

2021 – 2030 Watershed Management Plan

Appendices

Adopted November 4, 2020

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Appendix A

Land and Water Resource Inventory

November 2020

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A. Land and Water Resources Inventory

This Appendix of the Capitol Region Watershed District (District) Watershed Management Plan (Plan) summarizes the land and water resources located within the District. It contains information on location, topography and drainage, climate and precipitation, land use and demographics, soils, geology, groundwater resources, natural communities and rare species, fish and wildlife habitat, and potential pollutant sources. It also presents information about District surface water resources, including resource-specific water quality and flooding information.

Land and water resource information is important because it describes the condition of the watershed and how those conditions impact decisions about infrastructure, development, and resource management.

A.1 Location

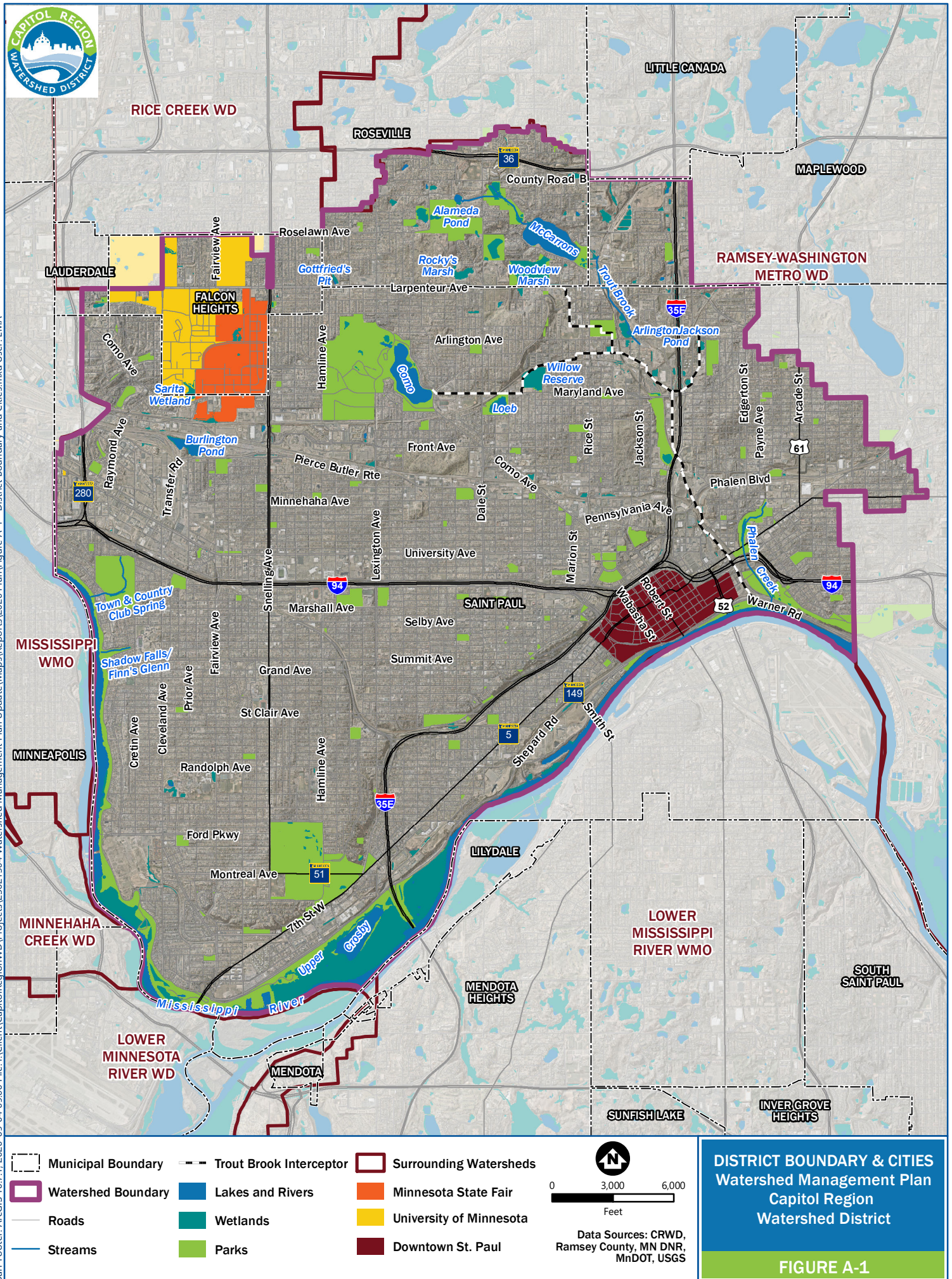
The District is 40.6 square miles in size and includes portions of the Cities of Falcon Heights, Lauderdale, Saint Paul, Maplewood, and Roseville (see Figure A-1). The District also includes the Minnesota State Fairgrounds and University of Minnesota Saint Paul Campus, which operate as autonomous entities outside the jurisdiction of local or state government. The District is bounded to the east by the Ramsey-Washington Metro Watershed District (RWMWD), and to the north by the Rice Creek Watershed District (RCWD) and the Grass Lake Watershed Management Organization (GLWMO). Table A-1 presents the contributing area of each city within the District.

Table A-1 District Cities and Areas

Entity	Acres	Square Miles	Percentage (%)
Saint Paul	22,116	34.6	85.1%
Roseville	1921	3.0	7.4%
Falcon Heights ¹	516	0.8	2.0%
Maplewood	609	1.0	2.3%
Lauderdale	40	0.1	0.2%
State Fairgrounds	350	0.5	1.3%
University of MN	437	0.7	1.7%
Total	25,989	40.6	100%
(1) Area of Falcon Heights does not include State Fairgrounds or University of Minnesota Campus			



Barr Footer: ArcGIS 10.7.1, 2020-09-04 09:00 File: I:\Client\CapitolRegion\Watershed Management Plan Update\Map Reports\2020 Plan Figure A-1 - District Boundary and Cities.mxd User: EMA



A.2 Topography and Drainage Patterns

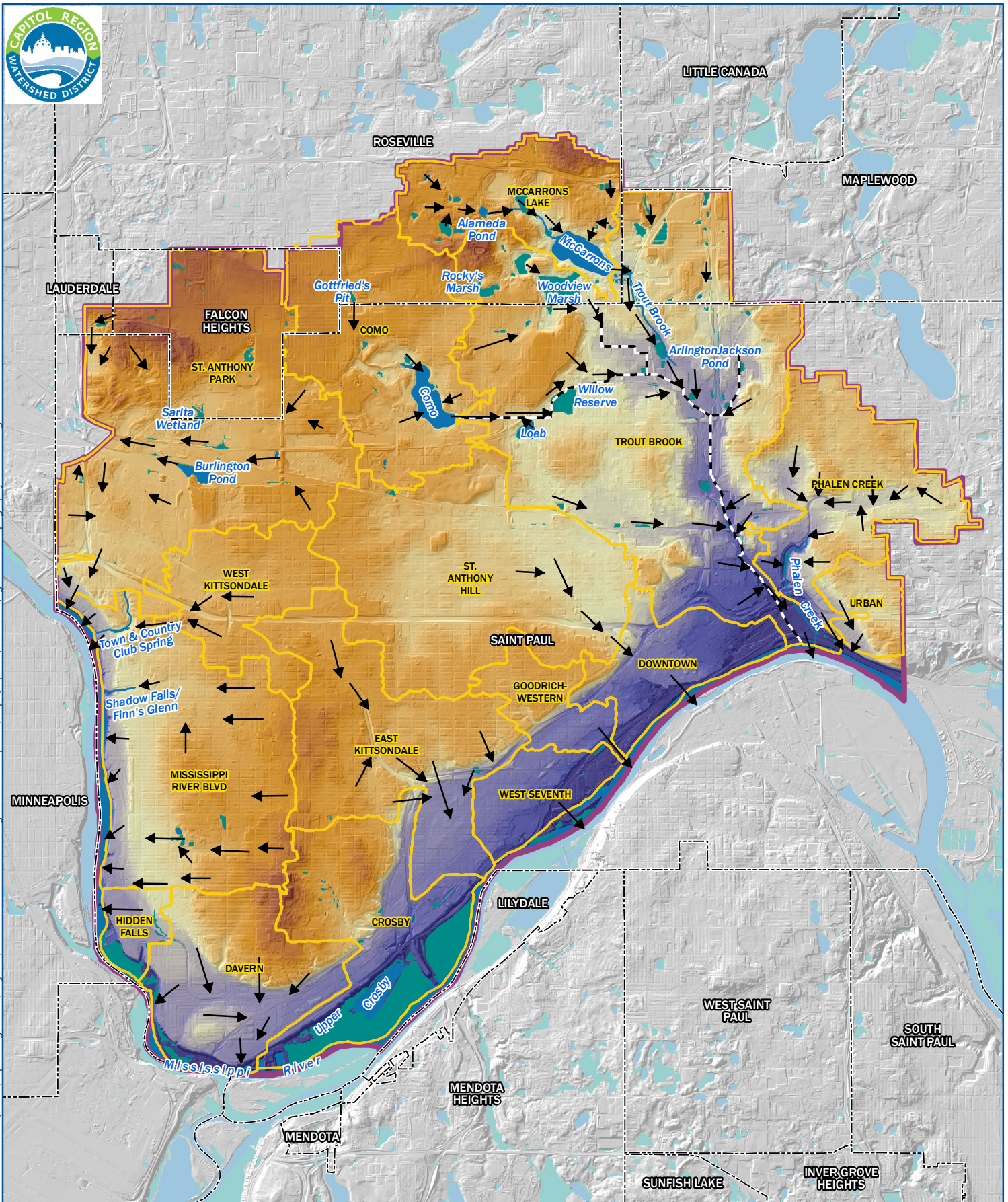
Topography within the District is characterized by a large, relatively flat outwash plain in the uplands above terrace deposits located along the Mississippi River. The outwash plain, referred to as the Saint Paul Sand Flats, was formed by meltwater associated with the most recent glacial events and includes incised tributary channels (Patterson, 1992). The historic Trout Brook and Phalen Creek created a large river valley that runs north/south through the District. Local areas of higher topography exist within the Saint Paul Flats, including Cathedral Hill and the Highland Park neighborhood.

The terrace deposits along the Mississippi River are part of the Mississippi Bottomlands (Patterson, 1992). Terrace deposits are characterized by flat topography between steep bluff lines. The terrace deposits were formed by the migration of the Mississippi River during glacial and post-glacial melting events, with each terrace representing a historic floodplain.

Local topography determines drainage patterns in the District. The east side of the District generally drains from north to south along the historic Trout Brook and Phalen Creek. The west side of the District drains west and south towards the Mississippi River. Elevations within the District range from over 1000 feet above mean sea level (MSL, NAVD88 vertical datum) in areas of Falcon Heights, Roseville, and Highland Park (Saint Paul) to a minimum of about 690 feet MSL along the Mississippi River.

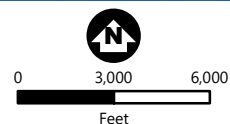


Barr Footer: ArcGIS 10.7.1, 2019-1A-08 13:34 File: I:\Client\CapitolRegion\Watershed Management Plan Update\Maps\Reports\2020 Plan\Figure A-2 - Topography and Drainage Patterns.mxd User: EMA



- | | |
|--------------------|-------------------------|
| Municipal Boundary | Trout Brook Interceptor |
| Watershed Boundary | Lakes and Rivers |
| Subwatershed | Wetlands |
| Streams | Flow Direction |

Elevation
1026 ft
686 ft



Data Sources: CRWD,
MN DNR, USGS

**TOPOGRAPHY &
DRAINAGE PATTERNS**
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-2

A.3 Climate and Precipitation

The climate of the Minneapolis-Saint Paul metropolitan area is a humid continental climate, characterized by moderate precipitation (normally sufficient for crops), wide daily temperature variations, large seasonal variations in temperature, warm humid summers, and cold winters with moderate snowfall. Climate data is often presented according to 30-year “climate normal” periods, the most recent spanning the period from 1981-2010. Several of the wettest years on record have been observed since 2010. Deviation from climate normal and data since 2010 are discussed in Section A.3.2. Climate data presented in this section is based on the 10-year period from 2010 through 2019, unless otherwise noted.

The mean annual temperature in the District is 45.0°F, as measured at the University of Minnesota-Saint Paul station (2010-2019). Mean monthly temperatures vary from 13.8°F in January to 73.6°F in July (2010-2019). For the 1981-2010 climate normal period, the average date for latest occurrence of freezing temperatures was April 25, while the average date for the first autumn frost was October 9. The average frost-free period (growing season) is approximately 166 days. Additional climatic data is available from the National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center (NCDC) (<http://www.ncdc.noaa.gov/>).

Table A-2 summarizes precipitation data for the University of Minnesota-Saint Paul station for the 2010-2019 period. Average total annual precipitation at the University of Minnesota-Saint Paul station is 35.2 inches. The mean monthly precipitation varies from 5.2 inches in July to 0.7 inches in January (2010-2019). From May to September, the growing season months, the average rainfall (2010-2019) is 20.8 inches, or about 65% of the average annual precipitation. Snowfall averages 54.4 inches annually at the Minneapolis-Saint Paul International Airport (MSP) station from 2010-2019; this is similar to the 1981-2010 climate normal average of 54.0 inches annually.

Additional information about local and regional climate is available from the Minnesota Department of Natural Resources (MDNR) State Climatology office and NOAA at:

- Minnesota State Climatology Office: <https://www.dnr.state.mn.us/climate/index.html>
- NOAA: <http://www.nws.noaa.gov/climate/index.php?wfo=mpx>

Table A-2 Climate and Precipitation Data (St. Paul, 2010-2019)

Month	Precipitation (inches)	Minimum Temperature (°F)	Average Temperature (°F)	Maximum Temperature (°F)
January	0.72	6.4	13.8	21.4
February	1.02	8.8	16.1	24.8
March	1.36	23.1	31.1	39.9
April	3.70	36.1	44.2	53.1
May	4.94	48.5	57.9	67.2
June	5.10	59.2	68.5	77.3
July	5.16	64.2	73.6	82.6
August	5.01	61.2	70.5	79.6
September	2.50	52.7	63.0	72.4
October	2.57	39.9	48.4	57.5
November	1.52	25.9	32.6	40.3
December	1.63	13.6	20.5	27.0
Total	35.24	--	--	--
Source: University of Minnesota-St. Paul station, 2010-2019 period				

A.3.1 Precipitation-Frequency Data (Atlas 14)

The amount, rate, and type of precipitation are important in determining flood levels and stormwater runoff rates. While average weather poses little risk to human health and property, extreme precipitation events may result in flooding that threatens infrastructure and public safety. NOAA published Atlas 14, Volume 8, in 2013. Atlas 14 is the primary source of information regarding rainfall amounts and frequency in Minnesota. 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, respectively. Atlas 14 improvements in 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. Table A-3 lists selected rainfall events for the District.

Runoff from spring snowmelt is not provided in Atlas 14 and current regional snowmelt runoff data is not available (Minnesota Stormwater Manual, 2019). However, 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.

Table A-3 Selected Rainfall Events Used for Design Purposes

Type	Frequency	Duration	Depth (in)
Rainfall	2-year	24 hour	2.80
	5-year	24 hour	3.49
	10-year	24 hour	4.18
	25-year	24 hour	5.29
	50-year	24 hour	6.29
	100-year	24 hour	7.40
	10-year	10 day	6.62
	100-year	10 day	9.95

Source: NOAA Atlas 14 – Volume 8. Station: Saint Paul – Station 21-7377. These depths reflect the 50% exceedance limit.

A.3.2 Climate Trends and Future Precipitation

There are typically wide variations in climate conditions in the District. However, climatologists have found four significant recent climate trends in the Upper Midwest (NOAA, 2013):

- Warmer winters—decline in severity and frequency of severe cold; warming periods leading to mid-winter snowmelt
- 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, annual and summer precipitation amounts in the Midwest are trending upward, as is the frequency of high intensity storms. Annual precipitation at the University of Minnesota-Saint Paul averaged 35.9 inches from 2010-2019, a 3.7 inch increase over the 1981-2010 climate normal. Annual precipitation exceeded the 1981-2010 climate normal average (32.2 inches) in 7 of 8 years since 2010.

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. Climate normal data available from the Minnesota Department of Natural Resources indicates annual precipitation is increasing within the Minneapolis-Saint Paul metropolitan area (see Figure A-3).

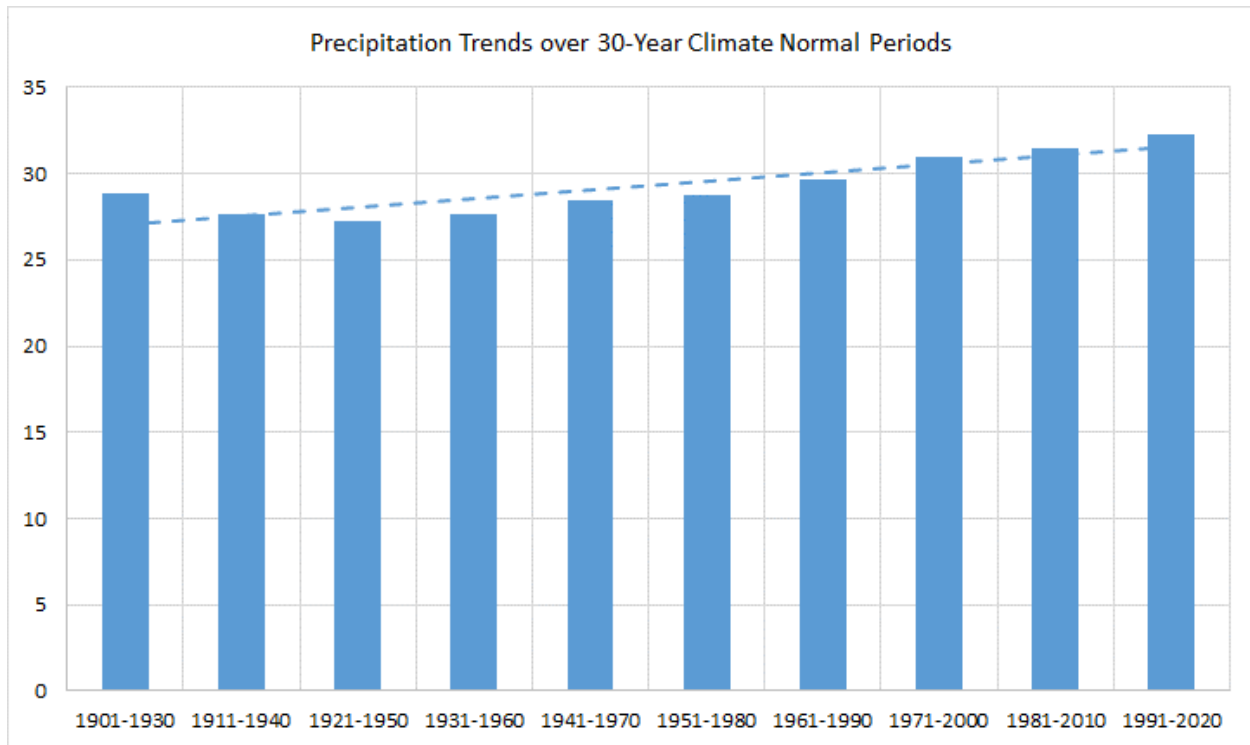


Figure A-3 Trends in Average Annual Precipitation (Twin Cities Region)

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. Recent work completed by the University of Minnesota (Moore et al., 2016) provides information useful to consider long-term extreme weather trends in the region. 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 (7.8 inches). The middle estimate is 10.2 inches, which is similar to the upper limits of the Atlas 14 90-percent confidence limits for the 100-year rainfall depth (10.4 inches). Upper estimates of mid-21st century 100-year 24-hour rainfall exceed the 90-percent confidence limits of Atlas 14.

Additional information about climate change is available from the Minnesota Department of Natural Resources (MDNR) at: https://www.dnr.state.mn.us/climate/climate_change_info/index.html

A.4 Land Use and Imperviousness

The District is entirely developed, although some lands that cannot be developed for various reasons (e.g., proximity to wetlands) may retain an “undeveloped” land use designation. Figure A-4 presents current (2016-2018) land use within the District.

The District contains areas of dense urban development, including the central business district of Saint Paul. Single family residential is the most common land use, covering approximately 46% of the District. Commercial (5%) and industrial (6%) land uses are generally located along major roadways or rail corridors. Both small, neighborhood-size parks and large regional parks are distributed throughout the District, including several located along the Mississippi River. Table A-4 summarizes current land use within the District.

Planned future land use (year 2040) is presented in Figure A-5 based on Metropolitan Council data. 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. Due to the District’s fully developed condition, significant changes in land use are not expected, although increases in mixed use (e.g., commercial-residential) land use and higher density residential land use are expected in Saint Paul (City of Saint Paul, 2019).

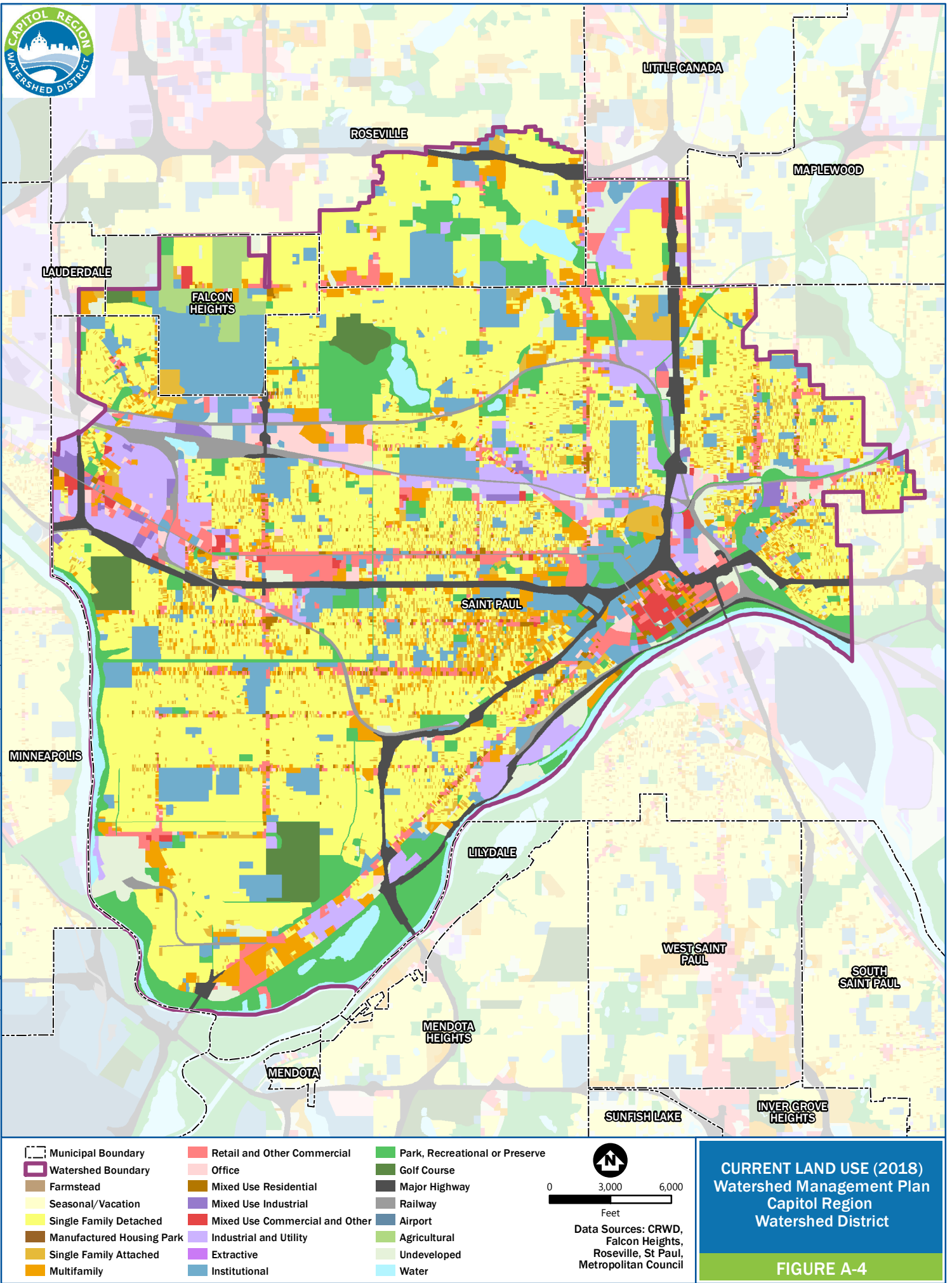
Land use can be a significant factor in stormwater management and planning, as urban land use is often correlated with impervious area that results in increased rate and volume of stormwater runoff from precipitation. In contrast, vegetated areas provide opportunities for stormwater retention and infiltration. Consistent with the District’s urban environment, impervious areas cover approximately 50% of the District. Areas of concentrated imperviousness exceeding 80% occur in downtown Saint Paul, along the Burlington Northern Santa Fe (BNSF) railroad, and in commercial and industrial areas adjacent to University Avenue and other major roads. Impervious area within the District is presented in Figure A-6.

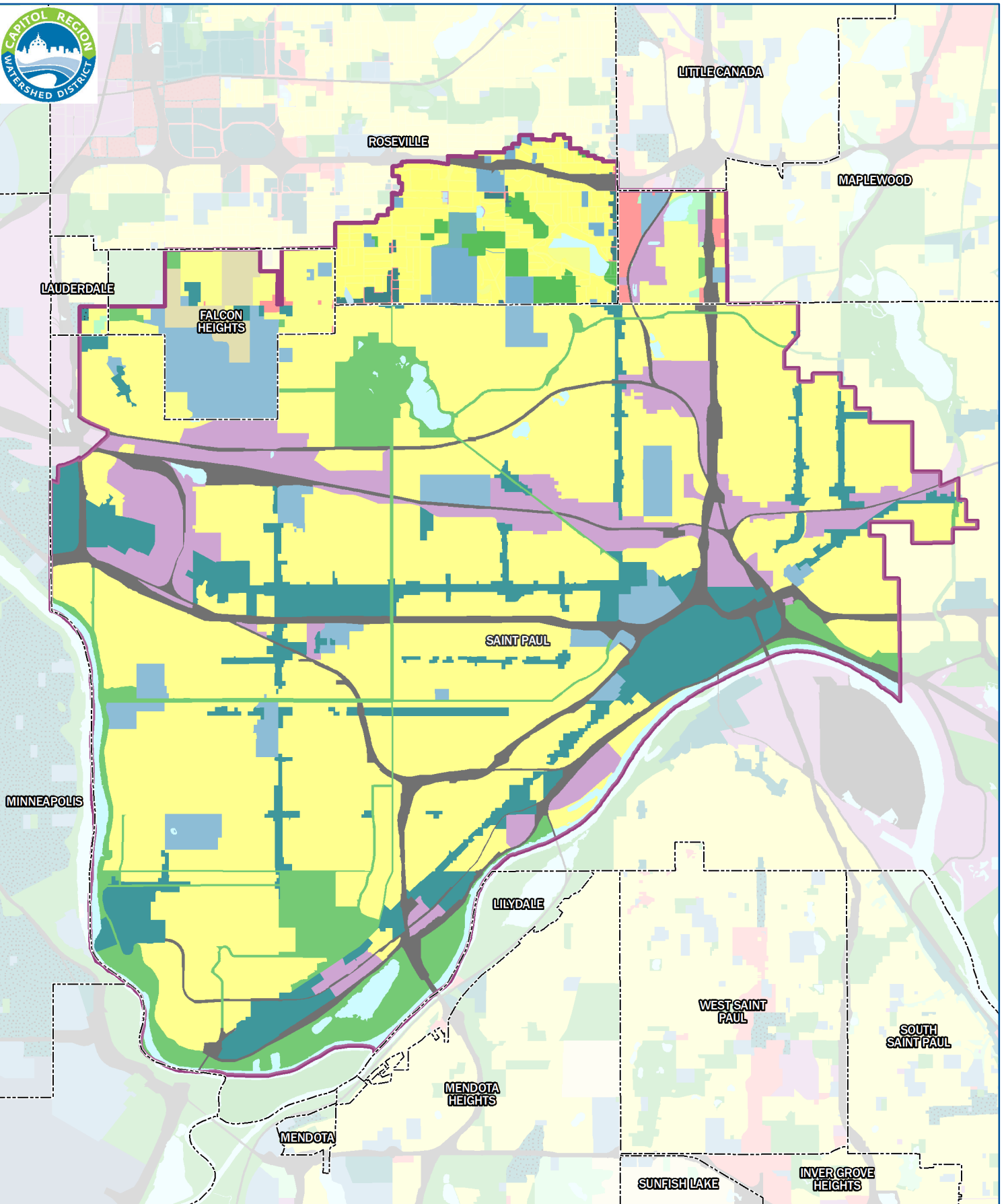
Table A-4 Current Land Use (2018)

Land Use	Acres	Percent of District
Agricultural	286.4	1.1%
Commercial	1213.7	4.7%
Golf Course	438.4	1.7%
Highway	1068.5	4.1%
Industrial and Utility	1483.6	5.7%
Institutional ¹	2878.2	11.1%
Mixed Use	542.8	2.1%
Multifamily	1379	5.3%
Office	383.8	1.5%
Park, Recreational, or Preserve	2331.9	9.0%
Railway	593.7	2.3%
Single Family Attached	1501.9	5.8%
Single Family Detached	10176.8	39.2%
Undeveloped	980.6	3.8%
Water	729.9	2.8%
Total	25,989.2	100%

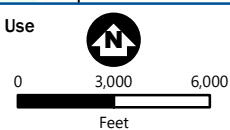
Source: Comprehensive Plans of Falcon Heights, Lauderdale, Roseville, Maplewood, and Saint Paul; Metropolitan Council

- (1) Includes institutional land uses and parks and open space associated with institutional land use (e.g. University of Minnesota, Minnesota State Fair Grounds, school playing fields).





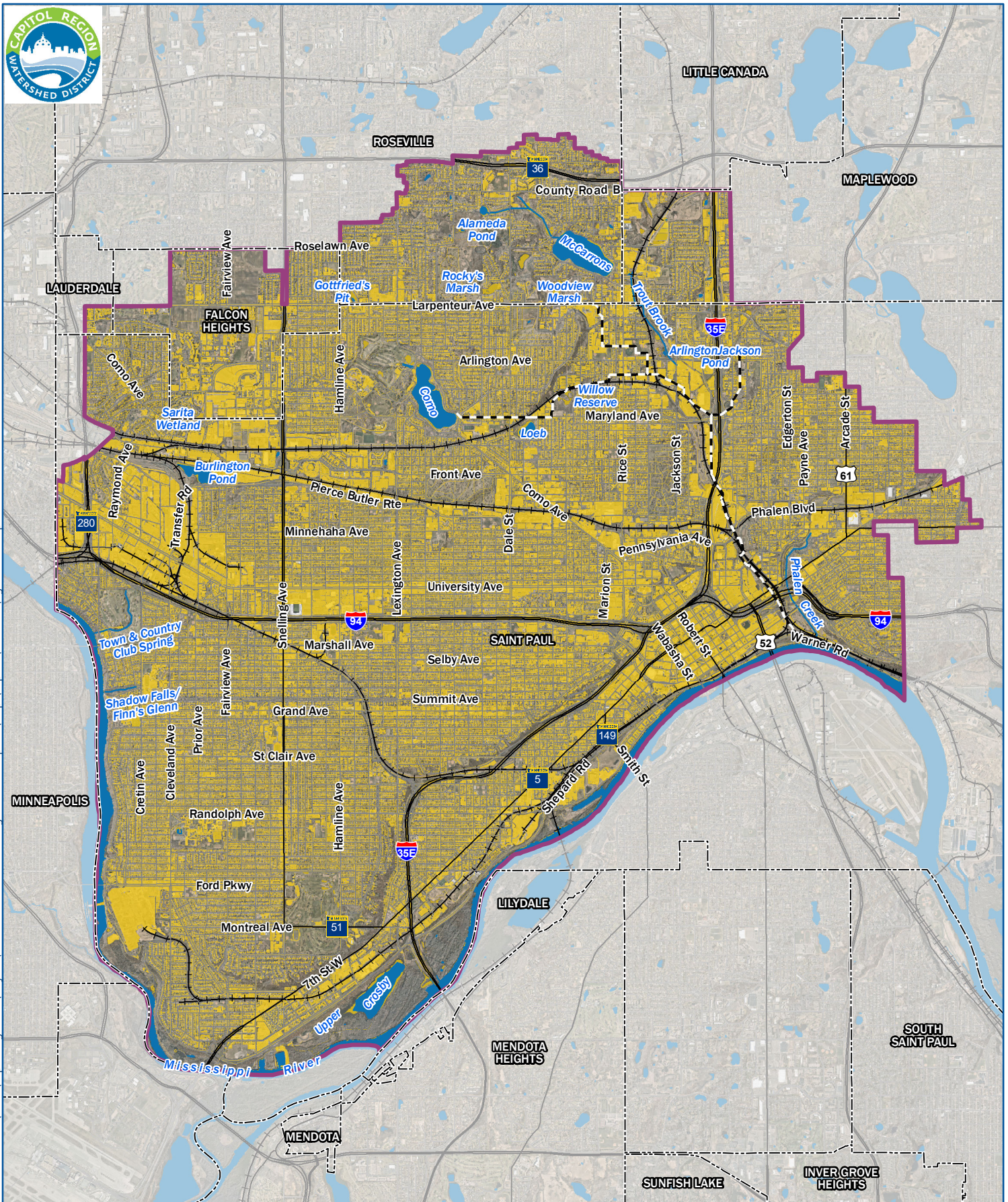
- | | | |
|--------------------------------|----------------------------|-------------------------------|
| Municipal Boundary | Commercial | Open Space or Restrictive Use |
| Watershed Boundary | Mixed Use | Rights-of-Way |
| 2040 Land Use | Industrial | Railway (inc. LRT) |
| Agricultural | Institutional | Airport |
| Rural or Large-Lot Residential | Park and Recreation | Water |
| Residential | Multi-Optional Development | |



Data Sources: CRWD,
Falcon Heights,
Roseville, St Paul,
Metropolitan Council

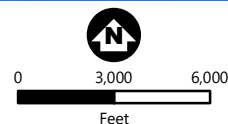
PLANNED LAND USE (2040)
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-5



- Municipal Boundary
- Watershed Boundary
- Lakes and Rivers
- Streams
- Trout Brook Interceptor

Impervious Surface



Data Sources: CRWD,
Ramsey County,
MN DNR, USGS

IMPERVIOUS AREA
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-6

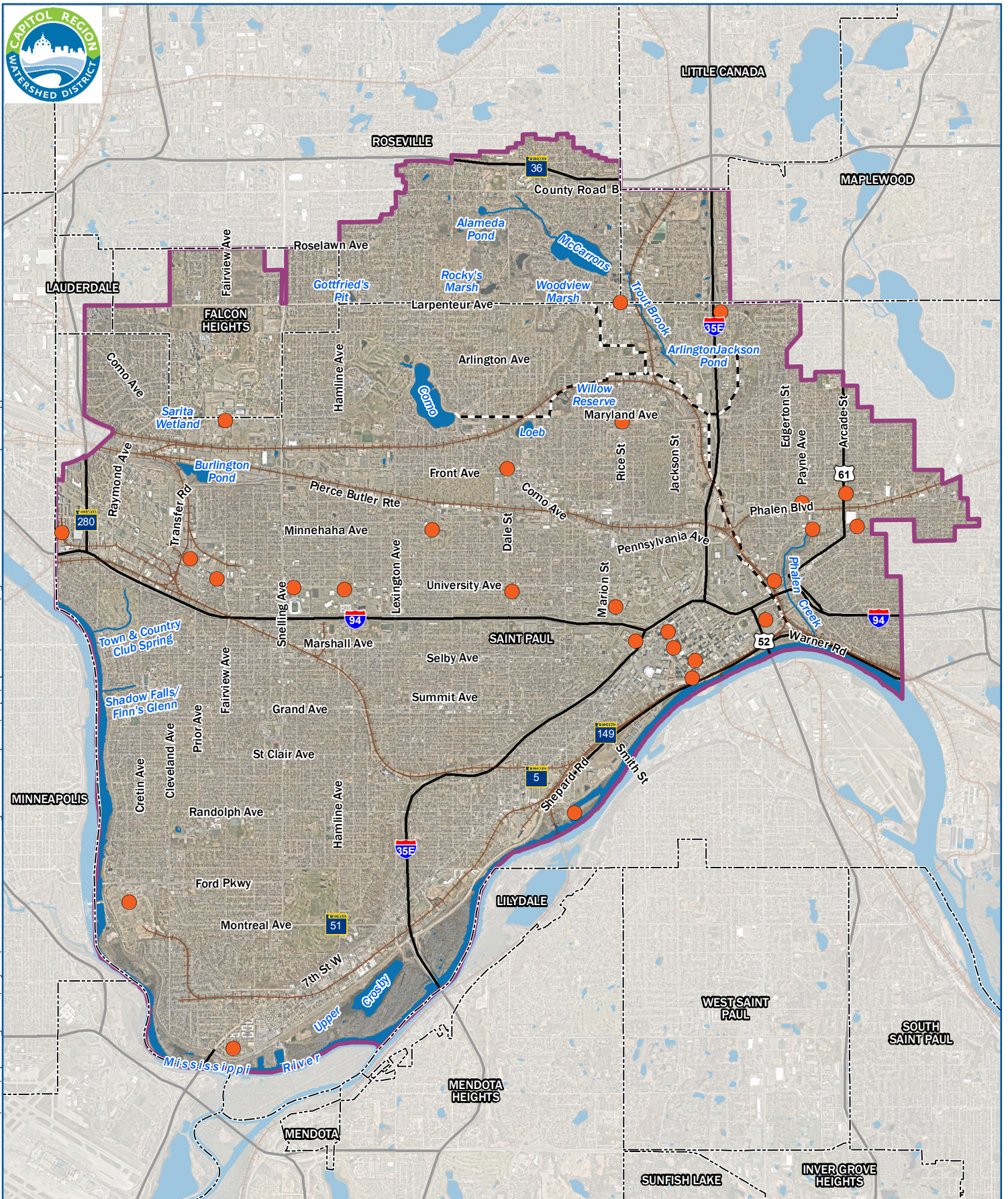
A.4.1 Redevelopment

The District is entirely developed. Thus, the majority of the expected overall change in land use will be from redevelopment. Redevelopment activity presents an opportunity to incorporate additional stormwater best management practices (BMPs) where implementation of such BMPs would be otherwise infeasible, both through the District's permit program and partnerships. The District's implementation plan (Section 3.0 of the Plan) describes the process by which the District works with partners to identify redevelopment opportunities and leverage those opportunities to incorporate BMPs to achieve the District's goals.

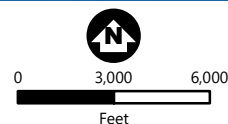
Potential redevelopment areas occur throughout the watershed, with many located in Saint Paul. The comprehensive plans for cities within the District contain more information about specific future redevelopment areas. Other future redevelopment opportunities are as yet unknown. Currently, the District is tracking several large-scale redevelopment opportunities, including:

- Former Sears site (Saint Paul)
- Ford site (Saint Paul)
- Towerside Innovation District (Saint Paul)
- Creative Enterprise Zone (CEZ, Saint Paul)
- Snelling-Midway Phase II (Saint Paul)
- Sites associated with the City of Saint Paul River Balcony Project

Figure A-7 presents the approximate location of potential redevelopment opportunities within the District.



- | | |
|-------------------------|---------------------------------|
| Municipal Boundary | Redevelopment Opportunity Sites |
| Watershed Boundary | Railroad |
| Lakes and Rivers | Interstate or Highway |
| Streams | |
| Trout Brook Interceptor | |



Data Sources: CRWD,
City of Saint Paul (2018),
MN DNR, USGS

**POTENTIAL REDEVELOPMENT
OPPORTUNITIES**
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-7

A.5 Population and Demography

Census data and City Comprehensive Plans identify observed and anticipated population and demographic changes in District Cities. The population of the District in 2018 was approximately 212,000 (estimated by interpolating individual City populations according to the percentage of each City within the District). Based on Metropolitan Council's *Thrive MSP 2040* forecasts, it is projected that the overall population within the District will increase by approximately 23,000 (11% relative to 2018 values). Estimated population growth is anticipated to result in higher density redevelopment within the already urbanized watershed (Saint Paul, 2019).

Table A-5 Estimated population within the District (adjusted by land area)

City	Percent in District	2010 Census Population ¹	2018 Census Population ¹	2030 Forecasted Population ¹	2040 Forecasted Population ¹
Falcon Heights	87%	4,628	4,887	4,611	4,611
Lauderdale	6%	143	152	150	151
Maplewood	15%	5,702	6,151	6,840	7,290
Roseville	22%	7,405	8,015	7,480	7,590
Saint Paul	62%	176,742	190,771	204,104	213,342
Total		196,630	211,993	225,215	235,024

Source: US Census data; Metropolitan Council *Thrive MSP 2040* (updated December 2018)

(1) Population within the District is estimated as the total City population multiplied by the percentage in the District.

