493,380	1,068,416	49,869
	Keratella quadrata	0	8,223	0	0
	Kellicottia sp.	0	0	0	0
	Polyarthra vulgaris	9,947	57,561	1,055,772	205,708
	Trichocerca cylindrica	0	0	0	0
	Trichocera similis	0	0	0	0
	Trichocerca multicrinis	0	0	0	0
	Conochilus sp.	387,940	468,711	410,929	0
	Euchlaris sp.	0	0	145,406	0
	UID Rotifer	0	0	0	0
	ROTIFERA TOTAL	**487,412**	**1,052,545**	**3,040,876**	**261,810**

TOTALS	**1,044,454**	**1,973,521**	**8,231,228**	**2,593,165**

Exhibit D

2017 Phytoplankton Summary Data

Table D1: 2017 **Lotus Lake** Phytoplankton #/L

	6/7/2017	6/21/2017	7/19/2017	8/2/2017	8/30/2017
Class	**#/L**	**#/L**	**#/L**	**#/L**	**#/L**
Bacillariophyceae	175405	59422	347485	548722	34000
Chlorophyceae	462297	3786155	339493	447401	681250
Cryptophyceae	570811	1277941	1238947	64948	1412500
Crysophyceae	0	0	86842	111340	31250
Synurophyceae	0	0	243158	4639	12500
Euglenophyceae	0	0	0	1206	
Dinophyceae	16351	32353	34737	27835	550000
Eustigmatophyceae	0	0	0	4639	
Cyanophiceae	74225	97706	3057652	3178670	1650000
Xanthophyceae	0	0	0	0	500
Total	**1299089**	**5253577**	**5348314**	**4389400**	**4372000**

Table D2: 2017 **Staring Lake** Phytoplankton #/L

	6/20/2017	7/6/2017	8/1/2017	8/29/2017
Class	**#/L**	**#/L**	**#/L**	**#/L**
Bacillariophyceae	163819	347485	22982	13412
Chlorophyceae	724000	339493	1187064	22706
Cryptophyceae	781818	1238947	209876	1117647
Synurophyceae	3636	243158	10494	0
Cyanophiceae	1062091	3057652	4132050	697527
Dinophyceae	11454	34737	8605	2000
Xanthophyceae	43636	0	210	0
Crysophyceae	0	86842	31481	0
Euglenophyceae	0	0	105	2942
Total	**2790454**	**5348314**	**5602867**	**1856234**

Table D3: 2017 **Lake Riley** Phytoplankton #/L

	7/20/2017	8/1/2017	8/30/2017
Class	**#/L**	**#/L**	**#/L**
Bacillariophyceae	310636	21670	340188
Chlorophyceae	329454	36991	91958
Cryptophyceae	1368182	413242	2326316
Crysophyceae	45455	413242	13684
Synurophyceae	364	55435	274
Euglenophyceae	455	5040	0
Cyanophiceae	952726	1195680	2487654
Dinophyceae	54545	15321	54737
Eustigmatophyceae	0	5040	0
Total	**3061817**	**2161661**	**5314811**

Table D4: 2017 **Rice Marsh** Lake Phytoplankton #/L

	6/20/2017	7/6/2017	8/3/2017	8/29/2017
Class	**#/L**	**#/L**	**#/L**	**#/L**
Bacillariophyceae	1905429	414928	21637	6914
Chlorophyceae	206180	323878	101274	66914
Cryptophyceae	749063	3111341	505739	2962766
Euglenophyceae	184		17796	1595
Chrysophyceae	168906	247794	12804	191489
Synurophyceae	14688		6530	1276
Cyanophyceae	213062	340332	255047	117871
Dinophyceae	1469	105526	2304	638
Raphidophyceae	275	0	0	319
Eustigmatophyceae	0	0	1024	106
Xanthophyceae	0	0	128	0
Total	**3259256**	**4543799**	**924283**	**3349888**

Table D5: 2017 **Lake Susan** Phytoplankton #/L

	6/21/2017	7/19/2017	8/2/2017	8/30/2017
Class	**#/L**	**#/L**	**#/L**	**#/L**
Bacillariophyceae	79840	28979	60909	53105
Chlorophyceae	933932	410172	499396	3596048
Cryptophyceae	698703	1538298	159091	2944909
Synurophyceae	998	0	0	108624
Cyanophiceae	2600199	5655830	43937475	4978984
Dinophyceae	40519	13277	378788	39829
Euglenophyceae	0	108894	129394	0
Crysophyceae	0	63830	53030	0
Xanthophyceae	1397	0	0	0
Total	**4355588**	**7819280**	**45218083**	**11721499**

Exhibit E

2017 Creek Assessments

Riley Creek Assessment

Rice Marsh Lake to Lake Riley

Conducted by: RPBCWD staff [Josh Maxwell, Zach Dickhausen] and University of MN volunteers

Summary

Site/Scope

On the 28th of November 2016, and continuing on the 17th of November 2017, Riley Purgatory Bluff Creek Watershed District (RPBCWD) staff conducted a stream corridor assessment of Reach R3 of Riley Creek. On the 28th of November 2016, staff started at Rice Marsh Lake and walked to 85ft downstream of highway 212 (approximately 0.2 stream miles). The walk continued in 2017 on the 17th of November, starting 85ft downstream of highway 212 before ending at Lake Riley (approximately 0.93 stream miles). Staff walked both sides of the creek to assess overall stream conditions and to discover and prioritize possible restoration locations. Staff conducted a Modified Pfankuch Channel Stability Assessment and a Minnesota Pollution Control Agency (MPCA) Stream Habitat Assessment (MSHA) on each subreach to better characterize the stream. A GPS, and a GPS-enabled camera were used to mark points and take photos.

- All pictures were taken <u>Facing Downstream</u> unless noted otherwise.
- <u>Right</u> and <u>Left</u> bank are defined by looking <u>Downstream</u>.
- Erosion was defined as <u>Slight</u>, <u>Moderate</u>, or <u>Severe</u>.
- <u>Stream Bank Erosion</u> was measured from the streambed to the top of the eroding bank.
- Vegetation was defined as <u>Sparse</u>, <u>Patchy</u>, or <u>Dense</u>.
- All measurements were recorded in <u>Feet</u>.
- All major erosion sites were labeled on the GPS by the erosion site number and reach.

Weather Conditions

11/28/2016	11/17/2017
Wind: NA	Wind: 2mph
Temp: NA	Temp: 5.4°C
Cloud Cover: NA	Cloud Cover: 100%

Stream Features

This reach starts in wetlands at the edge of Rice Marsh Lake and then passes through deciduous forest, residential areas, and a golf course before ending at Lake Riley. Riparian widths along both banks averaged about 90ft. The substrate in this reach consisted mainly of sandy mixtures (sand/silt and sand/gravel) with areas of moderate to heavy deposition of silt/silty mixtures. Slope gradients in this reach ranged from less than 10% or flat, to 45%. The first stretch of the reach (R3A) was not very sinuous, but the stream became very sinuous once reaching the wetland area around the golf course (R3B). The channel development (riffle/run/pool), for the most part, was poor-to-fair, except for subreach R3C, in which development was good.

Areas of Concern

There was little-to-moderate erosion along both banks throughout the reach. Subreach R3D exhibited some heavy erosion along both banks, which caused Pfankuch scores to shift to poor/moderately unstable. R3D also had a degraded stormwater culvert along the right bank exhibiting considerable erosion. The R3D riparian zone was less than 16ft, and non-existent in some areas (there were several areas where grass was mowed down to the edge of the stream). MSHA scores were fair for R3A and R3D due to increased siltation, but subreaches R3B and R3C received good scores. No major infrastructure risks or severe mass wasting sites were observed in this reach.

Subreach R3A - Rice Marsh Lake to 85ft Downstream of Highway 212

MSHA: 42.5 (Fair); Pfankuch: 71 (Moderately Stable)

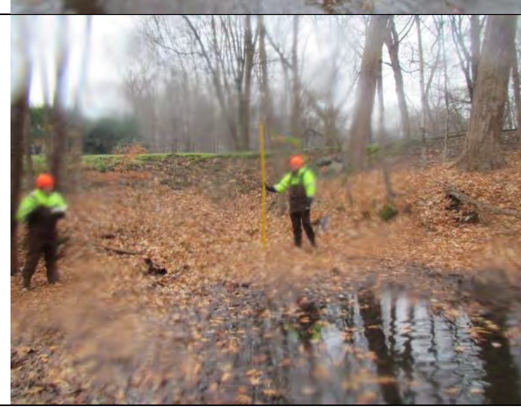
Staff began the creek walk at the south side of Rice Marsh Lake at the outlet of the lake to Riley Creek. The landscape surrounding outlet was full of emergent vegetation, lots of cattails, wetland sedges and grasses, as well as some woody vegetation (small, sparsely growing shrubs). Staff observed submersed vegetation in the creek as well (broadleaf pondweed, curly leaf pondweed, duckweed), along with filamentous algae. The surrounding landscape was very flat, virtually no grade existed within the first few hundred feet. Staff encountered some woody debris throughout the wetland stretch of the subreach which increased in magnitude as staff moved downstream. The channel was rather wide and shallow for a majority of the subreach. Most of the subreach was a glide with little-to-no channel development (riffle/run/pool). The sediment was very soft, silt/clay mixture. Approximately 70ft upstream of the recreational trail bridge, some relatively minor cutting/erosion occurred along the left bank. Just upstream of the bridge, staff observed a woody debris dam backing up the stream and boulders had been placed under the bridge to prevent erosion. Downstream, staff found some broadleaf pondweed in the stream. At this point, the channel narrowed a bit. The sediment remained very soft, predominantly a silt substrate. Underneath the 212 overpasses, a large amount of riprap was concentrated along both banks to prevent erosion. In addition, multiple artificial rock riffles had been created to add structure within the stream flow. The substrate in areas without the cobble was very mucky/silty and staff easily sunk into it. Staff ended this subreach 85ft downstream of the overpass.

Subreach R3B - 85ft Downstream of the Highway 212 Overpass to the North end Bearpath Golf Course

MSHA: 54.75 (Good); Pfankuch: 87 (Moderately Unstable)

This creek walk was a continuation of the creek walk started on the 11th of November 2016. Staff began this creek walk 85ft downstream of the Highway 212 overpass. The landscape within this subreach included forest and residential land-use types. Large oaks and a few smaller trees made up most of the forest canopy. Groundcover was very sparse; leaf litter covered much of the forest floor at the time of the assessment. The slope of the surrounding landscape was moderate, reaching grades up to 50%, but staying mostly around 30%. Houses were set back about 50ft to 100ft from both banks of the stream. Staff observed moss growing along a large proportion of both stream banks within the subreach (IMG_2155), which helped to protect the upper and lower banks from eroding. There was also a fair amount of woody debris within the stream. This subreach was sinuous, but the channel development was poor (riffle/run/pool).