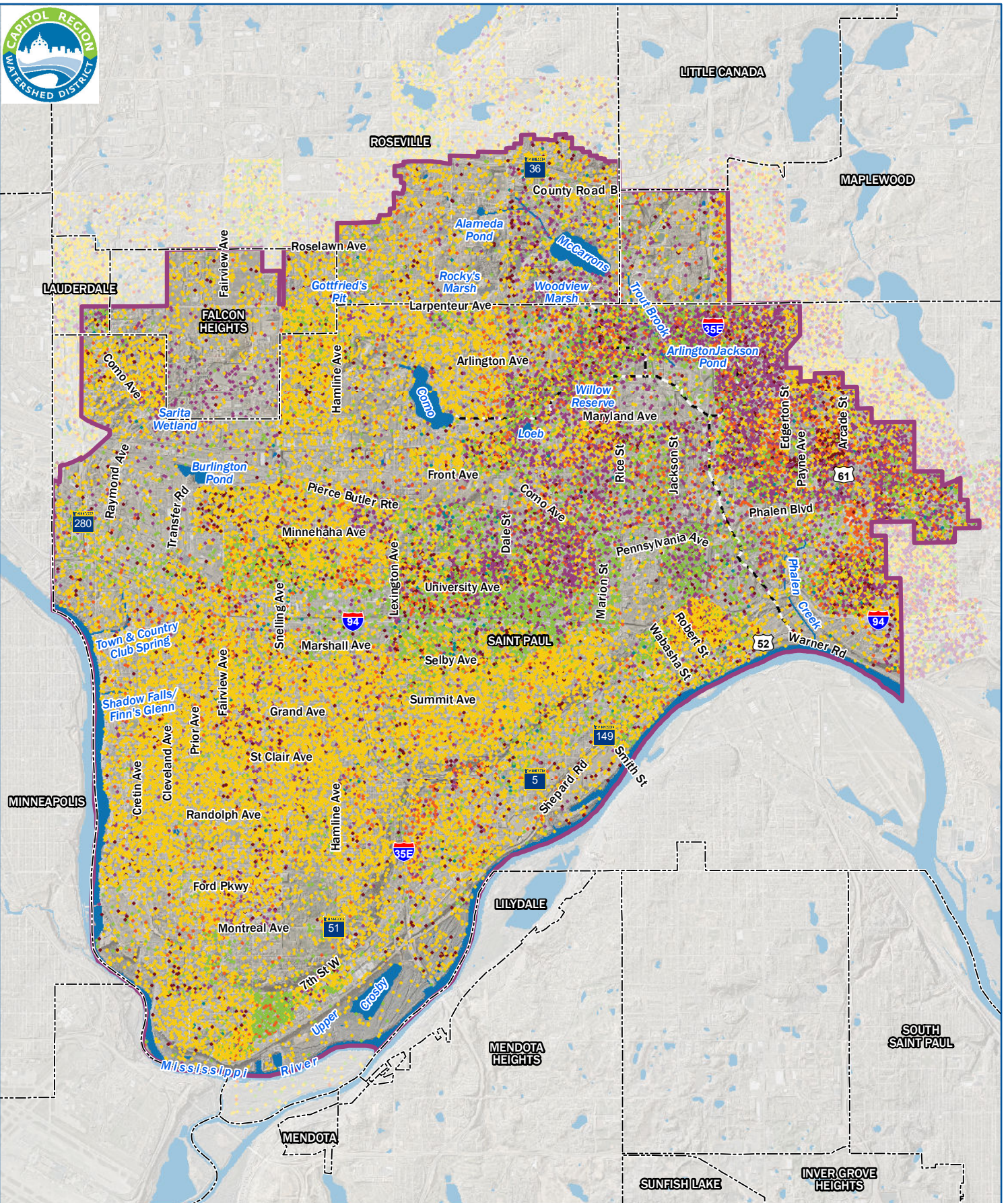
Over time, the District's population has grown more racially and ethnically diverse. Between 2000 and 2015, the percentage of people of color in Saint Paul increased from 36% to 46%. Across Ramsey County, this percentage increased from 13% in 2000 to 30% in 2014. These trends are expected to continue through 2040 (Saint Paul, 2019). Figure A-8 presents race and ethnicity information available from 2010 census data. Figure A-9 presents limited data regarding non-English languages spoken in homes within the District.

The District's residents are also aging. Ramsey County is projected to experience a nearly 50% increase in residents 65 and older between 2015 and 2030, and another 10% increase in this age cohort from 2030 and 2040 (Metropolitan Council, 2016). Figure A-10 presents age information available from census data.

Within the District there are significant gaps in income and other avenues to prosperity (Saint Paul, 2019). Education levels vary widely across the District (see Figure A-11). The Metropolitan Council has identified Areas of Concentrated Poverty (ACP50)—census tracts where greater than 50% of the residents are people of color and at least 40% of the residents live below 185% of the federal poverty line. Figure A-12 presents the ACP50 within the District. Within Saint Paul, the ACP50 also exhibits the lowest high school graduation (Saint Paul, 2019).

The District values diversity and inclusion and can achieve cleaner waters through engagement across communities. One of the goals/priorities in the District's 2018-2020 Strategic Diversity Plan is to "deepen

relationships with many communities in the District by increasing outreach.” The District uses local demographic information (including the data presented herein) to learn more about the population it serves and better tailor its activities to serve those populations. This practice promotes inclusion of traditionally underserved communities in the watershed, equitable distribution of services, and will help achieve the goals of the District’s 2018-2020 Diversity Plan.



- Municipal Boundary
- Watershed Boundary
- Lakes and Rivers
- Streams
- Trout Brook Interceptor

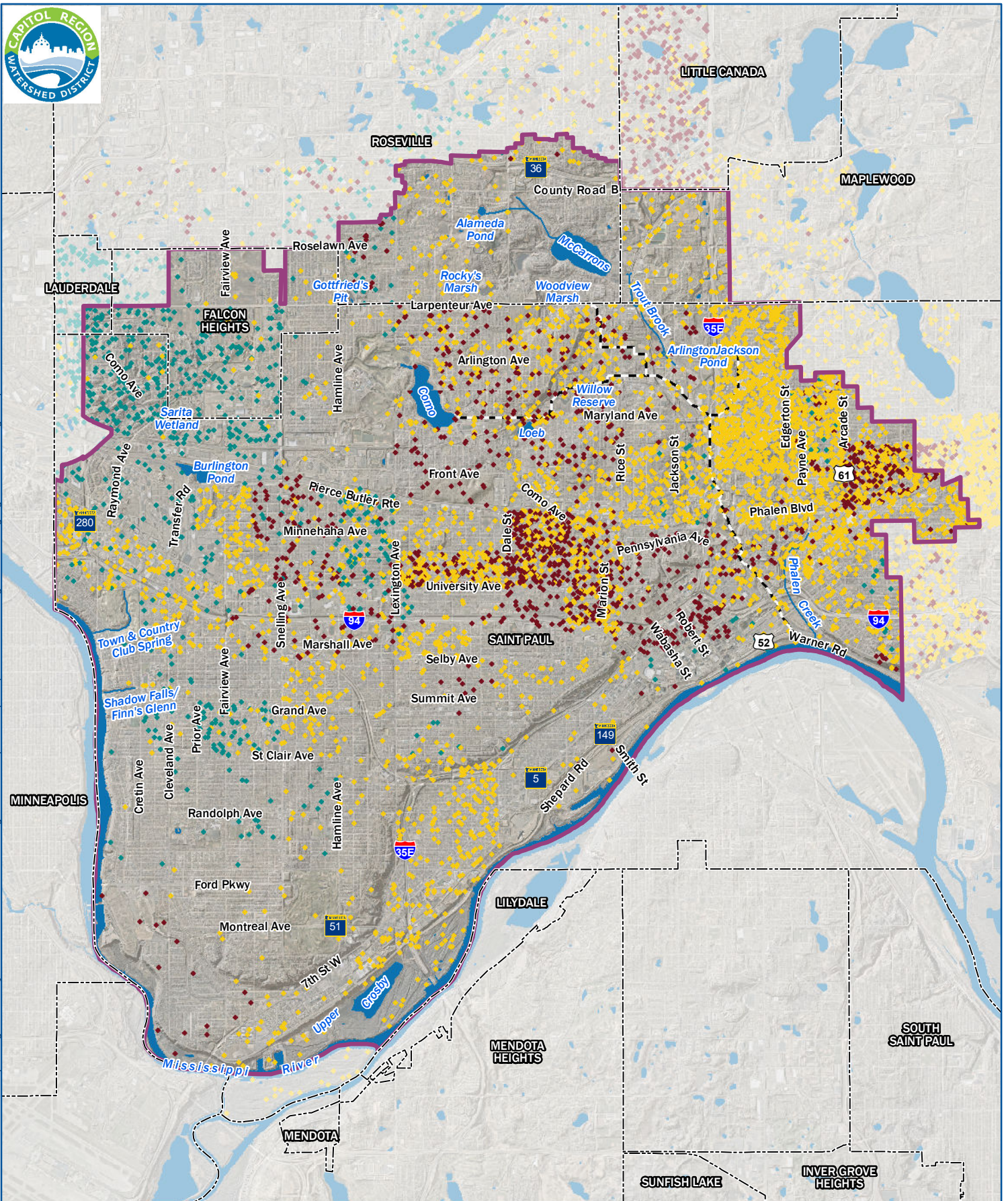
- Race and Ethnicity**
Each dot represents 5 people
- African American
 - Asian American
 - Hispanic
 - Native American
 - White American
 - Multiracial or Another Race

0 3,000 6,000
Feet

Data Sources: CRWD,
US Census Bureau (American
Community Survey, 2013-2017)
Metropolitan Council,
MN DNR, USGS

**RACE AND ETHNICITY
WITHIN THE DISTRICT**
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-8



- Municipal Boundary
- Watershed Boundary
- Lakes and Rivers
- Streams
- Trout Brook Interceptor

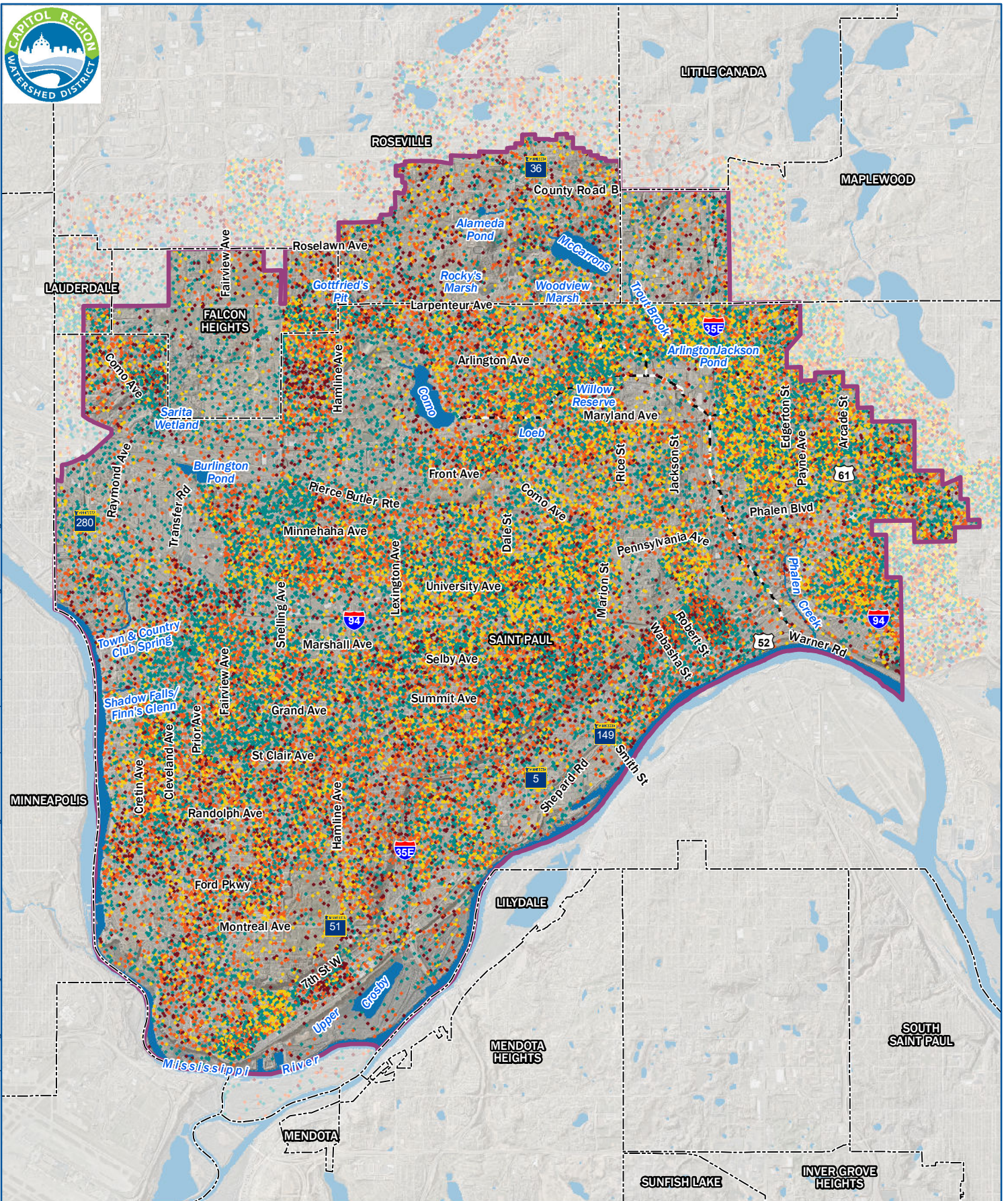
- Predominant Language other than English**
Each dot represents 1 person
- Spanish
 - Chinese
 - Vietnamese

0 3,000 6,000
Feet

Data Sources: CRWD,
US Census Bureau (American
Community Survey, 2013-2017)
Metropolitan Council,
MN DNR, USGS

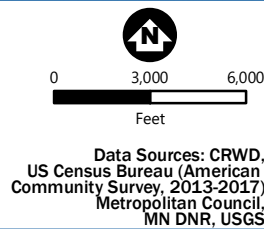
**LANGUAGE OTHER THAN
ENGLISH SPOKEN AT HOME
WITHIN THE DISTRICT**
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-9



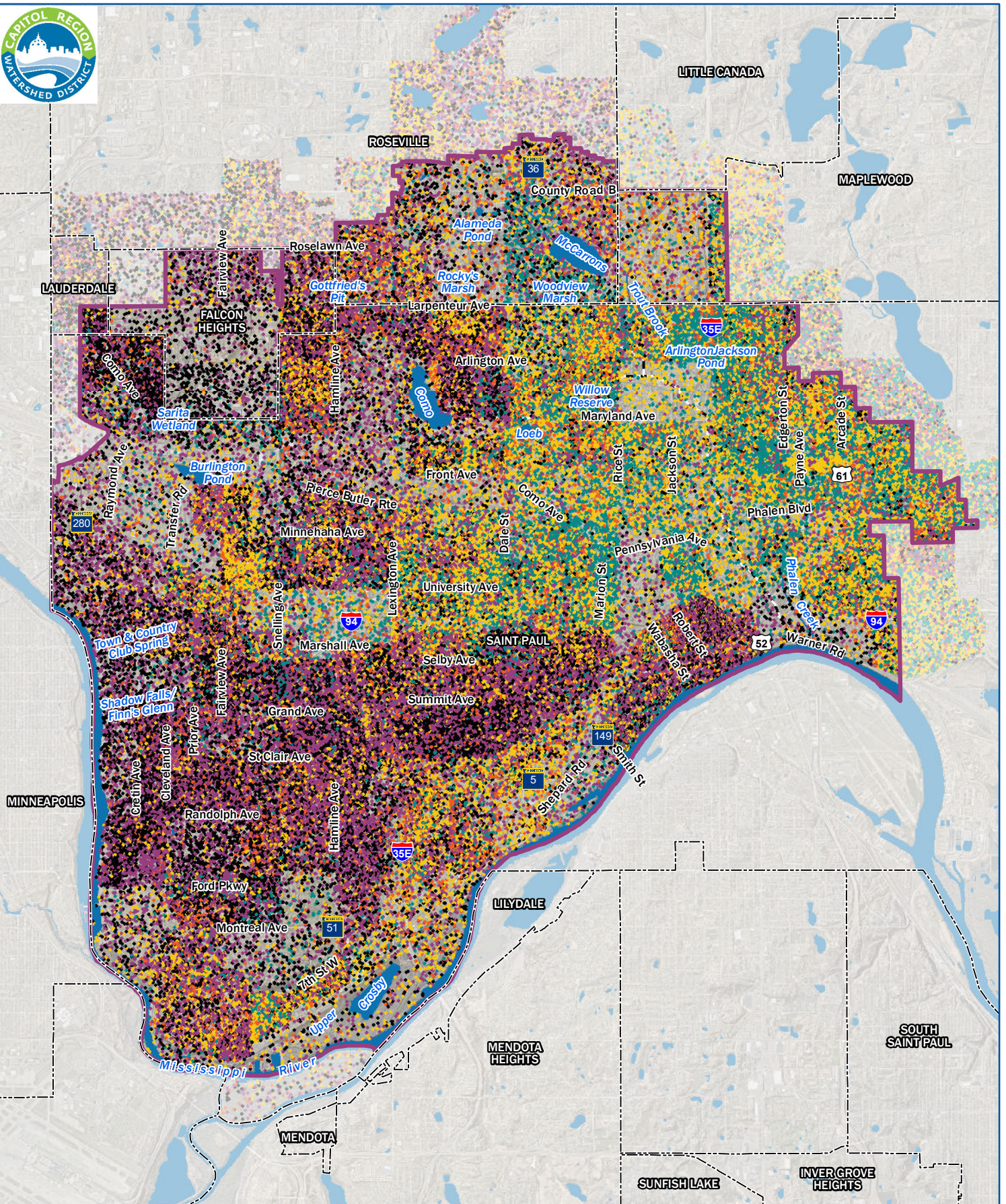
- Municipal
- Watershed
- Lakes and
- Trout Brook

- Age of Individuals
- Each dot represents 5 people
- Under 18 Years Old
 - 18 to 39 Years Old
 - 40 to 64 Years Old
 - 65 Years Old and Older



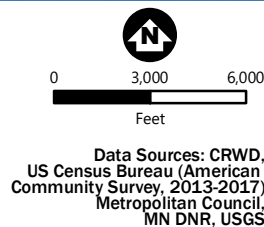
AGE IN THE DISTRICT
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-10



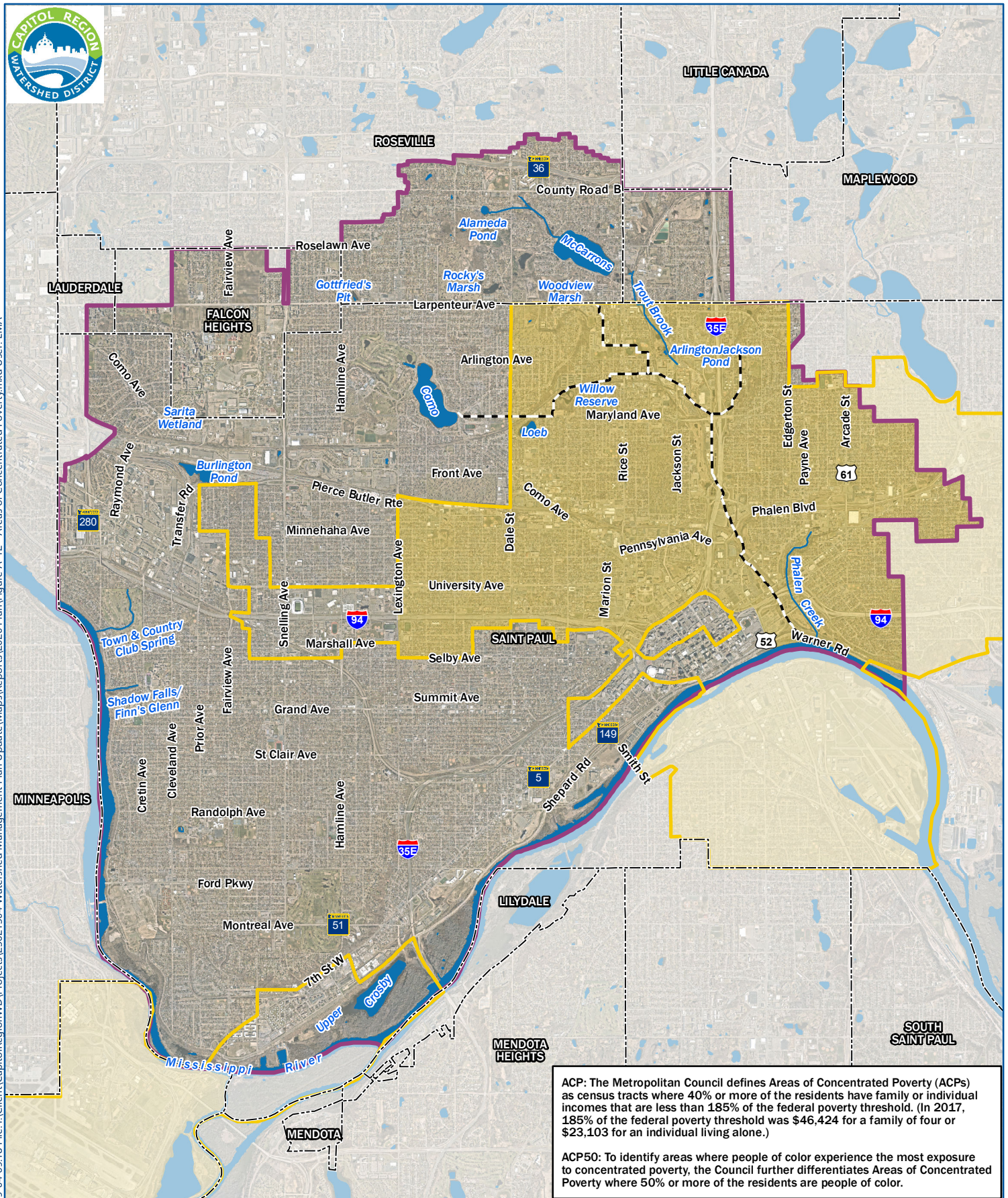
- Municipal Boundary
- Watershed Boundary
- Lakes and Rivers
- Streams
- Trout Brook Interceptor

- Highest Level of Education Attained**
Each dot represents 1 person
- Did not Graduate High School
 - High School Graduate
 - Two-Year Degree
 - Bachelor's Degree
 - Graduate Degree or Higher



**EDUCATION LEVELS
IN THE DISTRICT**
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-11



ACP: The Metropolitan Council defines Areas of Concentrated Poverty (ACPs) as census tracts where 40% or more of the residents have family or individual incomes that are less than 185% of the federal poverty threshold. (In 2017, 185% of the federal poverty threshold was \$46,424 for a family of four or \$23,103 for an individual living alone.)

ACP50: To identify areas where people of color experience the most exposure to concentrated poverty, the Council further differentiates Areas of Concentrated Poverty where 50% or more of the residents are people of color.

Municipal Boundary

Watershed Boundary

Lakes and Rivers

Streams

Trout Brook Interceptor

Areas Of Concentrated Poverty (ACP)

ACP50

0 3,000 6,000
Feet

Data Sources: CRWD,
Metropolitan Council
MN DNR, USGS

AREAS OF
CONCENTRATED POVERTY
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-12

A.6 Geology

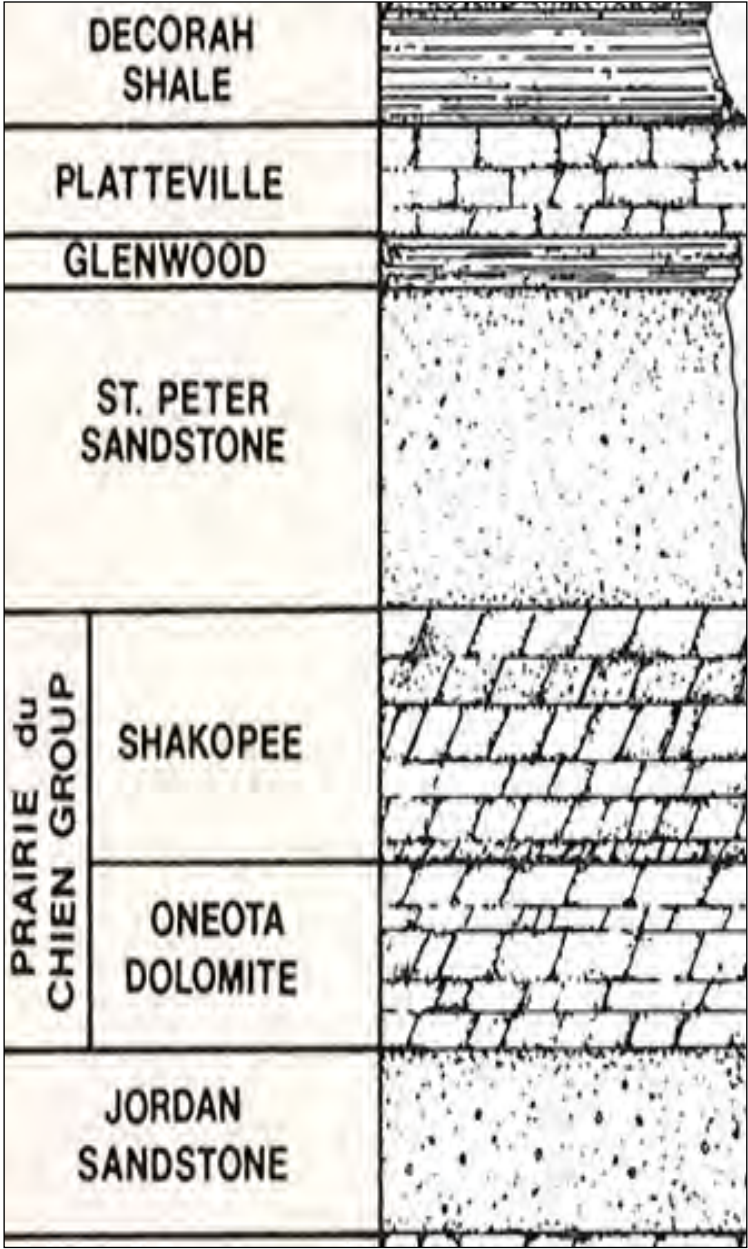
The geology of the District includes consolidated bedrock formations overlain by unconsolidated glacial sediments (also known as quaternary deposits). Unconsolidated glacial sediments are from glacial deposits left from the quaternary geologic period and modified by post-glacial erosion and soil formation processes. Most of the quaternary deposits in the District were deposited approximately 12,000 to 20,000 years ago by the Des Moines lobe (Grantsburg sublobe) and Superior lobe of the Wisconsin Glaciation (the most recent local glacial episode) (Meyer and Swanson, 1992).

The glacial (quaternary) deposits found in Ramsey County are primarily in the form of outwash, till, and stream and lake sediments, which are composed of varying percentages of sand, silt, clay, and gravel. The overall thickness of glacial deposits ranges from less than 10 to over 300 feet within the District. Deposits are thickest where pre-glacial and interglacial stream valleys, incised into underlying bedrock, have been filled with glacial sediment (e.g., Phalen Creek). Thinner deposits are found along the bluffs of the Mississippi River and in the southwest portion of the District (Meyer and Swanson, 1992). More recent quaternary deposits include floodplain alluvium along the Mississippi River, alluvial fan deposits, and peat deposits representative of historical wetlands (Meyer, 2007).

Consolidated bedrock formations (bedrock deposits) are much older and lie beneath the mantle of glacial sediments. They include a thick overlapping sequence of sandstones, limestones, dolostones, and shales. Most bedrock units in the District were deposited during the Paleozoic era marine environments about 450 to 530 million years ago. Some older undifferentiated Proterozoic-era rocks have been identified in the deep bedrock substrate (Meyer and Swanson, 1992).

The bedrock deposits in the District are part of a regional geologic setting called the Hollandale embayment. The embayment sequence of sandstone, carbonate and shale bedrock layers and acts as a huge groundwater basin. Table A-6 lists the bedrock deposits that outcrop (are exposed directly at the surface) or subcrop (are exposed in the subsurface directly below surficial sediments) within the District.

Table A-6 Upper-most bedrock deposits and local characteristics

Sample Bedrock Unit Cross Section		Bedrock Formations (descending order)	Local Characteristics
	DECORAH SHALE	Decorah shale	<ul style="list-style-type: none"> Occurs in west & center of the District Acts as a confining layer
	PLATTEVILLE	Platteville limestone & Glenwood Shale	<ul style="list-style-type: none"> Discontinuous in the District Outcrops present along Mississippi River bluffs
	GLENWOOD		
	ST. PETER SANDSTONE	St. Peter sandstone	<ul style="list-style-type: none"> Continuous except for buried bedrock valley near historic Trout Brook Lowest portion acts as confining layer Exposed along Mississippi River bluffs
	PRAIRIE du CHIEN GROUP SHAKOPEE	Prairie du Chien group (dolostone)	<ul style="list-style-type: none"> Continuous in the District Outcrops adjacent to the Mississippi River in downtown Saint Paul Can exhibit high conductivity
	ONEOTA DOLOMITE		
	JORDAN SANDSTONE	Jordan sandstone	<ul style="list-style-type: none"> Outcrops only extreme eastern portion of the District

Source: Ramsey County Geologic Atlas (Meyer and Swanson, 1992)

Note: Other bedrock layers occurring below Jordan sandstone that do not outcrop in the District include: St. Lawrence formation, Franconia formation, Ironston sandstone, Galeville sandstone, Eau Claire formation (shale), and Mt. Simon sandstone

Additional geologic information, including descriptions of specific quaternary and bedrock deposits located within the District, are presented in the *Ramsey County Geologic Atlas* (Meyer and Swanson, 1992), available at: <https://conservancy.umn.edu/handle/11299/58233>

A.7 Groundwater

A.7.1 Hydrogeology and Aquifers

The glacial and bedrock deposits discussed in Section A.6 form a layered sequence of aquifers and confining units that make up the hydrogeologic setting of the District. An aquifer is a geologic formation capable of supplying sufficient quantities of water to a well. A confining unit is a geologic deposit that impedes the flow of water between aquifers (see also the *Ramsey County Geologic Atlas* (Meyer and Swanson, 1992)).

The uppermost aquifers in the District are glacial deposits. Glacial aquifers (also known as surficial aquifers) include the water table and buried glacial aquifers, which are primarily used for domestic purposes. Glacial aquifers are variable in location and yield. Groundwater quality in glacial aquifers is often correlated to the quality of the water that is infiltrating at the surface. Groundwater flow in the water table aquifer is toward local discharge zones (wetlands, lakes, and streams) and, both locally and regionally, toward the Mississippi River.

Most high-capacity wells draw water from bedrock aquifers. The bedrock aquifers within the District include the following:

- **Platteville Formation** – The Platteville Formation is composed of limestone and dolostone and is generally between 25 and 30 feet thick. In some areas, the aquifer is fully confined and saturated; in others, the Platteville is either part of the water-table system or is unsaturated and incapable of providing water to wells. Use of the Platteville aquifer is prohibited in many areas due to its proximity to the surface and associated potential for contamination.
- **St. Peter Aquifer** – The St. Peter sandstone aquifer is generally 150-160 feet thick and is composed mainly of poorly cemented, uniform sand grains that form a porous and permeable aquifer medium. The basal portion of the St. Peter contains layers of mudstone, siltstone, and shale that form a confining layer. The St. Peter is used primarily for domestic and other low-volume uses.
- **Prairie du Chien-Jordan Aquifer** – The Prairie du Chien Group (a series of dolomite deposits) and Jordan Sandstone are hydrologically connected due to the absence of a confining unit between them. This aquifer has high yield rates and is the most heavily used aquifer in the District. Many large-diameter and high-capacity wells draw from this aquifer for industrial, commercial, and municipal water supplies. Most of the Prairie du Chien-Jordan aquifer is more than 200 feet thick. Groundwater flows through it from the northeast toward the discharge zone of the Mississippi River. Recharge to the aquifer occurs from overlying non-con materials, lateral groundwater flow and buried bedrock valleys.

- **Tunnel City-Wonewoc Aquifer** (formerly Franconia-Ironton-Galeville Aquifer) – This aquifer includes three hydrogeologically connected layers. Groundwater flow in this aquifer is generally from the north of Ramsey County towards the Mississippi River. Locally, this aquifer is rarely utilized due its moderate to low yield.
- **Mt. Simon-Hinckley Aquifer** – This aquifer underlies all of Ramsey County and is composed of fine- and coarse-grained sandstone. Groundwater flow is generally east to west towards a cone of depression formed by pumping in Hennepin County. The aquifer has moderate to high yield and low vulnerability to contamination. Its use is unrestricted by Minnesota Law.

Additional information about the aquifers within the District is available from the following sources:

- *Ramsey County Geologic Atlas* (Meyer and Swanson, 1992), available at: <https://conservancy.umn.edu/handle/11299/58233>
- *Ramsey County Groundwater Protection Plan* (Ramsey Conservation District, 2010)
- Metropolitan Council Water Supply Planning at: <https://metro council.org/Wastewater-Water/Planning/Water-Supply-Planning.aspx>

A.7.2 Groundwater Recharge

Recharge to the groundwater system occurs throughout the District. The characteristics of local geologic deposits at the land surface significantly affect the rate, volume, and distribution of recharge (see Section A.8). Water infiltrates most rapidly into sandy deposits and flows easily through sandy materials; clay deposits tend to slow and impede infiltration and subsurface flows. Relative to natural conditions, urban development and impervious surfaces (e.g., buildings, streets, parking lots) have reduced the amount of open space and decreased the amount of land available to infiltrate runoff and recharge groundwater.

Groundwater recharge reaches the water table (i.e., quaternary or surficial aquifer) at a fast rate through sandy geologic deposits. Surficial aquifers usually have higher static water levels than deeper aquifers, indicating that water flows downward into the aquifer system and that surficial aquifers help recharge deeper aquifer systems. Deeper bedrock aquifers are recharged through bedrock valleys, leakage through confining layers, fractures in tills and confining layers, improperly constructed wells, and other areas where good hydraulic connections and unforeseen flowpaths exist with upper aquifer units.

A.7.3 Drinking Water Supply, Wellhead Protection, and Pollution Prevention

The majority of residents within the District obtain their drinking water from the Saint Paul Regional Water Service (SPRWS). The SPRWS operates an intake from the Mississippi River, located in Fridley. Although most of the SPRWS water supply comes from surface water, the SPRWS may use groundwater as an alternate water supply when there are taste and odor problems, during drought conditions, or in other special situations (e.g., security reasons). Approximately 10% of the SPRWS water supply consists of groundwater annually (Ramsey Conservation District, 2009). As of 2015, the SPRWS maintains 10 groundwater wells located in the Prairie du Chien-Jordan aquifer (SPRWS, 2015). A portion of the

SPRWS drinking water supply system and management areas are located in the northeast portion of the District.

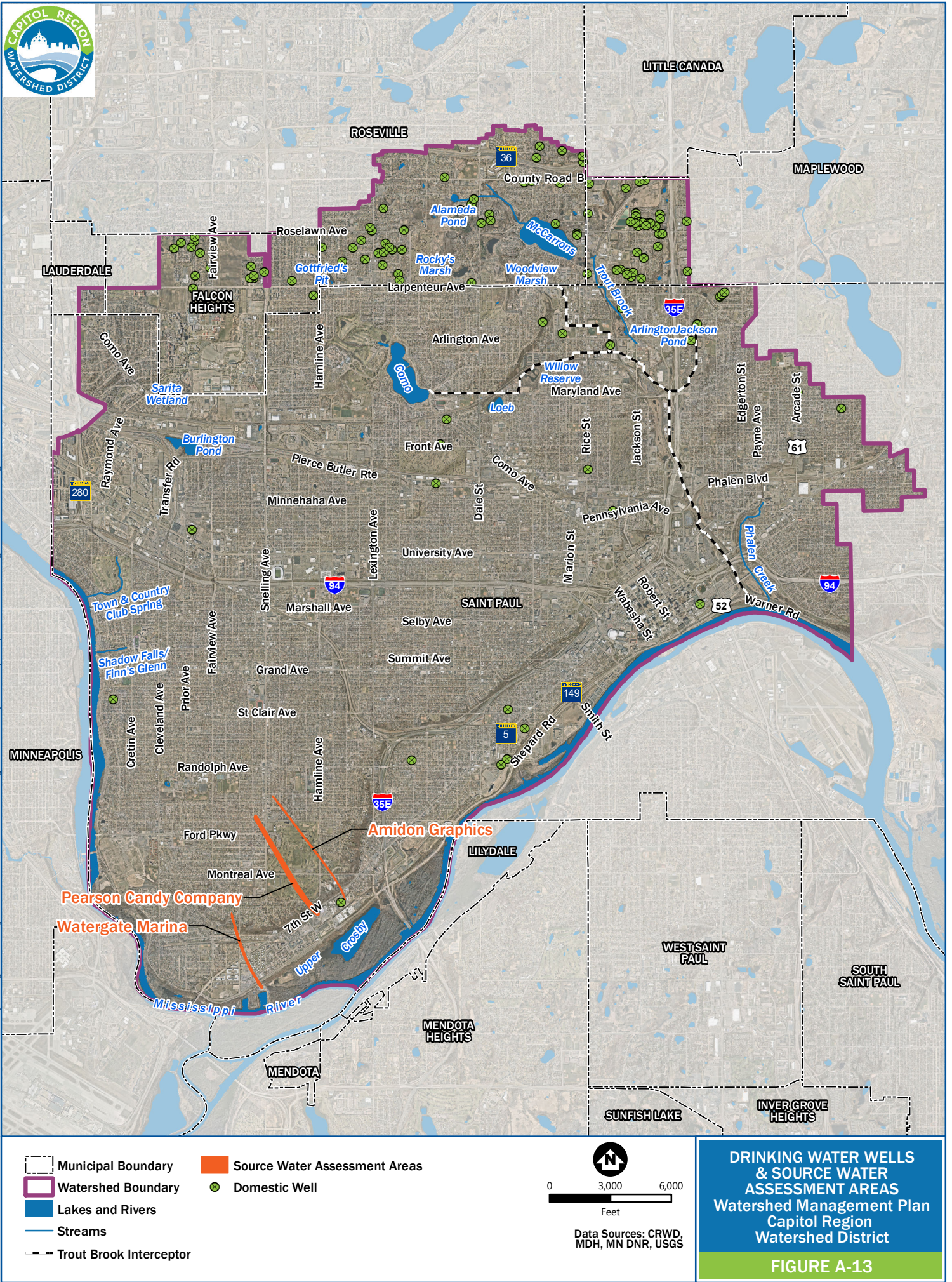
Groundwater is also used to privately supply drinking water to organizations and businesses. There are 105 wells identified in the County Well Index (CWI) as providing domestic consumption (i.e., drinking water) within the District (see Figure A-13). Most of these wells are located in Roseville, Falcon Heights, and Maplewood.

In 1989 the state of Minnesota instituted the Minnesota Groundwater Protection Act, which identified the Minnesota Department of Health (MDH) as responsible for the protection of groundwater quality. Through its wellhead protection program, the MDH administers and enforces the Minnesota Water Well Code, which regulates activities such as well abandonment and installation of new wells. The MDH also administers the Wellhead Protection Program, which is aimed at preventing contaminants from entering the recharge zones of public well supplies. In 1997, the Wellhead Protection Program rules (Minnesota Rules 4720.5100 to 4720.5590) went into effect.

The MDH prepares source water assessments for all Minnesota public water systems, including those using groundwater sources. Source water assessments consider data such as water sampling results, water system surveys, and well records to assess a water supply's susceptibility to contamination. In some cases, a source water assessment area is mapped to show the land area over which wellhead protection measures should be implemented. The MDH has mapped three source water assessment areas within the District (see Figure A-13).

Some public water suppliers are required to prepare wellhead protection plans (WHPPs). Through these wellhead protection plans, public water suppliers delineate drinking water supply management areas (DWSMA) for groundwater wells, assess the water supply's susceptibility to contamination from activities on the land surface, and establish management programs, such as identification and sealing of abandoned wells and education/public awareness programs. The DWSMA represents the boundaries of the recharge area to the well and is the area to be protected and managed by the wellhead protection plan. A portion of the SPRWS DWSMA is located within the northern portion of the District.

As the District and its partners rely more heavily on infiltration practices to improve water quality and reduce stormwater volumes, the District will continue to consider the possible impacts of infiltrated stormwater on groundwater quality. The MDH and MPCA also provide guidance for evaluating infiltration projects in areas with vulnerable groundwater supplies; the guidance considers the presence of wellhead protection areas, aquifer characteristics, land use, and other factors. This guidance is available from the MPCA website: https://stormwater.pca.state.mn.us/index.php/Stormwater_and_wellhead_protection



A.7.4 Groundwater Modeling

The Metropolitan Council developed and maintains a regional groundwater flow model for the entire Metropolitan Area (Twin Cities Metropolitan Groundwater Flow Model Version 3, as updated). The objective of this modeling effort is to maintain a groundwater-flow model that allows the Metropolitan Council, land use planners, and water utility planners across the metropolitan area to consider both groundwater availability and land use during the planning processes (Metropolitan Council, 2014).

The model was developed and calibrated for the primary purpose of predicting the effects of current and future groundwater withdrawals and land use on groundwater levels and the base flows of streams at a regional scale. These types of model predictions are useful for interpreting hydrogeologic data, informing future data collection, and for evaluating alternatives to enhance sustainable use of water resources in the metropolitan area.

The model is periodically updated; version 3 of the model (updated in 2014) is available from the Metropolitan Council at: <https://metro council.org/Wastewater-Water/Planning/Water-Supply-Planning/Metro-Model-3.aspx>

A.7.5 Groundwater Monitoring

Much of the groundwater monitoring performed by the District is completed as part of contaminated site management plans. These data are available from the Minnesota Pollution Control Agency (MPCA). The MPCA also implements a groundwater quality monitoring program; the program focuses on quaternary aquifers located throughout the state and the Prairie du Chien, Jordan, and Galena aquifers located in the Twins Cities Metro area and southeastern Minnesota.

The MPCA also monitors a network of shallow monitoring wells to augment the domestic well network. The monitoring well network is an early warning system designed to detect contamination as it enters the groundwater system. Groundwater quality monitoring information and data is available online from the MPCA at: <https://www.pca.state.mn.us/water/groundwater-monitoring>

The MDNR also coordinates an observation well network and collects static groundwater-level data to assess groundwater resources, determine long term trends, interpret impacts of pumping and climate, plan for water conservation, and evaluate water conflicts. The observation well network includes several sites in the District. More information is available from the MDNR at: <https://www.dnr.state.mn.us/waters/cgm/program.html>

A.7.6 Groundwater Quality

Long-term data for analyzing groundwater quality trends in the District are lacking. MDH tests water quality of several municipal drinking supply wells in Ramsey County, but often only after treatment. Only small-scale water quality studies and analyses have been performed in select areas for particular needs. A brief summary of some of these studies is presented in the 1996 *Ramsey County Ground Water Quality Protection Plan* (Ramsey Conservation District, 1996) and the 2009 draft *Ramsey County Groundwater Protection Plan* (Ramsey Conservation District, 2009).

Potential sources of groundwater contamination in the District include: commercial and industrial waste disposal, landfills, leaking petroleum tanks, unsealed wells, non-compliant septic systems, fertilizer/pesticide applications, animal waste, and road salt application (see also Section A.13). Emerging contaminants include pharmaceuticals, industrial effluents, personal care products, fire retardants, and other items that are washed down drains and not able to be processed by municipal wastewater treatment plants or septic systems.