Towards the beginning of the subreach, staff observed some erosion measuring up to 5ft high by 30ft along the right bank (IMG_2157). There were boulders in and along the channel throughout the start of the subreach (IMG_2157). The substrate was primarily composed of gravel and sand, with some silt occurring in the few pooling areas, and some cobble present within the riffles. Just downstream there was another stretch of erosion along the right bank, measuring 4ft high by 20ft (IMG_2158). Staff continued to see woody debris in-stream, including a small woody debris dam (IMG_2159). At this point there was some more erosion along the left bank measuring 3.5ft high (IMG_2159, IMG_2160). Continuing downstream, staff observed a stretch of cutting measuring 0.25ft high which was continuous along the right bank (IMG_2161). However, due to the presence of moss, the right bank was stable, despite the continuous cut bank. The stream then came up to a culvert under a driveway along the outside bend of the left bank as it shifted south (IMG_2162). The culvert was nearly full of sediment and the immediate sediment as seen in IMG_2163 was extremely soft muck/silt. The stream channel then shifted south and there was yet another stretch of erosion along the left bank, 3ft high by 30ft (IMG_2163). A considerable amount of sandy/silt deposition can also be seen in IMG_2163 on the opposing right bank. The stream at this point was 0.94ft deep by 11ft wide. At the start of the Bearpath golf course, staff encountered another woody debris dam (IMG_2165) which was causing some erosion measuring 3ft high by 10ft along the left bank. The golf course was adjacent to the left bank at this point; the grass was mowed to the stream edge (IMG_2165). Staff observed one final patch of erosion on the right bank before entering the next subreach (IMG_2166). The stream at this point measured 1.24ft deep by 6.4ft wide.

	**IMG_2155** General stream picture.		**IMG_2156** General stream picture.
	**IMG_2157** Erosion, 5ft by 30ft, RB.		**IMG_2158** Erosion, 4ft by 20ft, RB.
	**IMG_2159** Woody debris dam; bank erosion, LB.		**IMG_2160** Erosion, 3.5ft high, LB.
	**IMG_2161** General erosion, 0.25ft high, RB; moss on banks.		**IMG_2162** Culvert entrance under driveway on LB.

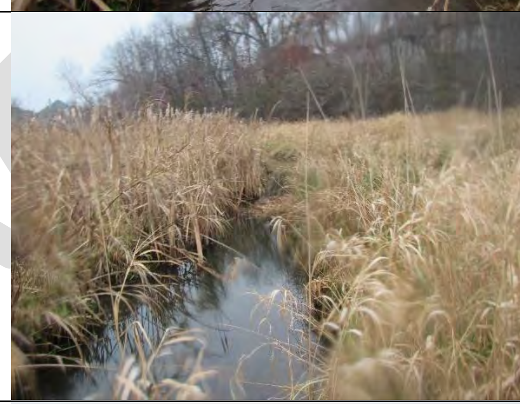
	**IMG_2163** General stream picture; erosion measuring 3ft high by 30ft, LB.		**IMG_2164** General stream picture.
	**IMG_2165** Woody debris dam causing erosion, 3ft by 10ft, LB.		**IMG_2166** Erosion near end of subreach, RB.

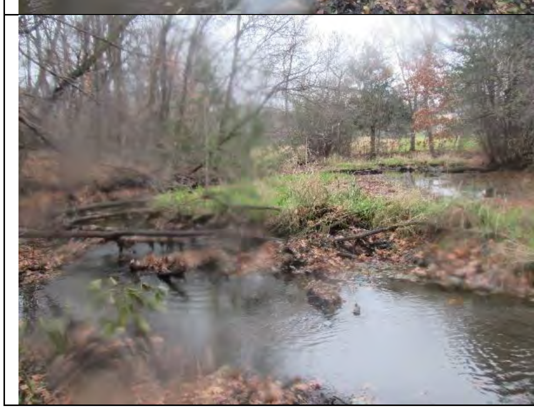
Subreach R3C - North End of Bearpath Golf Course to 260ft Upstream of Bearpath Trail MSHA: 50 (Fair); Pfankuch: 73 (Moderately Stable)

This subreach started at the north end of Bearpath Golf Course and had surrounding land slopes with grades less than 5% throughout its entirety. Wetland vegetation, mainly tall sedges and cattails surrounded the immediate banks. The golf course was setback 3ft to 7ft back from the left bank for the first 150ft before the meandering south into a thicker wetland area surrounding a large pond. The golf course was set back 30ft to 45ft along the last 260ft of the subreach. There was limited channel development (riffle/run/pool) in this subreach; it was mostly one continuous glide upstream and downstream of the pond. The channel was typical of a wetland stream as it was deep and narrow throughout the subreach. The channel was also very sinuous and there was little erosion throughout. The vegetation surrounding the channel was made up of primarily wetland and emergent plants, cattails, and wetland sedges and grasses (IMG_2167, IMG_2169, IMG_2170). The substrate within the channel consisted mainly of silt and sand throughout the reach. Staff did encounter mucky sediment in some areas.

About 260ft into the subreach, staff came upon a hairpin turn in the creek which bent right. There was a large deposition zone long the right bank here. Bank-full was measured at this point, approximately 22ft wide by 1.8ft deep. Continuing, the wetland area adjacent to the channel became thicker with tall grasses and the beginning of cattail stands (IMG_2168, IMG_2169). In this area, ponding within the riparian zone was frequent due to the low landscape slopes/floodplain. Bank-full was again measured; it narrowed, measuring approximately 11ft wide by 2.7ft deep. Staff observed some vegetation growing in-stream at this point that appeared to be sago pondweed (IMG_2171). The stream then entered the large ponded wetland area which covered about 2.13 acres (IMG_2172).

Staff walked along the pond to access the stream at the pond's outlet (IMG_2173). About 250ft downstream of the pond was a wooden walking/golf cart bridge crossing the stream (IMG_2174). The channel was deeper and much wider after the ponded wetland area (the surrounding riparian zone was ponded in several areas) but narrowed after the walking bridge. Immediately downstream of the bridge, staff observed a large grass/sedge island in the channel measuring 75ft long by 20ft wide (IMG_2175). Continuing downstream, the surrounding land-type began to shift to from grassy wetland back to mixed grass/forest (IMG_2176). Staff observed a large cement structure (IMG_2176) set back about 15ft from the left bank; its purpose was not identified. At this point, the golf course was set back about 15ft to 45ft from the right bank, and houses were set back about 90ft to 120ft from the left bank. The channel was still very connected to the floodplain at this point with small, isolated ponds being common along the channel. With an increase in canopy cover came an increase in woody debris within the stream with multiple piles of woody debris present (IMG_2178, IMG_2179). Near the second woody debris pile, a smaller riffle was present which was one of the few present in this subreach. The riffle then emptied into a deeper pool which measured 2.3ft in depth. Just downstream of the riffle and pool, erosion was observed on the left bank, measuring 2ft high and stretching for about 100ft (IMG_2181). Staff then found a dumpsite containing organic yard waste on the left bank behind a residence (IMG_2182). The stream then transitioned back to a grassy wetland landscape for about 210ft before the wooden walking/gulf cart bridge at the end of the subreach (IMG_2183). The stream was very connected to the floodplain at the bridge with ambiguous stream/channel edges. The in-stream sediment was very mucky just upstream of the bridge.

	**IMG_2167** General stream picture; golf course in background.		**IMG_2168** General stream picture; narrow, deep channel; cattails starting.
	**IMG_2169** Wetland grasses and sedges, LB.		**IMG_2170** Stream dispersed into wetland.
	**IMG_2171** In-stream vegetation.		**IMG_2172** Stream entering a large, ponded wetland.

	**IMG_2173** Stream DS of pond.		**IMG_2174** Wooden walking/golf cart bridge across stream.
	**IMG_2175** Grass/sedge island, 75ft by 20ft; US.		**IMG_2176** Large cement structure; LB.
	**IMG_2177** General stream picture.		**IMG_2178** Woody debris.
	**IMG_2179** General stream picture; woody debris.		**IMG_2181** Erosion on LB, 2ft high by 100ft.

IMG_2182

Yard waste dump site, LB.

IMG_2183

Walking/cart bridge across stream; mucky sediment; end of subreach.

Subreach R3D - 260ft Upstream of Bearpath Trail to 250ft Downstream of Bearpath Trail MSHA: 66.7 (Good); Pfankuch: 65 (Very Stable)

This subreach started at the walking bridge/cart path just north of Bearpath Trail (IMG_2184). The surrounding landscape contained a higher slope gradient than subreach R3C. At the beginning of the subreach, slope grades were estimated at 20% to 30%; these grades lessened to below 10% in the last quarter of the subreach. The surrounding landscape was mostly deciduous forest with moderate shrub cover. Ground cover was patchy; some areas were bare, while others had a considerable amount of cover. The substrate within the stream was made up predominantly of sand and gravel, with boulders and some cobble in the riffles. This subreach had good channel development (riffle/run/pool), improving from the previous subreach. The subreach also had excellent sinuosity. Houses were set back 30ft to 60ft from both banks.

Staff encountered a fair amount of woody debris immediately following the start of the subreach (IMG_2184). Like the previous subreach, vegetation was observed growing in-stream. Upon construction of the Bearpath Trail bridge, a large amount of riprap was placed for bank stabilization (IMG_2185). Addit6ionl boulders were placed for bank protection and used to create an artificial riffle downstream of the bridge as well (IMG_2186, IMG_2187). About 45ft downstream of the bridge, staff observed some exposed erosion blankets on the right bank behind the boulders (IMG_2187). Continuing downstream, a plugged stormwater culvert was found on the right bank which was causing some minor erosion (IMG_2188). Following the District's regular creek sampling site (R3), the surrounding slopes began to flatten out. Staff observed some erosion and undercutting along the left and right banks that measured 1ft high and continued for 50ft as the stream shifted south (IMG_2189). Staff ended this subreach at the walking bridge/cart path seen in IMG_2190. The stream widened for a short stretch here before narrowing again.

IMG_2184

General stream picture; woody debris.

IMG_2185

Bearpath Trail.