Wastewater collection is available throughout the District, the entirety of which is included within the Metropolitan Urban Services Area (MUSA). Few subsurface sewage treatment systems (SSTS) remain in the District; failing or non-compliant SSTS pose a potential risk to groundwater quality.

A.8 Soils

Soil composition and slope are important factors affecting the rate and volume of stormwater runoff. The shape and stability of aggregates of soil particles—expressed as soil structure—influence the permeability, infiltration rate, and erodibility (i.e., potential for erosion) of soils. Slope is important in determining stormwater runoff rates and susceptibility to erosion.

Soil infiltration capacity affects the amount of direct runoff resulting from rainfall. Higher infiltration rates result in lower potential for runoff, 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 Natural Resources Conservation Service (NRCS – formerly the Soil Conservation Service) has established four general hydrologic soil groups (HSGs). These groups are:

Hydrologic Soil Group A—(Low runoff potential): Group A soils have a high infiltration rate and are typically composed of more than 90% sand and gravel.

Hydrologic Soil Group B—(Moderately low runoff potential): Group B soils have a moderate infiltration rate and are typically composed of 50-90% sand.

Hydrologic Soil Group C—(Moderately high runoff potential): Group C soils have a slow infiltration rate and are composed of less than 50% sand.

Hydrologic Soil Group D—(High runoff potential): Group D soils have a very slow infiltration rate and are composed of more than 40% clay. These soils have a combination of high swelling potential, a permanently high water table, and a clay layer at or near the surface.

Dual HSGs (types A/D, B/D, and C/D) are soils that are considered D soils primarily because of a high water table. However, if the soil were drained it would be classified into a different group. The second group listed for dual HSG soils is for an undrained condition. For the purpose of evaluating infiltration capacity, dual HSGs are usually considered as D soils. The most current soils data for the District are based on the Soil Survey Geographic dataset (SSURGO) from the NRCS and are presented in Figure A-14.

Most of the District is not rated with respect to HSG. The “Not Rated/Not Available” classification is typically assigned to areas where development has altered the existing soil, or data were unavailable prior to development. Generally, areas of defined HSGs in the District are limited to parks and open spaces. In these areas, HSGs A and B are most common.

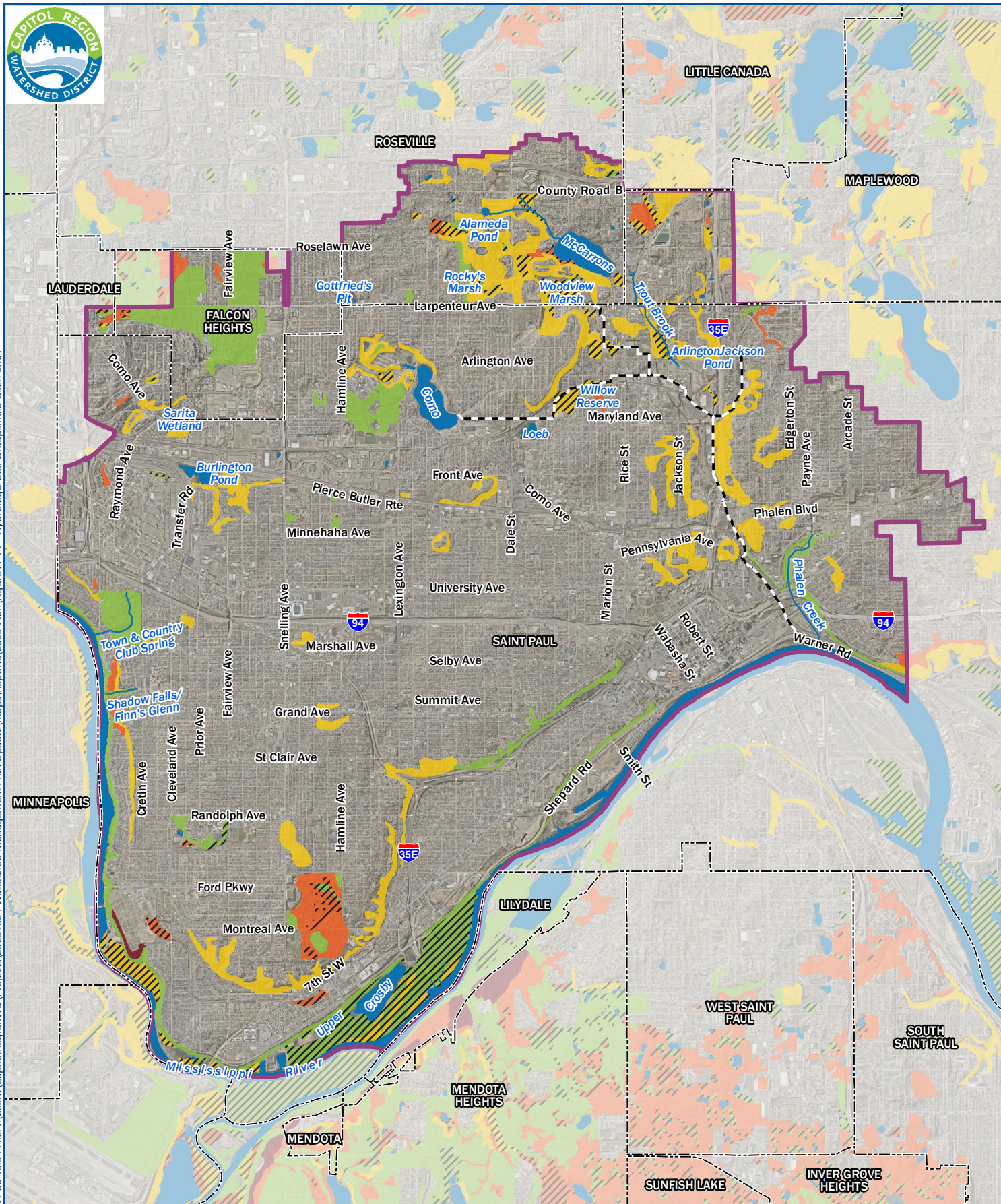
In areas of limited data, quaternary geology may be used as an indication of the types of soils present and the associated drainage characteristics. The SSURGO dataset from the NRCS includes the texture of the parent material. Soils in the District are classified as having well drained, moderately well drained, and poorly drained characteristics, based on the texture of the parent material. Very sandy geologic materials are classified as well drained (similar to HSG A and B soils). Clayey geologic materials are classified as poorly drained (similar to HSG C and D soils). Drainage characteristics based on surficial geology are presented in Figure A-15.

Development is another factor that may increase the potential for high volumes of runoff. As land is developed for urban use, much of the soil is covered with impervious surfaces, and soils in the remaining areas are significantly disturbed and altered. Development often results in consolidation of the soil and tends to reduce infiltration capacity of otherwise permeable soils, resulting in significantly greater amounts of runoff. Grading, plantings, and tended lawns tend to dominate the pervious landscape in urbanized areas and may become more important factors in runoff generation than the original soil type.

Figure A-14 and Figure A-15 provide general guidance about the infiltration capacity of soils. Site specific data such as geologic borings, piezometers, and other engineering studies are necessary to evaluate soil infiltration capacity for individual project sites.



Barr Footer: ArcGIS 10.7.1, 2019-1A-08 13:54 File: I:\Client\CapitolRegion\Watershed Management Plan Update\Maps\Reports\2020 Plan\Figure A-14 - Hydrologic Soil Groups.mxd User: EMA



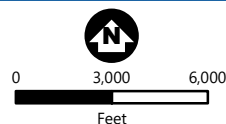
- Municipal Boundary
- Watershed Boundary
- Lakes and Rivers
- Streams
- Trout Brook Interceptor

- Soil Hydrologic Group***
- A
 - A/D
 - B
 - B/D
 - C

C/D

D

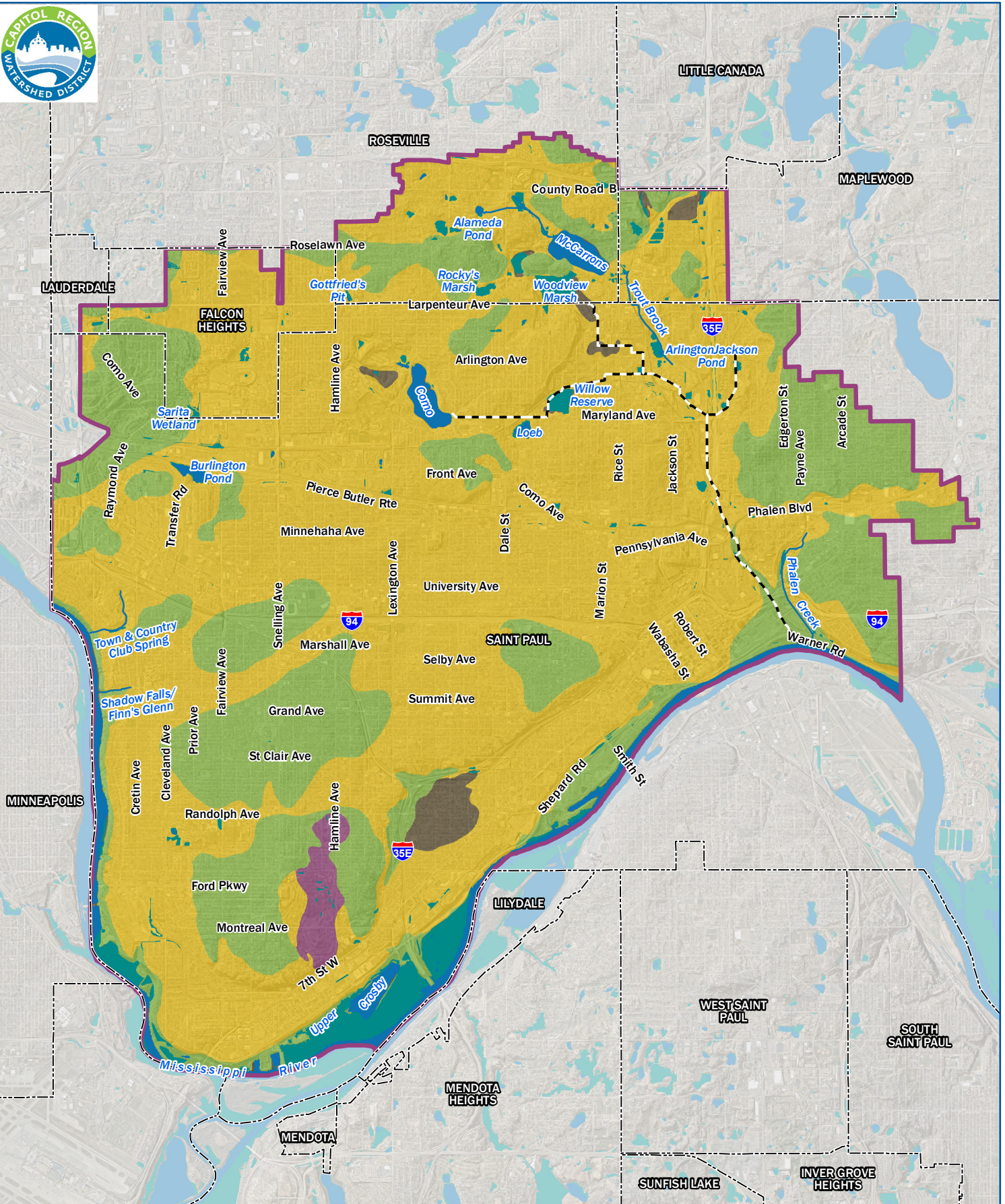
*Areas with missing soil data are due to the presence of urban soils.



Data Sources: CRWD, MN DNR, NRCS, USGS

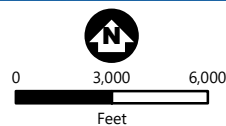
HYDROLOGIC SOIL GROUPS
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-14



- Municipal Boundary
- Watershed Boundary
- Lakes and Rivers
- Wetlands
- Streams
- Trout Brook Interceptor

- Drainage Characteristics
- Well drained
 - Moderately well drained
 - Poorly drained
 - Peat and muck



Data Sources: CRWD,
MN DNR, USGS,
MN Geological Survey

**DRAINAGE CHARACTERISTICS
OF SOILS BASED ON
SURFICIAL GEOLIGIC DEPOSITS**
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-15

A.9 Surface Water System

The District is located near the confluence of the Mississippi and Minnesota Rivers. The Mississippi River forms the western and southern border of the District and is a major regional resource serving power generation, recreation, navigation, and ecological functions. All areas in the District ultimately drain to the Mississippi River, either directly or through a network of stormwater and surface water features.

The development of Saint Paul and the surrounding communities has resulted in alterations to the natural hydrologic system: streams were filled or buried in underground pipes, wetlands were drained or filled, and stormwater infrastructure was constructed to convey water off the land. Historic water resources in the District are described in Section A.9.1.

For resource management purposes, the District has subdivided the watershed into six major planning areas:

- Como Lake subwatershed
- Lake McCarrons subwatershed
- Loeb Lake subwatershed
- Crosby Lake subwatershed
- Trout Brook subwatershed
- Mississippi River Gorge subwatershed
- Mississippi River Confluence subwatershed
- Mississippi River Downtown subwatershed

Figure A-16 presents the major subwatersheds in the District. Information specific to individual priority waterbodies is presented in this section as well as surface water resource information presented at a District-wide scale.

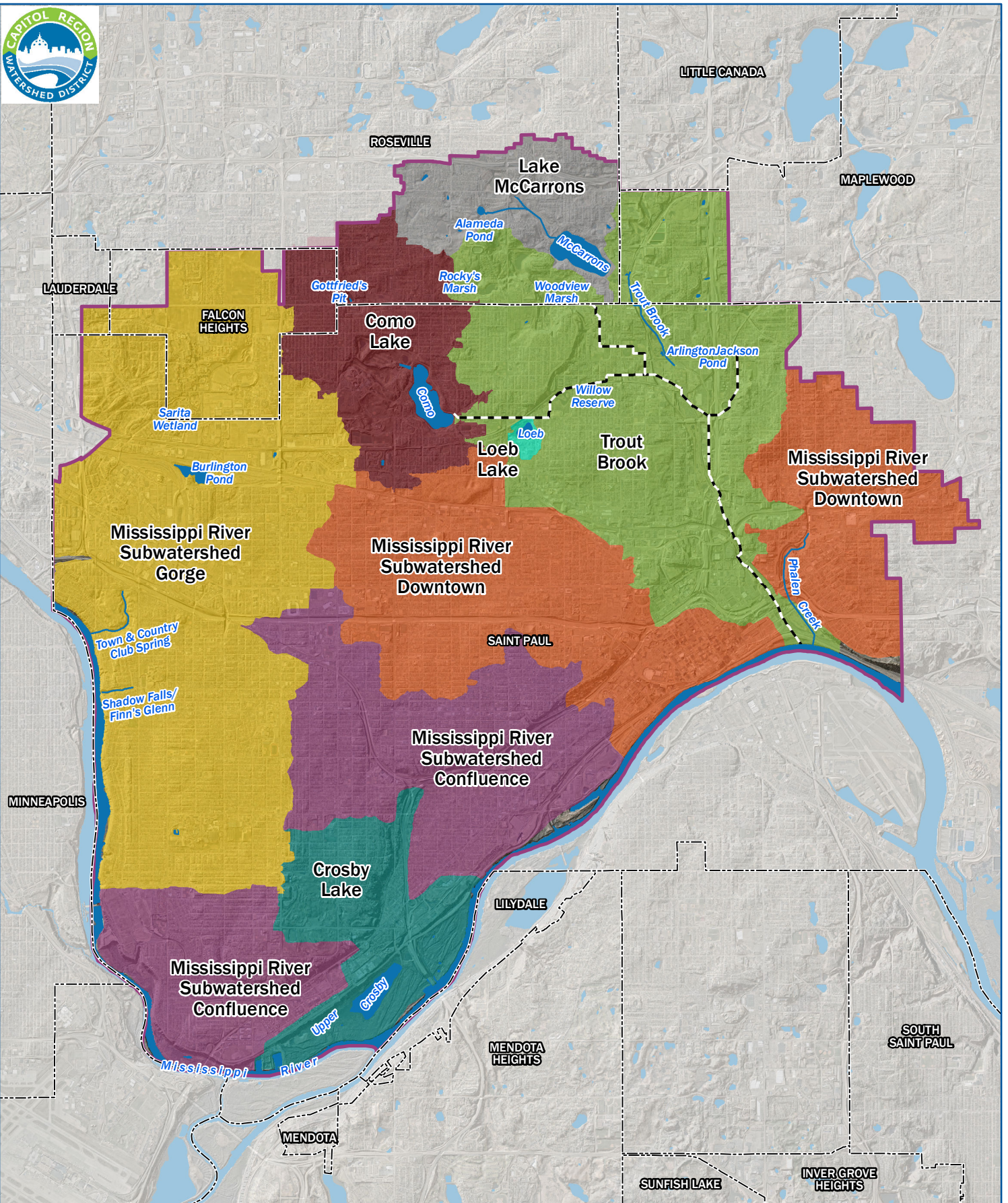
A.9.1 Historic Water Resources

Prior to urban development, the District contained many significant natural and water resources including lakes, wetlands, streams, and springs, and unique aquatic, riparian, and upland habitats associated with these resources. As the land in the District was developed, many of these water and natural resources were lost or altered. Wetlands were filled or drained to create more land suitable for development while streams and springs were buried in pipes.

The District has inventoried and mapped historic water resources to evaluate the potential for future restoration efforts (see Figure A-17). The inventory considered historic maps of the City of Saint Paul and Ramsey County (published between 1867 and 1922) and information from historian and geologist Greg Brick. The location of some historic resources is approximate owing to the natural variability of hydrologic features (e.g., expansion of wetland areas during wet cycles, stream channel migration). The extent of features presented on Figure A-17 generally represent the largest areal extent of the resource.



Barr Footer: ArcGIS 10.7.1, 2020-08-31 10:12 File: I:\Client\CapitolRegion\Watershed Management Plan Update\Map\Reports\2020 Plan\Updates 90 Day Draft\Figure A-16 - Watershed Planning Areas.mxd User: EMA



- Municipal Boundary
- Watershed Boundary
- Streams
- Trout Brook Interceptor
- Lakes and Rivers

- Major Watershed
- Como Lake
- Crosby Lake
- Lake McCarrons
- Loeb Lake

- Mississippi River Subwatershed Confluence
- Mississippi River Subwatershed Downtown
- Mississippi River Subwatershed Gorge
- Trout Brook

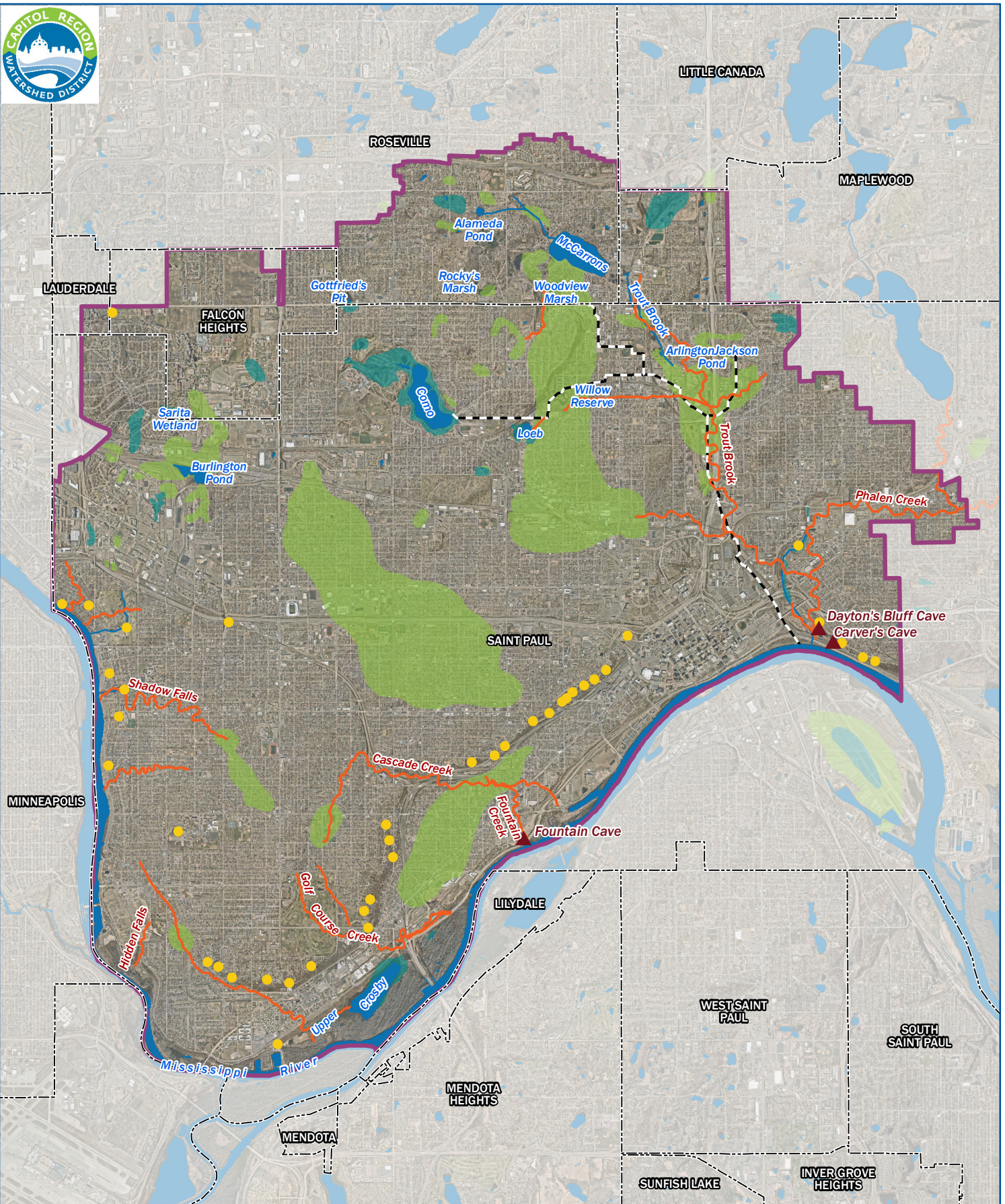


0 3,000 6,000
Feet

Data Sources: CRWD,
MN DNR, USGS

WATERSHED PLANNING AREAS
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-16



- | | |
|-------------------------|---|
| Municipal Boundary | Historic Water Resources (1848-1922) |
| Watershed Boundary | Historic Open Water |
| Lakes and Rivers | Historic Wetland |
| Streams | Historic Stream |
| Trout Brook Interceptor | Cave (Brick, 2008) |
| | Spring (Brick, 2008) |

0 3,000 6,000
Feet

Data Sources: MN DNR, Brick (2008), MGS
CRWD, MNDOT, Metro GIS, EOR,
David Rumsey Collection 1874, ES Norton 1886,
George Franklin 1889, AT Andreas 1874,
DL Curtice 1886, HM Smith 1912,
US Land Office 1848, City of St Paul 1922,
Rice 1874 & 1867

HISTORIC WATER RESOURCES Watershed Management Plan Capitol Region Watershed District

FIGURE A-17

A.9.1.1 Lakes

The larger historic lakes in the District remain today (i.e., Lake McCarrons, Como Lake, Loeb Lake, and Crosby Lake). Relative to its historic extent, Como Lake has become smaller. Mapping errors or inconsistencies may account for the shifting extents of some other lakes. In addition to these larger lakes, there were a number of smaller lake systems throughout the District that are no longer in existence.

A.9.1.2 Wetlands

Figure A-17 shows four large wetland complexes located in the center of District. Local topography suggests the two largest wetland complexes mapped on early surveys of the area are located on sloping terrain. Thus, portions of the wetland area shown on Figure A-17 may represent upland that drained to historic wetlands. Several historic wetlands were connected to other water resources such as streams, springs, marshes, and lakes. While the wetlands themselves have been filled for development, some of the connected resources can still be found today (i.e., Woodview Marsh, Willow Reserve, and Trout Brook). In addition to the large wetland complexes, several smaller wetland systems existed throughout the District.

A.9.1.3 Springs

A number of historic springs are presented in Figure A-17, many were tributaries to streams that discharged to the Mississippi River. Springs in the District tend to be found along spring lines at discrete elevations, depending on bedrock contacts, where there are perched water tables. Not all of the springs are perennial; some of them will only be found during wet years. Coverage for the City of Saint Paul is more complete than for the northern part of the District, away from the Mississippi River, where scattered, depression-type springs in glacial drift may exist and are as yet unmapped; this latter area remains to be thoroughly researched (Brick, 2008). Some of the historic spring systems are non-existent today while others exist in an altered state underneath the City of Saint Paul.

A.9.1.4 Caves

Cave systems are located at the downstream ends of the following historic streams: Phalen Creek, Trout Brook, and Cascade Creek. Notable natural caves within the boundary of the District include Carver's Cave, Dayton's Bluff Cave, and Fountain Cave (Brick, 2008). Carver's Cave is a short cave located downriver from downtown Saint Paul. Fountain Cave is longer than Carver's Cave and is located upstream of downtown Saint Paul. Stratigraphically, both Carver's Cave and Fountain Cave are located within St. Peter Sandstone (Carver's Cave near the middle of the formation, and Fountain Cave near the top). Dayton's Bluff Cave is similar in size and formation to Carver's Cave and is located a short distance upriver (Brick, 2009).

A.9.1.5 Streams and Creeks

Trout Brook and Phalen Creek originally flowed through the eastern part of the District to the Mississippi River. Trout Brook flowed from origins near Lake McCarrons and Loeb Lake south to the Mississippi River (see Figure A-17). Phalen Creek flowed south and west to the Mississippi River from Lake Phalen, through a deep ravine along Dayton's Bluff. Both streams were partially filled in the late 1800s by railroad companies using the stream valleys as track beds for railroad lines servicing downtown Saint Paul. Today,

these streams remain buried underground for the majority of their lengths. Lake Phalen is no longer drained by Phalen Creek, and is located in the Ramsey-Washington Metro Watershed District.

Cascade Creek, originating near Randolph St. and Hamline Ave in Saint Paul, once flowed south and east to the Mississippi River. In 1854, John Ayd, a German immigrant, bought 160 acres of land bounded by present-day Lexington, Victoria, St. Clair, and Randolph Avenues and built a grist mill and mill house on Cascade Creek. The mill operated until 1878. In 1880, the Short Line, a commuter rail line built to connect Minneapolis and Saint Paul, was completed, and at least a portion of the stream bed was filled in at that time. Today, Ayd Mill Road follows a portion of the original route of Cascade Creek.

Hidden Falls Creek, located on the west side of the District, originally flowed southwest from what is now the Highland Park neighborhood of Saint Paul towards the Mississippi River. Hidden Falls Creek was buried during development. Redevelopment of the Ford site in Saint Paul may include opportunities to daylight portions of Hidden Falls Creek.

A.9.2 Existing Lakes, Ponds, and Streams

Major surface waters in the District are presented in Figure A-18. Several of the surface water resources present in the District are classified by the MDNR as public waters. 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 (i.e., lakes, ponds, wetlands) and watercourses (i.e., streams, rivers) that meet the criteria set forth in Minnesota Statutes, Section 103G.005, Subd. 15 that are identified on public water inventory maps and lists authorized by Minnesota Statutes, Section 103G.201. The regulatory boundary of public waters and public water wetlands is called the ordinary high water level (OHWL). A MDNR permit is required for work within designated public waters. Table A-7 summarizes the public waters located within the District. PWI maps and lists are available on the MDNR’s website:

http://www.dnr.state.mn.us/waters/watermgmt_section/pwi/maps.html.

Table A-7 Public Waters

Waterbody Name	City	District Subwatershed ¹	Public Water ID Number	Lake or Wetland Designation	Approx. Area (acres)	Maximum Depth (ft)
Alameda Pond	Roseville	McCarrons	62-0215	W	2.0	--
Burlington Pond	Saint Paul	Mississippi	62-0224	W	18.2	--
Como Lake	Saint Paul	Como	62-0055	P	68.4	15.5
Crosby Lake	Saint Paul	Crosby	62-0047	P	48.0	19
Loeb Lake	Saint Paul	Loeb	62-0231	W	8.0	28
Lake McCarrons	Roseville	McCarrons	62-0054	P	68.1	57
Sarita Wetland ²	Falcon Heights	Mississippi	62-0223	W	4.9	--
Rocky Marsh	Roseville	Trout Brook	62-0222	W	5.4	--
Upper Lake	Saint Paul	Crosby	62-0225	W	8.2	--
Mississippi River	Saint Paul	Mississippi	27-3	--	--	--

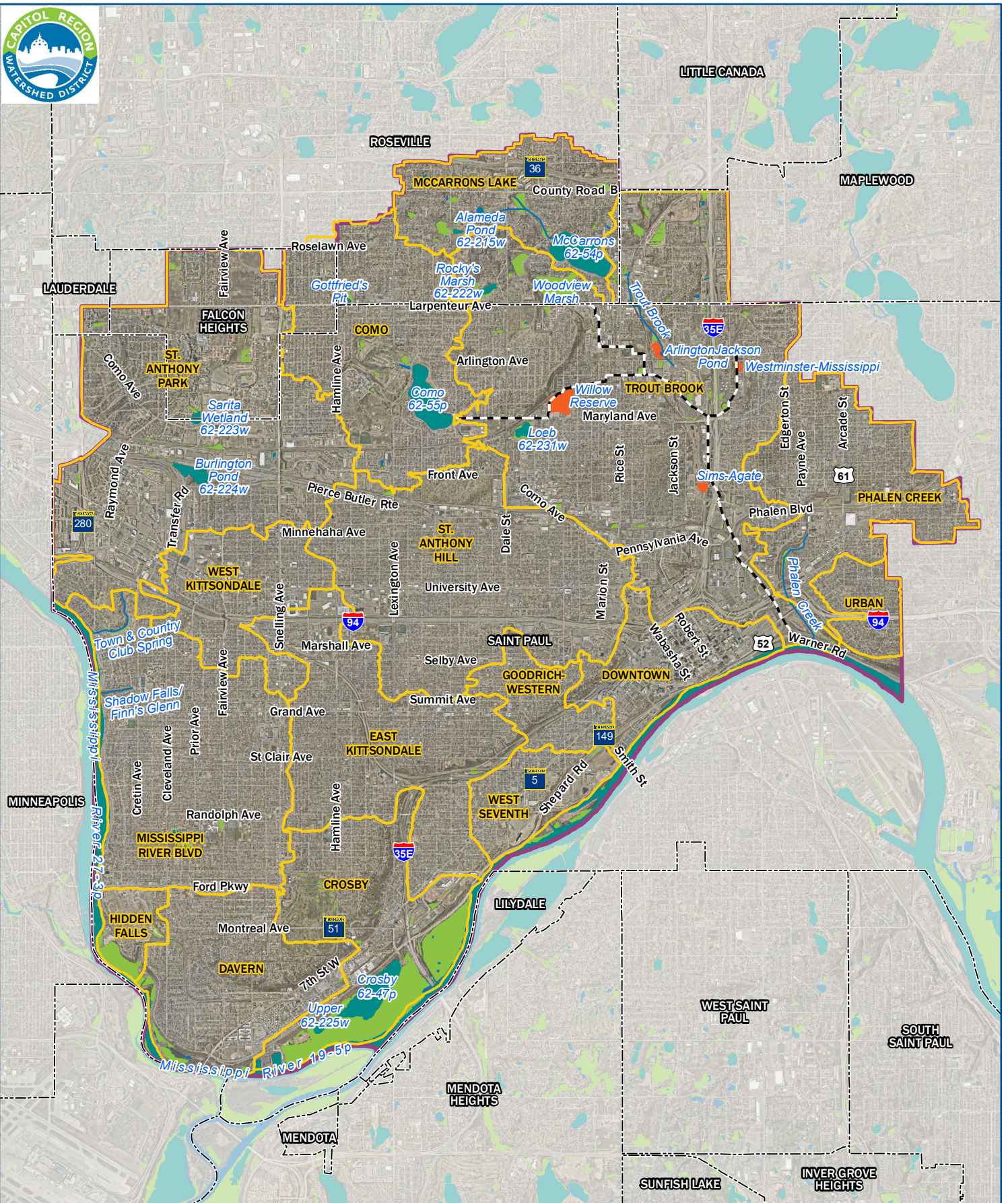
Source: US Census data; Metropolitan Council *Thrive MSP 2040* (updated December 2018)

(1) See Section A.2 and Figure A-16.

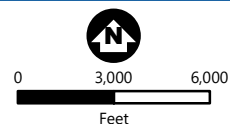
(2) Identified as Moo-U Slough on PWI maps and inventory

There are several waterbodies of significance located in the District that are not classified as public waters by the MDNR. These waterbodies are presented in Figure A-18 and include:

- Woodview Marsh (Roseville – Trout Brook watershed)
- Gottfried's Pit (Roseville – Como Lake watershed)
- Willow Reserve Pond (Saint Paul – Trout Brook watershed)
- Arlington-Jackson Pond (Saint Paul – Trout Brook watershed)
- Villa Park wetland system (Roseville – Lake McCarrons watershed)
- Westminster-Mississippi stormwater pond (Saint Paul – Trout Brook watershed)
- Hidden Falls Creek (Saint Paul – Mississippi River Gorge watershed)
- Town and Country Club Spring creek (Saint Paul – Mississippi River Gorge watershed)
- Shadow Falls/Finns Glenn creek (Saint Paul – Mississippi River Gorge watershed)



- Municipal Boundary
- Watershed Boundary
- Subwatershed
- Streams
- Trout Brook Interceptor
- Lakes and Rivers
- Wetlands
- PWI Lakes and Rivers
- Wetland Used for Stormwater



Data Sources: CRWD, MN DNR, MnDOT, USGS

SURFACE WATER RESOURCES
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-18

A.9.2.1 Como Lake

Como Lake is a 70 acre shallow urban lake located in Saint Paul's Como Regional Park. Como Lake is a popular regional recreation area; the lake is used for non-motorized boating, fishing, aesthetic viewing, and is surrounded by walking and biking paths. Como Lake supports a variety of wildlife and serves as a habitat sanctuary amidst a densely urbanized area. Throughout the year, several species of mammals, reptiles, birds, and pollinators can be observed at Como Lake.

Como Lake has a maximum depth of 15.5 feet, an average depth of 6.5 feet, and is classified as a shallow lake by the MPCA for water quality management purposes. The littoral zone (the area where light can penetrate to the lake bottom which allows for vegetation growth) exceeds 95% of the lake area. Approximately 1,700 acres of watershed drains to Como Lake. Water exiting Como Lake drains to the Mississippi River via the Trout Brook Interceptor (TBI) stormsewer system.

The size and depth of Como Lake has varied since surveys performed in the mid-1800s. Como Lake has been altered from its original shape and depth. Sediment borings indicate that Como Lake may have been shallower and could have historically been a wetland (CRWD, 2002). Alterations to the lake include dredging, draining, construction of the lake outlet, and continued development of the stormsewer network draining to the lake.

Como Lake Water Quality

Como Lake has experienced water quality problems associated with frequent algal blooms and occasional fish kills for decades. Excessive nutrient loading, particularly phosphorus, is the primary cause of Como Lake's water quality problems (CRWD, 2019). Consequently, the MPCA placed Como Lake on the State's 303(d) list of impaired waters for nutrients in 2002 (see Section A.9.6). Como Lake is also listed as impaired due to chloride and mercury in fish tissue (see Section A.9.6). Other pollutants of concern include sediment and trash.

Water quality samples have been collected in Como Lake by Ramsey County Public Works (RCPW) dating back to 1984. RCPW monitoring includes nutrients, transparency (i.e., Secchi depth), and physical parameters (e.g., temperature, pH). Phytoplankton and zooplankton samples are collected from the lake surface waters. Chloride is measured bi-weekly during the winter ice-covered period at the deepest point in the lake. In 2017, CRWD began measuring continuous DO with sensors at three monitoring locations to measure anoxia near the sediment surface. Quantification of the spatial extent and temporal extent of anoxia in the lake facilitates estimation of the diffusive flux of phosphorus from the sediments.

Como Lake water quality data are presented in Table A-8 and Figure A-19. Water quality in Como Lake is stable, despite significant variability from year to year, and exceeds applicable water quality standards in most years. The Water Quality Drivers Analysis Study completed in 2017 (CRWD, 2017) considered long-

term chemical, biological, and physical data and identified the primary sources of phosphorus loading to Como Lake. These sources include:

- Diffusive flux of sediment phosphorus
- Die-off and decay of curly-leaf pondweed (CLP)
- Phosphorus loading from watershed runoff

Understanding the sources and mechanisms of phosphorus loading to, and within, Como Lake is a critical element in prioritizing management strategies that will be most effective for reducing phosphorus loading and improving water quality. More information about the historical water quality of Como Lake and its contributing factors is included in the District's 2019 *Como Lake Management Plan* (Como LMP). The Como LMP also includes recommended strategies to improve Como Lake water quality; these strategies have been incorporated into the Plan (see Section 3.0) as appropriate.

Table A-8 Como Lake Water Quality Data (1984-2019)

Period	Total Phosphorus (µg/L)	Chlorophyll <i>a</i> (µg/L)	Secchi Depth (m)
1984-2019 (May-Sept)	173	34.2	1.4
10 year (2010-2019) (May-Sept)	184	37.8	1.0
MPCA Shallow Lake Standard	≤60	≤20	≥1.0

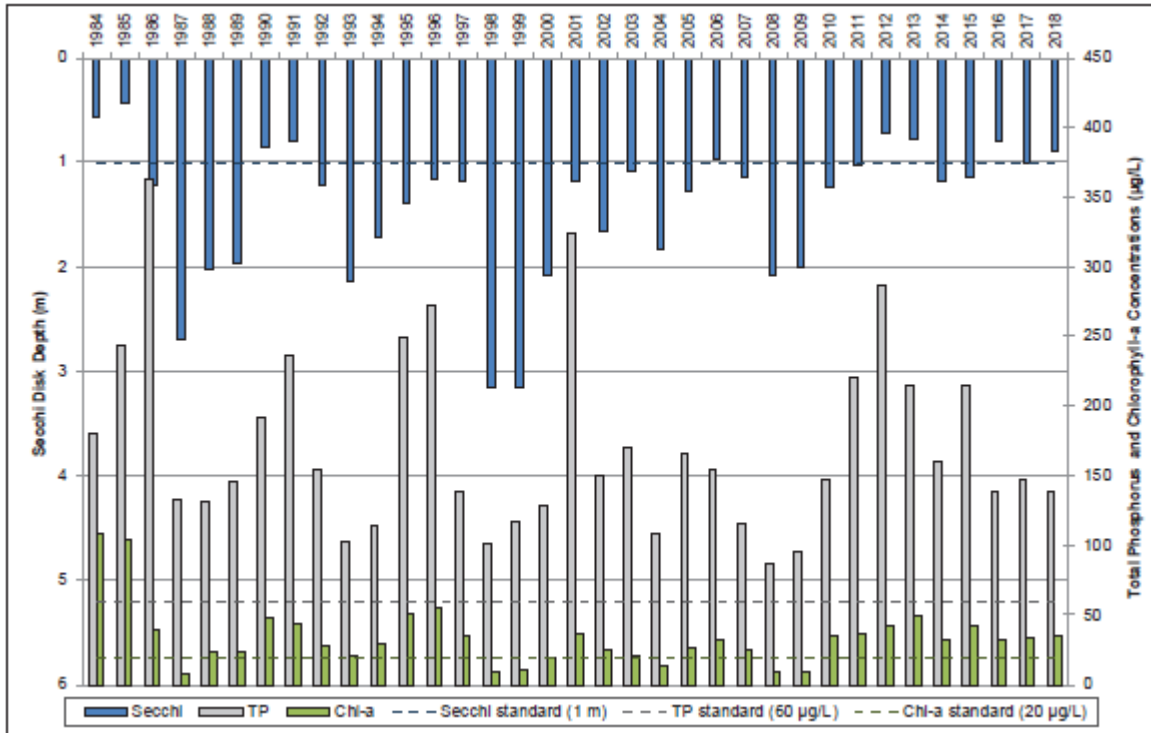


Figure A-19 Como Lake Water Quality Trends

Como Lake Macrophytes

The District and others have performed aquatic plant surveys in Como Lake during the ice off period since 2005, including multiple surveys per summer since 2013. Aquatic plant density in Como Lake is high (see Figure A-20). Recent surveys identify curlyleaf pondweed (CLP) as the dominant, abundant plant observed in late spring/early summer. CLP (*Potamogeton crispus*) is an invasive aquatic plant that disrupts macrophyte ecology, degrades water quality, and is nearly impossible to eradicate once established. CLP often outcompetes native vegetation to become the dominant aquatic plant species in a lake. In this region, it tends to die off and decay in mid- to late-June, releasing phosphorus into the water column and contributing to summer algal blooms. CLP was first observed in Como Lake in the early 1990s and now dominates the aquatic plant community.

Other native aquatic plant species present in Como Lake in moderate density include:

- Canadian waterweed (*Elodea canadensis*; a.k.a. American waterweed or pondweed),
- sago pondweed (*Potamogeton pectinatus*),
- leafy pondweed (*Potamogeton foliosus*),
- coontail (*Ceratophyllum demersum*),
- flatstem pondweed (*Potamogeton zosteriformis*), and
- filamentous algae (*Spirogyra/Cladophora* species).

Muskgrass (*Chara spp.*), greater duckweed (*Spirodela polyrriza*), lesser duckweed (*Lemna minor*) and wild celery (*Valisneria americana*) have also been observed in low density. In general, the density of the native

pondweeds, duckweeds, coontail, and filamentous algae tends to increase following CLP die-off in mid- to late-June.

Aquatic plants, including CLP, have historically been mechanically harvested in Como Lake for recreational purposes to maintain paddling lanes or clear areas near the fishing piers. Additional management actions such as herbicide treatments may be necessary to reduce CLP density in Como Lake.

Aquatic plants serve important functions in shallow lakes which includes habitat for fish and zooplankton, nutrient uptake, and stabilization of sediments. The District seeks to improve the native aquatic vegetation community in Como Lake and will continue to perform monitoring and management of the aquatic plant community in Como Lake following an adaptive management approach.

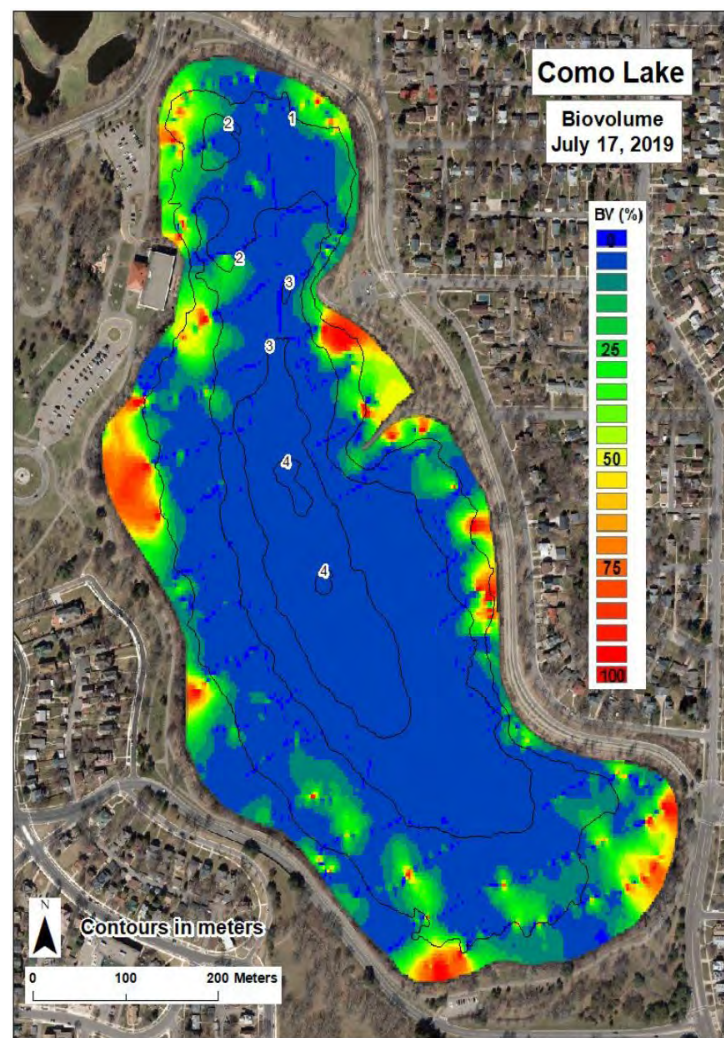
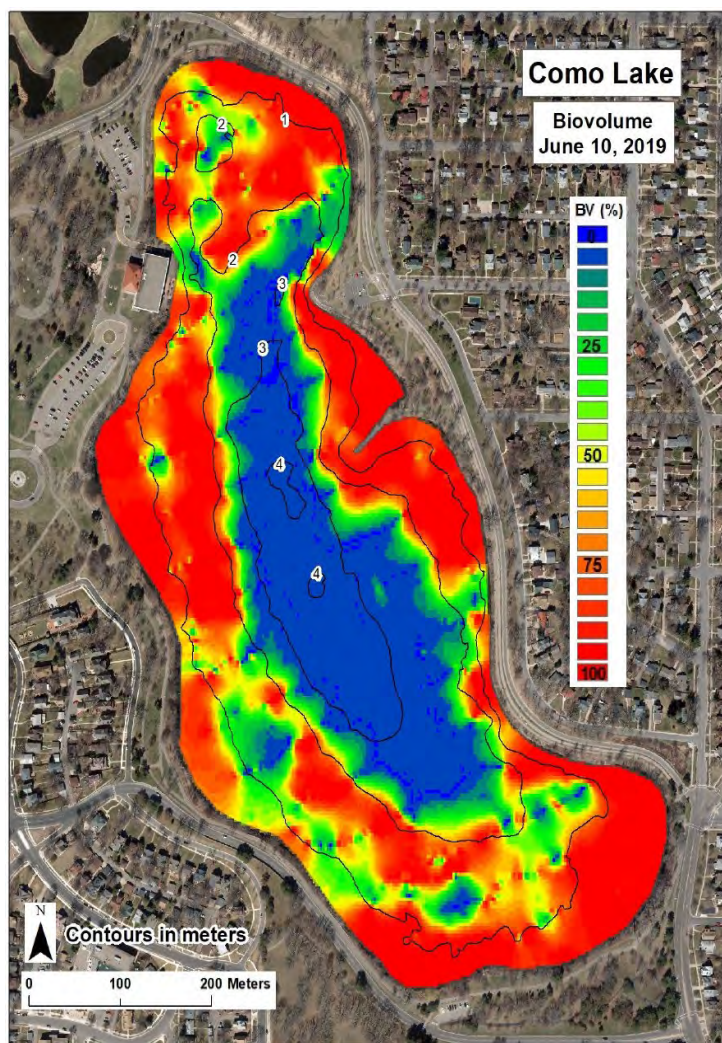


Figure A-20 Como Lake Aquatic Plant Biovolume (% occurrence)

Como Lake Fisheries

The MDNR has periodically performed fish surveys in Como Lake since 1976. The District has also sponsored supplemental surveys in recent years and. Frequent winter fish kills prompted the installation of an aeration device in October 1985. Following aerator installation, the MDNR implemented a biomanipulation strategy to improve water quality by shifting the rough fish population towards bluegill, walleye, and largemouth bass (Noonan 1998). Rough fish (e.g. goldfish, black bullhead, common carp) can negatively impact water quality by disturbing sediment and releasing dissolved phosphorus through feeding behavior. Biomanipulation initially resulted in improved water clarity, but the improvement was not sustained (Noonan, 1998).

Currently, Como Lake is stocked by the MDNR through their Fishing in the Neighborhood (FIN) Program (MDNR, 2019), which aims to increase angling opportunities in urban lakes. The species stocked historically by the MDNR include bluegill, channel catfish, largemouth bass, walleye, and yellow perch. In 2018, the MDNR stocked Como Lake with walleye in an effort to increase the population of top predators. Prior to recent walleye stocking, the fish community had been dominated by black crappie followed by black bullheads or bluegill sunfish since 2006.

The fish community in Como Lake has few top predators (e.g. walleye, northern pike), and is dominated by planktivorous forage fish (e.g. sunfish, black crappie) due to a combination of low predation pressure, historical stocking practices, and likely recreational fishing pressure (LimnoTech 2017). These fish preferentially consume large-bodied zooplankton like *Daphnia*, which graze on algae. Predation of *Daphnia* limits the ability of the zooplankton community in Como Lake to reduce algae growth levels, contributing to water quality issues. In addition, black bullheads have been prolific in Como Lake (black bullheads comprised more than 37 percent of the catch in 2015). This species will be tracked in future survey efforts as they can contribute to turbidity, nutrient and water clarity issues in lakes.

A.9.2.2 Lake McCarrons

Lake McCarrons is a small urban lake located in the southeast corner of Roseville. The Lake McCarrons subwatershed is approximately 1,080 acres (see Figure A-16) and consists primarily of residential land use. Lake McCarrons drains to the Mississippi River via the TBI stormsewer system. A Ramsey County park is located along the southeast shore of the lake and includes a boat launch, beach, and fishing pier. Lake McCarrons is a popular recreational feature within the District.

Lake McCarrons has a surface area of approximately 75 acres and a maximum depth of 54 feet. The average lake depth is 25 feet. The MPCA classifies Lake McCarrons as a deep lake for water quality purposes. The lake typically has a distinct thermocline at 14 to 16 feet, which separates an upper, warmer, mixed layer of water from a lower, colder, stagnant layer during the summer months. The lake is so strongly stratified that that it does not always turn over in the fall.

The District completed an updated Lake McCarrons Management Plan in 2020 (McCarrons LMP). The McCarrons LMP includes a detailed assessment of lake conditions, establishes water quality targets, and identifies management activities. Relevant management activities are included in this Plan's implementation plan (Section 3.0).

Lake McCarrons Water Quality

Like many other urban lakes, Lake McCarrons has previously experienced significant water quality problems, as documented in the 2003 Lake McCarrons Management Plan (The Osgood Group and Barr Engineering Co., 2003). The Villa Park Ponds and Wetland System were constructed in the mid-1980s to reduce watershed pollutant loading to the lake. Since then, several BMPs have been implemented within the watershed to improve lake water quality (see the 2020 Lake McCarrons Management Plan).

The District performed an alum treatment in Lake McCarrons in 2004 to reduce internal phosphorus loading from lake sediment. Since the alum treatment, water quality has improved significantly (CRWD, 2020). Recent water quality data indicate that Lake McCarrons is stable and is meeting applicable state eutrophication water quality standards (see Table A-9 and Figure A-21). The 2020 Lake McCarrons Management Plan includes targets for external (i.e., watershed) and internal phosphorus loading to maintain the lake's water quality in terms of TP and chlorophyll a concentrations and Secchi disk transparency.

Despite meeting eutrophication water quality goals, chloride concentrations observed in Lake McCarrons have increased from 1988-2018. If the current trend continues, it is likely that Lake McCarrons will be listed as impaired for chloride within the next 10 years (CRWD, 2020). The 2020 Lake McCarrons Management Plan includes activities to limit chloride loading from the watershed.

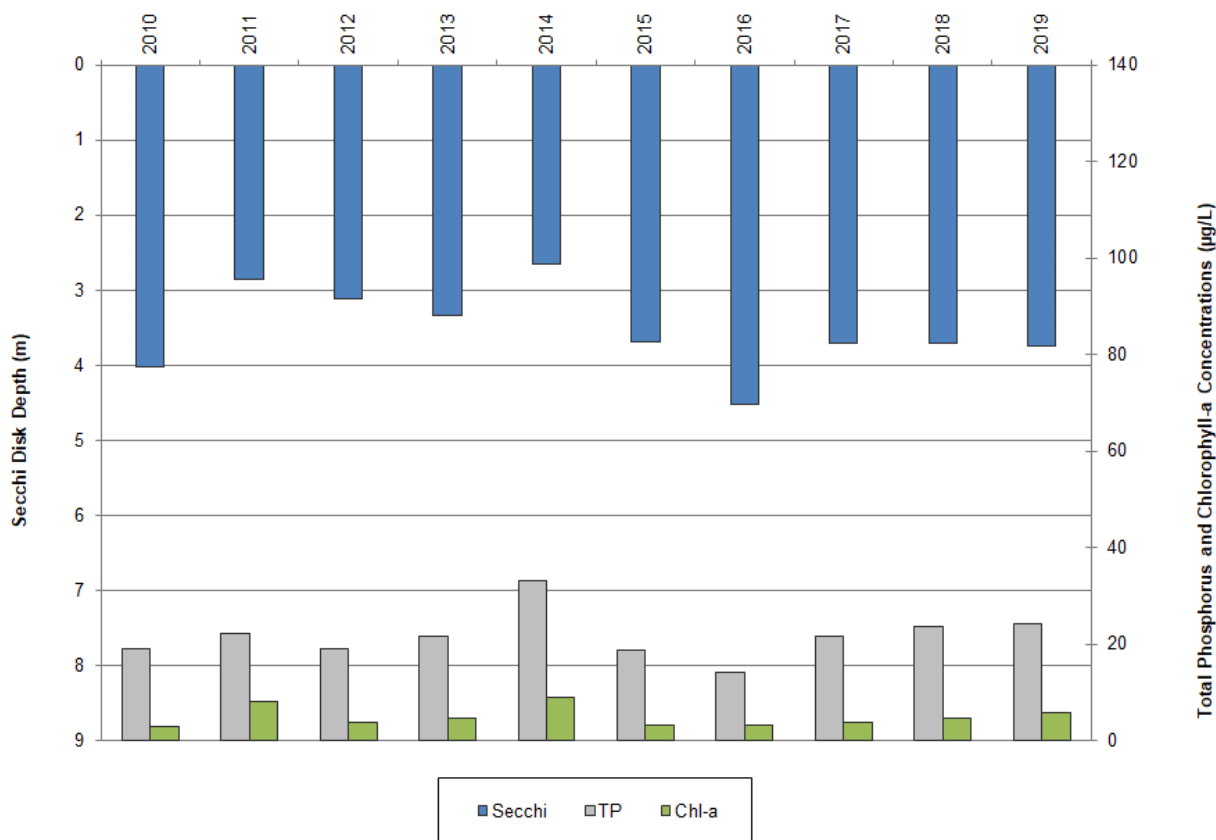


Figure A-21 Lake McCarrons Summer Average Water Quality (2010-2019)

Table A-9 Lake McCarrons Water Quality Data (2010-2019)

Period	Total Phosphorus (µg/L)	Chlorophyll <i>a</i> (µg/L)	Secchi Depth (m)
10 year (2010-2019) (May-Sept)	22	4.9	3.5
MPCA Deep Lake Standard	≤40	≤12	≥1.4

Lake McCarrons Macrophytes and Invasive Species

The 2003 Lake McCarrons Management Plan noted that Eurasian watermilfoil (EWM) had recently become established in the lake. Since then, this macrophyte species has been present to varying degrees year to year. Curly-leaf pondweed (CLP) has also been present in Lake McCarrons since 1996. CLP is of concern because its mid-summer dieback releases phosphorus into the water column at a time when algae are able to take it up.

The District has performed point intercept aquatic vegetation surveys during the ice-off period from 2014-2019. During each year, between 11-14 species of submerged and floating leaf species were observed within Lake McCarrons. The majority of the vegetation growth has been observed within the western littoral area of the lake (Figure A-22) and this area has high occurrences of coontail and EWM. Based on this data, the vegetation community did not meet the MDNR's Floristic Quality Index (FQI) thresholds, suggesting impairment in aquatic life for vegetation within the lake (CRWD, 2018).

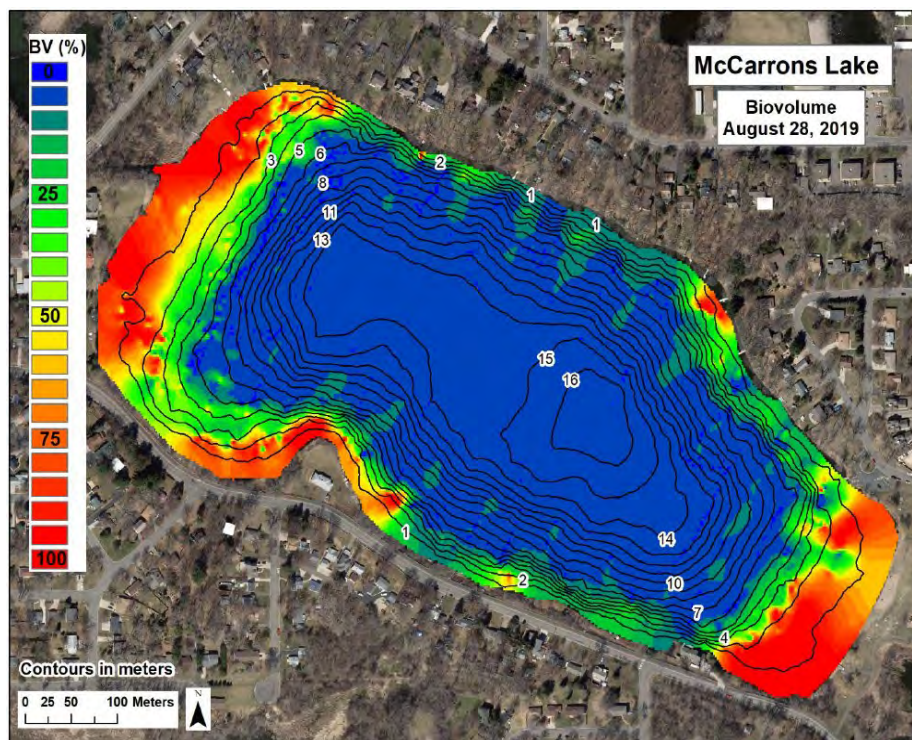
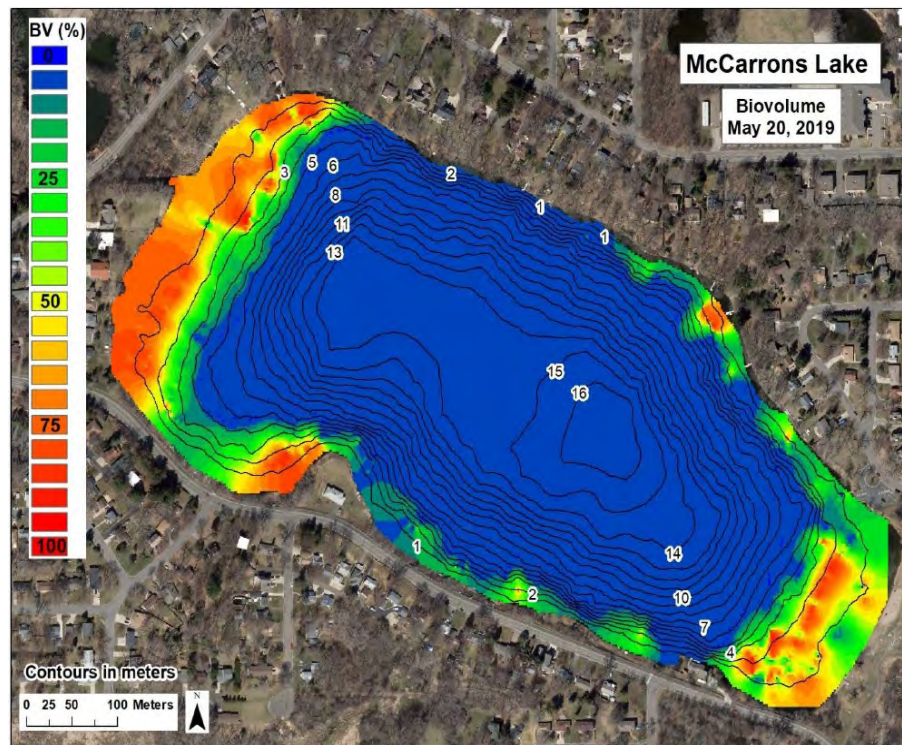


Figure A-22 Lake McCarrons Aquatic Plant Biovolume (% occurrence)

The 2020 McCarrons Lake Management Plan includes goals to increase the abundance and distribution of native submersed aquatic vegetation through the development and implementation of a lake vegetation management plan (LVMP). An LVMP is a document the MDNR develops with public input to address aquatic plant issues on a lake. The LVMP is intended to balance riparian property owners' interest in the use of shoreland and access to the lake with preservation of aquatic plants, which is important to the lake's ecological health. MDNR (2012) previously developed a LVMP for Lake McCarrons to prescribe the permitted aquatic plant management actions (mechanical and/or herbicides) for a five-year period, including controls for invasive plants and restoration of lake shore habitat.

In August 2019 the MDNR confirmed the presence of zebra mussels in Lake McCarrons. Ramsey County staff conducted a targeted search and confirmed a lakewide zebra mussel presence. The Lake McCarrons Aquatic Invasive Species (AIS) Plan (CRWD, 2018) defines the process and criteria by which AIS will be managed on Lake McCarrons. The LVMP will consider AIS threshold criteria for both legacy and newly discovered invasive species in the lake.

Lake McCarrons Fisheries

The MDNR has periodically performed fish surveys in Lake McCarrons dating back to 1958. With the maximum depth over 50 feet and a high abundance of aquatic vegetation, Lake McCarrons has a variety of habitat for various species of fish.

A 1958 survey identified a healthy panfish population consisting mostly of bluegills, with 30 percent measuring over 7 inches. Smallmouth bass were found to be present. Northern pike and black crappies were found to be low in numbers, while yellow perch were observed in high abundance. The lack of young northern pike and the few adults present substantiate a lack of natural spawning facilities for this fish. Fish surveys between 1958 and 2014 found generally similar results. The 2014 survey again identified northern pike as the primary management species in the lake. Northern pike captured averaged 24.8 inches in length and 3.1 pounds. Bluegills ranged from 3.4 to 8.4 inches in length and 17 percent of bluegills captured were 7 inches in length or larger.

Periodic partial winterkills tend to reduce the number of small bluegills back to levels of abundance that the lake can support. Although limited winter lake water quality monitoring data is available for Lake McCarrons, five years of data between 2005 and 2018 indicate that dissolved oxygen (DO) concentrations in the top 4 feet of Lake McCarrons were at least 8.8 mg/L. The recent data suggests that winterkill is not a serious concern for the lake presently.

A.9.2.3 Crosby Lake

Crosby Lake is located in the City of Saint Paul just north of the Mississippi River and collectively refers to two individual basins separated by a bog: Crosby Lake and Little Crosby Lake. Crosby Lake and Little Crosby Lake have surface areas of approximately 45 acres and 7 acres, respectively. Both lakes are classified as shallow lakes by the MPCA, with average depths of 3 feet and 7 feet, respectively. Crosby Lake is located within the Mississippi River floodplain. Mississippi River waters exchange with Crosby Lake at an estimated elevation of 697 feet. This flood elevation corresponds to a flow of 49,000 cubic feet per second in the Mississippi River and has a 33 percent chance of occurring annually (CRWD, 2010).

Although located in the District's Crosby Lake planning area (see Figure A-16), the drainage area to Crosby Lake is only 234 acres. Drainage from most of the planning area bypasses Crosby Lake before discharging to the Mississippi River. The area tributary to Crosby Lake includes industrial land, park space, and natural area. Crosby Lake is located within Crosby Farm Regional Park. Crosby Farm Park is a City of Saint Paul park and a part of the National Park Service's Mississippi National River and Recreation Area (Mississippi NRR). The Park provides opportunities for fishing, canoeing, walking, hiking, and cross country skiing.

The watershed around Crosby Lake is one of a few extensive areas of continuous vegetation remaining in the District (see Figure A-33) and is classified by the MDNR as an area of biological significance. The watershed includes diverse wetland and forest habitats that support many native wildlife species. Vegetation includes areas of intact sedge meadow, black ash seepage swamps, Kentucky coffee trees, and large tracts of intact floodplain forest.

The District developed a Crosby Lake Management Plan in 2010 (CRWD, 2010). Relevant management activities from the Crosby Lake Management Plan have been included in the implementation activities of this Plan (see Section 3.0).

Crosby Lake Water Quality

Water quality data for Crosby Lake and Little Crosby Lake have been collected since 1999 and 2011, respectively. Water quality data for the most recent 10-year period (2009-2018) are presented in Figure A-23, Figure A-24, and Table A-10 and demonstrate stable water quality trends. Summer average total phosphorus concentrations in both Crosby Lake and Little Crosby Lake exceed the 60 µg/L state water quality standard. Despite high total phosphorus concentrations, Crosby Lake is not included on the MPCA's 303(d) impaired waters list (see Section A.9.6) in part due to the influence of the Mississippi River. Although not yet listed as impaired, the MPCA identifies Crosby Lake as a waterbody that is at "high risk" for future chloride impairment.

Water samples collected near the lake bottom demonstrate very high concentrations of total phosphorus, suggesting that release from lake sediments may be a significance source of phosphorus (CRWD, 2010). Periodic flooding from the Mississippi River is also a source of phosphorus loading. For example, the lake was inundated by the river for 103 days in 2011, and for 50 days in 2014 (CRWD, 2017). Water quality data observed in the years following these inundation periods showed average TP concentrations above the normal historical values. In 2015, however, there were no documented days of river flooding, followed by only a single day of inundation in 2016. Water quality showed drastic improvements in TP and Chl-*a* during these years (see Figure A-23). The source of these high nutrient concentrations could be from high flow periods of the Mississippi River where large sediment loads enter the lake. Management efforts need to take into account the dynamic relationship between the lake and the river.

Despite periodic high TP concentrations, observed Chl-*a* concentrations and Secchi depth transparencies meet standards in both basins, suggesting the presence of feedback mechanisms that offset the lake's response to excess nutrients. These mechanisms include zooplankton grazing and a robust submerged aquatic vegetation community that stabilizes the sediments and prevents wind resuspension (CRWD,

2010). Consequently, Crosby Lake's water is relatively clear despite some signs of eutrophication (see Figure A-23, Figure A-24, and Table A-10).

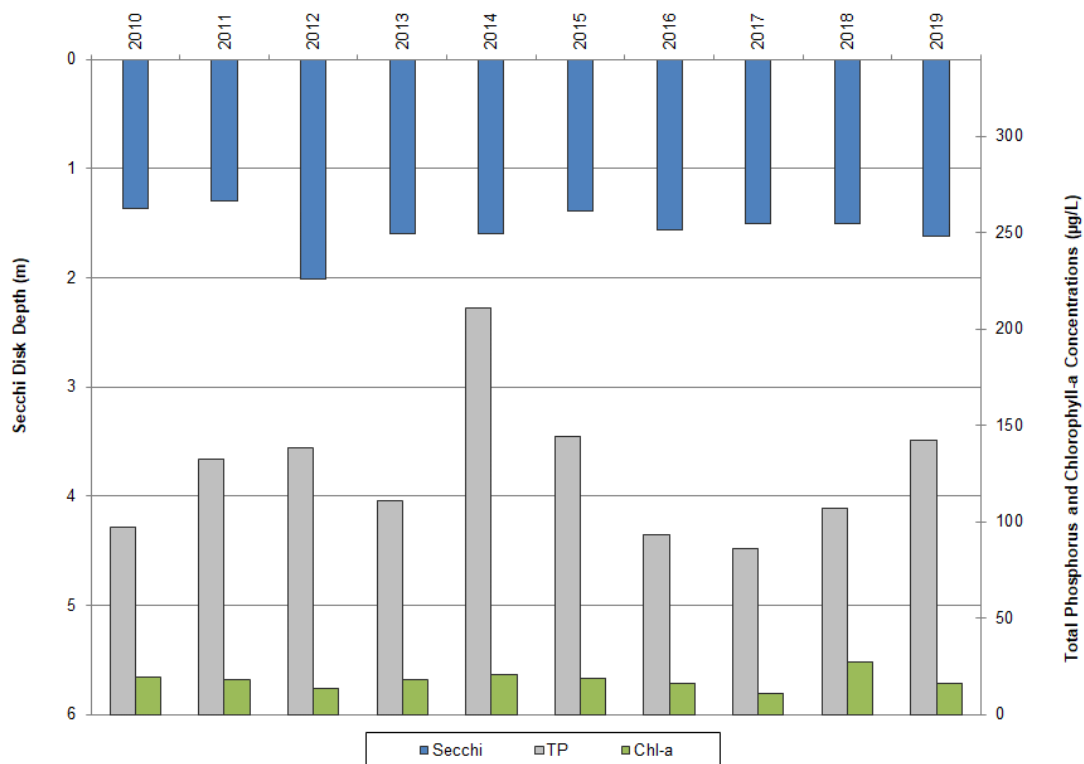


Figure A-23 Crosby Lake Summer Average Water Quality (2010-2019)

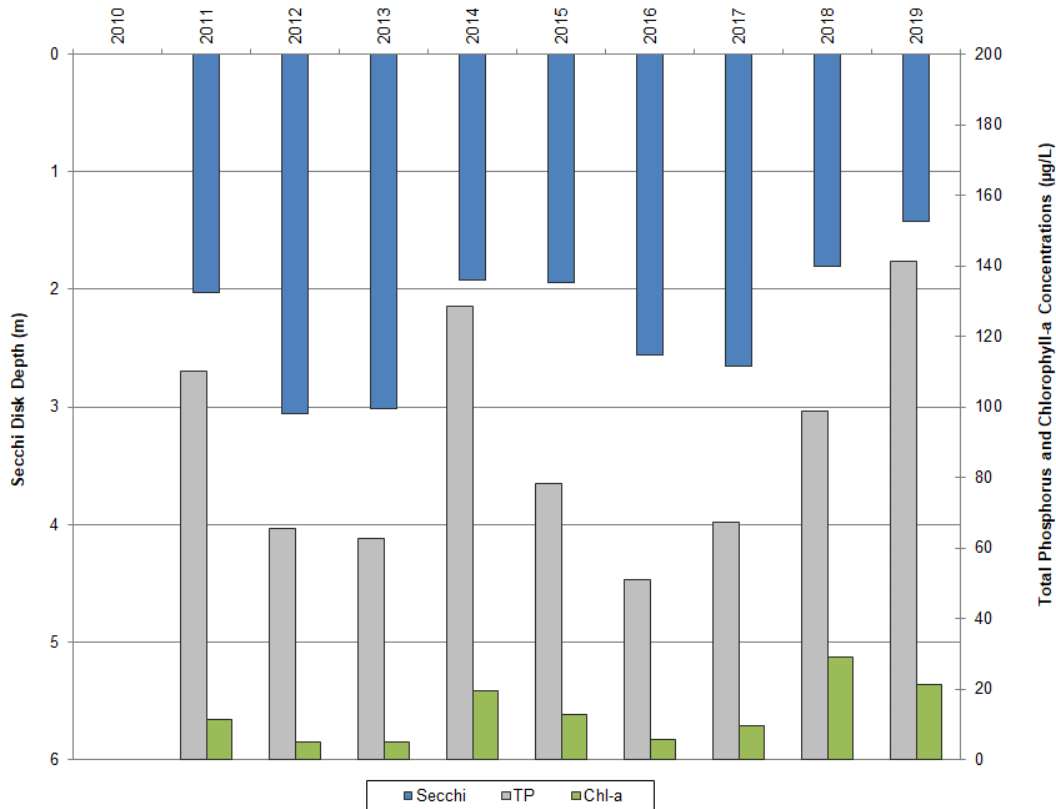


Figure A-24 Little Crosby Lake Summer Average Water Quality (2011-2019)

Table A-10 Crosby Lake and Little Crosby Lake Water Quality Data (2010-2019)

Period	Total Phosphorus (µg/L)	Chlorophyll a (µg/L)	Secchi Depth (m)
Crosby Lake (2010-2019) (May-Sept)	126	17.9	1.5
Little Crosby Lake (2011-2019) (May-Sept)	89	13.3	2.3
MPCA Shallow Lake Standard	≤60	≤20	≥1.0

Crosby Lake Macrophytes

The District has performed point intercept aquatic vegetation surveys in Crosby Lake during the ice-off period from 2014-2019. In 2018, 16 species of submerged and floating leaf species were observed within Crosby Lake. Aquatic plant density in Crosby Lake is high (Figure A-25). In general, in 2018, submerged aquatic vegetation has been dominated by white water lily, star duckweed, coontail and greater and lesser duckweed. Curly-leaf pondweed (CLP) has also been present in Crosby Lake. CLP is of concern because its

mid-summer dieback releases phosphorus into the water column at a time when algae are able to take it up.

Prior to 2014, submerged aquatic vegetation data was compiled from MDNR fish surveys and Ramsey County monitoring data to develop a general history of vegetative conditions in Crosby Lake. MDNR surveys were conducted as far back as 1968 and then in 1978, 1988, and 1999. Two plant surveys of Little Crosby Lake was performed in 2009. Plant indices of biological integrity of 16 and 20 were calculated from the 2009 surveys and fall into the "poor" category (<23). The poor plant IBI scores are due to a limited number of species presence and the relative dominance of a single species (coontail) (CRWD, 2016).

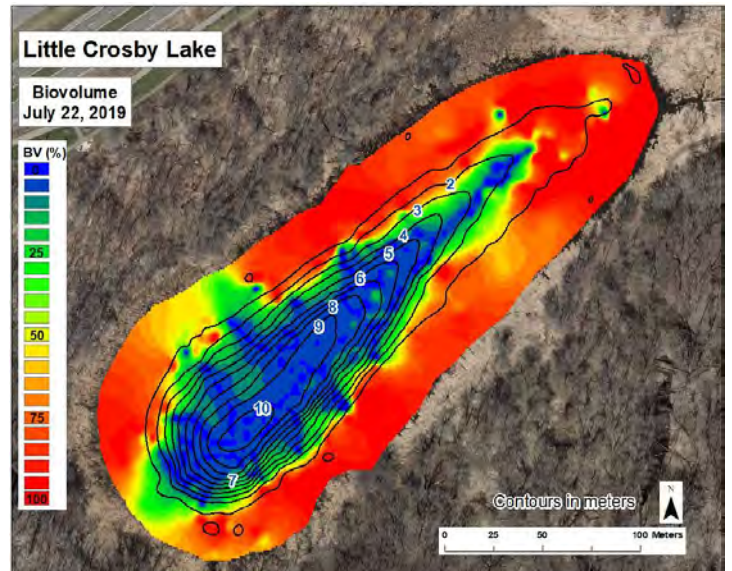
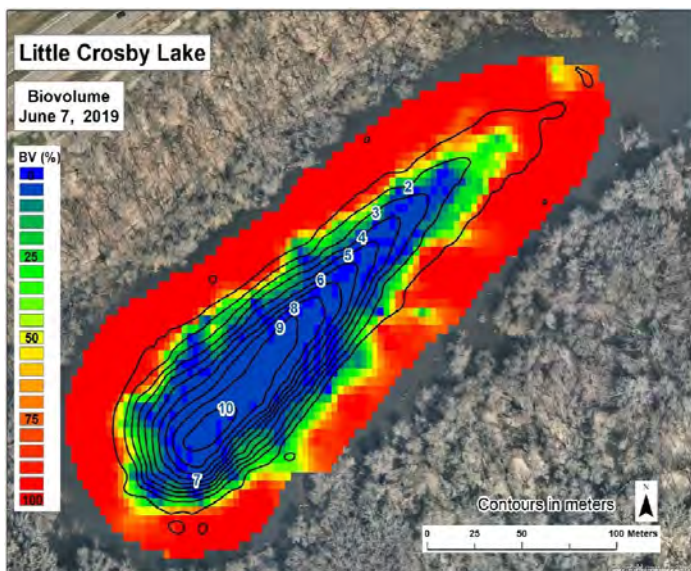
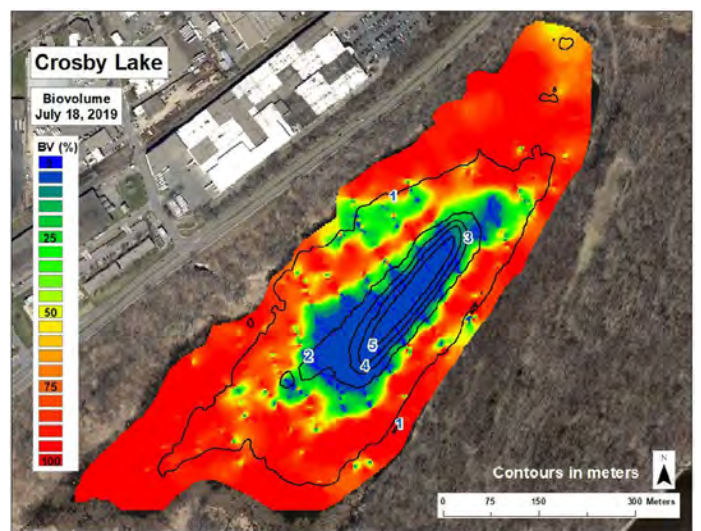
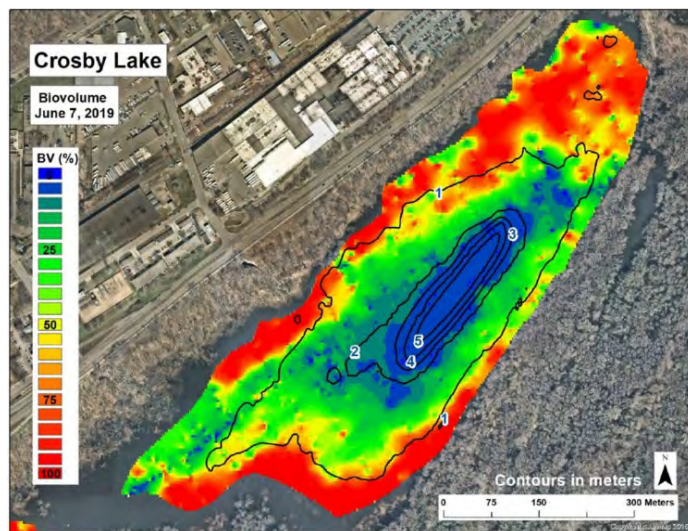


Figure A-25 Crosby Lake Aquatic Plant Biovolume (% occurrence)

Crosby Lake Fisheries

Fisheries surveys have been periodically conducted in Crosby Lake by the MDNR since 1968 and last performed by CRWD and Wenck in 2015. Prior to 1983, the Crosby Lake fish community was dominated by rough fish – bottom foragers such as common carp, yellow and black bullhead, and buffalo. Rough fish tend to have a destructive feeding pattern, rooting through sediment and submerged vegetation to find food. Top predators included northern pike of substantial size and numbers.

Since the 1983 survey, the rough fish community has diminished in size and abundance. Crosby Lake now demonstrates a much more balanced fishery with a healthy panfish population including bluegills, pumpkinseed sunfish. Panfish tend to eat zooplankton early in their life cycle and then macroinvertebrates later in their life cycle. Small numbers of rough fish remain present. Northern pike and bowfin remain the top predator species, although their abundance and size during the 2014 survey was lower than average for lakes similar to Crosby Lake. The bullhead population in Crosby Lake changes from year to year (as seen in differences between the 2014 and 2015 surveys) and may be a function of seasonal flooding.

A.9.2.4 Loeb Lake

Loeb Lake is a small, land-locked lake located in the north-central portion of Saint Paul, within the Trout Brook watershed (Figure A-16). The lake is located within Marydale Park, which includes a walking path around the lake. Loeb Lake has a surface area of 9.7 acres, an average depth of 9 feet, and a maximum depth of 28 feet. The MPCA classifies Loeb Lake as a shallow lake for water quality purposes because the lake's littoral area (the area less than 15 feet deep) of 81 percent exceeds the MPCA's criterion of 80 percent.

The watershed tributary to Loeb Lake is approximately 44 acres and is fully developed. Marydale Park occupies a significant portion (16 acres) of the watershed. Other land uses primarily include residential and industrial land uses, with a small amount of commercial land use. Although located in the Trout Brook watershed, Loeb Lake is landlocked and does not have a surface outlet. Water loss from the lake occurs via evaporation and groundwater outflow.

The District completed a Loeb Lake and Willow Reserve Management Plan in February 2009 (CRWD, 2009). The management plan includes more detailed information about the Loeb Lake watershed and water budget. Relevant management activities from that plan, as updated, have been included in the implementation activities of this Plan (see Section 3.0).

Loeb Lake Water Quality

Regular water quality monitoring data has been collected from Loeb Lake since 2004 (CRWD, 2009). Dissolved oxygen (DO) and temperature profiles suggest the lake becomes stratified during the summer with anoxic conditions (DO <2 mg/L) below a depth of approximately 4 meters. Although anoxic conditions can accelerate phosphorus release from lake sediment, water quality modeling of Loeb Lake suggests that internal loading of phosphorus from lake sediment is a small contributor of phosphorus relative to runoff from the watershed, which is also minimal (CRWD, 2009).

Water quality in Loeb Lake is good. Summer average total phosphorus concentrations in Loeb Lake are stable and remain well below the 60 µg/L MPCA water quality standard (Table A-11 and Figure A-26). Similarly, summer average Secchi Depth and chlorophyll-*a* data demonstrate good water quality and are well within applicable state standards (Table A-11 and Figure A-26). The high ratio of lake area to watershed area and percentage of the watershed occupied by park and natural area (approximately 40 percent) contribute to the good observed water quality in Loeb Lake.

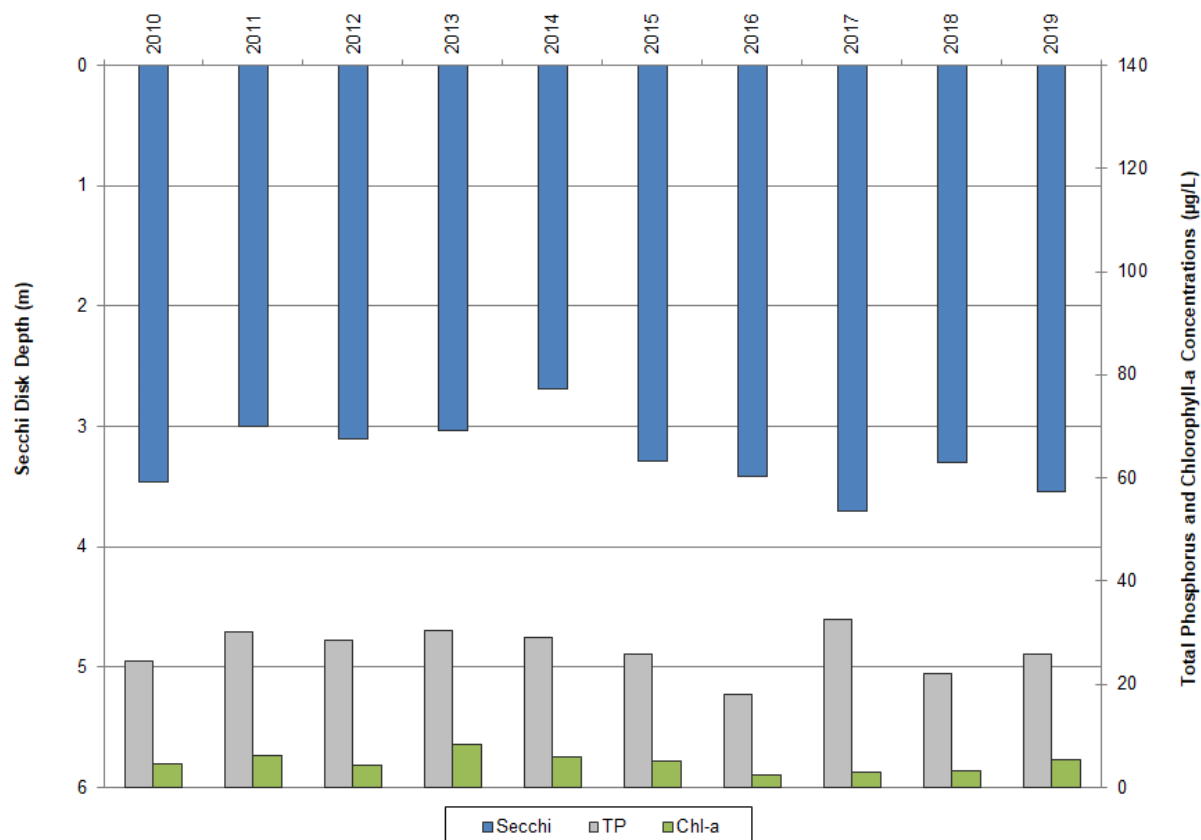


Figure A-26 Loeb Lake Summer Average Water Quality (2010-2019)

Table A-11 Loeb Lake Water Quality Data (2010-2019)

Period	Total Phosphorus (µg/L)	Chlorophyll a (µg/L)	Secchi Depth (m)
Loeb Lake (2010-2019) (May-Sept)	27	4.8	3.3
MPCA Shallow Lake Standard	≤60	≤20	≥1.0

Loeb Lake Macrophytes

The District has performed point intercept aquatic vegetation surveys in Loeb Lake during the ice-off period from 2014-2019. In 2019, 13 species of submerged and floating leaf species were observed within Loeb Lake. Aquatic plant density in Loeb Lake is high (see Figure A-27). In general, in 2019, submerged aquatic vegetation was dominated by coontail, slender leaf naiad, filamentous green algae, star duckweed, flatstem pondweed and greater duckweed.