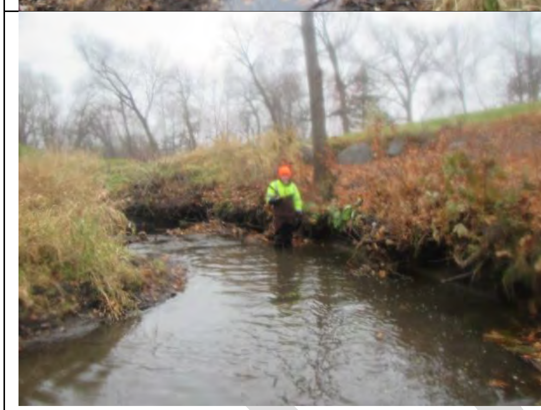
	**IMG_2186** Boulder riffle; boulders placed for bank stabilization.		**IMG_2187** Boulder riffle; exposed erosion blanket, RB.
	**IMG_2188** Stormwater culvert causing minor erosion, RB.		**IMG_2189** Erosion along left bank, 1ft by 50ft.
	**IMG_2190** Walking bridge/cart path over stream; end of subreach.		

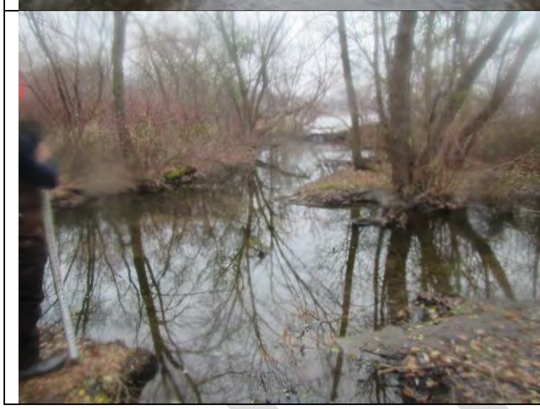
Subreach R3E - 250ft Downstream of Bearpath Trail to Lake Riley

MSHA: 40.1 (Fair); Pfankuch: 87 (Moderately Unstable)

This subreach started at the cart path just downstream of Bearpath Trail. This subreach was short, and it was surrounded primarily by the golf course and wetland grasses and sedges before it crossed Riley Lake Road. The riparian width was very narrow, about 15ft or less throughout. This subreach exhibited a great deal of erosion along both banks which was affecting stability. The predominant substrate types were sand and silt; the riffles contained some gravel. Although sinuosity was very good, channel development (riffle/run/pool) was graded as fair because of limited riffles present. There were spots where the golf course lawn was mowed to the bank edge which reduced bank stability (IMG_2195, IMG_2198). The slopes of the immediate upper banks were high (entrenched) but flattened out just a few yards beyond the upper bank tops.

Staff observed more instream vegetation growing at the start of this stretch. Immediately downstream of the bridge, staff encountered a heavily clogged stormwater culvert on the right bank (IMG_2191) which was suspended 3ft from the stream bed and was undercut 3.5ft (IMG_2191). Downstream of the culvert, there was considerable silt deposition in the stream and along the right bank as seen in IMG_2192. As the stream turned east, there was a stretch of erosion along the outside bend of the right bank measuring 3ft high by 100ft long (IMG_2193). This erosion reached past the next wooden bridge/cart path (IMG_2194). Downstream of the bridge was another stretch of erosion along the left bank measuring 2ft high by 20ft (IMG_2195). At this point, the riparian zone was non-existent; the top of the bank was sparsely covered by patchy, mowed grass (IMG_2195). The next length of erosion staff observed was on the left bank, measuring 4.5ft high by 40ft as the stream shifted south, heading towards Riley Lake Road (IMG_2196). The right bank was eroding as well, the erosion measuring 2.5ft by 30ft (IMG_2197). There were more silt deposits observed here along the left bank (IMG_2198). Just past the deposition, the outside bend of the left bank was bare and looked unstable (IMG_2198). The stream shifted south, and staff observed the culvert underneath Riley Lake Road (IMG_2199). Staff crossed Riley Lake Road and ended the walk at Lake Riley (IMG_2200, IMG_2201).

	**IMG_2191** Stormwater culvert suspended 3ft and undercut 3.5ft, RB, US.		**IMG_2192** Silt deposition DS of culvert.
	**IMG_2193** Erosion 3ft high by 100ft, RB.		**IMG_2194** Walking bridge/cart path; erosion, RB.
	**IMG_2195** Erosion 2ft high by 20ft, LB; grass mowed to channel.		**IMG_2196** Erosion 4.5ft by 40ft, LB.

	**IMG_2197** Erosion 2.5ft by 30ft, RB.		**IMG_2198** Silt deposition and bare banks, LB.
	**IMG_2199** Culvert under Riley Lake Road.		**IMG_2200** DS side of culvert under Riley Lake Road.
	**IMG_2201** Lake Riley, end of reach.		

Purgatory Creek Assessment

Powers Blvd to Lotus Lake

Conducted by: RPBCWD staff [Josh Maxwell] and University of MN volunteers

Summary

Site/Scope

On the 1st and 3rd of November 2017 at 14:56 and 12:35 (respectively), Riley Purgatory Bluff Creek Watershed District (RPBCWD) staff conducted a stream corridor assessment of Reach PT2 of Purgatory Creek. On the 1st of November, staff started at Lotus lake and walked upstream to just south of Carver Beach Road and Big Woods Blvd. On the 3rd of November, staff started at the recreation trail next to the pond just south of Butte Court and walked downstream to just south of Carver Beach Road and Big Woods Blvd. Subreach PT2A consisted of the pond which begins at Powers Blvd and ends at the recreation trail just south of Butte Court. Staff walked both sides of the creek to assess overall stream conditions and to discover and prioritize possible restoration locations (approximately 0.77 stream miles). Staff conducted a Modified Pfankuch Channel Stability Assessment and a Minnesota Pollution Control Agency (MPCA) Stream Habitat Assessment (MSHA) on each subreach to better characterize the stream. A GPS, and a GPS-enabled camera were used to mark points and take photos.

- All pictures were taken <u>Facing Downstream</u> unless noted otherwise.
- <u>Right</u> and <u>Left</u> bank are defined by looking <u>Downstream</u>.
- Erosion was defined as <u>Slight</u>, <u>Moderate</u>, or <u>Severe</u>.
- <u>Stream Bank Erosion</u> was measured from the streambed to the top of the eroding bank.
- Vegetation was defined as <u>Sparse</u>, <u>Patchy</u>, or <u>Dense</u>.
- All measurements were recorded in <u>Feet</u>.
- All major erosion sites were labeled on the GPS by the erosion site number and reach.

Weather Conditions

11/1/2017	11/3/2017
Wind: 5mph	Wind: 0mph
Temp: 3.5°C	Temp: 5.1° C
Cloud Cover: 100%	Cloud Cover: 100%

Stream Features

Tributary PT2 passes through deciduous forest and residential areas, beginning at the pond on the east side of Powers Blvd and ending at Lotus Lake. The substrate in this reach consisted mainly of sand mixtures. Several sections of the subreaches had gravel mixed with sand, while others had a mixture of silt and sand. There were multiple stretches within PT2D that contained large boulder riffles and had streambanks lined with different size rock. Subreach PT2C had a piped channel with interstitial surface water flow. Slope gradients within this reach were predominantly between 30% and 40%. The majority of subreach PT2C contained gradients predominantly between 0% and 5%. This reach was not very sinuous. Except for PT2D, which had good channel development (riffle/run/pool) throughout most of the subreach, this tributary had poor development.

Areas of Concern

There were two areas exhibiting mass wasting within this reach. One was in subreach PT2D, measuring about 15ft tall by 20ft wide. The other was located in PT2B where a stormwater culvert on the left bank was severely eroded and created a large scour hole. The lower quarter of PT2D was very incised 3-5ft. Landscaping rock was utilized in this section to stabilize the banks (often failing) and “beautify” the stream. Above the rock, banks were mowed to the edge and/or planted with hostas etc. PT2A was not scored because it was a pond. PT2B was very silted and was incised 3-4 feet. PT2C was a restored by the city of Chanhassen and looked good.

Subreach PT2D - Lotus Lake to Walking Trail South of Carver Beach Road and Big Woods Blvd MSHA: 53.3 (Good); Pfankuch: 86 (Moderately Unstable)

Staff began the creek walk at Lotus Lake and walked upstream (all photos taken upstream unless noted otherwise). While accessing the creek from Shadowmere Drive, staff observed a large stormwater pond just south of the creek, which collected runoff from the cul-de-sac. The pond had a large overflow structure that drained to the creek (IMG_2075). Staff noticed trash and debris around this pond as well as erosion around the inlet pipe entering the pond. The channel was surrounded by deciduous forest, but the riparian width was initially narrow, 0-15ft from residential properties along both banks. This changed about half way through the subreach, when the riparian width along the left bank increased to 30-150ft. Initially, the slope gradients of both banks were flat, but quickly increased to include slope gradients greater than 10%. Just upstream of Lotus, a walking bridge spanned the stream, joining the two adjacent properties (IMG_2076). Leaf litter was the predominant substrate throughout the subreach at the time of the creek walk. Boulders were placed along both stream banks, from the lake to upstream of the bridge, to reduce erosion. The adjacent properties had mowed lawns down to the stream edge (IMG_2077, IMG_2078). After the boulders, there was a check dam with landscape fabric covering it in the stream (IMG_2078). Upstream of the check down was a large sand/gravel deposition island just beneath the stormwater pond outlet culvert (IMG_2079). The outlet culvert itself was undercut, exposing an erosion blanket, and was clogged with detritus (IMG_2080).

	**IMG_2075** Stormwater pond off Shadowmere Drive.		**IMG_2076** Bridge just US of Lotus.
	**IMG_2077** Bridge US of Lotus; lawns mowed to creek edge.		**IMG_2078** Placed boulders lining creek banks; check dam, US.

IMG_2079

Deposition island of sand and gravel; SW culvert on RB, US.

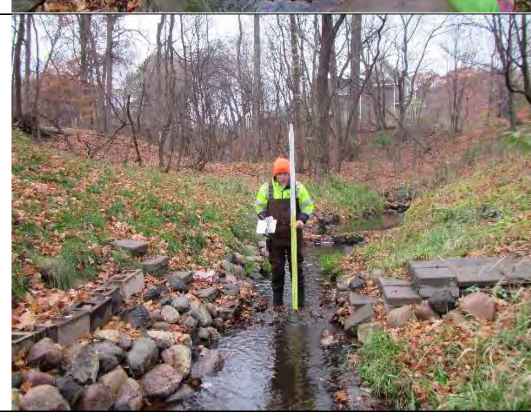
IMG_2080

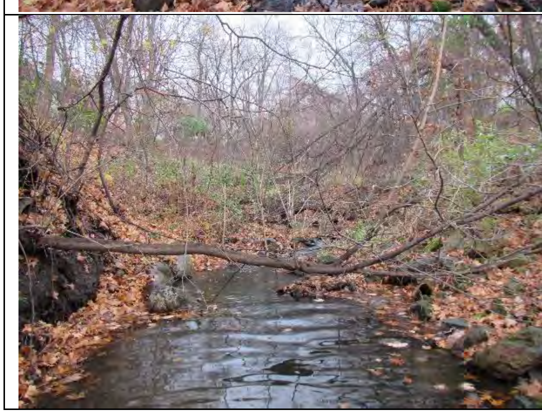
SW culvert from pond; undercut and clogged with debris; RB, US.

Continuing upstream, staff observed continuous erosion on the left bank, measuring up to 3ft high (IMG_2081). The in-stream sediment to this point consisted of gravel/sand in the riffles, sand/gravel in the runs, and sand/silt in the pools. Staff then encountered another bridge, made of large logs and boards (IMG_2082). Underneath the bridge there was significant undercutting occurring around the footings. After the bridge, the right bank was eroded, measuring about 6ft high, and was covered with an erosion blanket (IMG_2083). The channel around this section measured about 0.2ft deep and 4ft wide. Further upstream, staff observed erosion on the left bank measuring up to 4ft high stretching for 20ft (IMG_2085). At this point, there was some chain link fencing in the stream that may have been used to help stabilize the bank (IMG_2084). Upstream of the fencing, a resident had placed flat rock along both banks which was sloughing into the creek in some locations (IMG_2086). Hostas lined the upper banks above the rock and with bare soil beneath them. A third wooden walking bridge spanned the channel at this point (IMG_2086). At the next property line, there were three plastic drain pipes entering the stream from adjacent homes on the right bank (IMG_2087).

At this point, the bank slope gradient became more variable; some slopes reached gradients steeper than 40%. Moving upstream, there was a man-made stream crossing with stairs made from pavers (IMG_2088). The pavers were in-stream and restricting flow. Just upstream of the crossing was a small boulder check dam (IMG_2088). Upstream of the check dam was a large rock riffle (IMG_2089). The riparian width increased about 50ft on both sides. The stream turned south, and staff observed another check dam (IMG_2090). There was a stormwater culvert and a small, black, plastic drainage pipe entering the channel on the left bank (IMG_2090). North of the stormwater culvert was a large pond that was separated from the creek by a narrow berm. Erosion measuring up to 3ft high extended 30ft upstream from the culvert (IMG_2090). Continuing upstream, the left bank gradient increased, reaching slopes of 60% to 70%, while the right bank flattened (less than 5%, IMG_2091). There was also erosion along the left bank, measuring 1.5ft high (IMG_2091). The riparian zone then increased in size along both banks. Staff started to observe horse tail reed in large densities lining both banks (IMG_2091). Staff soon encountered the first mass wasting site observed in this tributary on the left bank, measuring 15ft tall by 20ft (GPS point: PT2DE1, IMG_2092). The estimated bank-full measurement at this point was 2ft deep by 9ft wide.

Continuing upstream, there was a former channel setback from the left bank. Just upstream, erosion was occurring on the right bank measuring 5ft high by 20ft (IMG_2093, IMG2094). Woody debris increased moving upstream (IMG_2095). There was also a manhole access point on the left bank (IMG_2096). Across the stream from the manhole cover was some erosion around a fallen tree's roots, measuring 5ft high by 20ft (IMG_2097). The estimated bank-full at this point was 2.2ft deep by 10ft wide. Continuing upstream, a remnant channel was observed along the right bank next to a large boulder riffle within the channel (IMG2_098). Further upstream, there was a stretch of erosion measuring 3ft to 5ft high along the RB, opposite a hard-armored left bank (IMG_2100). Staff noticed another black, plastic drainage pipe on the right bank (IMG_2101). At this point, the stream shifted north, and the outside bend of the right bank was lined with large boulders. The boulders on the downstream end of the placement had fallen into the stream and large amount of erosion was occurring on the right bank above them (IMG_2102).

	**IMG_2081** Continuous, 3ft erosion, LB, US.		**IMG_2082** Log bridge over creek, US.
	**IMG_2083** Erosion covered by erosion blanket; RB, US.		**IMG_2084** Wire fencing in stream; US.
	**IMG_2085** Erosion on LB.		**IMG_2086** Rock lining stream; hostas on banks; 3rd bridge across stream; US.
	**IMG_2087** Plastic drain pipes; RB, US.		**IMG_2088** Man-made stream crossing; boulder check dam; US.

	**IMG_2089** Large rock riffle; US.		**IMG_2090** Large rock riffle; black pipe and SW culvert entering channel on LB; US.
	**IMG_2091** Native vegetation; increased slope gradient on LB; US.		**IMG_2092** Mass wasting site PT2DE1; LB, US.
	**IMG_2093** Former channel, LB; US.		**IMG_2094** Erosion 5ft by 20ft, RB; US.
	**IMG_2095** Woody Debris; US.		**IMG_2096** Manhole access, LB; US.

IMG_2097

Erosion 5ft by 20ft, RB; US.

IMG_2098

Large boulder riffle; remnant channel, RB; US.

IMG_2100

Erosion 3ft to 5ft high, RB; hard-armored RB; US.

IMG_2102

Erosion, RB; large boulders in—stream; US.

PT2D Continued (11/3/2017)

The continuation of the walk of this subreach started at the culvert under the walking path just south of South of Carver Beach Road and Big Woods Blvd (IMG_2146). From here, staff walked downstream towards where they had previously left-off. The stream, out of the culvert, was very sinuous and there were many large boulders placed along the banks for erosion protection (IMG_2146, IMG_2148). Pools in this section measured up to 1.5ft deep. Staff noticed horse tail reeds and other native emergent vegetation growing in the riparian zone. As the channel shifted south, staff observed a failed boulder placement on the left bank with erosion occurring (IMG_2149). After a straight stretch (IMG_2150) staff observed two rock/debris riffles (IMG_2151), followed by some erosion on the outside bend of the right bank, measuring 4ft high by 20ft (IMG_2152). This was just before the hard-armoring began along the right bank, where staff stopped the previous creek walk.

IMG_2146

Culvert under walking path.

IMG_2148

Riprap along banks, LB.

	**IMG_2149** Failed riprap/ boulder placement, LB.		**IMG_2150** General stream picture.
	**IMG_2151** Two rock/debris riffles.		**IMG_2152** Erosion 4ft high by 20ft, RB.

Subreach PT2B - Recreation Trail Next to Pond South of Butte Court to Kerber Blvd MSHA: 41.8 (Fair); Pfankuch: 95 (Moderately Unstable)

Staff started this walk at the walking trail on the east side of the pond (IMG_2105) just south of Butte Court. This subreach had low and interstitial flows. Within the first third of the subreach, the riparian zone ranged from 15ft to 30ft on both sides. The surrounding vegetation was made up of deciduous (oaks, maple, birch) forest bordered by residential properties on the south side, and mowed, open parkland on the northwest side. Most of the slope gradients throughout the subreach were between 30% and 50%. The creek bed at the start of the subreach was piped underground. Above ground, there were four backyards with gardens, dump sites, and compost bins. (IMG_2106, IMG_2107, IMG_2109, IMG_2110). Approximately 45ft downstream, the channel was daylighted. After the creek was daylighted, the riparian zone on the left bank widened to 75ft. Staff did not locate the culvert; it was buried under a large pile of woody debris, some natural, some dumped (IMG_2111). The ground cover was sparse-to-absent beneath the blanketing leaf litter.

Where the stream started flowing, the left bank was incised 3ft to 6ft high, stretching for about 100 yards (IMG_2112). The sediment in this subreach was predominantly a silt and sand mixture, some areas containing gravel (IMG_2113) Gravel and sand were the predominant substrate in the riffles. Staff also observed boulders sparsely located in and along the channel throughout the subreach. There was a lot of woody debris and detritus throughout the subreach (IMG_2114). Continuing downstream, the stream was incised 4ft to 5ft high for 100ft on the left bank (IMG_2114) and for 50ft on the right bank. Most of the soil around the creek and on the banks was bare, with limited vegetative cover. Staff then walked a stretch of creek that was rather straight, with a very low, wide channel (IMG_2115). The creek shifted south. There was a large woody debris pile just upstream of a small, wooden walking bridge crossing the channel (IMG_2116). Just after the bridge, staff observed another woody debris jam which was creating a mini waterfall (IMG_2117); there was also erosion along the right bank measuring 0.8ft high (IMG_2117).

	**IMG_2105** Pond at start of subreach PT2B; US.		**IMG_2106** Start of creek; garden area of residents.
	**IMG_2107** Compost bins next above ground drainage, LB.		**IMG_2109** Dump pile/yard waste.
	**IMG_2110** Large dump site/wood pile blocking stream.		**IMG_2111** Creek bed, no water.
	**IMG_2112** Start of stream flow; erosion on RB, 3ft to 6ft high for 100yd.		**IMG_2113** In-stream sediment: silt/sand/ gravel.

	**IMG_2114** Erosion 4ft to 5ft high for 100ft, LB.		**IMG_2115** General stream picture; low-interstitial flow/level.
	**IMG_2116** Large woody debris pile US of small wooden bridge over stream.		**IMG_2117** Large woody debris dam; small waterfall with 0.8ft of erosion, RB; US.

Continuing downstream, there was an old stormwater culvert on the right bank (IMG_2118). Staff observed a large pile of riprap in the channel (IMG_2119) where a metal stormwater pipe entered the stream from the left bank. The culvert had eroded all the surrounding sediment and had fallen into the stream causing a very large scour hole. An eroding ravine had formed above the culvert measuring up to 6ft high (GPS point: PT2BE1, IMG_2121, IMG_2122). This site was the creek's main source of water at the time of the creek walk; the pool depth here measured 2.9ft (IMG_2121). The site in IMG_2121 was another erosion site on the outside bend of the left bank, measuring 6ft high by 12ft (IMG_2123). The stream at this point was 0.5ft deep by 3ft wide. Just upstream of the end of the subreach was a small, partially eroded ravine on the left bank (IMG_2125). When staff reached the end of the subreach, at Kerber Blvd, the culvert under the road was almost completely blocked by debris (IMG_2126, IMG_2127). There was an access structure located above the culvert (IMG_2128).