Curly-leaf pondweed (CLP) is also present in Loeb Lake. CLP is of concern because its mid-summer dieback releases phosphorus into the water column at a time when algae are able to take it up. Eurasian watermilfoil, another invasive species, was identified by the MDNR in 2003 and 2005, as well as by CRWD and Ramsey Conservation District in the 2019 survey.

Prior to 2014, submerged aquatic vegetation data was compiled from MDNR fish surveys (1981 and 2000) and Ramsey County (2005) monitoring data to develop a general history of vegetative conditions in Loeb Lake.

The following trends- were observed between 1981 and 2005:

- Between 1981 and 2000, there was a decline in the number of desirable native submerged species (sago pondweed, narrowleaf pondweed, and flatstem pondweed). Species such as sago pondweed are known to be important components of fish and waterfowl habitats.
- The abundance of narrowleaf pondweed declined significantly between 1981 and 2000, and was observed with a less than 5 percent relative abundance rating in 2005.
- Coontail was present in 1981, 2000, and 2005 in declining abundance. This species is known to be the last native to survive in vulnerable ecosystems.

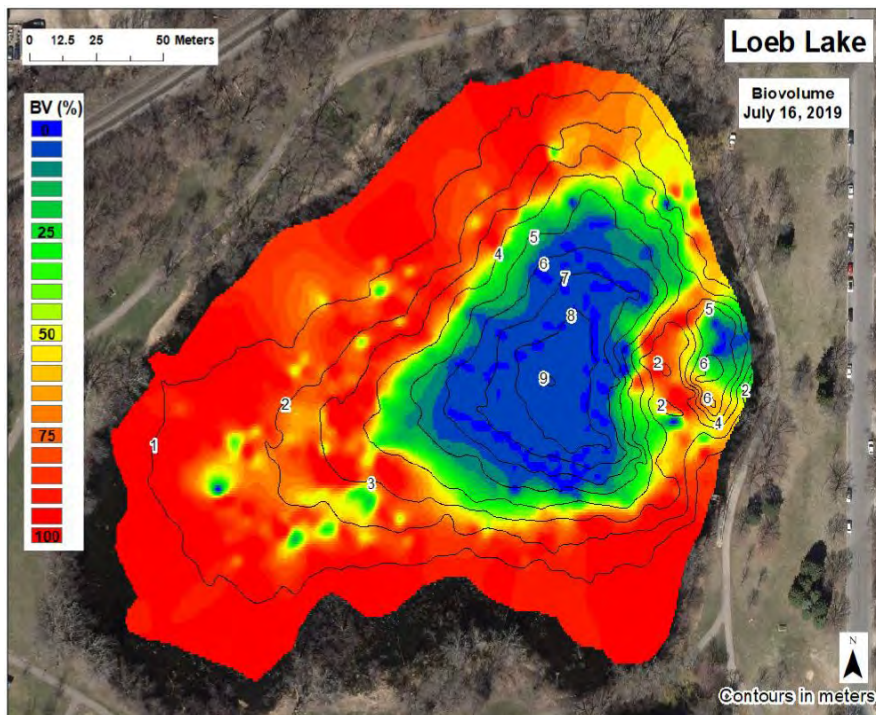
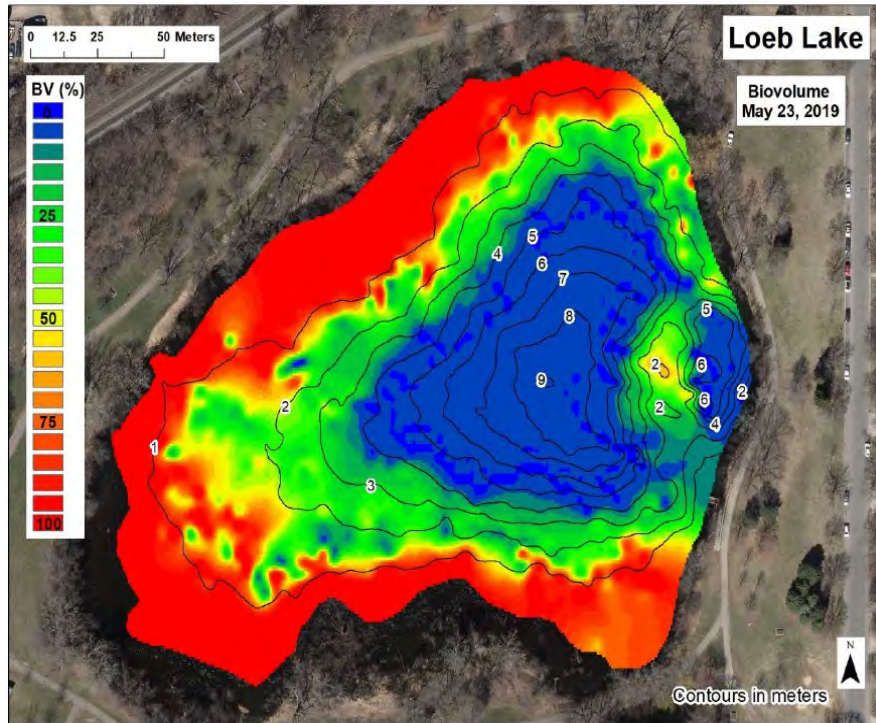


Figure A-27 Loeb Lake Aquatic Plant Biovolume (% occurrence)

Loeb Lake Fisheries

Fisheries surveys have been periodically conducted in Loeb Lake by the MDNR since 1974 and last performed in 2014. Panfish and rough fish groups comprise the majority of the catch during most surveys; black bullhead and bluegill have been the most numerous species collected. Predator species in Loeb Lake observed in 2014 include walleye and largemouth bass.

MDNR records indicate that Loeb Lake has periodically experienced winter kills due to low oxygen levels in the lake (as recently as the winter of 2006/2007). An aeration system installed in 2000 operates after ice formation to minimize winter kill of fish. Dissolved oxygen concentrations are also a concern in the summer. Dissolved oxygen profiles indicate that may limit fish to areas of the lake that are 7 feet deep and less due to lake stratification and anoxia below the thermocline.

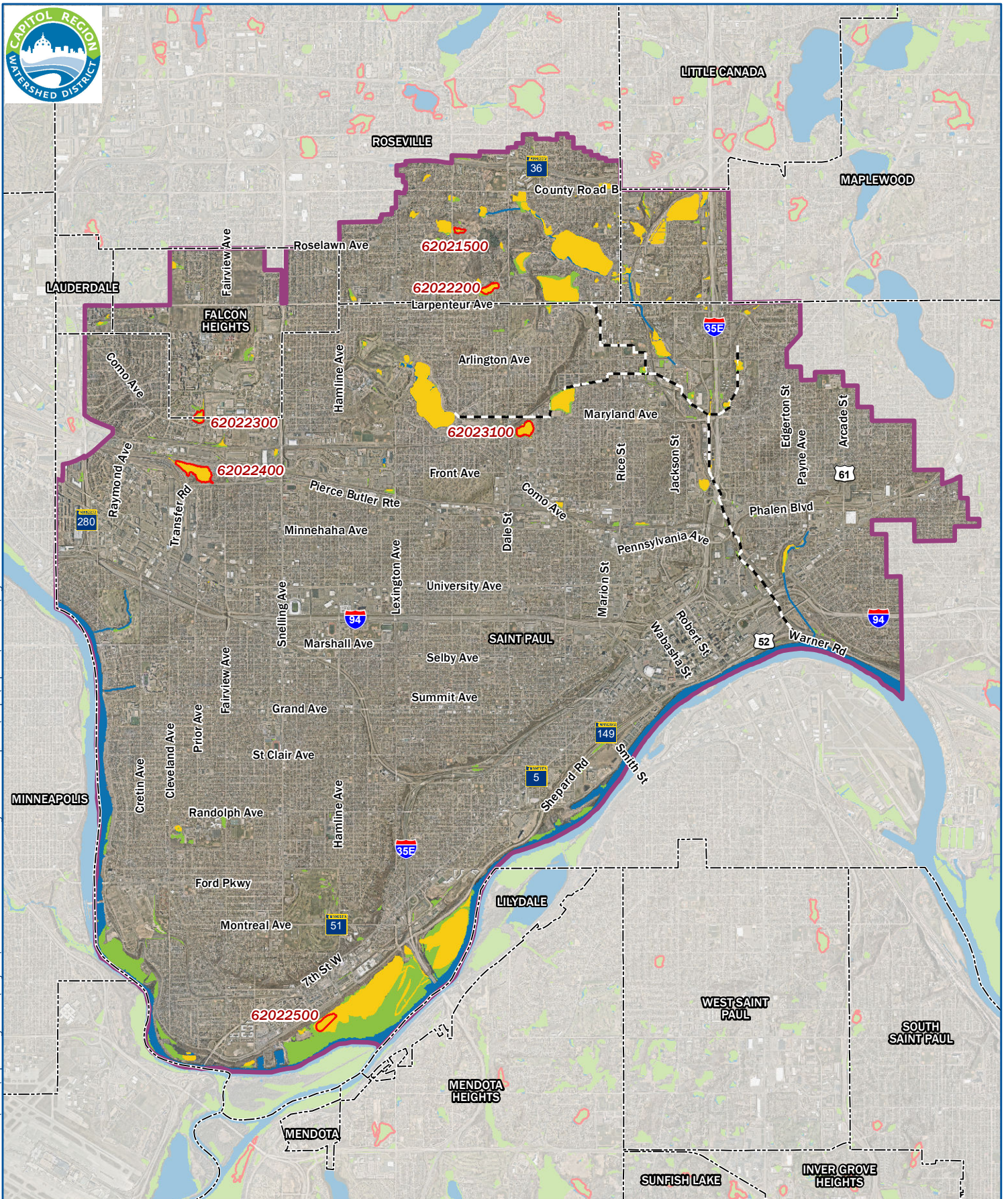
Loeb Lake is part of the MDNR's Fishing in the Neighborhood (FiN) program. The MDNR has stocked Loeb Lake at various times since 1974 with adult bluegill, walleye, channel catfish, black crappie, northern pike, and largemouth bass. Until 2016, Loeb Lake was stocked annually, usually with bluegill and walleye. Shore-fishing access is good along the east shore where there is a fishing pier and a quick drop-off. The rest of the lake is difficult for angling due to shoreline vegetation and shallow water near shore.

A.9.3 Wetlands

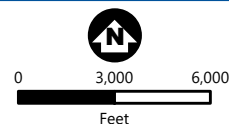
Wetland areas are important community and ecological assets. Wetlands provide significant wildlife habitat and refuge, while also supplying aesthetic, recreational, and water quality treatment benefits. Many of the historical wetland areas within the District (see Section A.9.1.2 and Figure A-17) were drained or filled for development prior to the establishment of wetland regulations. The largest remaining wetland tracts include: Woodview Marsh located near Larpenteur Avenue in Roseville, the Villa Park wetland located northwest of Lake McCarrons in Roseville, and Willow Reserve located near Maryland Avenue in Saint Paul.

To protect these valuable resources, the District continues to manage wetlands to achieve no net loss of acreage, functions, and value. The District serves as the Local Government Unit (LGU) responsible for administration of the Wetland Conservation Act (WCA) for projects within the District's boundaries in the Cities of Lauderdale, Falcon Heights, Maplewood, and Roseville (except for on Minnesota Department of Transportation projects).

The District seeks opportunities to restore and enhance existing and historic wetland resources (see Section 2.5 of the Plan). Potential wetland restoration opportunities are documented in the District's Wetland Management Strategy (see Appendix F), as amended. The District also implements a wetland monitoring program described in Section A.10.2.



- Municipal Boundary
- Watershed Boundary
- Streams
- Trout Brook Interceptor
- Capital Region WD Wetland Boundary
- Public Water Inventory Wetland
- National Wetland Inventory
- Lakes and Rivers



Data Sources: CRWD, MN DNR, MnDOT, USGS

DISTRICT WETLANDS
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-28

A.9.3.1 Wetland Conservation Act (WCA)

The purpose of the WCA (Minnesota Rules 8420) is to maintain and protect Minnesota's wetlands and the benefits they provide. To retain the benefits of wetlands and reach the legislation's goal of no-net-loss of wetlands, WCA requires anyone proposing to drain, fill, or excavate a wetland to first try to avoid disturbing the wetland; second, to try to minimize any impact on the wetland; and, finally, to replace any lost wetland acres, functions, and values. Certain wetland activities are exempt from the act, allowing projects with minimal impact or projects located on land where certain pre-established land uses are present to proceed without regulation.

The WCA rules require that drained and filled wetlands be replaced at replacement ratios of between 1:1 and 2.5:1 (depending upon the location of impact, location of replacement, and timing of replacement). LGUs (i.e., the District in all Cities except Saint Paul) may have more restrictive wetland regulations. The Minnesota Legislature has amended the WCA several times since its inception. More information about WCA guidance is provided at the BWSR website: <https://bwsr.state.mn.us/wetlands-regulation-minnesota>

As part of administering the WCA rules, the District is responsible for making determinations on the accuracy of wetland delineations, wetland functions and values assessments, and wetland replacement plans, often with review and input by a Technical Evaluation Panel (TEP). For all projects proposing to impact more than 10,000 square feet of wetland, the District must send a copy of the application to the TEP, MDNR, and any persons who have requested notification. The parties notified are invited to submit comments during a review period that must be at least 15 days long (per Minnesota Statute 103G).

A.9.3.2 Wetland Inventory and Assessment

It is important to understand the extent, function, and value of existing wetlands to provide a basis for wetland protection, management, and restoration efforts. 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.

Locally, the District has inventoried wetlands within its jurisdiction and continues to implement a wetland monitoring program (see Section A.10.2). In general, baseline wetland index of biological integrity (IBI) data and water quality data showed that wetlands within the District are highly impacted with lower species diversity and robustness. These impacts are likely due to watershed stressors introduced by intense urbanization, including the effects of surrounding land uses, stormwater inputs, and the lack of habitat connectivity (CRWD, 2016). Wetlands located within the District are presented in Figure A-28.

Results from wetland monitoring performed from 2007-2014 generally indicate that the District contains wetlands of "poor" to "moderate" quality based on the biological health of the macroinvertebrate and plant communities (CRWD, 2016). None of the wetlands surveyed in the District scored in the excellent category for either IBI assessment. Arlington-Jackson wetland and Woodview Marsh were the only two wetlands that scored in the "moderate" condition category for both plant and macroinvertebrate IBIs for their historical average scores, thus exhibiting the most stable condition and highest quality of all monitored District wetlands (CRWD, 2016).

A.9.4 Stormwater System

The District is completely developed and highly urbanized (see Section A.4). Pre-settlement drainage patterns and historic water resources have been significantly altered as part of land development (see Section A.9.2). Over time, Cities and land developers have constructed an extensive network of stormwater management infrastructure to collect stormwater and convey it downstream. The stormwater system includes pipes, ponds, lakes, wetlands, ditches, streams, swales, and other drainageways. Ultimately, all stormwater in the District is routed to the Mississippi River through a total of 55 outlets (owned by the City of Saint Paul).

Various units of government and private entities have jurisdiction over different parts of the stormwater system within the District. 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--35E and I-94), U.S. highways (i.e., Highway 10, and Highway 61), and state highways (i.e., Highway 5, Highway 36, and Highway 120). Ramsey County is 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 and maintenance responsibility over their own stormwater management systems. These systems include lateral (also called primary) stormwater systems (i.e., street gutters, pipes, and ditches) and outflow (also called main, trunk, or secondary) conveyors, which collect flows from city lateral systems and move the water downstream. Cities generally design lateral stormwater systems with capacity to convey runoff from 5- or 10-year frequency storms without significant flooding and protecting public health and safety for storms up to the 100-year frequency interval (these design levels are sometimes referred to as "level of service" and "level of protection"). City stormwater management systems are described in greater detail in each City's local water management plan. Owners of private stormwater systems are responsible for maintaining their facilities.

The District operates and is responsible for maintaining the Trout Brook Interceptor (TBI). The TBI was constructed as a combined sanitary sewer and stormwater system from the late 1800's to early 1900's. The combined sewer system was separated in 1988. The system includes tunnels ranging in size from six to thirteen feet in diameter (or height). The tunnel sections typically consist of reinforced concrete but include portions of brick and limestone block. The TBI drains the Trout Brook watershed (see Figure A-16) and includes three primary branches:

- TBI Mainline (approximately 23,200 feet)
- West TBI Extension (approximately 5,100 feet)
- East TBI Extension (approximately 3,000 feet)

The TBI was owned by the Metropolitan Council until 2006 when ownership was transferred to the District. The District owns the majority of the TBI and is responsible for operation, inspection, maintenance, and repair of the TBI. The City of Saint Paul owns and operates the furthestmost downstream approximately one-half mile of the TBI.

As the owner and operator of the TBI, the District is required to maintain a National Pollutant Discharge Elimination System (NPDES) municipal separate storm sewer system (MS4) permit. The District's MS4 permit includes specific requirements related to the maintenance of District-owned stormwater infrastructure.

The District monitors select stormwater infrastructure, including best management practices (BMPs) constructed by the District. Stormwater monitoring is described in in Section A.9.7.

A.9.5 Mississippi River

Stormwater runoff within the District ultimately discharges to the Mississippi River. Approximately 13 miles of the Mississippi River form the west and south boundary of the District (see Figure A-18). The confluence of the Minnesota River and Mississippi River occurs near the far south end of the District. The drainage area tributary to the Mississippi River downtown of the confluence with the Minnesota River is approximately 37,000 square miles; the District makes up approximately one one-thousandth (0.1%) of the Mississippi River drainage area at this location.

The United States Geological Survey (USGS) collects continuous streamflow data on the Mississippi River in Saint Paul dating back to 1892. Average annual flow at this location is approximately 12,500 cubic feet per second (cfs). Peak flows often occur in late spring and early summer and can exceed 100,000 cfs and raise the river level by over 20 feet (most recently reaching 116,000 cfs and 20.1 feet gage height on April 1, 2019).

Gage data is available from the USGS at: https://waterdata.usgs.gov/nwis/inventory/?site_no=05331000

The Mississippi River has been managed for navigation since 1930 and contains a series of locks and dams and an uninterrupted navigation channel. The Upper Mississippi River has a maintained navigation channel depth of at least 9 feet. The Saint Paul District of the United States Army Corps of Engineers (USACE) operates and maintains 12 locks and dams beginning at Lower St. Anthony Falls in downtown Minneapolis and ending at lock and dam 10 in Guttenberg, Iowa. Lock and dam 1, also known as the Ford Dam located adjacent to Ford Parkway, is the only lock and dam present within the District.

The Mississippi River corridor within the District is part of the Mississippi River Corridor Critical Area (MRCCA), a designation given under the Critical Areas Act of 1973 (Minnesota Statutes 116G). The designation was intended to allow management of the corridor as a multi-purpose resource while preserving and enhancing the area's natural, aesthetic, cultural, and historic value for public use, and protecting the corridor's environmentally sensitive areas. Land development within the MRCCA is subject to requirements of Minnesota Rules 6106, which are implemented through local plans and ordinances.

Additional information is available from the MDNR at:

https://www.dnr.state.mn.us/waters/watermgmt_section/critical_area/faqs.html

A.9.6 Impaired Waters

The federal Clean Water Act (CWA) requires states to adopt water quality standards to protect the nation's waters. Water quality standards designate beneficial uses for each waterbody and establish criteria that must be met to support its designated use(s). The criteria differ depending on the waterbody's classification as a wetland,

shallow lake, or deep lake. Section 303(d) of the CWA requires each state to identify and establish priority rankings for impaired waters that do not meet the water quality standards. The list of impaired waters, sometimes called the 303(d) list, is maintained by the MPCA and updated every 2 years.

For impaired waterbodies, the CWA requires an assessment that addresses the causes and sources of the impairment. This process is known as a total maximum daily load (TMDL) analysis. A TMDL is a threshold calculation of the amount of a pollutant that a waterbody can receive and still meet water quality standards. A TMDL establishes the pollutant loading capacity for a waterbody and develops an allocation scheme amongst the various contributors, which include point sources, nonpoint sources and natural background, as well as a margin of safety. As a part of the allocation scheme, a waste load allocation (WLA) is developed to determine allowable pollutant loadings from individual point sources (including loads from storm sewer networks in MS4 communities), and a load allocation (LA) establishes allowable pollutant loadings from nonpoint sources and natural background levels in a waterbody.

Within the District, Como Lake, Lake McCarrons, and the Mississippi River are listed on the 2018 MPCA impaired waters 303(d) list for a variety of impairments. Crosby Lake is also identified as high risk for chloride impairment. Table A-12 summarizes these impairments and the status of applicable TMDLs. Completed TMDLs and associated implementation plans may contain actionable steps for the District. The District and its partners have completed some actions recommended in the Como Lake TMDL (CRWD, 2010), while others are incorporated into the more recent Como Lake Management Plan (CRWD, 2019) and this Plan. The District will continue to review completed TMDLs and TMDL implementation plans and incorporate recommended actions into the District's implementation plan, where appropriate.

Current impaired waters listings are available from the MPCA website:

<https://www.pca.state.mn.us/water/minnesotas-impaired-waters-list>

Applicable water quality standards for CRWD lakes are presented in Table A-13. Water quality standards vary according to lake depth and location (the District is located in the North Central Hardwood Forest, or NCHF, ecoregion).

Table A-12 Impaired Waters within CRWD

Waterbody	Impaired Use	Pollutant or Stressor	Year Listed	TMDL Study Target Completion	TMDL Study Approved
Como Lake	Aquatic Consumption	Mercury in fish tissue	2008	--	2008 ¹
	Aquatic Life	Chloride	2014	--	2016 ²
	Aquatic Recreation	Nutrients/ Eutrophication	2002	--	2010 ³
Lake McCarrons	Aquatic Life	Mercury in fish tissue	2006	--	2010 ¹
Mississippi River	Aquatic Consumption	Mercury in fish tissue	1998	--	2007 ¹
		Mercury in water	1998	--	2007 ¹
		PCB in fish tissue	1998	2020	--
		PFOS in fish tissue	2008	2025	--
		PFOS in water	2014	2025	--
	Aquatic Life	Total suspended solids	2014	--	2015 ⁴
	Aquatic Life Aquatic Recreation	Nutrients/ Eutrophication	2016	2018	--
		Fecal coliform	1994	2022	2016 ⁵

Source: 2020 (draft) MPCA Impaired Waters 303(d) List.

PFOS = Perfluorooctane Sulfonate; PCB = Polychlorinated Biphenyl

- (1) Addressed by the *Minnesota Statewide Mercury Total Maximum Daily Load* (MPCA, 2007, as revised)
- (2) Addressed by the *Twin Cities Metro Area Chloride Total Maximum Daily Load* (MPCA, 2016)
- (3) Addressed by the *Como Lake TMDL* (CRWD, 2010)
- (4) Addressed by the *South Metro Mississippi River Total Suspended Solids Total Maximum Daily Load* (MPCA, 2015, as revised)
- (5) Addressed by the *Upper Mississippi River Bacteria Total Maximum Daily Load* (MPCA, 2016)

Table A-13 Water Quality Standards Applicable to District Lakes

MPCA Lake Classification	Select Water Quality Standards ¹			
	Total Phosphorus (µg/L)	Chlorophyll-a (µg/L)	Secchi Disk Depth (m)	Chloride (mg/l) ²
Shallow Lake (Como, Crosby, Loeb, Little Crosby)	< 60	< 20	> 1.0	230
Deep Lake (McCarrons)	< 40	< 14	> 1.4	230

Source: [Minnesota Rules 7050](#) for NCHF eco-region; note that water quality standards for additional parameters are also applicable to District water resources

- (1) Standards for total phosphorus, chlorophyll-a, and Secchi Disk Depth are summer average (June – September)
- (2) The 230 mg/L chloride standard is the chronic standard, where two or more exceedances within a three year period are considered an impairment (as opposed to the acute standard which deems one exceedance over 860 an impairment).

A.9.7 Floodplains

Floodplains are lowland areas adjacent to lakes, wetlands, and rivers that are susceptible to inundation of water during a flood. For regulatory purposes, the term “floodplain” refers to the area inundated during a flood or storm event with a 1 percent chance of occurring in any year (i.e., a 100-year event).

The Federal Emergency Management Agency (FEMA) performs flood insurance studies (FIS) and develops Flood Insurance Rate Maps (FIRMs) to identify areas prone to flooding during 100-year storm events. The water level corresponding to the 100-year flood event is referred to as the Base Flood Elevation (or BFE) and is the basis for the mapped floodplain extent. Figure A-29 presents floodplains delineated by FEMA; within the District, FEMA-delineated floodplains are limited to those areas adjacent to the Mississippi River, Lake McCarrons, and wetlands in Maplewood.

Each of the cities within the District 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. NFIP is implemented independently of the District and are described herein for informational purposes. FEMA-established floodplains and 100-year flood levels are available from FEMA at: <https://msc.fema.gov/portal/home>

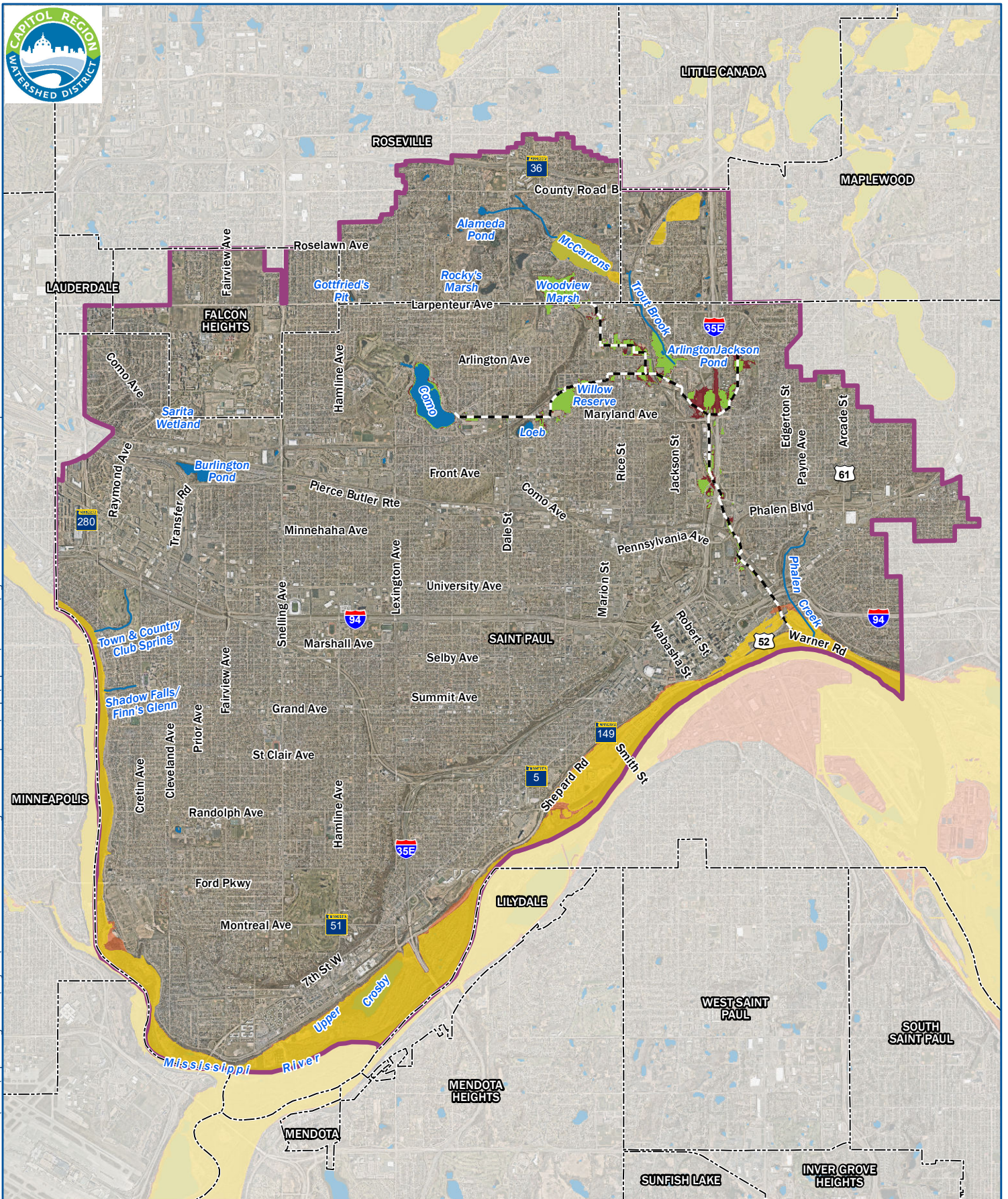
The District has also mapped the 100-and 500-year floodplains adjacent to the Trout Brook Storm Sewer Interceptor (TBI) (see Section A.10.4). The District will use this information to identify and prioritize improvements to the TBI system and to inform its permit program.

The Cities within the District have prepared local water management plans containing more detailed information regarding localized flooding issues. Some of the more significant local flooding issues are identified for potential future action in the District’s implementation plan (see Section 3.0). The District’s permit program includes a flood control rule (Rule D) and requires a District permit for activities located within the 100-year floodplain. The

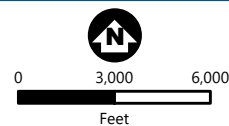
rule is intended to limit adverse impacts to floodplains and minimize flood risk. The rule includes criteria for minimum building elevations relative to the 100-year flood levels and compensatory storage for filling of the floodplain. In areas where FEMA-mapped floodplains and District-delineated floodplains differ, the most restrictive elevations and/or floodplain extent shall govern.



Barr Footer: ArcGIS 10.7.1, 2019-1A-08 13:56 File: I:\Client\CapitolRegionWD\Projects\23621304 Watershed Management Plan Update\Maps\Reports\2020 Plan\Figure A-19 - FEMA and District Floodplans.mxd User: EMA



- | | |
|-------------------------|---------------------------------------|
| Municipal Boundary | FEMA Flood Zone |
| Watershed Boundary | 100-Year Flood Zone |
| Lakes and Rivers | 500-Year Flood Zone |
| Streams | District-Delineated Floodplain |
| Trout Brook Interceptor | 100-Year Inundation Area |
| | 500-Year Inundation Area |



Data Sources: CRWD,
MN DNR, MnDOT,
USGS, FEMA

**FEMA & DISTRICT
FLOODPLAINS**
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-29

A.10 Surface Water Monitoring

The District monitors the water quality of lakes, wetlands, and stormwater throughout the District. The District's monitoring program collects data for various purposes, including to:

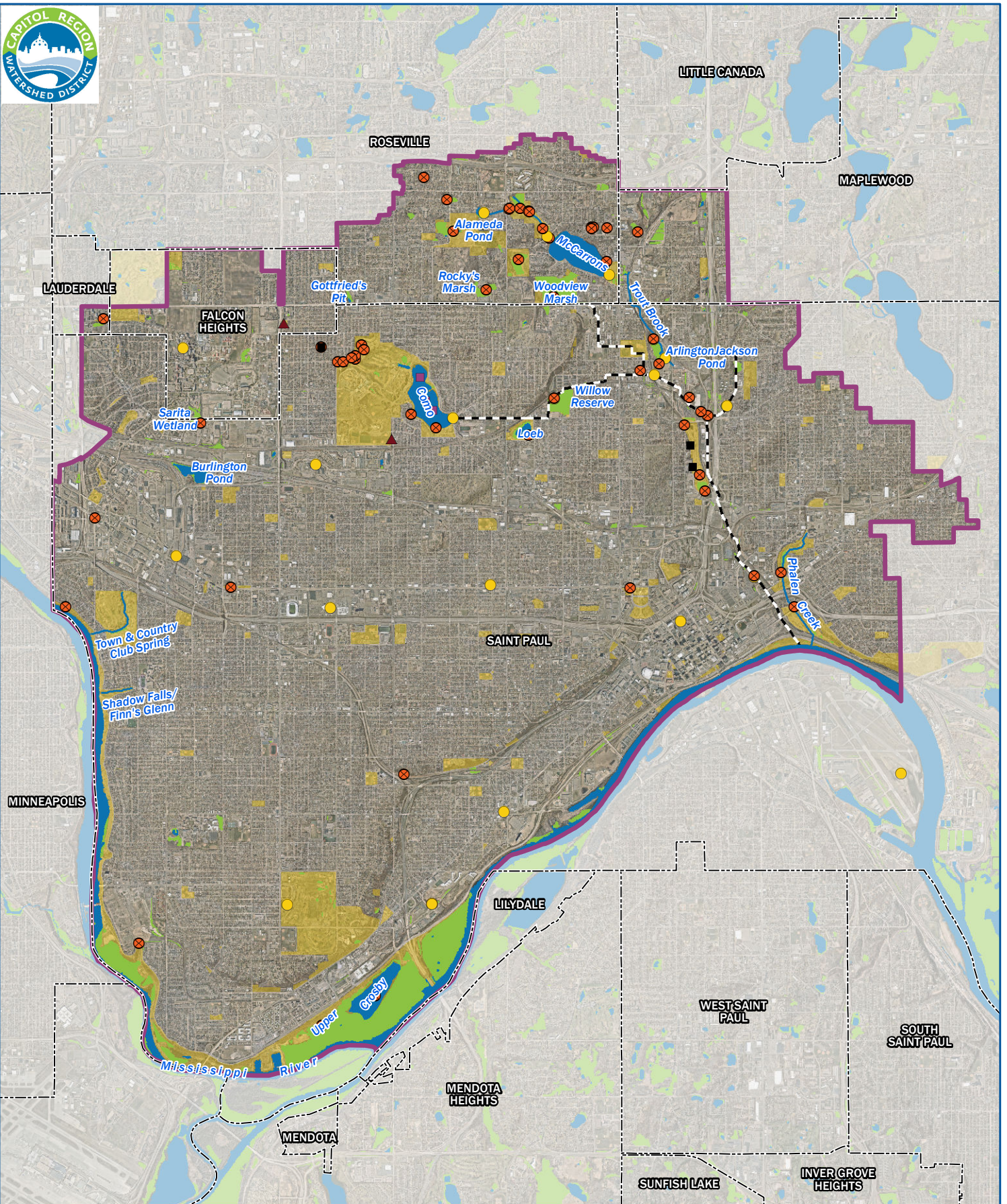
- establish baseline conditions
- identify water quality problem areas
- quantify runoff pollutant loadings
- evaluate water quality trends
- evaluate the effectiveness of BMPs
- provide data for the calibration of hydrologic, hydraulic, and water quality models
- promote informed, science-based decisions

District monitoring locations are presented in Figure A-30. The District's monitoring program focuses primarily on stormwater due to the highly urbanized setting as well as the presence of other monitoring programs focusing on natural resources (e.g., lakes).

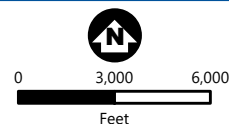
In addition to District monitoring activities, several other entities monitor water quantity and water quality of the Mississippi River including the USGS, Metropolitan Council, MPCA, and the Mississippi Watershed Management Organization (MWMO). Data collected for the Mississippi River in the Twin Cities Metro Area has been summarized by the MPCA and is available at: <https://www.pca.state.mn.us/water/watersheds/mississippi-river-twin-cities>



Barr Footer: ArcGIS 10.7.1, 2019-1A-08 13:57 File: I:\Client\CapitolRegion\WD Projects\23621304 Watershed Management Plan Update\Maps\Reports\2020 Plan\Figure A-20 - District Monitoring Locations.mxd User: EMA



- | | | |
|-------------------------|---------------------|--------------------------|
| Municipal Boundary | Wetlands | Lake Monitoring |
| Watershed Boundary | Parks | Precipitation Gauges |
| Lakes and Rivers | Monitoring Location | Water Quality Monitoring |
| Streams | BMP | |
| Trout Brook Interceptor | Groundwater | |



Data Sources: CRWD,
MN DNR, USGS

**DISTRICT MONITORING
LOCATIONS**
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-30

A.10.1 Lake Monitoring

The District and its partners routinely monitor five lakes, including:

- Como Lake
- Crosby Lake
- Little Crosby Lake
- Loeb Lake
- Lake McCarrons

Monitoring is performed by the Ramsey County Public Works (RCPW), Ramsey County Parks, MDNR, and/or District staff. Lake monitoring includes:

- Water levels
- Water chemistry and physical parameters
- Phytoplankton and zooplankton
- Aquatic vegetation
- Fish surveys

Monitoring methods are summarized in the following section. Detailed information about the District's lake monitoring methods and monitoring results are available in the 2016 CRWD Lakes Monitoring Report (CRWD, 2017) and subsequent monitoring reports published during the life of this Plan.

Lake Levels

Historical lake level data is available for Como Lake, Loeb Lake, and Lake McCarrons from the MDNR's Lakefinder website at: <https://www.dnr.state.mn.us/lakefind/index.html>

MDNR lake level data is typically recorded twice per month based on manual readings of staff gauges. The District has installed level loggers on Como Lake, Loeb Lake, Lake McCarrons, and Crosby Lake (lake levels in Little Crosby Lake are similar to Crosby Lake due to hydrologic connection). The District level loggers record continuous water level data from early spring (typically April) to late fall (November).

Chemistry and Physical Data

The RCPW generally collects between eight and ten water quality grab samples between April and October. Grab samples are generally collected at the deepest part of the lake. The physical and chemical parameters of depth, temperature, dissolved oxygen, conductivity, and pH are measured at 1-meter sampling intervals for the full depth profile of the lake using a multi-probe. Water transparency, or water clarity, is determined with the use of a Secchi disk. Water chemistry samples are collected from the epilimnion (the mixed layer near the surface) and at multiple depths along the profile of the lake. Water samples are analyzed for:

- Turbidity
- Chlorophyll-a
- Total phosphorus (TP)
- Soluble reactive phosphorous (SRP) or ortho-phosphorus (ortho-P)
- Total Kjeldahl nitrogen (TKN)

- Nitrate (NO₃)
- Ammonia (NH₃)
- Chloride (Cl)

Lake chemistry monitoring results are compared to applicable water quality standards presented in Table A-13.

Phytoplankton and Zooplankton Data

Phytoplankton and zooplankton data are collected concurrently with water chemistry sampling by RCPW. For phytoplankton analysis, a composite sample is collected using a plastic tube inserted vertically 2 m into the upper layer of the water column. This sample is thoroughly mixed and a sub-sample collected and preserved for laboratory analysis. To collect a zooplankton sample, a net tow is lowered to the observed thermocline to collect samples from the oxygenated layer of the lake. The net tow is allowed to settle and then pulled up to the water surface at a rate of 1 m/sec. The net and capture bucket are drained down to a volume of 100 mL and preserved for laboratory analysis also conducted by RCPW.

Aquatic Vegetation Surveys

Ramsey Conservation District (RCD) performs point-intercept aquatic vegetation surveys of District lakes three times per year (spring, summer, and fall). This method consists of using GPS to pre-select specific, evenly spaced monitoring points throughout the full area of the lake. At each point, plant species are identified and given an abundance ranking (CRWD, 2016). RCD also performs biovolume surveys to collect submerged aquatic vegetation data. The biovolume survey uses a GPS-enabled depth finder to assess evenly spaced transects; the collected data is analyzed by CI BioBase software to determine the depth of the lake and the extent of aquatic vegetation along each transect.

Fish Stocking and Surveys

The MDNR performs fish stocking to improve fishing conditions on selected Minnesota lakes, including Como Lake (stocked annually), Loeb Lake (last completed in 2016), and Lake McCarrons (last completed in 2009). Fish are stocked at different life stages depending on the desired effect in the lake. The MDNR performs fish surveys approximately every 5-10 years; the MDNR last performed standard fish surveys on District lakes in 2014. The District also contracts with consultants to perform targeted fish surveys in support of lake management activities (e.g., Como lake improvements).

A.10.2 Wetland Monitoring

As one of many efforts to assess impacted water resources, the District began a wetland biological monitoring program in 2007 as part of the District's larger water resource monitoring program. The District monitors 20 wetlands through this program. The goal of the wetland monitoring program is to establish baseline quality conditions of major wetlands to better inform management decisions and understand their value. The data collected through wetland monitoring is used to understand the services provided by wetlands, including:

- Biological function:
 - Ecological diversity
 - Urban wildlife habitat and connectivity
- Environmental services:
 - Water quality improvements
 - Flood control
 - Carbon sink
- Community and human health value:
 - Green space/aesthetics
 - Recreation

Biological monitoring data are used to assess wetland conditions using an Index of Biological Integrity (IBI), consisting of aquatic invertebrate and plant indices. Monitoring consists of a collection of aquatic macroinvertebrates and a survey of aquatic plants, along with collection of water quality and land-use data. These data are then evaluated through macroinvertebrate and plant metrics that provide an overall rating within the IBI. The assessment process is described in greater detail in the 2007-2014 Wetland Monitoring Report (CRWD, 2016).

A.10.3 Stormwater Monitoring

The District regularly collects stormwater quality and flow data at seven locations dating back to 2005, including:

- St. Anthony Park subwatershed outlet
- East Kittsondale subwatershed outlet
- Phalen Creek subwatershed outlet
- Hidden Falls
- East Branch of Trout Brook Storm Sewer System
- West Branch of Trout Brook Storm Sewer System
- Outlet of the Trout Brook Storm Sewer System

These monitoring locations are presented in Figure A-30. Routinely monitored water quality parameters include: Total phosphorus (TP), ortho-phosphorus, nitrate/nitrite, total suspended solids (TSS), chloride, *Escherichia coli* (*E. coli*) and metals.

Pollutant concentration data collected from these locations is summarized in Table A-14. The District also monitors flow at these stormwater outlets which allows the District to calculate pollutant loads.