	**IMG_2118** Old stormwater culvert, RB.		**IMG_2120** Large pile of riprap in stream.

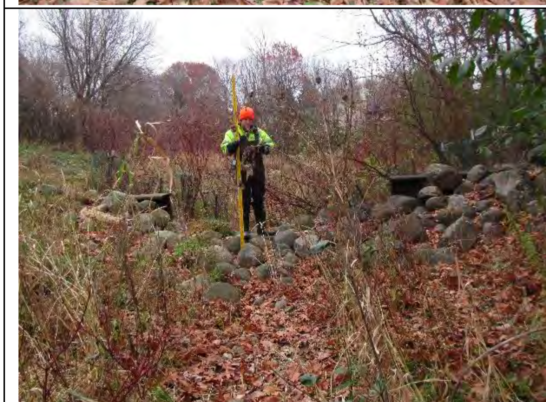
	**IMG_2121** Mass wasting site PT2BE1; stormwater culvert on LB.		**IMG_2122** Mass wasting site PT2BE1 (continued).
	**IMG_2123** Erosion on LB, 6ft by 12ft.		**IMG_2124** General stream picture.
	**IMG_2125** Partially eroding ravine, LB.		**IMG_2126** End of subreach; access to culvert.
	**IMG_2127** Culvert under Kerber Blvd nearly completely blocked by debris.		**IMG_2128** Access structure above culvert at end of subreach.

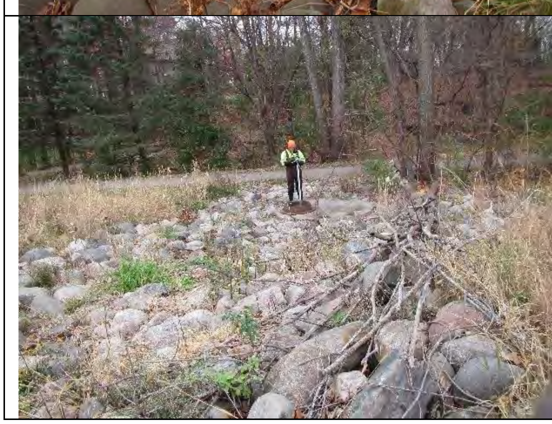
Subreach PT2C - Kerber Blvd to Walking Trail South of Carver Beach Road and Big Woods Blvd MSHA: 33.5 (Fair); Pfankuch: 53 (Very Stable)

Staff started this subreach on the east side of Kerber Blvd. The above-ground creek bed started in the back yard of a residential home (IMG_2129). For the majority of the subreach the stream was piped underground, running underneath residential yards and restored prairie (IMG_2132, IMG_2135). The riparian width was between 15ft and 90ft within the first third of the subreach but expanded to over 150ft. The surrounding landscape contained mostly wet-prairie, surrounded by deciduous forest and residential areas. Immediate slopes, for the most part, had gradients less than 10% throughout most of the subreach. Staff encountered four weir structures within the channel of this subreach.

After starting the walk, about 80ft downstream, staff observed an access/overflow structure (IMG_2130). Just downstream, staff encountered the first large, metal weir structure (IMG_2131). There were large boulders spread along the width of the structure to prevent erosion. Some short shrubs were observed surrounding the creek bed just downstream, but most of the vegetation continuing downstream was made up of grasses and sedges (IMG_2132). The second weir structure was about 170ft downstream of the first one (IMG_2133). There was small cobble placed in the overland streambed along the entire length of the subreach (IMG_2135, IMG_2136). Staff encountered a third weir structure about another 170ft downstream of the last, similar in size with the same boulder configuration (IMG_2136). Staff still had not observed any water in the creek by this point in the walk. Just downstream of the third weir, a stormwater culvert crossed the overland streambed and exited the channel on the left bank (IMG_2138). The fourth weir structure was several hundred feet downstream of the last weir (IMG_2139). Before reaching the pond near the end of the subreach, staff observed another overflow structure containing standing water. The structure was about 50ft upstream of the diked pond (IMG_2141). Just north of this pond receiving the tributary flows was another, larger pond. The culvert at the inlet of the pond was clogged with organic material/detritus (IMG_2143). Staff observed another overflow structure at the downstream end of the pond (IMG_2144) which both ponds would drain into if levels where high enough. The last 50ft to 70ft of the subreach was full of many large, placed boulders (IMG_2145). Staff observed a manhole access here (IMG_2145). The walk ended at the recreation trail extending from Carver Beach Road and Big Woods Blvd.

	**IMG_2129** Start of subreach; residential yard.		**IMG_2130** Access/ overflow structure.

	**IMG_2131** Large metal weir structure; surrounded by boulders.		**IMG_2132** General stream picture.
	**IMG_2133** Second weir structure.		**IMG_2134** General stream picture.
	**IMG_3135** General stream picture.		**IMG_2136** Third weir structure.
	**IMG_2137** General stream picture.		**IMG_2138** Stormwater culvert leaving channel, LB.

	**IMG_2139** Fourth weir structure.		**IMG_2140** General stream picture.
	**IMG_2141** Overflow structure; piped creek inside structure.		**IMG_2142** Stream daylighting into diked pond.
	**IMG_2143** Inlet culvert entering pond clogged with debris.		**IMG_2144** Overflow structure at west end of pond.
	**IMG_2145** End of subreach; manhole access.		

Purgatory Creek Assessment

Kerber Pond to Lotus Lake

Conducted by: RPBCWD staff [Josh Maxwell, Zach Dickhausen]

Summary

Site/Scope

On the 11th of April at 11:45, 2017, Riley Purgatory Bluff Creek Watershed District (RPBCWD) staff conducted a stream corridor assessment of PT3A, the middle Lotus ravine of Purgatory Creek that drains into Lotus Lake. Staff started at Lotus lake and walked upstream, crossing Frontier Trail, to Kerber Pond. Staff walked both sides of the creek to assess overall stream conditions and to discover and prioritize possible restoration locations (walked approximately 0.22 stream miles). Staff conducted a Modified Pfankuch Channel Stability Assessment and a Minnesota Pollution Control Agency (MPCA) Stream Habitat Assessment (MSHA) on each subreach to better characterize the stream. A GPS, and a GPS-enabled camera were used to mark points and take photos.

- All pictures were taken Facing Upstream unless noted otherwise.
- Right and Left bank are defined by looking Downstream.
- Erosion was defined as Slight, Moderate, or Severe.
- Stream Bank Erosion was measured from the streambed to the top of the eroding bank.
- Vegetation was defined as Sparse, Patchy, or Dense.
- All measurements were recorded in Feet.
- All major erosion sites were labeled on the GPS by the erosion site number and reach.

Weather Conditions

4/11/2017
Wind: 0.5mph
Temp: 12.4°C
Cloud Cover: NA

Stream Features

This reach of the stream drains from Kerber Pond, passing through deciduous forest and residential areas, before ending at Lotus Lake. The substrate within the reach was made up of sand, silt, and gravel. Boulders were sparsely present in-stream in some areas, and there was a significant buildup of detritus at the time of the creek walk. The subreach had moderate-to-heavy woody debris in sections of the reach. Slope gradients were between 30% and 50% for much of the reach but flattened out upon reaching Kerber Pond. Sinuosity was fair-to-poor throughout the reach, as was channel development (riffle/run/pool). Staff did encounter several riffles between long runs. Water level was low, slow flowing and fairly dispersed throughout the entirety of the reach.

Areas of Concern

There was little bank erosion and the channel was stable (moderate/high). Near Frontier Trail on the left bank was a compost pile spilling into the stream. Smaller yard waste dump sites were found along the reach. There was potential for erosion on the banks of the middle section of the reach, most of the soil there was bare and fallen trees were scattered along the steep slopes of this area.

PT3A: Middle Lotus Ravine - Lotus Lake to Kerber Pond

MSHA: 40.8 (Fair); Pfankuch: 75 (Moderately Stable)

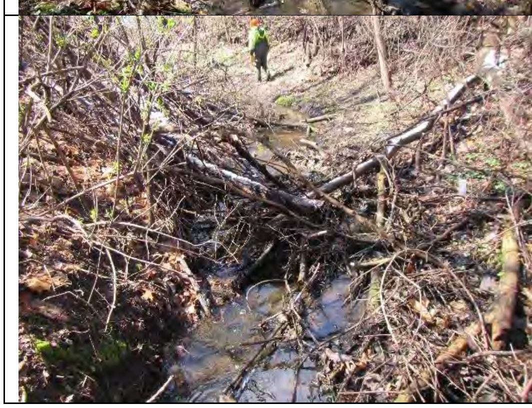
Staff began this walk at the culvert and storm drain just east of Frontier Trail, at the west upper bank of Lotus Lake (IMG_0406, IMG_0407). Staff continued across Frontier Trail to the culvert on the upstream side (IMG_0408, IMG_0409); here they observed two wooden weir structures holding back about 0.3ft of water

(IMG_0408). The substrate early in the reach consisted of mainly sand and gravel, with some scattered boulders. The riparian width was about 15ft to 30ft on the left bank, and 45ft on the right bank near Frontier Trail. The overhead canopy was rather thick, made up of small-to-medium sized deciduous trees. Just upstream of the wooden weirs was a natural check dam (IMG_0410). Continuing upstream, staff encountered a raised manhole near the right bank that was well within the channel (IMG_0411); the manhole was marked as a sewer main access point. The stream water levels were low and there was quite a bit of detritus and woody debris in and around it (IMG_0411). Just opposite the manhole was a residential compost pile surrounded by chain-link fencing (IMG_0412). As seen in IMG_0412, some of the compost was falling directly into the stream. Staff observe increased woody debris in-stream as they continued upstream (IMG_0413). The upper bank slopes were high, reaching gradients of 40% to 50%. The soil of the upper slopes was bare and exposed; downed trees were also scattered along the slopes. A second raised manhole access was observed upstream (IMG_0414). The stream continued to be very shallow and dispersed. The upper banks reduced in height moving upstream (IMG_0415).

	**IMG_0406** Culvert draining into Lotus Lake; US.		**IMG_0407** Storm drain leading to Lotus.
	**IMG_0408** Wooden Weirs (x2).		**IMG_0409** Culvert under Frontier Trail.
	**IMG_0410** Riffle and check dam.		**IMG_0411** Raised manhole within channel.

	**IMG_0412** Compost pile falling into stream, LB.		**IMG_0413** General stream picture; woody debris.
	**IMG_0414** Second raised manhole, LB.		**IMG_0415** General stream picture.

The channel continued to lack sinuosity and channel development (riffle/run/pool) as staff moved upstream. The stream was very straight but contained both riffles and runs. One of the riffles encountered by staff had cinder blocks and scrap wood discarded in it (IMG_0417). About 45ft upstream of this riffle was a third manhole (IMG_0418). Continuing upstream, staff observed a storage shed on the upper slopes of the right bank (IMG_0419); the shed could potentially fall into the channel if the steep bank gave way. Towards the end of the reach, herbaceous ground cover was growing on the banks. Staff encountered a small, wooden bridge across the stream and a fourth manhole access just upstream (IMG_0420). There was a heavy amount of woody debris at this point in the walk (IMG_0420, IMG_0422). On the right bank a 4in PVC pipe was entering the channel from the residence above, possibly a sub pump pipe (IMG_0421). After passing the last manhole and heavy woody debris, staff approached the end of the reach and the culvert running below a walking path from Kerber Pond (IMG_0423); the area around the culvert had eroded away. At the outlet of the pond, staff observed an overflow structure (IMG_0424). At the west end of the pond was a wetland drainage area which drained into the pond (IMG_0427). Just south of the pond outlet and the pond was a second, small stormwater pond (IMG_0428, IMG_0429).

	**IMG_0416** General stream picture.		**IMG_0417** Riffle with cinder blocks and discarded wood.
	**IMG_0418** Third raised manhole, RB.		**IMG_0419** Shed on slope, RB.
	**IMG_0420** Small, board bridge and a fourth manhole on LB.		**IMG_0421** 4in PVC pipe entering stream from home above, RB.
	**IMG_0422** Heavy woody debris.		**IMG_0423** Culvert below walking path, connecting to Kerber pond; rock riffle.

	**IMG_0424** Kerber pond and overflow structure.		**IMG_0425** Kerber pond.
	**IMG_0427** Wetland drainage area above pond.		**IMG_0428** Walking path and small stormwater pond adjacent to Kerber pond (south side of Kerber Pond).
	**IMG_0429** Small stormwater pond adjacent to Kerber pond (south side of Kerber Pond).		

Purgatory Creek Assessment

Santa Fe Trail to Lotus Lake

Conducted by: RPBCWD staff [Josh Maxwell, Zach Dickhausen]

Summary

Site/Scope

On the 11th of April at 9:45, 2017, Riley Purgatory Bluff Creek Watershed District (RPBCWD) staff conducted a stream corridor assessment of PT4A, the southern Lotus ravine of Purgatory Creek that drains into Lotus Lake. Staff started at Lotus lake and walked upstream, crossing Frontier Trail, to Santa Fe Trail, and then walked along a tributary which ran from the crossing point at Frontier trail southeast to Eire Ave. Staff walked both sides of the creek to assess overall stream conditions and to discover and prioritize possible restoration locations (walked approximately 0.8 stream miles). Staff conducted a Modified Pfankuch Channel Stability Assessment and a Minnesota Pollution Control Agency (MPCA) Stream Habitat Assessment (MSHA) on each subreach to better characterize the stream. A GPS, and a GPS-enabled camera were used to mark points and take photos.

- All pictures were taken <u>Facing Upstream</u> unless noted otherwise.
- <u>Right</u> and <u>Left</u> bank are defined by looking <u>Downstream</u>.
- Erosion was defined as <u>Slight</u>, <u>Moderate</u>, or <u>Severe</u>.
- <u>Stream Bank Erosion</u> was measured from the streambed to the top of the eroding bank.
- Vegetation was defined as <u>Sparse</u>, <u>Patchy</u>, or <u>Dense</u>.
- All measurements were recorded in <u>Feet.</u>
- All major erosion sites were labeled on the GPS by the erosion site number and reach.

Weather Conditions

4/11/2017
Wind: 1mph
Temp: 10.6°C
Cloud Cover: NA

Stream Features

This reach of the stream passed through deciduous forest and residential areas, ending at the Lotus Lake. The substrate within this reach was made up of gravel and detritus with areas of silt. Once above the two ponds west of Frontier Trail, the creek bed was dry and detritus/leaflitter made up most of the creek bed. Placed boulders and cobble were predominant between Lotus Lake and Frontier Trail. At Frontier Trail, there was a tributary flowing into the subreach from the south. This tributary was about 0.27 stream miles long, starting just to the west of Erie Ave. Close to Lotus Lake, slope gradients were lower (rarely reaching 20%), but increased as the walk continued west, reaching up-to about 50% above Frontier Trail. In areas where flow occurred, channel development (riffle/run/pool) was fair-to-poor. The stream was not very sinuous.

Areas of Concern

Overall, the channel within this subreach was fairly stable with relatively little bank erosion. Clogging of culverts by detritus and garbage could be an issue by backing up water. Above the ponds, surrounding bank slopes were steep (up to 60%) and many downed trees were scattered across them. A single mass wasting scarp was observed in this area as well. Bare, exposed soils were common in this stretch. Staff did find multiple yard-waste dump sites. The tributary stream had considerable deposition in slack water areas and above each check dam. The old culvert and the plastic drain tile at the top of the subreach could be replaced to reduce erosion.

PT4A: Southern Lotus Ravine - Lotus Lake to Santa Fe Trail

MSHA: 45.95 (Fair); Pfankuch: 65 (Moderately Stable)

Staff started this walk at Lotus Lake and walked upstream to Santa Fe Trail. Starting at the outlet, there was a small, metal bridge spanning the stream (IMG_0356). The adjacent residential properties grass was mowed about 3ft to 5ft away from the stream banks for first 110ft of the stream (IMG_0356, IMG_0357). There were boulders in-stream and placed along the banks for stabilization (IMG_0357, IMG_0358). Staff observed quite a bit of detritus and leafy debris as seen in IMG_0358. The underlying substrate consisted primarily of placed/artificial cobble. Continuing upstream, the stream was surrounded by moderately-dense deciduous forest containing a mixture of medium sized trees (IMG_0359). At this point, houses were set back about 150ft to 180ft from the right bank, and 75ft to 110ft from the left bank. There was a dirt road/trail connecting Frontier Trail to the lake edge about 15ft from the left bank (IMG_0359). Before reaching Frontier Trail, staff encountered some woody debris, including a large, downed tree across the stream (IMG_0360). This was the point where the stream formed a "Y" and the tributary entered the subreach along the right bank. There was also some woody debris/downed trees and more boulders just below the downstream side culvert under Frontier Trail (IMG_0361).

	**IMG_0356** Lotus inlet; bridge across stream; DS		**IMG_0357** General stream picture; large boulders and placed rock.
	**IMG_0358** Rock riffle.		**IMG_0359** General stream picture.

IMG_0360

Tributary converges on stream; large downed tree; boulders in-stream (GPS-115).

IMG_3061

DS culvert under Frontier Trail.

Staff then crossed Frontier Trail to continue the walk. On the upstream side of the road, there was a series of three stormwater ponds which drained into the stream. The culvert on the upstream side of the Frontier Trail was extremely clogged with leaf litter (IMG_0362). After clearing the debris, staff observed a 1ft-drop in water level on the first pond upstream of Frontier Trail. The substrate above Frontier Trail was silty. Directly upstream of the pond was a second pond which drained, via a culvert, into the first pond (IMG_0364, IMG_0365, IMG_0368). Again, the culvert above the first pond was heavily clogged with detritus and garbage (IMG_3065). There were many boulders placed above the culvert draining into the second pond which was the emergency overflow structure (IMG_0366). The second pond sat about 15ft to 20ft higher than the first pond. The culvert at the eastern side of the second pond can be seen in IMG_0368. Water entered the second pond via another culvert (IMG_0367).

Staff walked uphill to the structure above the second pond (IMG_0369). AT the time of the creek walk, staff did not observe any water in-stream above the stormwater ponds. The channel bed was covered with leaf litter and the upper banks were heavily forested, but there was a significant amount of bare soil (IMG_0369). Staff also observed a truck topper and tire dumped in the channel near the outflow structure (IMG_0369). The grade of the upper banks also increased, reaching slopes of 50% to 60% (IMG_0369, IMG_0370). These higher slopes were littered with fallen trees along both banks above the dry channel (IMG_0370). Further upstream, staff encountered a large scarp/mass wasting site along the left bank (IMG_0372); it was not entirely clear how extensive the scarp was due to the amount of leaf litter covering the banks. Continuing upstream, staff observed a dump-site on the right bank, consisting of branch trimmings, logs, and boulders (IMG_0373). Staff soon ran into a second large earth berm, covered in woody debris from several large, fallen trees (IMG_0374). There was some water ponding on the downstream side of the berm which was slowly draining downstream (IMG_0374). Upstream of the berm was a large ravine entering the channel from the right bank (IMG_0375); there was some erosion, as well as some dumped branches and yard waste at the top of it (IMG_0375, IMG_0376). Continuing upstream, staff found the first drain pipe/tile which drained to the culvert downstream into the ponds (IMG_0377); it was marked with a GPS point (point "116"). Approximately, 600ft upstream of the drain pipe was Santa Fe Trail. Before reaching Santa Fe Trail, staff found another storm drain pipe (the end of the reach, IMG_0378, IMG_0379, IMG_0380).

IMG_0362

US culvert under Frontier Trail, clogged with debris.

IMG_3063

Pooling water/small pond draining into creek.

	**IMG_3064** Culvert draining into first pond.		**IMG_3065** Culvert above first pond, clogged with debris and garbage.
	**IMG_0366** Placed boulders on berm above culvert.		**IMG_0367** Culvert draining into second pond.
	**IMG_0368** Second pond draining into creek, DS.		**IMG_0369** Stream bed above second pond; no flow/water; garbage in channel; grated overflow drain.
	**IMG_0370** Fallen trees above dry channel, RB.		**IMG_0371** Fallen trees above dry channel, RB.

	**IMG_0372** Scarp/mass wasting along left bank.		**IMG_0373** Large boulders and dump pile, RB.
	**IMG_0374** Large earth berm and fallen tree across channel.		**IMG_0375** Large ravine entering channel from right bank; dumpsite at top of ravine.
	**IMG_0376** Dump pile at top of large ravine, right bank.		**IMG_0377** Storm drain pipe leading to culvert above ponds downstream.
	**IMG_0378** Second storm drain pipe.		**IMG_0379** Second storm drain pipe.