The MPCA and the U.S. Environmental Protection Agency (EPA) have established surface water standards for several water quality parameters (Minnesota Rules 7050). While these standards apply to receiving waters (i.e., lakes, streams) and are not directly applicable to stormwater discharge, it is useful to compare District stormwater quality to these standards and the observed water quality in the Mississippi River, an impaired water (see Section A.9.6)

Data presented in Table A-14 indicate that pollutant concentrations in District stormwater discharges exceed those in the Mississippi River receiving water for all monitored parameters. The elevated pollutant concentrations

in stormwater relative to the Mississippi River reflect the high imperviousness of the District, which facilitates the transport of metals and other pollutants. Average chloride concentrations in District stormwater discharges are generally at or below the 230 mg/L chronic standard applicable to Class 2B rivers and lakes (see Minnesota Rules 7050) but are greater than the average chloride concentration in the Mississippi River. While the stormwater pollutant concentrations presented in Table A-14 are generally greater than those in the receiving water, the pollutant load from District stormwater discharges is a small percentage of cumulative pollutant loading to the Mississippi River (the District is approximately 1/1000th of the drainage area to the Mississippi River below the Minnesota River).

The Mississippi River data included in Table A-14 also demonstrate the impact of the Minnesota River, which enters the Mississippi River between mile 847.1 (Ford Dam) and mile 839.1, as a significant source of total suspended sediment and total phosphorus.

Figure A-31 and Figure A-32 present annual phosphorus loading and annual total suspended solids loading, respectively, for the monitored stormwater outlets from 2009 through 2018. Comparison of the average loading from stormwater outlets allows the District to prioritize areas for implementation of structural and non-structural best management practices to reduce pollutant loading.

Table A-14 District Stormwater Quality Monitoring Results (2010-2019)

Location	Average Concentration						
	Chloride (mg/L)	Copper (µg/L)	E. coli ^{1,3} (cfu/100 mL)	Lead (µg/L)	TP (µg/L)	TSS (mg/L)	Zinc (µg/L)
Stormwater Outlets							
East Kittsondale	234	19.6	4,123	16.6	229	123	84.6
Hidden Falls	84	12.6	3,125	16.3	205	122	61.3
Phalen Creek	178	13.3	3,242	19.2	272	165	71.6
Saint Anthony Park	141	12.5	3,755	8.6	190	110	62.6
Trout Brook - East Branch	243	10.2	3,842	6.5	295	103	44.9
Trout Brook - West Branch	90	11.0	3,446	8.9	268	365	46.6
Trout Brook Outlet	121	11.7	3,312	10.3	260	131	44.5
Mississippi River Locations and Standards							
Mississippi River Mile 839.1 (Ford Dam)	24	1.8	130.9	0.7	134	46	5.8
Mississippi River Mile 847.7 (Downtown St. Paul)	18	2.4	130.6	0.5	68	11	5.2
Water Quality Standard (in Mississippi River)	230 ²	-- ⁵	-- ³	-- ⁵	100 ²	32 ⁴	-- ⁵
<p>Notes: Mississippi River water quality standards are not applicable to District stormwater discharges and are presented as additional information.</p> <p>(1) Units for <i>Escherichia coli</i> are colony forming units (cfu) per 100 mL of water and are presented as geometric means</p> <p>(2) Based on Minnesota Rules 7050;</p> <p>(3) District E. coli samples are not collected with frequency sufficient to determine exceedances of applicable water quality standards</p> <p>(4) Site-specific standard based in the South Metro Mississippi River Turbidity TMDL (MPCA, 2015)</p> <p>(5) MN Rules 7050 applicable standards for copper, lead, and zinc are a function of total hardness</p>							

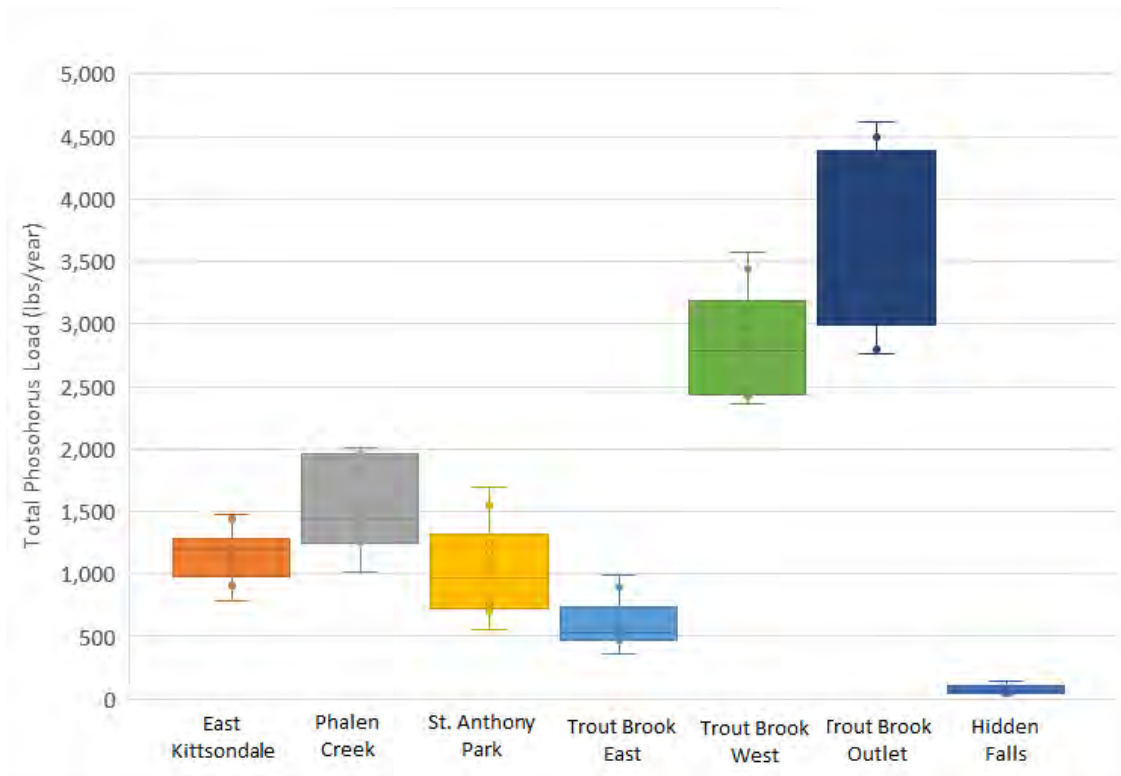


Figure A-31 District Stormwater Total Phosphorus Loading (2010-2019)

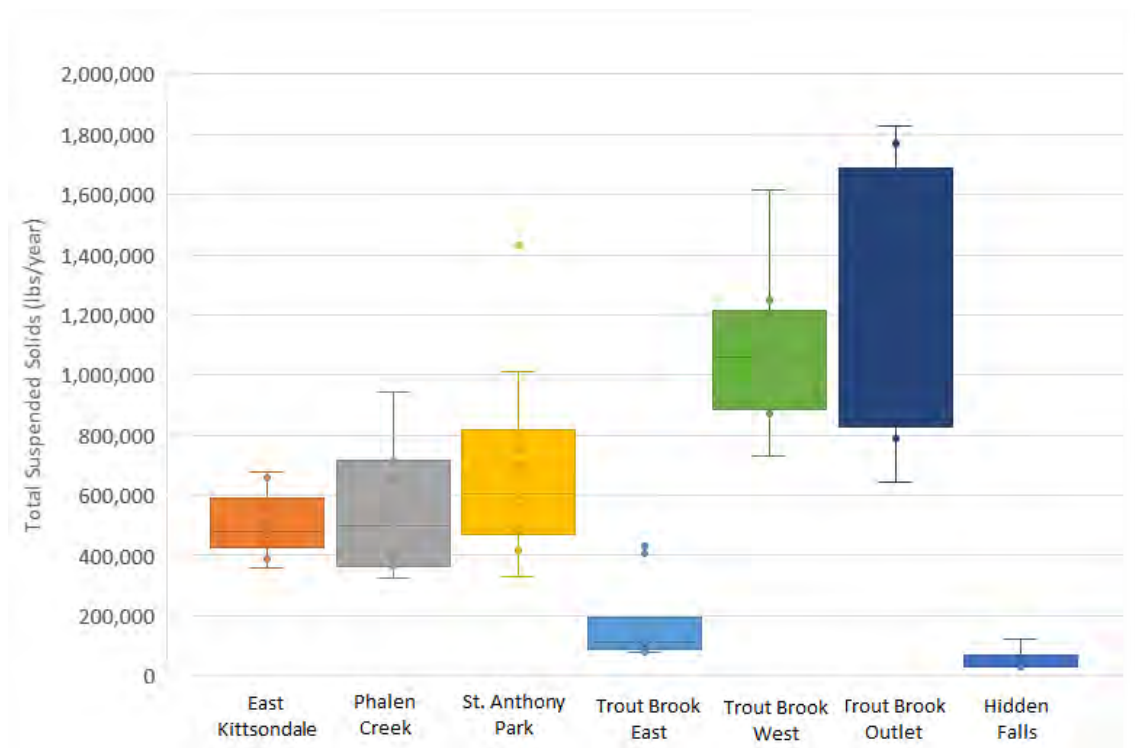


Figure A-32 District Stormwater Total Suspended Solids Loading (2010-2019)

A.10.3.1 Best Management Practice (BMP) Monitoring

In addition to stormwater outlet monitoring, all structural best management practices constructed by the District are also monitored for water quantity and water quality to assess the amount of stormwater and pollutant reductions achieved by the BMP. The District also assesses BMP performance data in aggregate to evaluate the feasibility of classes of BMPs (e.g., underground infiltration) and inform future design decisions.

Significant BMP monitoring locations are presented in Figure A-30. Individual BMP performance data is available from the District on request.

A.10.4 Surface Water Modeling

Portions of the District have been modeled as part of the development of subwatershed analyses and resource management plans (e.g., Como Lake Management Plan – CRWD, 2019). Modeling efforts include hydrologic, hydraulic, and/or water quality modeling as needed to address the specific analytical goals. Modeling results are summarized in the applicable resource management plans.

The District maintains a hydrologic and hydraulic model of the Trout Brook Storm Sewer Interceptor (TBI) system. The District updates this model as needed to incorporate land use changes and evaluate potential stormwater infrastructure improvements. The District has used the TBI model to evaluate flood risk along the TBI system and prioritize areas for future improvements (see Section 3.0). Figure A-29 presents the approximate floodplain adjacent to the TBI system.

A.11 Natural Areas, Habitat, and Rare Features

Through its Natural Heritage and Nongame Research Program (NHNRP), the MDNR collects, manages, and interprets information about rare natural features, native plants and plant communities, and nongame animals, including endangered, threatened, and special concern species. As part of the NHNRP, the MDNR maintains the Natural Heritage Information System (NHIS) as a statewide database of these resources. The MDNR limits publication of spatial attributes and locations of these items to protect rare features or species from damage or collection.

Additional information about rare, threatened, and endangered species is available from the NHNRP at: <https://www.dnr.state.mn.us/nhnrp/index.html>

As described in Section A.9.2, the MDNR and CRWD perform periodic fish surveys on Como Lake, Crosby Lake, Loeb Lake, and Lake McCarrons. Fish stocking and survey information for individual lakes is available from the MDNR's Lakefinder website at: <https://www.dnr.state.mn.us/lakefind/index.html>.

The MDNR's Minnesota County Biological Survey for Ramsey County (1994, with Anoka County) identified pre-settlement vegetation. Prior to settlement, the District was covered primarily by oak forest interrupted by tall grass prairie. River bottom forests occurred along the Mississippi River below the bluff. Portions of dense deciduous forest known as the "Big Woods" covered portions of the east side of the District, Falcon Heights, and the Highland neighborhood of Saint Paul. Elm, sugar maple, and basswood are representative Big Woods tree species.

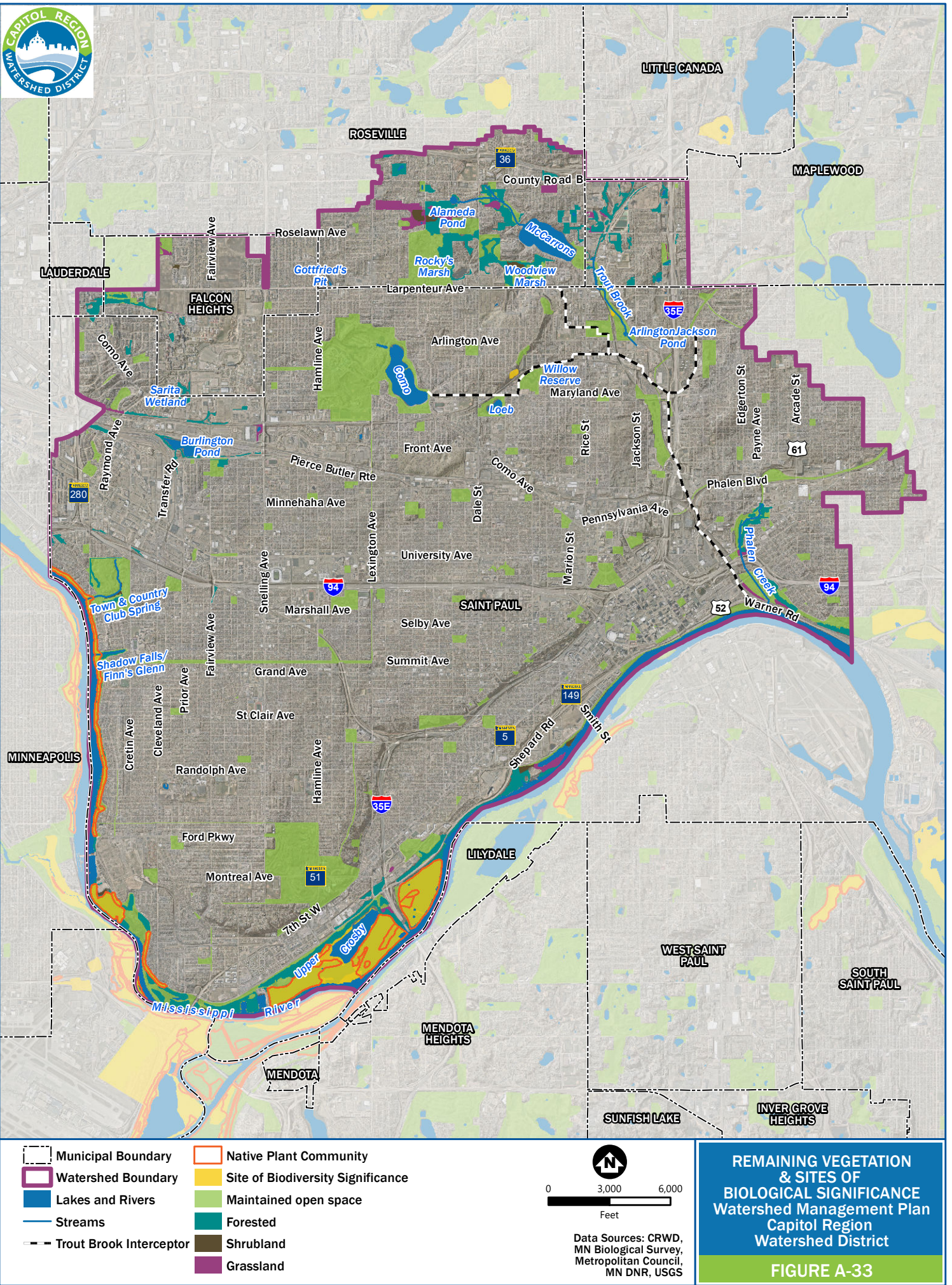
Most of the District has been developed for residential, commercial, and other urban land uses (see Section A.4). However, some areas of natural and semi-natural vegetation remain. These areas provide ecological benefits, such as wildlife habitat, in addition to water quality and recreational value. Areas of remaining natural and semi-natural vegetation are presented in Figure A-33 and are concentrated along the Mississippi River and in the north end of the District near Lake McCarrons. Most natural and semi-natural areas are located within existing regional parks (e.g. Hidden Falls-Crosby Farm Regional Park, and Mississippi Gorge Regional Park) and are thus protected from future development.

Minnesota County Biological Survey also identifies sites of biodiversity significance. Sites of biodiversity significance within the District are located along the Mississippi River corridor (see Figure A-33). These sites include:

- Crosby Lake Park (high biodiversity significance)
- Portions of the Mississippi River Floodplain (moderate biodiversity significance)
- Mississippi River bluffs (moderate biodiversity significance)

Additional information is available from the Minnesota Biological Survey at:

<https://www.dnr.state.mn.us/mbs/index.html>



A.12 Open Space and Recreation

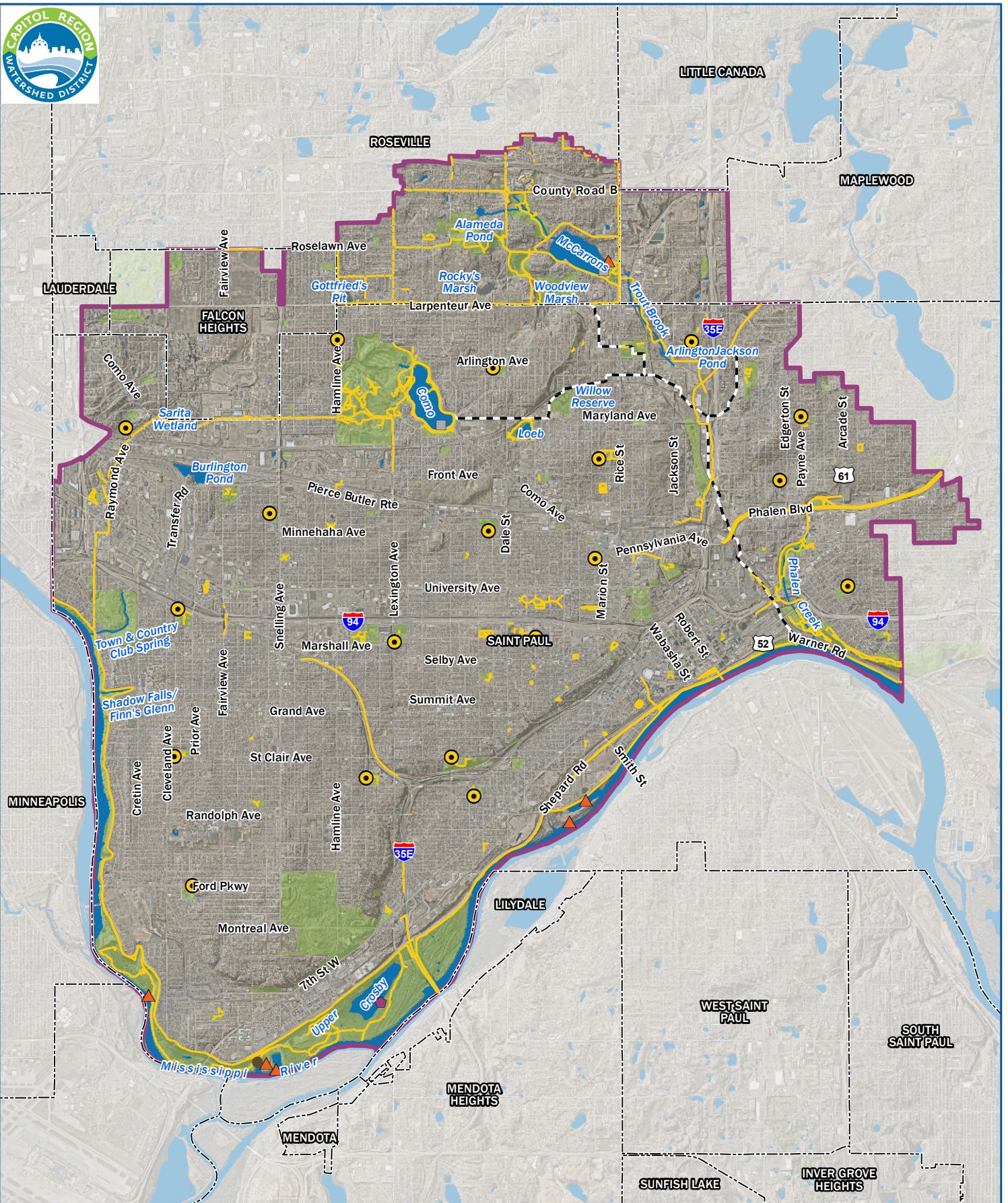
Despite the urban nature of the watershed, about 9% of the District is occupied by park, open space, or preserve land uses. Additionally, the District includes the State Fair Grounds. Open space and recreational areas are presented in Figure A-34. The regional and municipal parks located within the District have preserved scenic views and allow access to the Mississippi River Valley and other water resources. These spaces provide opportunities for residents and people who recreate in the District to appreciate and connect with the District's resources.

Popular recreational opportunities within the District include activities like boating, fishing, hiking, walking, biking, and others. There are several public water access points within the District, including:

- boat access (Mississippi River and Lake McCarrons)
- carry-in boat access (Como Lake)
- fishing piers (Como Lake, Loeb Lake, Lake McCarrons)
- on-shore fishing access (Como Lake, Mississippi River)

In addition, there is an extensive network of on- and off-road bike trails throughout the District including the Gateway Trail which extends from Saint Paul to Pine Point Regional Park just northwest of Stillwater.

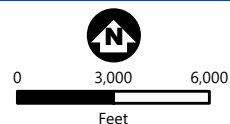
Parks and other open spaces may also provide stormwater management opportunities for the District and its partners. In addition to providing physical space for BMPs, these spaces are often in an ideal location situated between the non-point pollutant source (e.g., urban development) and the receiving water (e.g., lakes, ponds, wetlands). Implementing BMPs in parks and other areas frequented by the public can further enhance demonstration and education benefits.



- Municipal Boundary
- Watershed Boundary
- Lakes and Rivers
- Trout Brook Interceptor

- Park
- Rec Center
- Off-road Trail

- Water Access
- Boat Access
- Pier Fishing
- Pumpout Facility
- Shore Fishing



Data Sources: CRWD,
Metropolitan Council,
MN DNR

OPEN SPACES &
RECREATIONAL AREAS
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-34

A.13 Potential Pollutant Sources

The sources of water pollution in the District are many and varied. Potential pollutant sources in the District include permitted pollutant sources, potentially contaminated sites, leaking above- and below-ground storage tanks, unsealed wells, and non-point sources.

The MPCA maintains a database of potential environmental hazards, 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. Sites identified in this database are presented in Figure A-35.

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.

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>

A.13.1 Permitted Pollutant Sources

A.13.1.1 Municipal Separate Storm Sewer System (MS4) Stormwater

Public entities that manage stormwater and meet certain criteria are required by the MPCA to obtain a Municipal Separate Storm Sewer System (MS4) permit. Entities required to obtain a permit are known as "MS4s." The MS4 Stormwater Program is designed to reduce the amount of sediment and pollution that enters surface water and groundwater from storm sewer systems. The MS4 stormwater discharges are regulated by National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) permits administered by the MPCA.

Within the District, there are several MS4s, including:

- Capitol Region Watershed District
- City of Falcon Heights
- City of Maplewood
- City of Lauderdale
- City of Roseville
- City of Saint Paul
- Metropolitan State University
- Minnesota Department of Transportation
- Ramsey County
- Saint Paul Community and Technical College
- University of Minnesota – Twin Cities

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. For most waterbodies,

stormwater runoff is a major source of pollutants. Table A-15 summarizes the principal pollutants found in stormwater runoff and provides example sources and possible impacts of each pollutant.

As a requirement of the permit, MS4s must develop and maintain a stormwater pollution prevention program (SWPPP) which outlines programs and practices to minimize pollutant loading and water quality impacts resulting from stormwater management. The SWPPP contains six areas of focus, known as minimum control measures, including:

- Public Education and Outreach
- Public Participation/Involvement
- Illicit Discharge Detection and Elimination
- Construction Site Stormwater Runoff Control
- Post-Construction Stormwater Management
- Pollution Prevention/Good Housekeeping For Municipal Operations

Each MS4 submits a report to the MPCA annually documenting the implementation of its SWPPP. The District is required to obtain an MS4 permit and maintain a SWPPP based on its ownership of the Trout Brook Interceptor stormwater system (see Section A.9.4).

The MPCA periodically updates the MS4 General Permit. More information is available from the MPCA at: <https://www.pca.state.mn.us/water/municipal-stormwater-ms4>

Table A-15 Pollutants Commonly Found in Stormwater

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, and benthic toxicity
Organic Materials	Leaves, grass clippings	Algal growth, reduced clarity, other problems associated with eutrophication (oxygen deficit, release of nutrients and metals from sediments)
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 and fluid leaks, waste oil.	Toxicity of water column and sediment, bioaccumulation in aquatic species and throughout 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).

A.13.1.2 Construction Stormwater

Construction sites can contribute substantial amounts of sediment to stormwater runoff. The NPDES/SDS Construction Stormwater Permit administered by the MPCA requires that all construction activity disturbing an area of one acre or more must obtain a permit and create a Stormwater Pollution Prevention Plan (SWPPP) that

outlines how pollutant loading from the construction site will be minimized during and after construction. Construction stormwater permits are required throughout construction activities through final stabilization of the site. In addition to the NPDES Construction Stormwater Permit, the District and each of its Cities implement permit programs (independently or through the District) to regulate pollutant loading from construction activity.

The MPCA periodically updates the Construction Stormwater Permit. More information is available from the MPCA at: <https://www.pca.state.mn.us/water/construction-stormwater>

A.13.1.3 Industrial Stormwater

The NPDES/SDS Industrial Stormwater Permit applies to specific industrial operations with the potential to contaminate stormwater runoff. The permit requires that the industrial facility create a Stormwater Pollution Prevention Plan (SWPPP) documenting structural and/or non-structural BMPs used to manage stormwater and a spill prevention, control, and countermeasure (SPCC) plan.

The MPCA periodically updates the Industrial Stormwater General Permit. More information is available from the MPCA at: <https://www.pca.state.mn.us/water/industrial-stormwater>

A.13.1.4 Feedlots

Two registered feedlots are located within the District: the University of Minnesota Feedlot and the State Fairgrounds. Feedlot operations capable of holding 1,000 or more animal units or more are classified as a large concentrated animal feeding operation (CAFO) and are required to obtain a NPDES/SDS permit for livestock production from the MPCA. Neither feedlot in the District is required to have an NPDES/SDS permit based on its size.

A.13.1.5 Municipal and Industrial Wastewater

Several facilities within the District are permitted by the MPCA to discharge wastewater such as industrial process wastewater and non-contact cooling water discharge. Municipal wastewater is sanitary waste from residential and commercial sources. Industrial wastewater is a waste generated by an industrial process. For any wastewater discharge an NPDES/SDS permit is required from the MPCA. Figure A-35 includes permitted wastewater discharges within the District.

A.13.2 Potentially Contaminated Sites

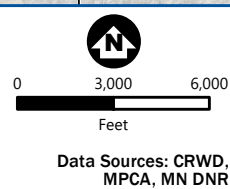
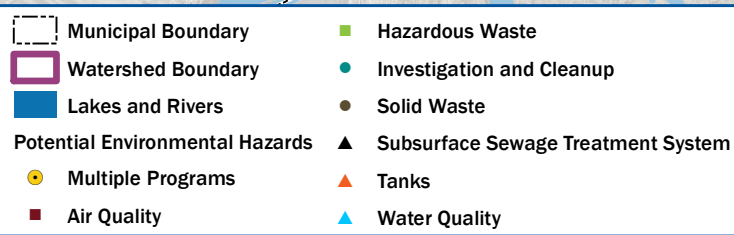
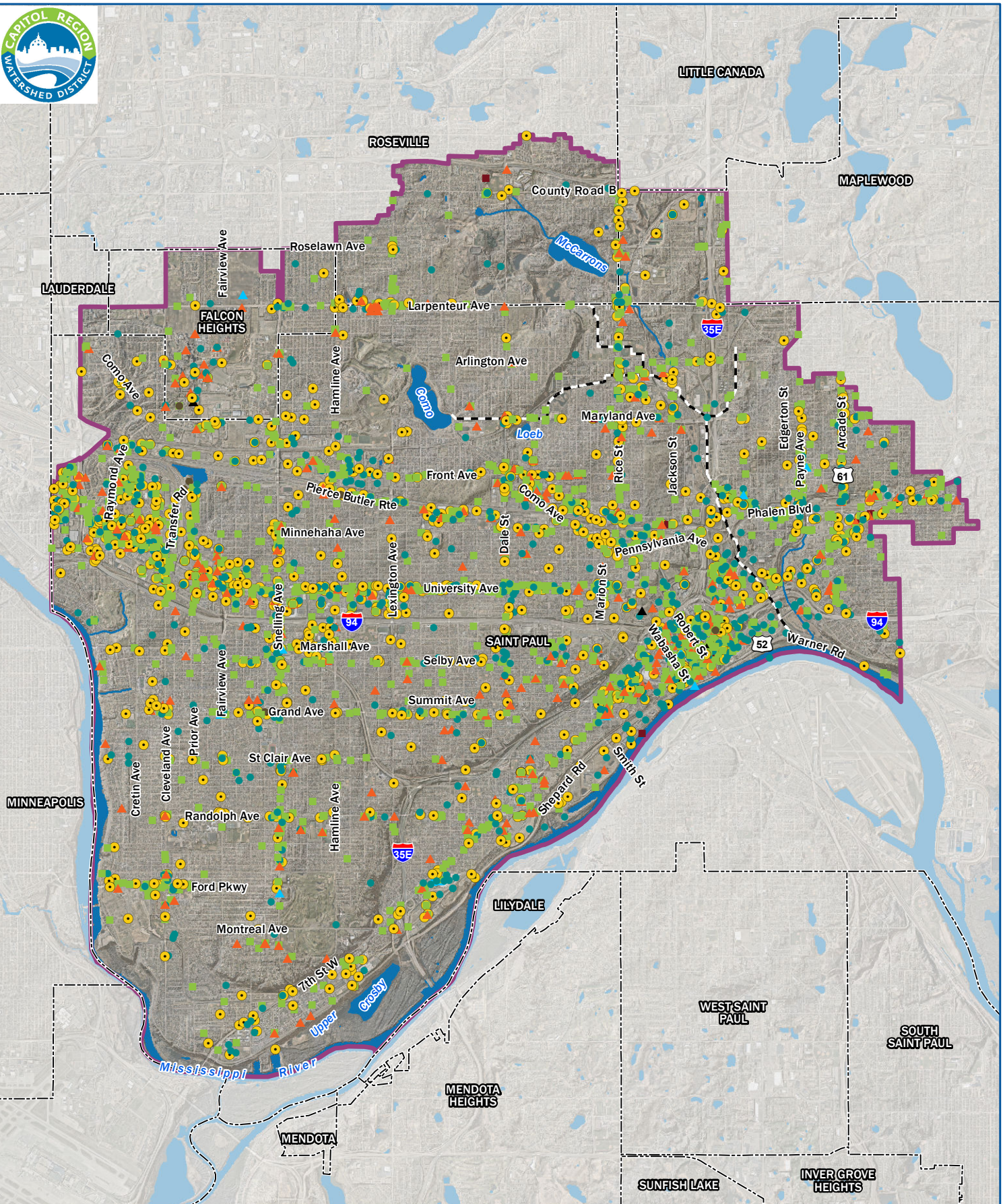
Sites identified by the MPCA as potentially contaminated are included in Figure A-35. The MPCA database includes properties that have already been investigated and cleaned up, properties currently enrolled in MPCA cleanup programs, and suspected contaminated properties determined to be clean upon investigation. Sites included in the database may include operational and abandoned landfills, dumps, solid waste sites, and others. Discharges at these sites may contain pollutants with the potential to contaminate both groundwater and surface water.

A.13.3 Leaking Above- & Below-ground Storage Tanks

Leaking above- and below-ground storage tanks may leach pollutants into groundwater and surface water. The MPCA investigates and cleans up releases from petroleum tanks. Locations of storage tanks within the District are shown in Figure A-35.

A.13.4 Wells

There are many wells within the District. When not properly constructed or maintained, wells can function as an unintended pathway for flow between aquifers or from surface water to groundwater. When wells are abandoned, appropriate well sealing is necessary to limit potential for groundwater contamination.



POTENTIAL POLLUTANT SOURCES
Watershed Management Plan
Capitol Region
Watershed District

FIGURE A-35

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Appendix B

2021 Plan Stakeholder Engagement Summary Memorandum and Fact Sheet

Memorandum

To: Anna Eleria, Capitol Region Watershed District
From: Greg Williams
Subject: Summary of Results from the Capitol Region Watershed District 2020 Plan Update Stakeholder Outreach
Date: July 29, 2019
Project: 23621304
C:

In developing its 2020 Watershed Management Plan (WMP, Plan), Capitol Region Watershed District (CRWD) created a Stakeholder Outreach Plan (February 2019). The Stakeholder Outreach Plan outlined several activities to engage and receive input from a broad, diverse group of stakeholders that reflect the demographics of CRWD. This memorandum summarizes the results of the stakeholder outreach activities completed through June 30, 2019 and provides a recommendation to CRWD's Board of Managers regarding issue prioritization that considers the results of CRWD outreach efforts.

In addition to this summary memo, Barr Engineering Company (Barr) and CRWD staff will prepare an infographic to summarize the stakeholder outreach process and results. This infographic will be shared with stakeholder outreach activity participants and the public. As Plan goals and implementation items are developed in future tasks, CRWD staff will track the connection between stakeholder comments and applicable goals and implementation items. This process will document the link between stakeholder input and Plan outcomes.

1.0 Stakeholder Outreach Activities

Activities to solicit stakeholder input conducted by CRWD between February 2019 and June 2019 include the following:

- Plan update notification to State and local government agencies (as required by MN Rules 8410.0045)
- Technical Advisory Committee (TAC) workshop – May 22, 2019
- Citizen Advisory Committee (CAC) workshop – June 12, 2019
- CRWD staff workshop – June 25, 2019
- Community conversation events (four), including:
 - CRWD office – May 6, 2019
 - Hallie Q. Brown Community Center – May 13, 2019
 - Gloria Dei Lutheran Church – May 30, 2019
 - Arlington Hills Community Center – June 4, 2019

- Face-to-face meetings with the following organizations:
 - Urban Roots
 - Hmongtown Marketplace
 - African Economic Development Solutions
 - Lower Phalen Creek Project
 - Frogtown Farms
 - East Site Area Business Association
- Meetings with St. Paul District Councils, including:
 - North End Neighborhood Organization
 - Union Park District Council Environment and Parks Committee
 - Capitol River Council
- Surveys, including:
 - Long form hosted online at the CRWD website
 - Short form completed via tablet at community events

CRWD's stakeholder outreach activities were advertised via eight circulars reaching over 175,000 readers as well as 14 social media posts reaching over 8,000 accounts (shared 55 times and resulting in over 200 comments, reactions, or shares). In addition to the structured meetings and workshops listed above, CRWD staff attended 17 community events from April 20, 2019 through June 30, 2019 to advertise stakeholder engagement opportunities and solicit input via surveys. Events included:

- Urban Roots Cleanup native planting cleanup event at Bang Brewing
- St. Paul Cleanup events at 7 locations
- St. Paul Regional Water Service (SPRWS) tours
- Waterfest at Phalen Lake
- Como Lake Cleanup
- Lowertown Cleanup at Mears Park
- Parkview 1st Grade Field Day at Lake McCarrons
- Falcon Heights Spring Together
- Frogtown Farm Community Celebrations
- Dragonfly Bonanza at Trout Brook Nature Sanctuary
- Peace Celebration at Ober Community Center

Engagement strategies and methods are documented in detail in Section 3 of the Stakeholder Outreach Plan.

2.0 Stakeholder Outreach Results

This section summarizes the input received from the various stakeholder outreach activities. In total, CRWD received over 800 comments from the responses to the notification letter, workshops, and face-to-face meetings. Over 150 people completed the online survey (120 short form, 43 long form).

The variety of activities and methods used during stakeholder outreach limits the use of a single, quantitative method to evaluate all input. Instead, the following sections summarize outreach results by activity. Overall results and emerging themes are described in Section 3.0; recommendations for issue prioritization and organization in the Plan are included in Section 4.0.

2.1 Responses to Notification Letter

CRWD received responses to the Plan update notification letter from the following organizations:

- City of Falcon Heights
- City of Roseville
- City of St. Paul
- Metropolitan Council
- Minnesota Board of Water and Soil Resources (BWSR)
- Minnesota Department of Natural Resources (MDNR)
- Minnesota Pollution Control Agency (MPCA)
- Ramsey County

Comments provided in the responses to the notification letter are summarized in Table 1; comments are varied in specificity and applicability. Responses from cities generally addressed specific, local issues (e.g., maintenance of the Villa Park weir system). Specific problem areas identified in the City responses will be useful in establishing the Plan implementation program. Several comments addressed the issue of establishing measurable goals and assessing CRWD's progress and performance. Other comments in the responses to the notification letter identified potential issues to be addressed in the Plan (e.g., invasive species, green infrastructure) but generally did not focus on the characteristics of the issue specific to CRWD. Issues identified in the responses to the notification letter were also incorporated into the TAC workshop to provide opportunities for clarification/elaboration (see Section 2.2).

Table 1 Summary of Responses to Plan Update Notification Letter

Agency or Local Government Unit	Comment Summary	Comment Topic
City of Falcon Heights	<ul style="list-style-type: none"> - Update flood mapping - Projects to reduce flood risk 	<ul style="list-style-type: none"> - Flood risk - Partnerships
City of Roseville	<ul style="list-style-type: none"> - Update flood mapping - Projects to reduce flood risk 	<ul style="list-style-type: none"> - Flood risk - Partnerships
City of St. Paul	<ul style="list-style-type: none"> - Partnerships for regional treatment - Water quality permitting partnerships - Natural resource management partnership opportunities - Como Lake water quality 	<ul style="list-style-type: none"> - Water quality - Regulation - Partnerships - Ecosystem health
Ramsey County	<ul style="list-style-type: none"> - Projects to reduce flood risk - Studies to inform LGU flood actions 	<ul style="list-style-type: none"> - Flood risk - Partnerships
BWSR	<ul style="list-style-type: none"> - Need for strong stakeholder input - Measurable goals drive prioritized, targeted implementation - Self-evaluation tied to measurable goals 	<ul style="list-style-type: none"> - Education/outreach - Measurable goals - Implementation - Evaluation/reporting
MDNR	<ul style="list-style-type: none"> - Use of watershed health assessment framework - Several "recommended actions" provided 	<ul style="list-style-type: none"> - Ecosystem health - Flood risk
MPCA	<ul style="list-style-type: none"> - Incorporate and implement strategies from TMDLs (Como, chloride, MS River TSS) - Prioritized areas for implementation - Quantitative assessment of progress towards measureable water quality goals 	<ul style="list-style-type: none"> - Water quality - Measurable goals - Implementation - Evaluation/reporting
Met Council	<ul style="list-style-type: none"> - Consistency with 2040 Policy Plan - Measurable goals to address issues 	<ul style="list-style-type: none"> - Measurable goals

2.2 TAC Workshop

CRWD hosted a TAC workshop at CRWD's offices on May 22, 2019. Fifteen TAC members representing CRWD municipalities, State and regional agencies, and major institutions attended the workshop. At the TAC workshop, CRWD used the 20 issue statements from the 2010 CRWD Plan as a starting point for facilitated discussion. The 20 issue statements were organized on posters according to nine "Topic Areas" as follows (generally based on the 2010 CRWD Plan):

1. Education and outreach
2. Water quality (included as part of Urban Stormwater Management in the 2010 Plan)
3. Water quantity (included as part of Urban Stormwater Management in the 2010 Plan)
4. Monitoring and data
5. Funding and organization
6. Regulation and enforcement
7. Ecosystem health
8. Future trends
9. Other

Comments/issues provided in response to the Plan update notification letter (see Section 2.1) were added to the appropriate topic area posters (as those comments were generated by organizations participating in the TAC). TAC participants were divided into groups of 3-4 and asked to provide additional comments or issues to the appropriate topic area posters. The TAC generated 120 issues/comments during the exercise in addition to comments provided in the responses to the notification letter. After the additional comments/issues had been added, TAC members were given 10 stickers to vote for the 10 highest priority issues (one sticker per issue/comment). The TAC identified the following comments/issues as the highest priority (three of which come from the 2010 CRWD Plan, shown in bold text):

1. **Coordination with District partners on regulatory issues is needed for more efficient and effective stormwater regulation across all jurisdictions** (Regulation category, 9 votes)
2. Focus on climate resilience (Future trends, assigned to Water Quantity category, 8 votes)
3. **Regular maintenance is critical to the success of stormwater BMPs and is not consistently performed to achieve desired performance** (Water Quality category, 7 votes)
4. Ongoing engagement and collaboration with government, institutions, and other partners (Education and Outreach category, 6 votes)
5. Study to evaluate options for regional treatment (Water Quality category, 5 votes)
6. Increased focus on flood risk in response to Atlas 14/climate trends (Water Quantity category, 5 vote)
7. CRWD is uniquely positioned to be the convener of cities, government, large property owners, to work together on shared WQ goals (Funding and Organization category, 5 votes)
8. **The land within the District developed during a time when resource protection was not a priority. As a result, there are a number of opportunities to restore historic resources** (Ecosystem Health category, 4 votes)
9. Establish of native grassland and herbaceous plant communities in place of mowed turf grasses on watershed and highway projects (Ecosystem Health category, 4 votes)
10. Work with cities to eliminate excess pavement; how will future transportation allow this to happen? (Water Quantity category, 4 votes)

11. Update/create 100-year flood mapping and identify vulnerable areas (Water Quantity category, 4 votes)
12. Identify long-term opportunities for District/regional scale stormwater projects (Water Quality category, 4 votes)

After the workshop, the issues/comments identified by the TAC (excluding the existing issues from the 2010 Plan) were categorized into 9 possible topic areas (including topic areas 1-7 listed above and categories for “Groundwater” and “Quality of Life/Recreation”). Comments from the “Other” and “Future Trends” workshop topic areas were redistributed among the other nine categories, as appropriate. Comments addressing multiple topic areas were assigned to a single topic area most directly related to the comment. A breakdown of the number of TAC comments/issues by category is presented in Figure 1 (*note that the total number of issues identified in each category does not reflect the number of votes assigned to individual comments within those categories*).