	**IMG_0380** End of reach at Santa Fe Trail.		

Staff then went back to where the tributary entered the reach below Frontier Trail and walked upstream. There was a second culvert under Frontier Trail draining stormwater runoff from the road and area across the road. The tributary can be seen entering the subreach on the left bank in IMG_0381. The stream was small; it measured about 0.15ft deep and 3.3ft wide. The substrate was made up of silt, sand, and gravel. There was some minor erosion measuring 0.8ft high along both banks, about 60ft upstream from the culvert (IMG_0385). Before reaching a culvert under a residential driveway (about 150ft upstream of the second culvert under Frontier Trail), the stream flowed over a mowed lawn and had visible silt deposition occuring (IMG_0386, IMG_0387). Upstream of the culvert under the driveway had a lot of leaf litter and sediment deposits in and around it (IMG_0388). The stream continued through forested area, but the riparian zone was very narrow, ranging from about 3ft to 30ft on either side. The stream was restricted along the right bank due to a driveway (IMG_0391). The stream was flowing very slowly here, and water level was low (IMG_0389). About 390ft upstream of the previous culvert, staff encountered a raised manhole cover on the left bank (IMG_0390). About 60ft upstream of that was another raised manhole cover on the right bank (IMG_0392). Here, the riparian width increased to about 150ft on either side. A third manhole cover was observed just upstream of the second (IMG_0393). At this point, staff started to observe remnant stream restoration measures, including a series of boulder check dams (IMG_0393, IMG_0394, IMG_0397, IMG_0398). Woody debris in the channel increased, building up near the check dams. Sediments directly upstream of the check dams were comprised of heavy silt. The channel became narrow and the immediate banks were higher. The upper bank slope gradients increased, but some areas were still relatively flat. Just upstream of the first check dam, the banks were lined with black, plastic erosion netting for sediment control (IMG_0396). About 660ft from the driveway culvert, staff encountered a culvert draining from a pond and its overflow structure (IMG_0398, IMG_0399). Above the pond was another check dam which was backfilled with silt (IMG_0401). There was another check dam upstream, with erosion occurring along both sides of it, and tree roots stretching across the channel (IMG_0403). At the start of the tributary (end of the walk) was an old cement drain pipe (IMG_0404); staff also observed broken, plastic drain tile coming out of the right bank, next to the culvert. Both failing structures were causing 1.5ft high erosion on the left bank (IMG_0404). The walk ended at a storm drain structure in a residential yard above the pipe (IMG_0405).

	**IMG_0381** Second culvert under Frontier Trail, draining into tributary.		**IMG_0383** General stream picture of south tributary draining into reach.

	**IMG_0385** Erosion along both banks measuring 0.8ft high.		**IMG_0386** Stream running through residential lawn.
	**IMG_0387** DS culvert under residential driveway.		**IMG_0388** US culvert under residential driveway; lots of leaf litter and sediment deposition, DS.
	**IMG_0389** General stream picture; low water level; sediment deposition.		**IMG_0390** First raised manhole cover, LB.
	**IMG_0391** Ditched along a driveway.		**IMG_0392** Second raised manhole cover, RB.

	**IMG_0393** Third manhole cover, RB.		**IMG_0394** Woody debris built up at boulder check dam.
	**IMG_0396** Stream lined with plastic netting for sediment control.		**IMG_0397** Second rock check dam.
	**IMG_0398** Heavy woody debris and downed trees; culvert below pond.		**IMG_0399** Overflow structure for pond draining into tributary.
	**IMG_0401** Check dam above pond.		**IMG_0402** Second check dam above pond; roots spanning channel width.

	**IMG_0404** Old cement stormwater culvert and broken plastic drain tile causing significant erosion.		**IMG_0405** Storm drain pipe in residential yard; start of tributary.

Exhibit F

2017 Lake and Creek Fact Sheets

Appendix G Draft Report Card

METRO WATERSHED DISTRICT PERFORMANCE STANDARDS

LGU Name: ______________________________

Performance Area	Performance Standard	Level of Review	Rating	
	★ High performance (optional) standard ■ Basic practice or statutory requirement (see instructions for explanation of standards)	I Annual Compliance II BWSR Staff Review & Assessment (1/5 yrs)	Yes, No, or Value	
			YES	NO
Administration	■ Activity report: annual, on-time	I		
	■ Financial report & audit completed on schedule	I		
	■ Drainage authority buffer strip report submitted	I		
	■ Rules: date of last revision or review	II	mo/yr	
	■ Personnel policies: written and reviewed/updated within last 5 yrs	II		
	■ Data practices policy: reviewed/updated within last 5 yrs	II		
	■ Manager appointments: current and reported	II		
	■ Consultant RFP: within 2 yrs for legal, engineering, accounting	II		
	★ Administrator on staff	II		
	★ Board training: orientation & cont. ed. plan and record for each board member	II		
	★ Staff training: orientation & cont. ed. plan and record for each staff person	II		
	★ Operational guidelines exist and current	II		
	★ Public drainage records: meet modernization guidelines	II		
Planning	■ Watershed management plan: up-to-date	I		
	■ City/twp. local water plans not yet approved	II	%	
	■ Capital Improvement Program: reviewed every 2 yrs	II		
	★ Plan goals and objectives guide annual budgeting	II		
Execution	■ Engineer Reports: submitted for DNR & BWSR review	II		
	■ Total expenditures per year (past 10 yrs)	II	attach table	
	■ Project & program $ expended/total $ expended (past 5 yrs)	II	%	
	★ Water quality trends tracked for priority water bodies	II		
	★ Watershed yield trends monitored / reported	II		
Communication & Coordination	■ Website: contains annual report, financial statement, board members, contact info, watershed mgmt plan	I		
	■ Functioning advisory committee(s): recommendations on projects, reports, 2-way communication with Board	II		
	■ Communication piece: sent within last 12 months	II		
	★ Website: contains meeting notices, agendas & minutes; updated after each board mtg; additional content	II		
	★ Obtain stakeholder input: within last 5 yrs	II		
	★ Track outcomes for public I & E plan objectives	II		
	★ Coordination with County Bd and City/Twp officials by managers or staff	II		
	★ Partnerships: cooperative projects/tasks with neighboring districts, counties, soil and water districts, non-governmental organziations	II		

* district in operating under 103B. Engineer Reports submission to DNR & BWSR for review required for petitioned projects

Riley Purgatory Bluff Creek Watershed District Project Report Card

Project Name:	
District ID:	
Description:	
Partners:	

Planned Start:		**Planned Completion:**	
Actual Start:		**Actual Completion:**	
Schedule Notes:			

Estimated Cost:		**Final Cost:**	
Authorized Budget:			
Grant Funding:			
Partner Funding:			
District Funding:			
Funding Notes:			

	Goal
Admin 1	
Data Collection 1	
Education & Outreach 1	
Planning 1	
Planning 2	
Regulation 1	
Regulation 2	
Water Quality 1	
Water Quality 2	
Water Quality 3	
Groundwater 1	
Water Quantity 1	
Water Quantity 2	

Benefits	Metric
Habitat (acres)	
Pollutants (e.g., TP, TSS, etc; lbs)	
Abstraction (cubic ft)	
Streambank Restored (feet)	
Groundwater Conserved (gal)	
Community Reach	See E&O Tracking
Flow Reduction (fps, cfs, psf, etc.)	
Flood Storage (acft)	
Wetland Management Class	

Status 5 Years Later

Appendix H BSWR Approval and RPBCWD Adoption

BOARD OF WATER AND SOIL RESOURCES

June 27, 2018

Riley Purgatory Bluff Creek Watershed District
C/o Claire Bleser, Administrator
18681 Lake Drive East
Chanhassen, MN 55317

Dear Chair and Managers:

I am pleased to inform you that the Minnesota Board of Water and Soil Resources (Board) has approved the Riley Purgatory Bluff Creek Watershed District (RPBCCWD) revised Watershed Management Plan (Plan) at its regular meeting held on June 27, 2018. For your records I have enclosed a copy of the signed Board Order that documents approval of the Plan. Please be advised that the RPBCWD must adopt and implement the Plan within 120 days of the date of the Order, in accordance with MN Statutes 103B.231, Subd. 10.

The managers, staff, consultants, advisory committee members, and all others involved in the planning process are to be commended for developing a plan that clearly presents water management goals, actions, and priorities of the watershed. With continued implementation of your Plan, the protection and management of the water resources within the watershed will be greatly enhanced to the benefit of the residents. The Board looks forward to working with you as you implement this Plan and document its outcomes.

Please contact Steve Christopher of our staff at 651-249-7519, or at the central office address for further assistance in this matter.

Sincerely,

Gerald Van Amburg

Gerald Van Amburg
Chair

Enclosure

cc's on next page

Cc: Karen Galles, Hennepin County (via email)
Jeanne Daniels, DNR (via email)
Kate Drewry, DNR (via email)
John Freitag, MDH (via email)
Karen Voz, MDH (via email)
Jeff Berg, MDA (via email)
Judy Sventek, Met Council (via email)
Beth Neuendorf, MN DOT (via email)
Kevin Bigalke, BWSR (via email)
Steve Christopher, BWSR (via email)
File Copy

Minnesota Board of Water and Soil Resources
520 Lafayette Road North
Saint Paul, Minnesota 55155

In the Matter of the review of the Watershed Management Plan for the Riley Purgatory Bluff Creek Watershed District, pursuant to Minnesota Statutes Section 103B.231, Subdivision 9.	**ORDER APPROVING A WATERSHED MANAGEMENT PLAN**

Whereas, the Board of Managers of the Riley Purgatory Bluff Creek Watershed District (RPBCWD) submitted a Watershed Management Plan (Plan) dated April 2018 to the Minnesota Board of Water and Soil Resources (Board) pursuant to Minnesota Statutes Section 103B.231, Subd. 9, and;

Whereas, the Board has completed its review of the Plan;

Now Therefore, the Board hereby makes the following Findings of Fact, Conclusions and Order:

FINDINGS OF FACT

1. **RPBCWD Establishment.** The Riley Purgatory Creek Watershed District was established on July 31, 1969 by order of the Minnesota Water Resources Board under the authority of the Minnesota Watershed Act (Minnesota Statutes, Chapter 112). The first water resources management plan for the District was prepared and adopted in 1973. The second plan was adopted in 1982. Bluff Creek was added to the District in June 1984. The plan was then revised in accordance with the Metropolitan Surface Water Management Act of 1982 (M.S. 103B), and approved by the Board of Water and Soil Resources (Board) in August 1996. The Board approved the current "third generation" Water Resources Management Plan in January 2011.

2. **Authority of Plan.** The Metropolitan Surface Water Management Act requires the preparation of a watershed management plan for the subject watershed area which meets the requirements of Minnesota Statutes Sections 103B.201 to 103B.251.

3. **Nature of the Watershed.** The District is approximately 47 square miles in size and located in both Hennepin County (32.8 sq. miles) and Carver County (14.5 sq. miles), within the Minnesota River basin. The land use in the watershed consists predominantly of single family low density residential land use, with a mix of recreational/golf courses/preserved areas, commercial, industrial, institutional land uses, as well as undeveloped areas. Development pressure within the watershed is projected to slightly increase through the life of this Plan, particularly from medium density residential development. There are a total of 13 major lakes and three major creeks in the District. The following municipalities lie partially within the District: Bloomington, Chanhassen, Chaska, Deephaven, Eden Prairie, Minnetonka, and Shorewood. The District is bound by the Lower Minnesota River Watershed District to the south, the Carver County WMO to the southwest, the Minnehaha Creek Watershed District to the west and north, and the Nine Mile Creek Watershed District to the east.

4. **Plan Development and Review.** The RPBCWD initiated the planning process for the 2018-2027 Plan in January of 2016. As required by MR 8410, a specific process was followed to identify and assess priority issues. Stakeholders were identified, notices were sent to municipal, regional, and state agencies to solicit input for the upcoming Plan.

   RPBCWD initiated a survey and began promotion of the public input meetings in February of 2016. RPBCWD conducted numerous technical advisory committee meetings, citizen's advisory committee meetings and staff workshops along with public input meetings. The RPBCWD also provided a preview of the plan at their annual watershed tour on July 31st which allowed stakeholders to better understand the goals.

   The Plan was submitted for formal 60-day review in November 2017. The District received comments on the draft Plan and responded to Plan reviewers' comments in writing. After formal review of the RPBCWD Plan, the District held a public hearing on the draft Plan on March 15, 2018. All additional comments received during the 90-day review period have been addressed. The final draft Plan and all required materials were submitted and officially received by the Board on April 13, 2018.

5. **Local Review.** The RPBCWD distributed copies of the draft Plan to local units of government for their review pursuant to Minnesota Statutes Section 103B132, Subd. 7. Local written comments and edits were received from City of Eden Prairie, Bloomington Sustainability Commission, Lotus Lake Conservation Alliance, Mitchell Lake Association, along with several citizens. The RPBCWD responded to all comments.

6. **Metropolitan Council Review.** During the 60-day review, the Council noted the thorough and well organized plan. RPBCWD thanked the Council for its comments.

7. **Department of Agriculture (MDA) Review.** No comments were received during the 60-day or 90-day final review period.

8. **Department of Health (MDH) Review.** No comments were received during the 60-day or 90-day final review period.

9. **Department of Natural Resources (DNR) Review.** The DNR noted that the plan is well thought out and aligns with the Agency's goals. The DNR also noted the efforts of the District in its regulatory capacity and goals for sustainable groundwater management. RPBCWD thanked the DNR for its comments.

10. **Pollution Control Agency (PCA) Review.** PCA participated in TAC meetings and provided feedback throughout the plan development process. During the 60-day review, PCA stated it had no additional comments.

11. **Department of Transportation (DOT) Review.** No comments were received from the DOT during the 60-day or 90-day comment periods.

12. **Board Review.** Board staff commended the RPBCWD on a Plan that demonstrates sound justification for its programs and projects. Board staff also noted the high number of goals and stressed the importance of measurability to gauge its success. RPBCWD responded to this comment noting that it will be continuing to develop a process for measurement, tracking and reporting on the aforementioned goals.

13. **Plan Summary.** The Plan focuses on a watershed approach recognizing the needs of it three major subwatersheds: Riley Creek, Purgatory Creek and Bluff Creek. Each subwatershed has its own resource needs and well developed strategies are identified to address each.

The process identified the following thirteen goals:

- Operate in a manner that uses District resources and capacity efficiently and effectively while advancing the District's vision and goals.
- Collect data and use the best available science to recommend and support management decisions.
- Design, maintain, and implement Education and Outreach programs to educate the community and engage them in the work of protecting, managing, and restoring water resources.
- Plan and conduct the District's implementation program to most effectively accomplish its vision with consideration for all stakeholders and resources.
- Include sustainability and the impacts of climate change in District projects, programs, and planning.
- Implement the District's regulatory program to protect water resources from further degradation, enhancing resources when possible.
- Support Carver and Hennepin County to operate effectively as Ditch Authorities.
- Protect, manage, and restore water quality of District lakes and creeks to maintain designated uses.
- Preserve and enhance the quantity, as well as the function and value of District wetlands.
- Preserve and enhance habitat important to fish, waterfowl, and other wildlife.
- Promote the sustainable management of groundwater resources.
- Protect and enhance the ecological function of District floodplains to minimize adverse impacts.
- Limit the impact of stormwater runoff on receiving waterbodies.

The District has also set a goal of the following overarching outcomes for the duration of the plan:

- 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

14. **Central Region Committee Meeting.** On June 7, 2018, the Board's Central Region Committee and staff met in St. Paul to review and discuss the final Plan. Those in attendance from the Board's committee were Jill Crafton, Jack Ditmore, Terry McDill, Duane Willenbring (via phone), Paige Winebarger (via phone), and Joe Collins, chair. Board staff in attendance were Central Region Manager Kevin Bigalke and Board Conservationist Steve Christopher. RPBCWD Administrator Claire Bleser provided highlights of the Plan and process. Board staff recommended approval of the Plan. After presentation and discussion, the committee unanimously voted to recommend the approval of the Plan to the full board, with the exception of a committee member who abstained due to a conflict of interest.

CONCLUSIONS

1. All relevant substantive and procedural requirements of law and rule have been fulfilled.

2. The Board has proper jurisdiction in the matter of approving the Watershed Management Plan for the Riley Purgatory Bluff Creek Watershed District (RPBCWD) pursuant to Minnesota Statutes Section 103B.231, Subd. 9.

3. The RPBCWD Watershed Management Plan, attached to this Order, defines the water and water-related problems within the RPBCWD's boundaries, possible solutions thereto, and an implementation program through 2027.

4. The RPBCWD Watershed Management Plan will be effective July, 2018 through June, 2027.

5. The attached Plan is in conformance with the requirements of Minnesota Statutes Sections 103B.201 to 103B.251.

ORDER

The Board hereby approves the attached Riley Purgatory Bluff Creek Watershed District Watershed Management Plan dated April 2018.

Dated at Saint Paul, Minnesota this 27th day of June 2018.

MINNESOTA BOARD OF WATER AND SOIL RESOURCES

Gerald Van Amburg

BY: Gerald Van Amburg, Chair

RESOLUTION 2018-004

RILEY-PURGATORY-BLUFF CREEK WATERSHED DISTRICT BOARD OF MANAGERS

Resolution adopting watershed management plan

Manager **Ward** offered the following resolution and moved its adoption, seconded by Manager **Crafton:**

WHEREAS Riley-Purgatory-Bluff Creek Watershed District is responsible for the preparation of a watershed management plan for the Riley-Purgatory-Bluff Creek watershed pursuant to Minnesota Statutes section 103B.231, subdivision 3;

WHEREAS in accordance with Minnesota Statutes section 103B.231 and Minnesota Rules chapter 8410, beginning in early 2015 RPBCWD solicited input for a 10-year update of its watershed plan from watershed residents and other stakeholders, state agencies with jurisdiction over water resources and counties and municipalities with jurisdiction in the Riley-Purgatory-Bluff Creek watershed to ensure that current issues in watershed management were identified prior to preparing the update;

WHEREAS RPBCWD, relying on and informed by the input received, prepared a draft watershed management plan, entitled "Riley-Purgatory-Bluff Creek Watershed District: Planning for the Next Ten Years 2018-2027" (the Plan) in accordance with Minnesota Statutes sections 103B.201 through 103B.255, chapter 103D and Minnesota Rules 8410.0050 through 8410.0150 to set forth the goals, policies, programs and projects RPBCWD would adopt and implement to fulfill its statutory role;

WHEREAS RPBCWD submitted a draft of the Plan to local, regional and state governmental organizations for review and comment in accordance with Minnesota Statutes section 103B.231, subdivision 7, and RPBCWD analyzed the comments and revised the plan in consideration thereof;

WHEREAS RPBCWD held a duly noticed public hearing on the Plan, in accordance with Minnesota Statutes section 103B.231, subdivision 7(c), on March 15, 2018, and duly considered the comments made at the public hearing;

WHEREAS the District submitted the draft Plan to the state Board of Water and Soil Resources for final review and approval in accordance with Minnesota Statutes section 103B.231, subdivision 9, and the Board of Water and Soil Resources approved the Plan on June 27, 2018;

WHEREAS the RPBCWD Board of Managers finds that RPBCWD has completed the required process to update its watershed plan, and that the Plan fairly reflects a robust engagement in the planning process with watershed residents, communities and agencies and will serve as a sound document to guide the management of the Riley-Purgatory-Bluff Creek Watershed in the next 10 years; and

WHEREAS the RPBCWD Board of Managers finds that the adoption of the Plan is in accordance with the law and the best interests of the public.

NOW THEREFORE BE IT RESOLVED that the Riley-Purgatory-Bluff Creek Watershed District Board of Managers hereby adopts the Riley-Purgatory-Bluff Creek Watershed District: Planning for the Next Ten Years 2018-2027 in accordance with Minnesota Statutes section 103B.231, subdivision 10; and

BE IT FURTHER RESOLVED that the board of managers directs the administrator to publish the adopted Plan on the RPBCWD website, along with an expression of the managers' appreciation for the involvement of the members of watershed residents, communities and agencies in the development of the Plan, and to transmit a copy of the Plan to the clerks of each of the local governmental units within the watershed, and to Hennepin County and Carver County, together with a letter expressing the managers' appreciation for their involvement in the preparation of and contributions to the Plan.

The question was on the adoption of the resolution and there were 4 yeas, 0 nays and 1 absent as follows:

	Yea	Nay	Absent
CHADWICK	■	☐	☐
CRAFTON	■	☐	☐
PEDERSON	■	☐	☐
WARD	■	☐	☐
YETKA	☐	☐	■

Upon vote, the chair declared the resolution **adopted**.

Richard J Chadwick   Dated: July 11, 2018

Richard Chadwick, Secretary

* * * * * * * * * * *

I, Richard J. Chadwick secretary of the Riley-Purgatory-Bluff Creek Watershed District, do hereby certify that I have compared the above resolution with the original thereof as the same appears of record and on file with RPBCWD and find the same to be a true and correct transcript thereof.

IN TESTIMONY WHEREOF, I have hereunto set my hand this 11 day of July, 2018.

Richard J Chadwick Secretary