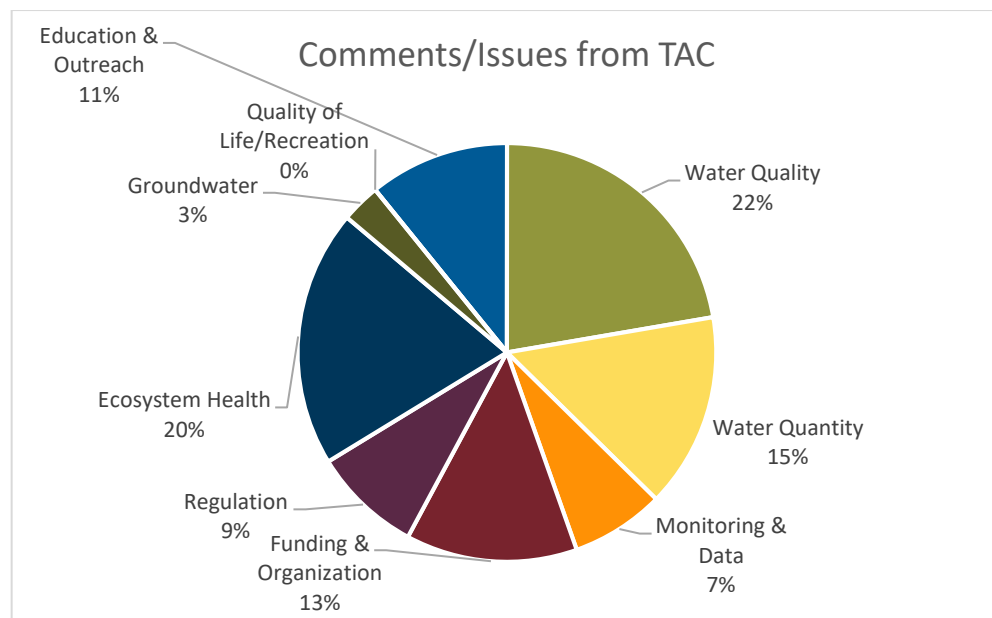


Figure 1 Comments from TAC by category

2.3 CAC Workshop

CRWD hosted a CAC issue identification/prioritization workshop at CRWD’s offices on June 12, 2019. Eight CAC members were in attendance. CRWD again used the 20 issue statements and nine topic areas based on the 2010 CRWD Plan (see Section 2.2) as a starting point for the CAC workshop. CAC participants were divided into groups of 3-4 and asked to review the existing issues and add new comments/issues to the appropriate topic area posters. The CAC generated 120 issues/comments in addition to the 20 issues from the 2010 CRWD Plan. After CAC members had the opportunity to add comments/issues to each poster, each CAC member was given 10 stickers to vote for the 10 highest priority issues. The CAC identified the

following comments/issues as the highest priority (several of which are issues from 2010 CRWD Plan, shown in bold text):

1. **Coordination with District partners on regulatory issues is needed for more efficient and effective stormwater regulation across all jurisdictions** (Regulation category, 9 votes)
2. **Future watershed management strategies need to be responsive to emerging issues resulting from climate change and technological advances** (Future Trends category reclassified as Funding and Organization category, 4 votes)
3. **Within an urbanized area, runoff from impervious surfaces is directed to storm sewers and discharged to surface waters rather than infiltrating into the ground resulting in reduced groundwater recharge and impacts to receiving waters** (Water Quantity category, 3 votes)
4. Be a strong presence at neighborhood meetings (Education and Outreach category, 3 votes)

An additional 15 comments each received two votes (including 5 additional issue statements from the 2010 Plan). The 15 comments with two votes each were distributed among the topic categories as follows:

- Ecosystem Health – 5 comments with 2 votes (including 2 issues from the 2010 Plan)
- Education and Outreach – 4 comments with 2 votes
- Water Quality – 3 comments with 2 votes (including 3 issues from the 2010 Plan)
- Water Quantity – 2 comments with 2 votes
- Funding and Organization – 1 comment with 2 votes (from the 2010 Plan)

As was done following the TAC workshop, the comments generated by the CAC staff were categorized according to the 9 general topic areas. The breakdown of CAC comments is presented in Figure 2.

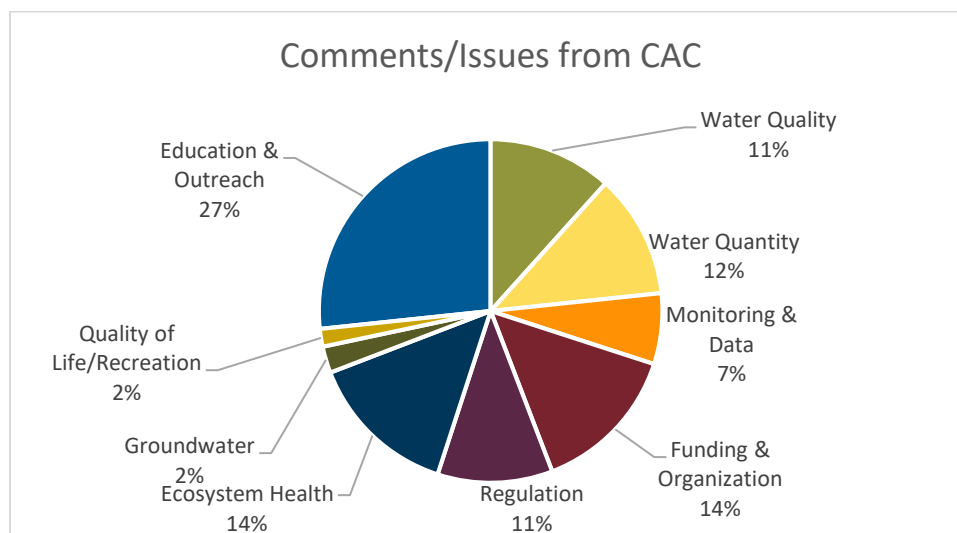


Figure 2 Comments from CAC by category

2.4 CRWD Staff Workshop

Similar to the TAC and CAC workshops, CRWD staff participated in an issue identification prioritization workshop. Using the 20 issue statements and nine topic areas based on the 2010 CRWD Plan as a starting point (see Section 2.2), CRWD staff generated 286 new issues or comments. Because of CRWD staff's intimate knowledge of the organization, its operations, and their work, CRWD staff were encouraged to consider how identified issues have evolved since the 2010 Plan and how they may evolve in the future. After CRWD staff had the opportunity to add comments/issues to each poster, they used 10 stickers to vote for the 10 highest priority issues. CRWD staff identified the following comments/issues as the highest priority (none of which are issues from 2010 CRWD Plan):

1. Regulate sites less than 1 acre (Regulation category, 7 votes)
2. Regulate chlorides (Regulation category, 6 votes)
3. Aging infrastructure will need significant funding (Funding and Organization category, 5 votes)
4. Trash! (Water Quality category, 5 votes)
5. Major promotional efforts to get messaging out - CRWD billboard!? (Education and Outreach category, 4 votes)
6. Make the data fun/visual (Education and Outreach category, 4 votes)
7. A comprehensive plan for BMP maintenance for CRWD and partners is desperately needed (Water Quality category, 4 votes)
8. Microplastics (Water Quality category, 4 votes)
9. Build equity into all new management strategies (Funding and Organization category, 4 votes)
10. Need equity in distribution of CRWD funds (Funding and Organization category, 4 votes)
11. Building internal organization capacity and expertise to do the work (Funding and Organization category, 4 votes)
12. More ecological inventories, hubs, and corridors (existing and potential); natural resource inventories (Ecosystem Health category, 4 votes)
13. Connect ecosystem health to human health. New partnerships with underserved communities (Equality of Life/Recreation category, 4 votes)

The comments generated by CRWD staff were categorized into the same 10 general topic areas applied to the TAC and CAC comments. The breakdown of CRWD staff comments by category is presented in Figure 3. The "Future Trends" category was included in the CRWD staff workshop exercise based on the inclusion of that category in the 2010 Plan. Comments generated in this category at the CRWD staff workshop covered a broader range of topics than the comments at the TAC and CAC workshops (see Sections 2.2 and 2.3), although many comments still centered around climate change and its related impacts on CRWD's roles and responsibilities. Other comments in this category addressed topics of vegetation management, equity and income gaps, emerging contaminants, and others.

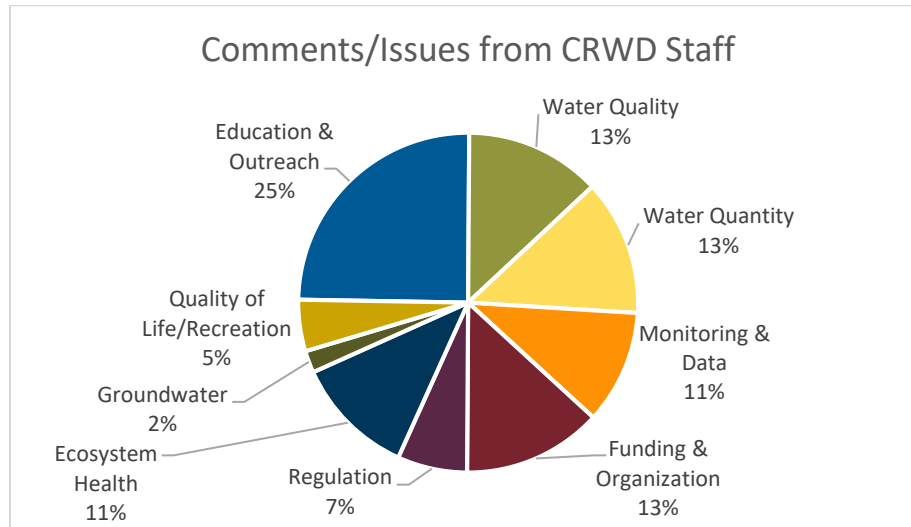


Figure 3 Comments from CRWD Staff by category

2.5 Watershed Community Conversations

CRWD hosted four community conversation meetings or watershed community conversations located across the watershed intended to solicit resident input on the Plan update. CRWD advertised the workshops on its website, through social media, in local newspapers and at community events attended by CRWD staff. Also CRWD partner organizations including Saint Paul District Councils advertised the community conversation events. Attendance varied by workshop. In total, over 30 community members attended the watershed community conversations. Programming at the watershed community conversations included a brief introduction to CRWD and the Plan update followed by facilitated, small group discussions focusing on three questions:

1. What are the valuable resources in your community?
2. How does the health (or quality) of water resources and natural areas affect you and your friends, family, and community?
3. Are there parts of your community or natural environments you would like to see improved? If so, how?

Discussion around these questions generated over 70 recorded comments, issues, and recommendations. Participants in the watershed community conversations did not identify priority issues through a voting exercise (as was done for the TAC, CAC, and CRWD Staff workshops). The comments were categorized similar to the TAC, CAC, and CRWD staff comments. The breakdown by category of comments received at the four watershed community conversations is presented in Figure 4.

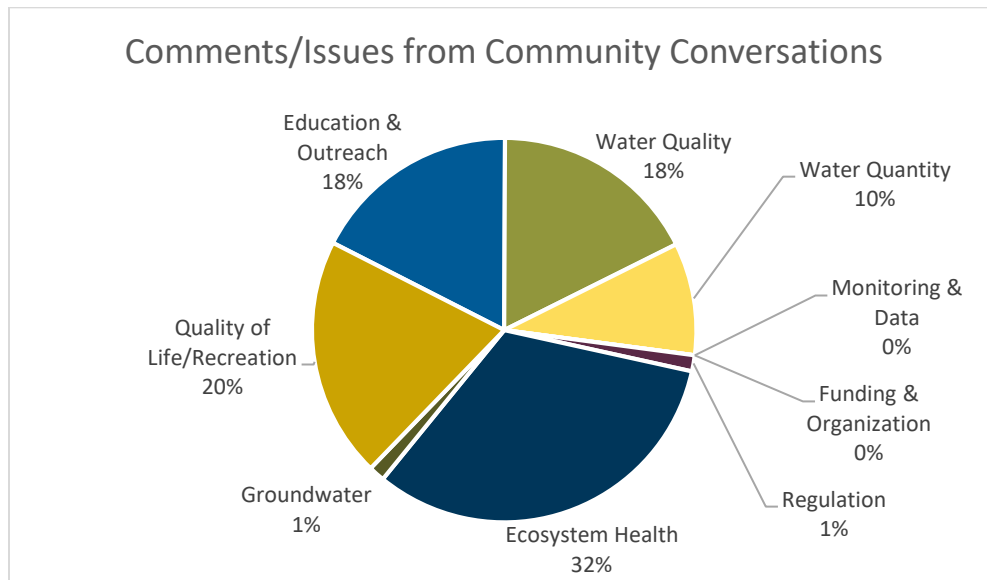


Figure 4 Comments from watershed community conversations by category

2.6 Face-to-Face Meetings with Community Organizations

CRWD staff performed face-to-face meetings with several community organizations (see Section 1.0). Organizations were targeted to obtain input from previously under-represented stakeholder groups (see Outreach Plan). CRWD staff conducted face-to-face meetings in a conversational format including questions related to each organization's relationship with CRWD, the community, and water and natural resources. CRWD staff also asked about specific opportunities for community and natural resource improvement and CRWD partnership opportunities.

In many cases, responses to the CRWD interview questions were unique to the community organization's mission and operation. Information about how best to support and engage with each organization will be useful in designing the Plan implementation program and future project/program execution. Some common themes were included among the interview responses, including:

- Green space is important to all populations
- Many community members do not know what they can do about water quality issues
- Lack of resources to invest in innovative or non-critical practices (e.g., rainwater reuse) limits implementation
- CRWD grant programs are valuable to, and utilized by, several organizations
- Government is often perceived as a barrier/challenge to operations
- There are additional education/engagement opportunities through:
 - o Water education at community celebrations
 - o Signage around projects and features
 - o Demonstration of technical skills and implementation of green infrastructure

2.7 St. Paul District Planning Council Meetings

CRWD staff contacted 13 St. Paul district planning councils as part of its stakeholder outreach efforts and attended three district planning council meetings upon request (see Section 1.0). Discussion at the North End Neighborhood Organization and Union Park District Council Environmental Committee was based on the three interview questions used at the watershed community conversations. Discussion at the Capitol River Council was more open ended and included less discussion of topics directly related to CRWD's role. Discussion at the planning council meetings generated approximately 100 comments from approximately 20 people. Frequently occurring responses/comments related to the three interview questions include the following:

1. What are the valuable resources in your community?
 - Community gardens and home gardens
 - Parks, trees, and green space
 - Mississippi River and riverfront (Capitol River Council)
 - Loeb Lake and Willow Reserve (North End Neighborhood Organization)
2. How does the health (or quality) of water resources and natural areas affect you and your friends, family, and community?
 - Natural areas promote mental well-being
 - Outdoor recreation: fishing and swimming
 - Safe drinking water
3. Are there parts of your community or natural environments you would like to see improved? If so, how?
 - a. More rainwater capture (rain gardens, rain barrels, rooftop gardens)
 - b. Incentives to reduce turf grass and landscape for clean water
 - c. Improvements to park areas (several specific areas mentioned)

Meeting participants provided over 50 comments in response to the third question, many of which are specific in nature (e.g., "Improve drainage for Rice athletic fields between Cook and Lawson"). Specific improvement suggestions will be referenced when developing the implementation program included in the Plan update. Responses to the third question were categorized among the 10 topic areas applied to the results of the TAC workshop (see Section 2.2); the results are presented in Figure 4.

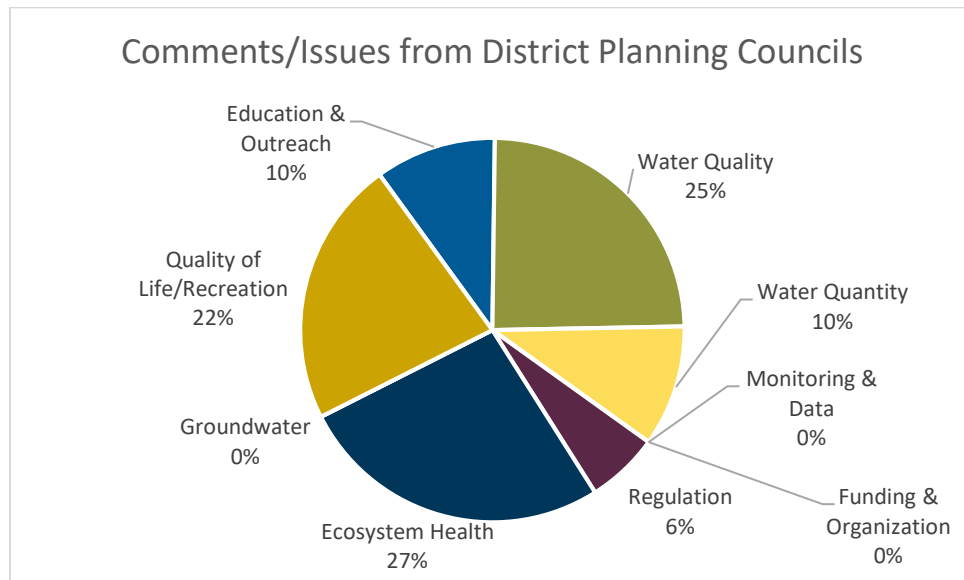


Figure 5 Comments from District Planning Councils by category

2.8 Survey (Long and Short Form)

CRWD developed an online survey to obtain input from residents. A long version of the survey, hosted on CRWD's website, included 18 questions related to the value of community and natural resources, concerns about water and natural resource health, resident behaviors, and interactions with CRWD. Three of the questions from the long form were excerpted to create a short version of the survey that could be completed via tablet or paper at community events. The short version includes the same questions used at the watershed community conversations and district planning council meetings:

- What are the valuable resources in your community? (long form question 3)
- How does the health (or quality) of water resources and natural areas affect you and your friends, family, and community? (long form question 5)
- Are there parts of your community or natural environments you would like to see improved? If so, how? (long form question 8)

The long version of the survey was completed 45 times. The short version was completed 120 times. Results of the short form survey and select results from the long form survey are presented in this section. Complete results of the long form survey are available upon request.

Both surveys asked respondents to identify valuable resources in the community (long form question 3). Among the results, the keywords referenced most frequently when identifying valuable resources in the community are presented in Figure 6.

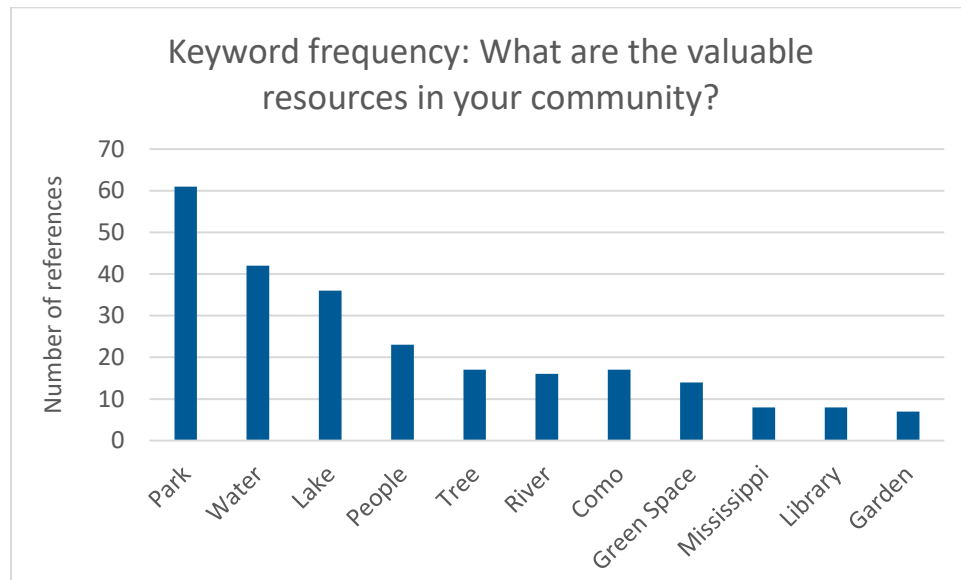


Figure 6 Keyword frequency in responses to Long Form Survey Question 3

Question 4 of the long form survey asked survey respondents to further quantify the importance of different types of resources on quality of life. The results are presented in Figure 7 generally corroborate the priority given to parks, lakes, and the river observed in the open-ended responses.

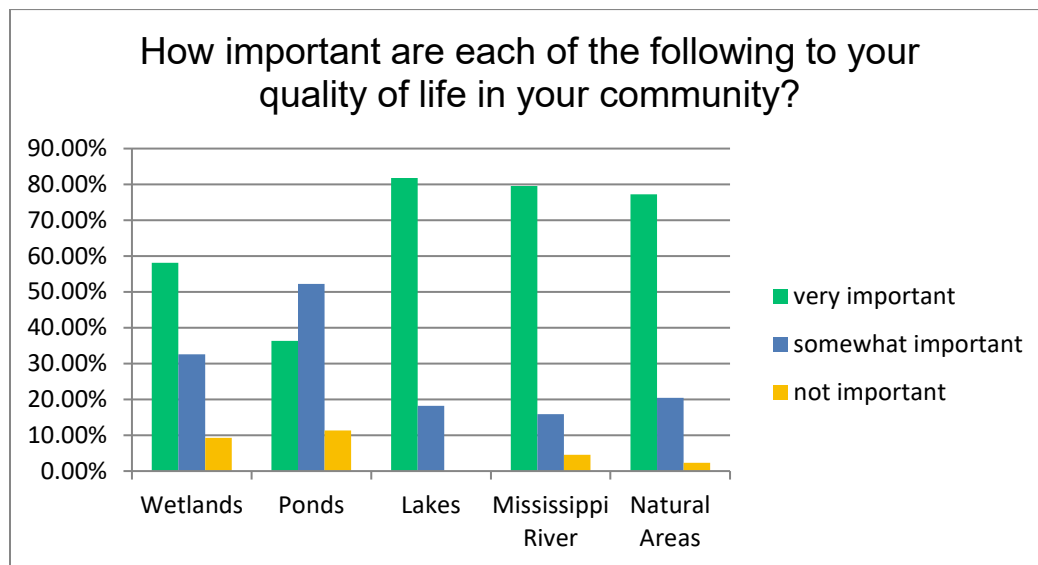


Figure 7 Responses to Long Form Survey Question 4

Both the short form and long form survey asked: How does the health (or quality) of water resources and natural areas affect you and your friends, family, and community? Overwhelmingly survey respondents cited the following four themes among a total of 152 responses:

- **Physical health and mental wellbeing** – 54 survey responses (36%) cited physical health and/or mental wellbeing as being affected by the quality of water and natural resources. Many of these responses referenced drinking water directly. Some referenced health impacts through pathways such as food production and bathing.
- **Recreation** – 49 survey responses (32%) noted that recreation is impacted by the quality of water and nature resource. Responses cited impacts to swimming, canoeing, fishing, aesthetic viewing, and using trails. Four responses specifically noted the smell/aesthetic of Como Lake as a detractor to recreation.
- **Quality of the community** – 20 survey responses (13%) made a connection between resource health and the overall quality of the community. These responses included references to local economy, property values, resources as community gathering spaces, and contributing to overall quality of life.
- **Plant and wildlife health** – 12 survey responses (8%) referenced impacts to plant, animal, and ecosystem health stemming from water and natural resource health.

Several survey responses noted that water and natural resource health impacts “a lot” but did not elaborate on the type of impacts. Two survey responses specifically mentioned water and natural resource health as affecting education opportunities.

The long form survey further asked if there are specific resources and issues that survey respondents are concerned about (question 6) and provided a pre-populated list of issues that survey respondents could select as concerns (question 7). The specific resources most frequently cited in the 39 responses to question 6 are presented in Figure 8 and identify Como Lake and the Mississippi River as top concerns.

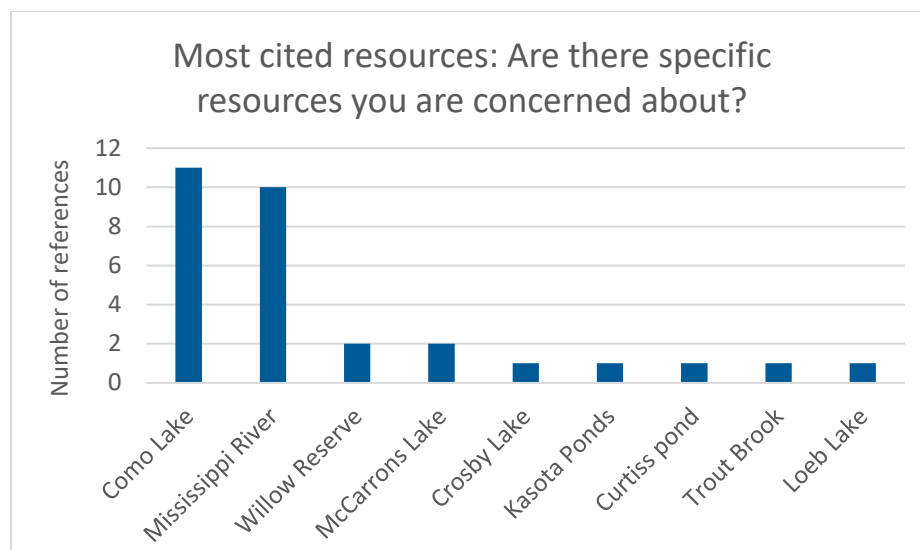


Figure 8 Responses to Long Form Survey Question 6

Figure 9 presents the top concerns as identified among 45 responses to long form survey Question 8. Other concerns identified included use of pesticides, burning or trash, and safety of residents around lakes.

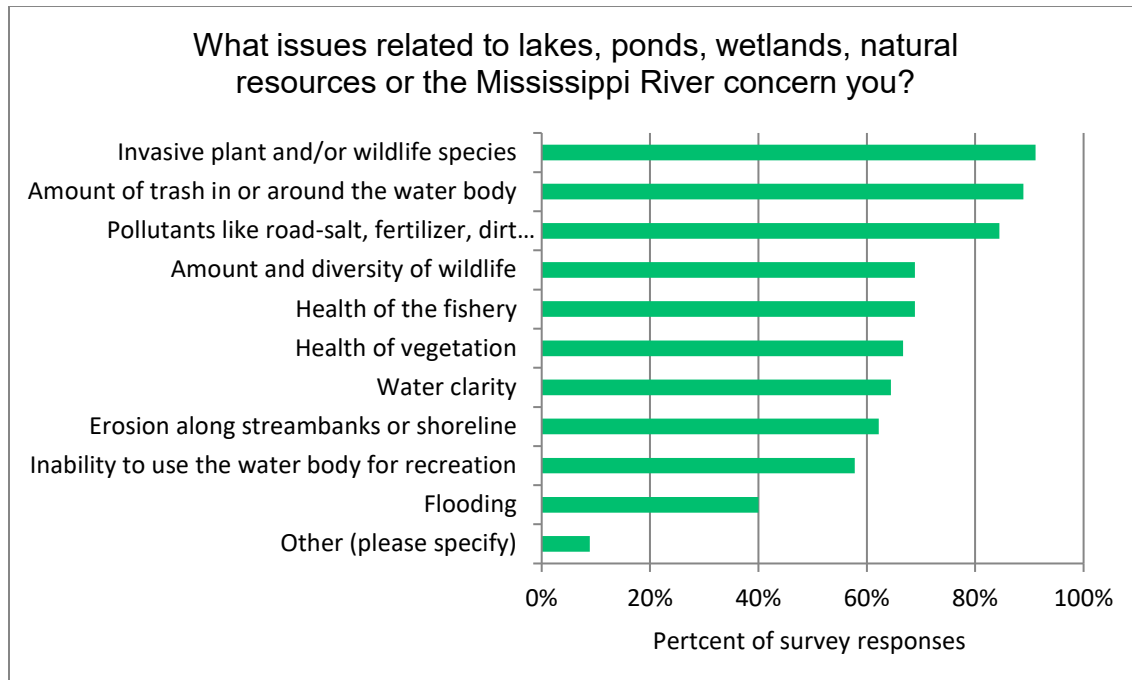


Figure 9 Responses to Long Form Survey Question 6

The short and long form surveys both asked respondents to identify if there are parts of the community or natural environment they would like to see improved (and how). The 160 responses to this question are varied, but the following themes occur most frequently:

- **Trash and litter** – 31 survey responses (19%) cited excessive trash and litter in parks, raingardens, streets, and water resources as an area for improvement. Several responses suggested more frequent, organized “clean up days” or similar activities.
- **Water quality** – 25 survey responses (16%) indicated a desire for improved water quality. Specific CRWD resources referenced among the responses included: Como Lake, Lake McCarrons, and the Mississippi River. Comments addressed improving in-lake water quality (e.g., algal blooms) as well as reducing pollutant loading from the watershed. Salt and plastics were among the pollutants noted.
- **Green space and/or vegetation** – 41 survey responses (26%) sought more or improved parks, green space, and/or vegetation. Comments included references to vegetated buffers, increased tree canopy, and landscaping with native vegetation. Several comments identified specific locations for improvements.

- **Recreation and access** – 18 survey responses (11%) referenced improvements for recreation and resource access. Comments referenced increased bike paths and trails, free or reduced-cost nature camps, and more accessible paths to water resources.
- **Education and stewardship** – 11 survey responses (7%) indicated a need for increased action from homeowners and community members to address water and natural resource management issues. Comments referenced a need to increase community awareness about stewardship practices and encourage positive behaviors.

Other improvements cited less frequently included improvements to roads, sidewalks, and public safety. Several comments (14 responses) identified specific locations that will be helpful to consider when developing the Plan implementation program.

The long form survey (completed by 43 respondents) contained additional questions regarding community willingness to perform actions to improve water quality (question 9), awareness of CRWD and the Plan update (questions 10 and 11), and what actions the CRWD should emphasize in the future (question 12). Quantitative results of questions 9 and 11 are presented in Figure 10 and Figure 11, respectively.

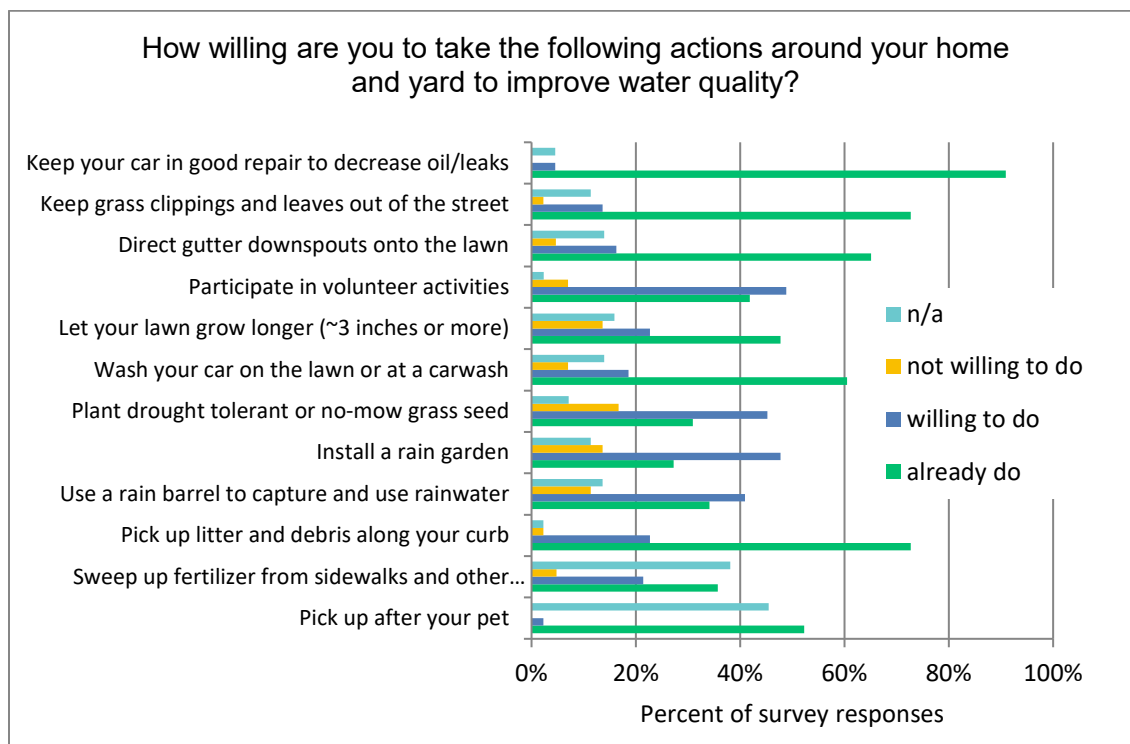


Figure 10 Responses to Long Form Survey Question 9

Responses to survey question 9 indicate that many community members are already performing or willing to perform actions to improve water quality. These results, however, are based on only 23 survey responses, and may not accurately represent the community at large. The results of question 11 (see Figure 11) indicate that >70% of survey respondents are somewhat or very familiar with CRWD. This suggests that long form survey responses may over-represent community awareness of water quality issues; long form survey results may be biased towards those who are concerned about water quality issues and are willing to take action to address water quality issues.

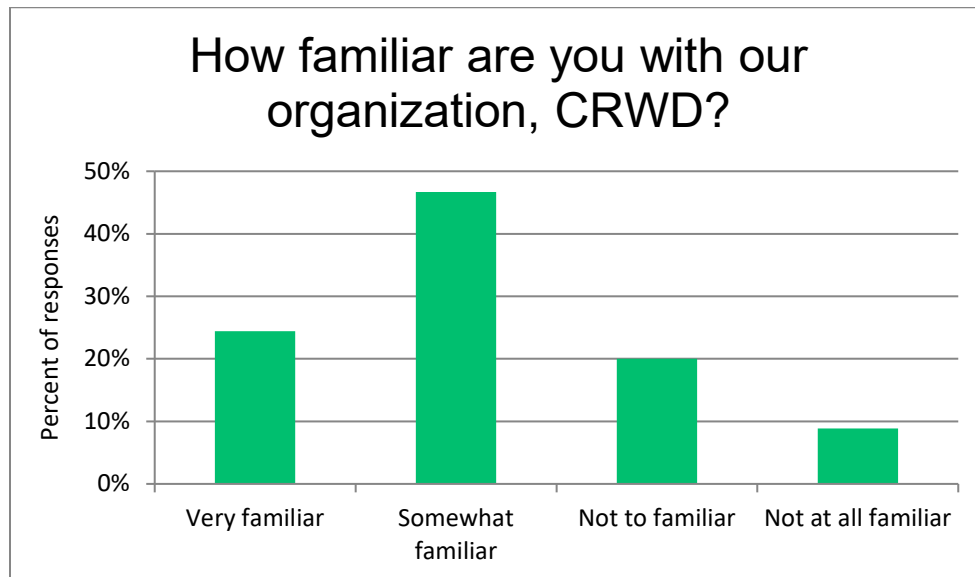


Figure 11 Responses to Long Form Survey Question 11

Twenty-two survey respondents provided input about what CRWD should start doing or do more of (question 12). Several of the responses described similar activities:

Community engagement – 7 responses (32%) encouraged more engagement with the community. Specific suggestions included engaging/training stormwater professionals in the community to provide local leadership, organizing volunteer clean-up events, and increasing engagement opportunities for senior citizens and residents with disabilities.

Rain garden program – 6 responses (27%) promoted the continuation or expansion of CRWD's rain garden program, including additional education, oversight, and financial and technical support for maintenance of existing rain gardens.

Other suggestions included additional efforts to manage invasive species, address flooding, promote the CRWD brand, work with private landowners to increase native plantings, and increase organizational transparency.

2.8.1.1 Survey Demographics

The long form of the survey included optional questions about the respondent's age, highest level of education, and race/ethnicity (see. Similar questions were not included in the short form survey. Age of survey respondents was well distributed between 25 to 74 years, with three respondents of 24 years or less. Of the 45 long survey responses, over 75% identified as having completed a bachelor's degree or higher (compared to an average of 40% for the City of St. Paul and 39% for Ramsey County). About 80% of survey respondents identified as white or Caucasian.

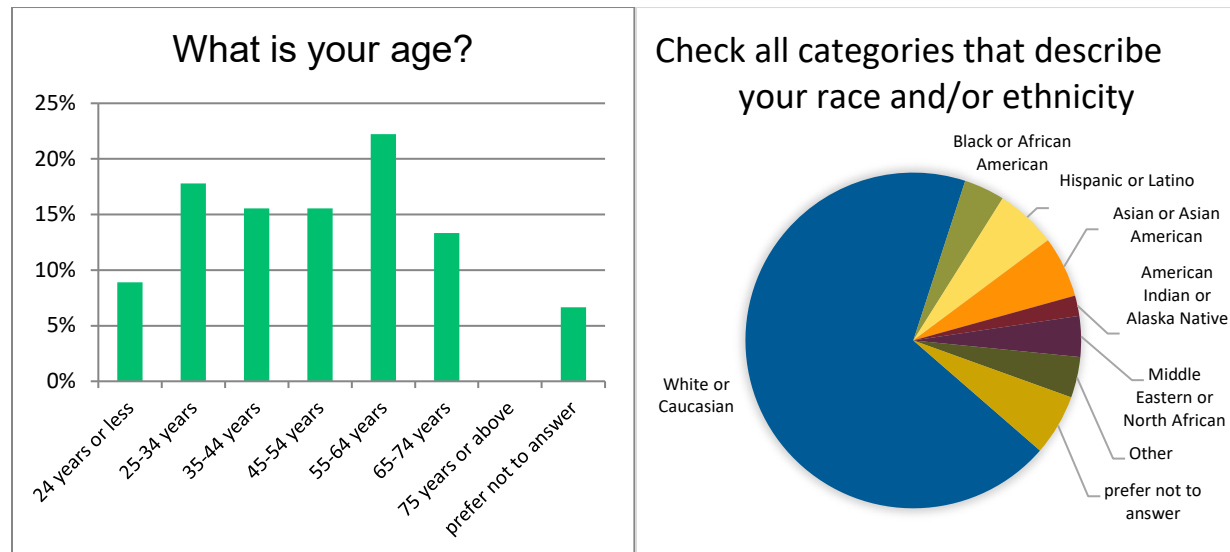


Figure 12 Responses to select survey demographic questions

3.0 Aggregate Results

The stakeholder outreach activities conducted by CRWD have generated significant input from target audiences (see Section 2.0). The range of target audiences (e.g., TAC, CAC, community members) and outreach formats (e.g., survey, interview, voting exercise) prevent the application of a single method or tool to concisely summarize stakeholder input. However, some common themes and items of significance among the stakeholder outreach results include:

1. **The issues addressed in the 2010 CRWD Plan remain relevant in 2019.** The issue statements and topic categories from the 2010 CRWD Plan were used as a basis for organizing comments from the TAC, CAC, CRWD Staff, and watershed community conversations. Comments from the workshops were broadly distributed across all categories (see Figure 1, Figure 2, Figure 3, and Figure 4), indicating the continued relevance of a range of issues. Comparison of Figure 1 through Figure 4 identify issues related to Water Quality, Education and Outreach, and Ecosystem Health as high priorities regardless of audience. In both the TAC and CAC workshops, specific issue

statements from the 2010 CRWD Plan were identified as top priorities through a voting exercise, including the following issues statements from the 2010 Plan:

- Coordination with District partners on regulatory issues is needed for more efficient and effective stormwater regulation across all jurisdictions (Regulation category)
- Regular maintenance is critical to the success of stormwater BMPs and is not consistently performed to achieve desired performance (Water Quality category)
- The land within the District developed during a time when resource protection was not a priority. As a result, there are a number of opportunities to restore historic resources (Ecosystem Health category)
- Future watershed management strategies need to be responsive to emerging issues resulting from climate change and technological advances (Future Trends category, reclassified as Funding and Organization category)
- Within an urbanized area, runoff from impervious surfaces is directed to storm sewers and discharged to surface waters rather than infiltrating into the ground resulting in reduced groundwater recharge and impacts to receiving waters (Water Quantity category)

2. **Community audiences (watershed community conversation attendees, survey respondents, district planning councils, and community organizations) emphasized issues related to quality of life and recreation.** Comments from these audiences generally included more references to quality of life, recreation, and resource access than comments from stakeholders affiliated with CRWD (CRWD staff, TAC, CAC). This is expected based on differences in how each audience interacts with water and natural resources (i.e., occupation vs. recreation), but also highlights how public expectations and priorities may differ from those of CRWD.
3. **CRWD-affiliated stakeholders (TAC, CAC, CRWD staff) highlighted regulatory and maintenance issues.** Several comments from the TAC, CAC, and CRWD staff workshop were related to continued or expanded regulatory programs. Regulatory-related issues were identified as high priority issues by the TAC (see Section 2.2) and CRWD staff (see Section 2.4). The TAC, CAC, and CRWD staff all prioritized issues related to ongoing maintenance of BMPs and capital projects.
4. **Strong emphasis on/concern for green space, vegetation, and ecosystem health.** Input from all stakeholder groups identified the recreational and/or ecological importance of green space and vegetation. Trees and native vegetation were the focus of many comments ranging from technical audiences (TAC, CRWD staff) to community members. Comments from community- and CRWD-affiliated stakeholder audiences encouraged an increased role in vegetation management for CRWD. Several comments made the connection between vegetation issues and climate change.
5. **Strong emphasis on water quality, though specific concerns vary.** All stakeholder groups voiced comments and concerns about water quality (see Figure 1 through Figure 5 and Figure 9).

Comments covered a broad range of “water quality” concerns, including aesthetic problems, pollutants like salt, plastics, and nutrients, and safety of drinking water. A range of audiences identified trash as a high priority concern. The range of concerns highlights differences in the technical background and expectations of each stakeholder audience.

6. **TAC-specific concerns about flooding.** Across most of the stakeholder outreach activities, very few stakeholder comments were related to flooding. Flooding, including site-specific concerns, was identified as a priority item for several TAC members.
7. **Focus on inclusive engagement and community action.** All stakeholder groups commented on the role of the community on water and natural resource management and the need for increased community engagement and action. Multiple audiences noted the difficulty in developing community capacity and motivation for action. Several comments noted difficulties engaging historically under-represented groups (as well as identified opportunities). Comments generally eschewed passive educational roles (e.g., distributing information) and promoted interactive (and labor intensive) programs and opportunities.
8. **Climate change and climate resilience are over-arching issues affecting all CRWD activity.** Comments from several stakeholder audiences noted concerns over current and continued climate trends. Comments from CRWD staff identified multiple ways climate change will impact a broad range of CRWD operations.
9. **Assessment of progress.** Several comments from the TAC, CAC, and CRWD staff emphasized the need for increased assessment of CRWD’s projects and programs to promote cost-effectiveness and demonstrate progress towards goals. This issue was not identified among community audiences.
10. **Opportunities for partnerships.** Numerous comments from the TAC, CAC, and CRWD staff workshops cited opportunities to leverage partnerships to increase CRWD effectiveness. Interviews with community organizations (see Section 2.6) identified specific opportunities for CRWD collaboration. Survey responses also suggest that partnerships may be important in addressing issues traditionally outside of CRWD purview, but of concern to the public (e.g., recreational access).

4.0 Recommendations for Issue Prioritization

CRWD’s Board of Managers are tasked with establishing priority resources and issues to be addressed by the Plan. These priority issues and resources are generally more specific than the higher-level, organizational priorities established in CRWD’s 2019 Strategic Plan. Our recommendations for issue prioritization are discussed in this section and consider the 2010 CRWD Plan and results of the stakeholder outreach efforts.

Overall, the results of the stakeholder outreach activities corroborate the issues prioritized in the 2010 Plan. Many stakeholder comments focus on the same topics included in the 2010 Plan while highlighting

potential new emphases and/or specific concerns. Therefore, we recommend the following issue priority and organizational structure for the 2020 Plan:

- Resource Issues
 - Water quality
 - Ecosystem health
 - Water quantity and flooding
 - Land use, imperviousness and built environment?
- Organization Issues
 - Community Engagement
 - Communications
 - Regulation
 - Organization and funding
 - Infrastructure Management – Operations and Maintenance

We recommend that the Plan generally distinguish between “resource” issues (i.e., physical) and “organization” (i.e., non-physical) issues based on estimated differences in how CRWD will approach these types of issues. We recommend that resource issues be presented without priority or ranking, owing to the potential for overlap between individual resource issues (e.g., issues related to “infiltration” may be related to water quality, water quality, and/or land use).

We recommend the elimination of the “Future Trends” issue category included in the 2010 Plan. All of the issues identified in this category in the TAC, CAC, and CRWD staff workshops were applicable to one or more of the proposed issue categories listed above (e.g., emerging contaminations = water quality) of fall under one of the overarching themes (e.g., climate resilience).

We also recommend that the Plan discuss the following overarching themes as applicable to all issues (including themes from the 2010 Plan, shown in bold):

- **Bring water back to St. Paul**
- Community equity and engaging underrepresented groups
- Recreation
- Quality of life
- Climate change and resilience
- **Partnerships**
- **Innovation**
- **Adaptive Management**

The topics listed as overarching themes were highlighted by many audiences throughout the stakeholder outreach efforts, identified both as stand-alone issues (e.g., “More partnerships”) and in reference to other

To: Anna Eleria, Capitol Region Watershed District
From: Greg Williams
Subject: Summary of Results from the Capitol Region Watershed District 2020 Plan Update Stakeholder Outreach
Date: July 29, 2019
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issues (e.g., “Partnerships to develop regional stormwater treatment). These themes are anticipated to be applicable to a wide range of CRWD projects and programs in varying degrees: as driving forces (e.g., planning for climate resilience), tools to facilitate implementation (e.g., partnerships for cost-share), and as direct or indirect benefits (e.g., enhanced quality of life). Because of the breadth of influence of these issues, we recommend the Plan discuss these issues as applicable to all of CRWD’s projects and programs and include strategies and/or examples of how CRWD activities will consider these themes during the life of the Plan.

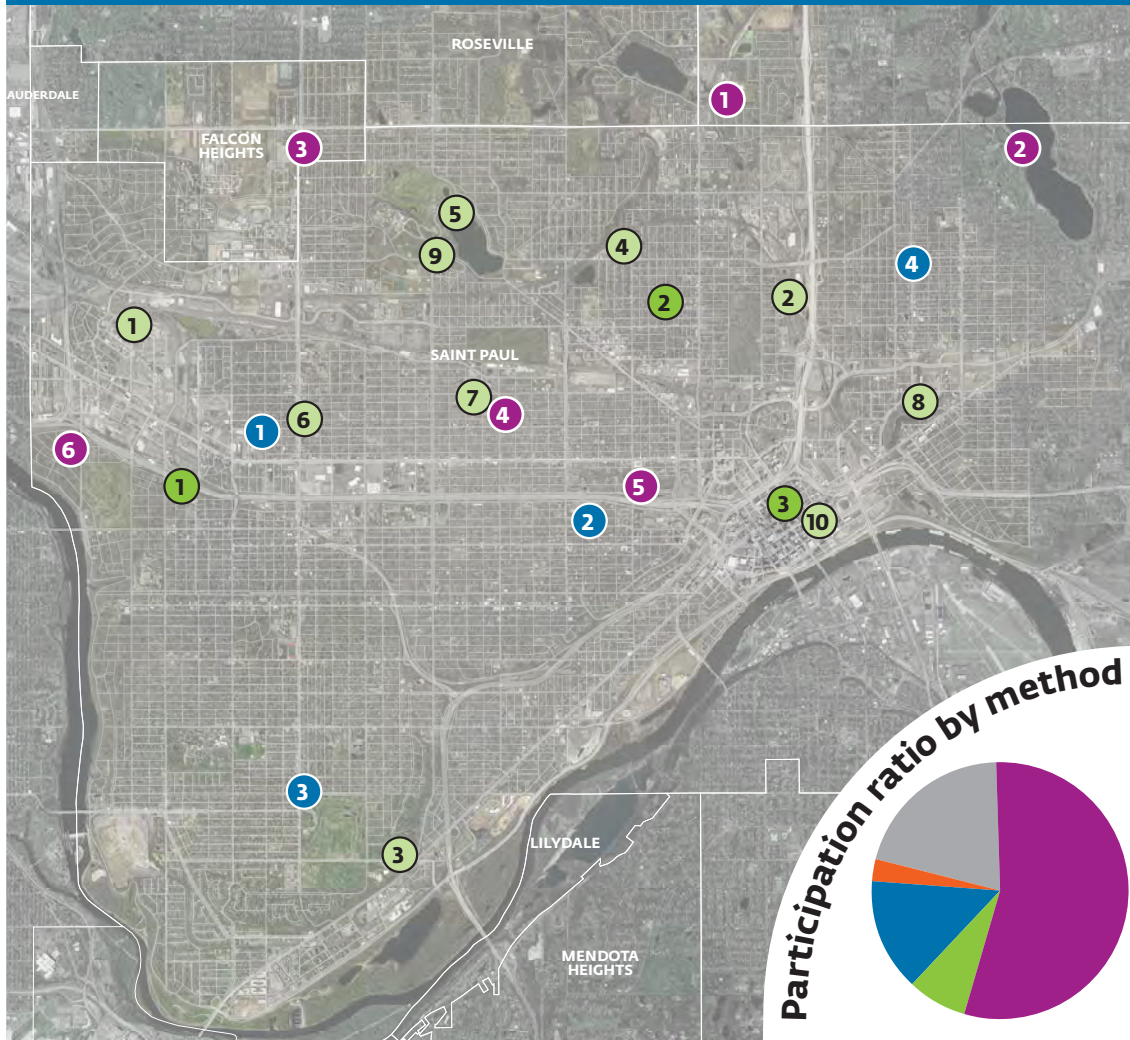
2020 WATERSHED MANAGEMENT PLAN

COMMUNITY PARTICIPANT SUMMARY

As part of the development of the 2020 Watershed Management Plan (WMP), Capitol Region Watershed District (CRWD) conducted outreach activities from April through June 2019 to gather input from a broad, diverse group of stakeholders in order to gain an understanding of their views related to water in their community.

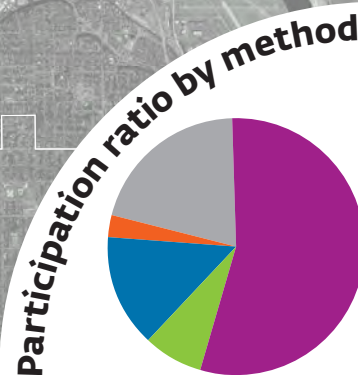


Locations of Stakeholder Engagement Opportunities



Methods of Community Input:

- Participation at community events in the district
- Discussions with District Planning Councils
- Watershed community conversations
- Face-to-face meetings with community leaders
- Online surveys



Saint Paul cleanup events

- 1 Urban Roots
- 2 Trout Brook Nature Sanctuary
- 3 Highland Picnic Area
- 4 Willow Reserve
- 5 Como Lakeside Pavilion
- 6 Hamline Park
- 7 Frogtown Farm
- 8 Swede Hollow
- 9 Como Lake
- 10 Lowertown

Community events

- 1 St Paul Regional Water Services Tours
- 2 RWMWD Phalen Lake WaterFest
- 3 Falcon Heights Spring Together
- 4 Frogtown Farm Community Celebration
- 5 Peace Celebration
- 6 Desnoyer Park Neighborhood Annual Picnic

In-person meetings with local leaders

- 1 Union Park District Council
- 2 North End Neighborhood Organization
- 3 Capitol River Council

Watershed community conversations

- 1 CRWD Office
- 2 Hallie Q. Brown Community Center
- 3 Gloria Dei Lutheran Church
- 4 Arlington-Hills Community Center

VIEWS OF WATER RESOURCES IN THE COMMUNITY

Community members shared their thoughts on valuable community resources, citing recreational benefits and the importance of access to water and natural resources on their lives, and opportunities for resource improvement. Many participants noted the influence of water and natural resources on their physical health and overall well-being, citing recreational benefits of access to high-quality natural areas. Trees, vegetation, and green space were cited as valuable resources and areas for improvement, while many respondents noted concerns of pollution and climate change.

What are the valuable resources in your community?



Are there parts of your community or natural environment you would like to see improved?

Water Quality (Pollutants)

Trash & litter

Green space & vegetation

Recreation and access

Education and stewardship

How does the health (quality) of water resources and natural areas affect you and your community?

#1 Physical health and mental well-being

#2 Recreation

#3 Quality of community

#4 Plant and wildlife health

KEY OUTCOMES

- Strong emphasis on vegetation, green space, and associated benefits for recreation and quality of life
- Concerns about the impact of climate change on water resources and vegetation
- Interest in community participation through rain gardens and other practices
- Increase public awareness of local water resources and CRWD's work to improve resource health

The Mississippi River and Como Lake are resources respondents were most concerned about.

For future updates and more information on the WMP, visit:
<https://www.capitolregionwd.org/watershed-management-plan/>

Find us on social media!



Appendix C

CRWD Strategic Plan

CRWD Strategic Plan, June 13, 2019

In late 2018, Capitol Region Watershed District began a strategic planning process. The strategic plan was timed to be completed ahead of the District's 2020 Watershed Management Planning process and sought to understand the current situation and define the vision, values and high-level goals of the organization for the next 10 years. A detailed description of the planning process can be found in Appendix 1.

Mission

To protect, manage and improve the water resources of Capitol Region Watershed District

Vision statement

Cleaner waters through innovative, resilient and equitable watershed management in collaboration with diverse partners.

Values

The District values our vibrant, and varied communities and strives to focus our work to support the goals of each community. We complete our work with the following values:

- **Integrity:** transparency, accountability, fiscal responsibility
- **Diversity:** equity, inclusion, openness
- **Collaboration:** strategic partnerships, communities
- **Innovation:** bold, science-based

Goals (desired future condition)

1. Cleaner waters

Measurably cleaner water resources will be achieved as documented by conventional water quality metrics. Additionally, the public perceives that the District's water resources are noticeably cleaner.

2. Stormwater managed to mimic natural hydrology

Stormwater management approaches, that include more green infrastructure systems, will improve water quality, recharge groundwater, achieve healthy ecosystems and provide multiple other benefits for the community. Stormwater runoff is embraced as a resource instead of a waste product.

3. Communities connected to water

Re-establish historic or previously lost water resources. Connect communities to water resources to achieve more equitable access to water across all communities of the District.

4. Community awareness and action for water quality

Community understanding and support of the need for and value of clean water is foundational to implementing the work of the District and accomplishing our mission. A community that is engaged and informed is empowered to take action.

5. Resilient watershed management strategies

Changing climate will require the District to incorporate resilient strategies and practices into everything we do. Through implementation of adaptive management, the District will achieve more resilient water management infrastructure.

6. Improved, consistent water governance

Water governance will be more consistent, streamlined, and equitable in and adjacent to the District. Consistent watershed boundaries and regulation across municipal jurisdictions will result in better and more efficient efforts towards water quality improvement.

7. Equity in the work of CRWD

Diversity of our community will be reflected in the District's staff, board and Citizen Advisory Committee (CAC). Programs and projects are offered and implemented equitably across the watershed.

8. Organizational excellence

The District will be a key partner and innovator, both locally and nationally. The District will implement industry-leading work while widely sharing our experiences to help advance the field of water management. The District will be a creative and collaborative workplace with passionate, skilled staff, CAC and Board Managers.

Strategies (actions to achieve our goals)

A. Leadership (Lead in stormwater management)

1. Increase implementation of green infrastructure

The District will continue to promote green infrastructure. This approach to stormwater management provides additional community benefits (social, environmental, economic) beyond the stormwater function and focuses on rain as a resource rather than a waste product to be managed.

2. Bring water back to St. Paul

The District will work to restore/re-create water resources that have previously been lost or buried. This strategy includes bringing water back to the consciousness of the community through increased awareness, connection, and access to water.

3. Innovate using new technologies and research

The District will innovate when developing, implementing and evaluating its programs and projects to be most effective in carrying out its mission. Research, including practical application of new technologies, will be critical to effective innovation.

4. Ensure long-term project operation and maintenance

Significant investment has been made in stormwater management practices. Providing adequate resources and commitment to ensure long-term operation and maintenance is critical to making sure these investments are protected and continue to function as designed.

5. Implement targeted water management projects that improve water quality, are resilient and provide community benefits

The District will ensure that the most value is derived from funds spent to implement water management projects. These strategic investments will be maximized through targeted identification and prioritization of cost-effective projects that are resilient to climate change and provide equitable community benefits.

B. Inspiration (Inspire and engage stakeholders to actively support the District's mission)

6. Increase visibility to cultivate support

Increased visibility of the District and its mission is important for long-term public support of its work. Sharing and communicating who the District is, the work we conduct and why its beneficial to the community will help to build community support.

7. Maintain existing and cultivate new partnerships

The District has been successful in cultivating partnerships and will continue to maintain them. Cultivation of new partnerships will need to occur as they are a key method for implementing work to all areas of the District.

8. Expand connections and engage with diverse/underserved communities of CRWD

The District will expand its work with, and in, diverse and underserved communities by connecting them to District work and focusing new projects/programming where the District has had less of a presence.

C. Organizational Strength (Strengthen and expand the District's role and capacity)

9. Promote consistent, efficient water management, governance and funding

Watershed District representation across all of St. Paul would provide a more consistent, equitable and efficient delivery of water resource improvement/protection work to all City residents. The District will strive for consistent water management regulations across all its member municipalities.

10. Hire, develop and retain high quality staff

Passionate and highly skilled staff are vital to implementing the often times complicated and nuanced work of the District. The District will provide competitive compensation, enriching professional development, and a challenging and collaborative workplace to develop and retain high quality staff.

11. Recruit and retain high quality volunteers

Support, train and empower volunteers to help expand the reach and work of the District.

Appendix 1—Strategic Planning Process

CRWD strategic planning process

In 2018-2019 the Capitol Region Watershed District created a 10-year strategic plan, which will guide development of the next watershed management plan. The process engaged partners and staff in assessing the current situation, reaffirming the agency’s mission and articulating values, and describing a vision of the desired future, 10-year goals and strategies to achieve the goals. Specific implementation actions will be included in the watershed management plan. The CRWD contracted with the State of Minnesota’s Management Analysis and Development (MAD) office to facilitate the planning process.

Strategic plan elements

Elements of the strategic plan are intended to answer the following questions:

Situation assessment: What should we keep in mind as we plan for the future?

Vision: What is the desired future state we are helping to create (brief description)?

Mission: Who are we and why do we exist?

Values: How does the organization approach its work?

Goals: What specific outcomes should we look for within this broad vision?

Strategies: How will we achieve the goals?

Situation assessment (see Appendix 2)

Over the Fall and Winter of 2018-2019 MAD met with stakeholders in one-on-one interviews and focus groups, discussing the following questions:

1. Describe in your own words the mission of the CRWD.
2. What is the CRWD doing well?
3. What are the two most important issues the CRWD needs to address?
4. What should the CRWD enhance or change in order to respond to these issues and effectively carry out its mission over the next 10 years (may include internal organizational considerations)?
5. Is there anything else you would like to comment on?

The stakeholders included:

Focus groups

- Citizen Advisory Council
- Board of Managers
- CRWD staff

- Agency and city partners
- Grantees, citizens and community groups

Interviews

- St. Paul Public Works Director

- St. Paul Water Resource Coordinator
- St. Paul Chief Resilience Officer
- CRWD artist in residence

Mission and vision

Board members and strategic planning team members [describe team membership] met in February 2019 to review and draw conclusions about the current situation, review and confirm the agency's mission and identify possibilities for a 10-year vision. Participants also brainstormed values to complement the mission, as a way to express how the organization approaches its work.

Goals

The strategic planning team met in March 2019 to review and refine products created at the previous meeting, identified goals and brainstormed strategies for achieving the goals.

Appendix 2—CRWD 2018 Situation Assessment

CRWD Situation assessment

February 2019

Introduction

In preparation for developing a new 10-year strategic plan, the Capitol Region Watershed District (CRWD) asked Management Analysis and Development (MAD) to conduct a situation assessment. Over the Fall and Winter of 2018-2019 MAD met with stakeholders in one-on-one interviews and focus groups, discussing the following questions:

1. Describe in your own words the mission of the CRWD.
2. What is the CRWD doing well?
3. What are the two most important issues the CRWD needs to address?
4. What should the CRWD enhance or change in order to respond to these issues and effectively carry out its mission over the next 10 years (may include internal organizational considerations)?
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The stakeholders included:

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- Citizen Advisory Council
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- Agency and city partners
- Grantees, citizens and community groups

Interviews

- St. Paul Public Works Director
- St. Paul Water Resource Coordinator
- St. Paul Chief Resilience Officer
- CRWD artist in residence

MAD's summary of the interview and focus group results is presented below, for review and discussion at the February 28, 2019 meeting with CRWD board and strategic planning team members. The intent is to stimulate thinking about the vision and strategies for the CRWD's next strategic plan.

Mission

All of the interviewees see the mission of the CRWD as to protect, manage, and improve the water resources within St. Paul or the Capitol Watershed district. Many interviewees explained that the CRWD does so through:

- Education and outreach to the public
- Advocating for water resource management
- Coordination and collaboration with other municipal and government entities for water management
- Gathering sound data and using scientific evidence for decision making
- Technical expertise and guidance in developing Best Management Practices (BMPs)
- Securing funds for projects and developing programs to promote water quality
- Playing a regulatory role such as permitting, wetland management, etc.

Accomplishments

Leadership

- Many interviewees described the CRWD as leaders in watershed management in the region. Some also added that that work done by CRWD is transferable and they have done a good job of sharing that knowledge.
- One interviewee noted that while in the past the CRWD's role as a regulator had caused friction, the CRWD has managed to balance its role as a regulator and partner.

Partnership

- Several people commended the work done by CRWD to engage with stakeholders and partners in a meaningful way in the work they do. Examples include:
 - Working with cities to do cooperative projects to share dollars
 - Work with other agencies such as the Central High School parking lot project
 - Work with the city of St. Paul and individual homeowners on raingardens in the Como Park neighborhood
 - Work with the city on the storm water management project at Alliance Field by providing funds to make the system viable and cost competitive.
 - Stormwater management project along University Avenue and Aldine Street.
- One interviewee also noted that CRWD partnerships help to foster innovation in how stakeholders approach watershed management. The interviewee cited the example of the stormwater management project at Alliance Field:

"That site is the first time the city has done a district stormwater system... the district saw the benefit of that approach. [The CRWD is] a key partner in them pursuing that approach. In fact, ordinance changes are in process to structure rates differently to users. This is really valuable to the city."

- A few interviewees noted that the CRWD has worked on relationship building over time. One interviewee noted that they have improved their relationship with the communities compared to 10 years ago, while another discussed how CRWD has worked to build trust in their partner relationships.
- One interviewee also noted that the CRWD builds relationships not just with stakeholders in a technical capacity, but also others in the watershed communities to get their involvement in a meaningful way.

Innovation

- Several people described the CRWD as innovative in their approach to their work. Interviewees mentioned work done by CRWD including: working with the community and individual home owners to use boulevards for raingardens; building cisterns; porous pavements, daylight Trout Brook, work with the CHS field and Met Council to collect water for watering the field and flushing toilets, etc.
- Some interviewees praised the innovative and can-do attitude in leadership and staff of the CRWD.

Operations

- Many interviewees noted that the high level of skills and expertise of the staff at CRWD. Staff pointed out that CRWD has established ways to collaborate across projects and expertise level, and that the organizations leaderships supports the work they do.
- Similarly a few interviewees noted that the board and staff trusted each other. The board lauded the way that the staff gather information and new ideas. Staff members commended the board for governing well and described them as functional and supportive. Others noted the high level of engagement of the Citizen Advisory Committee (CAC) compared to other districts, some who do not have a CAC.
- Interviewees noted the effective management of the CRWD, including:
 - Thoughtful and informed decision on where to allocate resources and documenting logical decision making (e.g., rule making)
 - Technical expertise in watershed management with well-planned processes grounded in science
 - Clear processes for competing for funds
 - Commitment to monitoring and evaluating impact of project over long-term, and adapting strategies based on this information
 - Tracking information to build database of information (WSKI database and DIRT)
 - Ensuring distribution of projects throughout the district, and willingness to put resources to projects, and
 - Looking for projects with more comprehensive benefits (example reducing groundwater pumping and use of potable water, aesthetic benefits and ways to better engage the community, etc.

A few interviewees noted that the CRWD's skilled workforce, trust between staff and leadership, data-driven decision making, and stakeholder engagement positions them well to address the future needs of the organization.

Future Challenges

When asked about the two most important issues on the horizon for the CRWD, interviewees noted:

Climate change

The majority of interviewees noted that CRWD needed to address changing conditions related to climate change. Several interviewees highlighted that the changing climate, resulting in increased storm events, temperature extremes, and higher precipitation will affect how the district manages its watershed and stormwater systems. One interviewee noted about heavier precipitation, “there are going to be challenges with existing infrastructure handling those events in particular . . . requiring even larger facilities, larger pipes, which could create tension with development.” Another noted that the CRWD will need to develop a crisis communication plan. Another interviewee said the CRWD needed to make a deeper connection between water quality and climate change mitigation in its education efforts.

Education and outreach

Many interviewees focused on changing people’s attitudes towards water through education and outreach. As one interviewee noted, the CRWD needs to “elevate the awareness and appreciation of water across the watershed. Everyone gets drinking water importance. Other water is seen as a waste product.” Specific outreach and education efforts mentioned include:

- The need to raise awareness about the CRWD and its role to build stakeholder support
- Outreach to communities who have not been engaged with in the past, such as apartment owners
- Partnership with communities that are underserved by the district now such as racial and ethnic minority groups, and connecting the work of the district to equity and justice issues. Some interviewees also noted the importance of communicating water quality messages with communities that are different from them (e.g., those who had previously lived in arid regions with different relationship to water), and suggested tapping into local knowledge and cultural heritage of other communities to deliver those messages
- Build capacity of the public to play a role in advocating for public policy changes

Development and infrastructure

A few interviewees discussed the capacity of the existing infrastructure of the watershed management systems and highlighted future challenges related to development in the region. Interviewees noted that the region is heavily built out, with aging storm systems and infrastructure, so there is a greater need for public policy changes to build resilience. Interviewees cited priorities, such as the need to work together across county, city and the watershed to address these issues, and the need to work with policy makers and individuals to promote changes such as permeable surfaces and raingardens. One city official noted that, with the growing need for newer infrastructure, CRWD can play a role in helping stakeholders work through new systems. Another interviewee noted that CRWD should continue to guide and support the city of Saint Paul in long term maintenance of green infrastructure that has been installed.

Addressing diversity

A few interviewees discussed the need for the CRWD to address diversity both within the organization and in how it interacts with the communities. One interviewee noted that attracting staff that is diverse is important for the CRWD stating that, “[We] cannot have people go to public meetings and tell the great things we’re doing if the staff don’t reflect the communities we serve.” Some interviewees noted that the CRWD does have a diversity plan aimed at working on issues of race, class and gender, however, as one interviewee noted implementation of the plan is a long journey.

CRWD’s role

A few interviewees discussed the potential for growth in the role and scope of the CRWD, including:

- How to manage the staff and budget of the CRWD with the growth in the organization
- Providing funding and maintenance for BMPs that are existing and will be built over the next 10 years
- How to address emerging issues such as related to emerging contaminants, and how to address them in project planning, monitoring, and communications
- Prioritizing the initiatives of the CRWD to identify their role while being aware of capacity, and understanding the role of the CRWD within larger state system
- Tackling projects under one acre
- Providing access to water ways by providing seed money to recreation departments such as canoeing and fishing opportunities
- Attracting staff who are forward-thinking, risk-taking, and willing to try new things
- Dealing with impact of salt and road salt
- Advocating for expansion of the watershed boundary to include the rest of St. Paul, which has a lot of activity and development and needs more protection.

Opportunities

When asked about what the CRWD should enhance or change in order to respond to the challenges outlined above and effectively carry out its mission in the next 10 years, interviewees noted the following;

- **Funding:** Interviewees noted the need to continue to funding BMPs and to develop stable and predictable funding for BMPs such as using bond financing. Other suggestions include alternative funding mechanisms to build new infrastructure to improve water quality, such as environmental impact bonds and new taxing districts. One interviewee proposed setting aside funding for future projects that may come up (e.g. Opportunity Fund).
- **Improve communication and outreach:** Interviewees discussed the need for improving outreach to communities not represented well in CRWD’s work, including expanding outreach efforts, hiring more staff dedicated to outreach and education, advancing diversity and hiring from underrepresented communities, expanding opportunities for youth stewardship (e.g., Youth Farm), collaboration with organizations (such as Fresh Water Society master water stewards, Conservation Corps, Urban Boat Builders), and using arts as an engagement tool. Other suggestions focused on enhancing the brand recognition of the CRWD, including using social media for visibility and credibility. One group suggested specific strategies such as internship and partnership programs (e.g., Kitty Anderson program at the Science Museum, and Frogtown Farm) to promote this field amongst students of color who may otherwise not be exposed to this field.

- **Collecting and sharing data:** A few interviewees discussed the need to collect data including helping communities to collect data, centralizing the data in a storm water database, to allow for more robust tracking and sharing.
- **New building:** A few interviewees the opportunity to use the new building to bring visibility to the work of the CRWD and its outreach efforts. As one interviewee noted, “[the new office will be] a much more dynamic space, designed with so many more elements that explain and illustrate water resources and stormwater management. It will help visitors to understand.”
- **Maintenance:** Interviewees also discussed the need to allocate more resources to doing inspection of previously installed projects, as well as budgeting resources to maintain those projects.
- **Partnerships:** Interviewees discussed the need to diversify partners or consultants in the work that the CRWD does, highlighting the need to target young people and bring them in to the field. They also stressed the importance of maintaining and developing new relationships with large-scale partners, individual residents, etc. Others mentioned educational institutions and other public entities for partnership in research.
- **Clear strategy and prioritization:** Interviewees also discussed the need for the CRWD to have a clear strategy for the work they do. They also discussed the need to move towards a unified sense of priorities and to develop a priority plan.

CAC vision

In addition to responding to the same questions discussed in all of the other interviews and focus groups, the Citizen Advisory Committee (CAC) brainstormed a vision for the future as a result of the CRWD's work in its next strategic plan. Their individual brainstormed ideas are included below in regular type, and their collective vision themes are included in **boldface type**.

Enhanced public recognition

- High positive visibility of CRWD among residents and organizations
- All of St. Paul + Falcon Heights + Roseville loves the CRWD
- Strong brand/image and broad name recognition

Water quality outcomes

- People swimming in Como Lake safely
- At least one unimpaired water body (Como, McCarrons, etc.)
- Water leaves CRWD better and healthier than when it arrives
- Cleaner water in the sewer drains
- Increased water quality and clarity for Como
- A big impact on Ford Plant Development with high visibility
- Happy wildlife

Recognized leadership

- Establish leadership beyond Minnesota . . . doing similar things in other organizations
- An organization recognized for its innovation and leadership

Fully engaged public in water quality activities

- Residents managing their run-off (in a CRWD style)
- Alternatives to turf (ex. Low mow, bee lawns)
- Every drain is adopted

Equity, diversity in outreach

- 10 BMPs on the East Side of St. Paul (Trout Brook area)

Organizational health

- Maximize skills of CAC members to support CRWD projects
- Succession plan for staff is in place
- Secure, diverse funding sources
- Have a crisis communication plan
- Increased diversity of CRWD staff and CAC

(Ungrouped)

Strong sustainable partnerships with commitments to water quality

Continuing successful CRWD projects and activities

The better for CRWD the better for St. Paul/Roseville and the world

Make peace with Ma Nature

Stormwater is seen as a utility (resource that can be reused; grey water, etc.)

Appendix D

CRWD Diversity, Equity and Inclusion Plan

Diversity, Equity, and Inclusion Plan 2020-2025



Capitol Region Watershed District
Saint Paul, MN

September 16, 2020



CRWD's Diversity, Equity and Inclusion Plan

Background, History and Implementation of Plan

CRWD's Board of Managers created a diversity and inclusion statement in 2010. "The Capitol Region Watershed District embraces and values diversity and seeks to recruit, promote and retain employees that reflect the community we serve. We believe that a diverse mix of employees enrich the workplace and enhance the quality of our service. The Capitol Region Watershed District encourages all qualified to apply for open positions."

In 2016, the Board directed staff to develop a Diversity Plan with support from a consultant. A Diversity Committee, including Board Managers Seitu Jones and Joe Collins and Citizen Advisory Committee (CAC) member Pat Cavanaugh, was established. In 2017, Azon Consulting was hired. They began by interviewing key Board, CAC and staff members to learn more about the district's cultural competency, mission, vision and values, and how they related to diversity and inclusion. A Diversity Strategic Plan was developed and approved in 2018.

The district began implementing the Diversity Strategic Plan by reviewing and improving its hiring practices with support provided by Ramsey County. The first step was to review CRWD's position descriptions and announcements and where the district was promoting its openings. Staff participating on interview committees attended implicit bias training and external colleagues were invited to participate in the training and interview panel as well. Interview questions were adapted to include topics such as ethics, values and a demonstrated understanding of and commitment to diversity and inclusion. Applicants received questions in advance of the interview and all personal information was redacted prior to staff review to reduce bias.

Historically, some areas and communities within the watershed have been underserved due to prior District work focused on high-impact projects located in limited areas (e.g., Como Lake and Lake McCarrons subwatersheds). In 2018, with the help a Minnesota GreenCorps Member, the District analyzed hundreds of grant-funded projects and found significantly less program participation in the central and eastern portions of the District (Trout Brook, Saint Anthony Hill and Phalen Creek subwatersheds). These subwatersheds correspond to areas of racially concentrated poverty (ACP50) defined by Metropolitan Council as 40% or more of the residents live with incomes below 185% of the federal poverty threshold and 50% or more of the residents are people of color.

Since 2019, staff have identified ways to reduce potential barriers to participation in the grant program by underserved communities. CRWD is offering higher grant awards and conducting promotion efforts in areas with low participation. Staff began reaching out to district planning councils and community groups in those areas to discuss the

program and how residents, businesses and community groups can get involved as well as additional support provided by the district.

CRWD adopted a policy for soliciting professional services in 2010 and solicits statements of qualifications from interested consultants on a bi-annual basis. The last time CRWD staff solicited qualifications from consultants was in early 2017 for the 2017–2018 consultant pool. A Request for Qualifications (RFQ) for general water resource professional services for 2019 and 2020 was distributed to CRWD's previous RFQ list as well as approximately 95 Minnesota businesses that meet WBE (women-owned) or MBE (minority-owned) certifications through MNUCP (Federal/State database) and/or CERT (Metro database administered by St. Paul).

CRWD received Statements of Qualifications (SOQs) from 28 firms and determined their qualifications for specific service areas. Of the submittals received, 15 were firms in CRWD's 2017-2018 pool, and 13 are new firms for 2019-2020. Of the new firms, six are disadvantaged business enterprises (DBE) bringing the total DBE firms in the pool to seven. Going forward, staff will request proposals or qualifications for projects from the pool within a respective service area as needed and will include DBE firms when possible.

Relationship building is the corner stone of establishing trust and making real progress when it comes to diversity and inclusion work. CRWD staff began developing and/or deepening relationships with community groups serving areas of the district where engagement has been low. Staff has presented at community meetings, attended many new events, elevated storytelling about diverse community members doing great work and created a new display with a local artist to better engage residents at community and cultural events. The district has also worked to identify and address barriers to participation in meetings such as transportation, childcare, accessibility, etc.

Since 2018, CRWD staff has gathered over lunch to discuss a wide range of diversity and inclusion topics. These meetings have been focused on reading or watching memoirs, blogs, and videos as well as a role play activity depicting a local environmental justice case. The group has covered topics such as racism, gender equality, environmental justice, sexual identity/orientation, mental health, indigenous history, personality type. The intention of this informal staff group is to build a more inclusive team internally and to make connections to our work that reach outside our organization.

CRWD has folded its Diversity Strategic Plan goals and implementation activities into its updated 10-year watershed management plan, which will be adopted in fall 2020. The plan also includes nine themes that reflect high level topics and District values that will be considered and weaved into every aspect of the District's work over the next 10 years. Community equity and engaging underrepresented groups is one of the nine themes. We recognize that we can achieve cleaner waters through engagement across the District's diverse communities.

Need for a Plan

CRWD serves a highly diverse population of residents. Over time, CRWD's population has grown more racially and ethnically diverse. Between 2000 and 2015, the percentage of people of color in the City of Saint Paul, which comprises 85% of the District, increased from 36% to 46%. Across Ramsey County, this percentage increased from 13% in 2000 to 30% in 2014. These trends are expected to continue through 2040.

The Board and staff acknowledged the need for a more thoughtful and strategic approach to the district's diversity and inclusion work in an effort to better engage all of CRWD's residents.

The Diversity Committee developed the following goals in preparation for creating its first Diversity Strategic Plan.

1. CRWD and its service providers should reflect the racial, gender and cultural demographics of the watershed and City of Saint Paul.
2. Understand and incorporate cultural perspectives on water and government.
3. Create opportunities for people of color in the environmental/water resources profession through training and recruitment.
4. Consider equity and equality as a means to achieve diversity.
5. Use water management as a tool to help address local and community concerns.

CRWD participants and external partners involved in developing the Plan

CRWD staff, CAC, Board of Managers

Diversity Committee: CAC member Pat Cavanaugh and Board Managers Seitou Jones and Joe Collins with support from CRWD staff Mark Doneux and Jessica Bromelkamp

Val Jensen, AZON Consulting, Diversity Strategic Plan

Dana Mitchell, Assistant Ramsey County Attorney, Best Hiring Practices

Paul Gorski, Equity Literacy Institute, Implicit Bias Training

Kevin Lindsay, Diversity Implementation Plan

Diversity, Equity and Inclusion Plan Timeline

2010

Board develops the following diversity statement.

12/2016

Diversity Committee formed

1/2017

Azon Consulting is hired to develop a Diversity Strategic Plan.

Interviews with staff, board, and CAC.

10/2017

Board reviews and comments on draft plan

8/2018

Second draft of plan, with Committee, staff and CAC feedback, presented to the board and approved.

See dates above for timeline of subsequent diversity-related activities since Board approval of the Diversity Plan.

Geography of Capitol Region Watershed District

Capitol Region Watershed District includes portions of the Cities of Saint Paul, Roseville, Lauderdale, Falcon Heights and Maplewood.

Barriers that were encountered during the process

Meeting audiences where they are was emphasized in the study A Community Capacity Assessment for Stormwater Management in the Twin Cities Metro Area, 2016. CRWD has been making intentional efforts to do just that by participating in numerous cultural events that are not explicitly connected to water management.

CRWD has also learned that to succeed in being a diverse and equitable organization, it is important to hire staff and consultants that reflect the communities we serve. Staff has been working with partner groups to strengthen programming that educates and empowers young people of all backgrounds to pursue careers and higher education in natural resource fields.

Outcomes and Benefits of the Plan

- Best Practices in Hiring
 - New publications where positions were posted: African News Journal, Hmong Times, Insight News, LaPrensa/Vida y Sabor, MN Spokesman Recorder.
 - CRWD received 284 applications for five positions. Demographics were not collected during the application process.
- Stewardship Grant Equity Bonus
 - Staff conducted outreach to three Saint Paul District Planning Councils.
- Water Resource Professional Services Consultant Pool Expansion
 - 95 Minnesota businesses that meet WBE (women-owned) or MBE (minority-owned) certifications through MNUCP received the 2019-2020 Request for Qualifications

- CRWD received six new Statements of Qualifications from disadvantaged business enterprises (DBE) bringing the total DBE firms in the pool to seven.
- 8 BMP maintenance service providers (landscape contractors) including 4 DBEs received the request for quotes for 2020 services.
- CRWD hired a DBE firm to provide 2020 BMP maintenance services.
- Relationship Building
 - In 2019, CRWD made connections with nearly 11,000 residents at over 70 different events. Events included school presentations, tours, community gatherings and others reaching audiences of all backgrounds and ages across the watershed. CRWD emphasized its presence in neighborhoods and with cultural and ethnic groups the District had previously not worked with.
- CRWD Diversity and Inclusion Staff Group
 - 12 meetings to explore a variety of diversity and inclusion topics.

Lessons learned

The district is very comfortable developing and implementing plans to complete projects. The Diversity Strategic Plan is unique in that the work does not always materialize in a linear way and will likely continue indefinitely, even with specific goals and outcomes in mind. Part of moving forward is embracing that journey and making progress without knowing what to expect and that some strategies may fail. The key is to learn from them and to make improvements.

In cases where the district does not have relationships in a community, it's most effective to communicate through and with trusted community leaders and organizations. The district continues to look for ways to communicate about its programs and projects in ways that resonate with what's important to those audiences. This includes translating materials, amplifying the work of partners through storytelling and sharing, and incorporating the arts and technology into our community engagement efforts.

Plan Costs

External consultants and Training	\$25,000
Staff and Board costs	\$10,000

Capitol Region Watershed District values diversity, equity and inclusion and can achieve cleaner waters through engagement across communities.				
COMMITMENTS				
INNOVATION We will be innovative in our approaches to communities who truly represent our district.				
COLLABORATION We will continue to collaborate across differences.				
OPEN We will be open to the challenges our community presents as it relates to diversity and inclusion.				
PASSION We will approach our efforts of inclusion with the same level of passion as water resource protection.				
Priorities	Goals	Implementation Tasks	Indicators of Progress	Timeline
1. Expand CRWD’s internal awareness of the opportunities and challenges related to creating a more diverse and inclusive environment.	Goal 1. a) Create safe spaces and opportunities to explore and understand unconscious bias and increase cultural competency.	Create internal communication strategy about the importance of Diversity, Equity, and Inclusion (DEI). Identify speakers and presentation topics. Select DEI workshop opportunities. All Board, Staff and CAC will attend Implicit Bias and Anti-Racism Training.	Indicator 1. a) Internal communication strategy has been created. Speakers and topics have been identified. All Board, Staff and CAC attend 1-2 Implicit Bias/Anti-Racism Training workshops or cultural experiences annually.	2020-2022, ongoing
	Goal 1. b) Formalize regular reviews of progress made implementing the Diversity Strategic Plan and share with CRWD’s staff, Board and CAC.	Schedule regular meetings throughout the year between Administrator and Senior leadership team to discuss DEI efforts. Consider implementing Diversity tool or dashboard to graphically communicate progress and present to the Board of Managers.	Indicator 1. b) Provide quarterly Diversity Strategic Plan updates at CAC, Board, and staff meetings.	2020-2022, semi-annual
	Goal 1. c) Establish Diversity Coordinator.	Designate a Diversity Coordinator on staff to lead and coordinate the implementation of the District's Diversity Strategic Plan and track progress to achieving the District's DEI goals and actions.	Indicator 1. c) Diversity Coordinator has been identified and appointed.	2020
2. Deepen relationships with many communities in CRWD by increasing outreach.	Goal 2. a) Use local data to learn more about the audiences CRWD serves.	Meet with the Office of MN Demographer to better understand demographics within CRWD. Meet with the University of MN Center for Urban & Regional Affairs (CURA) Coordinator of Community Geographic Information Systems (CGIS) Program. Conduct demographic analysis of the District and determine how this information will be used. Meet with Minnesota Legislative POCI Caucus (People of Color and Indigenous) and ethnic community groups to gain a better understanding of ethnic communities and to identify strategic community partners.	Indicator 2. a) Meet with diverse groups, community leaders and partner organizations to identify three underserved ¹ communities to focus engagement and communications work. Meet with MN Demographer, gain access to data/maps.	2020-2021
	Goal 2. b) Create an outreach plan which includes community engagement focused on building long-term, sustainable relationships.	List existing outreach strategies. Develop and implement Thick Engagement ² . Identify evaluation tool for community engagement plan.	Indicator 2. b) Implement an outreach plan for three underserved communities with guidance from members of the community.	2020-2021, ongoing
	Goal 2. c) Create a communications plan which includes materials that are culturally appropriate and translated into the underserved community’s native language(s).	Review existing communications materials. Meet with MN Legislative POCI council and ethnic community groups to refine engagement and communications strategy. Identify metrics for communication plan.	Indicator 2. c) Implement a communications plan for the same three underserved communities (identified in 2. b) with guidance from members of the community.	2020-2022, ongoing

Priorities	Goals	Implementation Tasks	Indicators of Progress	Timeline
3. Increase organizational diversity and inclusion efforts by increasing recruitment of candidates who truly represent our district for staff, CAC and service providers.	Goal 3. a) Identify organizations, schools and student groups working with people of color and underserved communities to encourage them to enter the environmental field.	Identify trade associations or groups comprised of environmental organizations to collaborate on DEI efforts. Develop long term employment strategy of raising visibility of employment opportunities in the environmental field within high schools and colleges.	Indicator 3. a) Engage 3-5 organizations and schools working with people of color and underserved communities.	2020, ongoing
	Goal 3. b) Formalize best practices in hiring staff are used to ensure an inclusive process and to provide diverse pool of candidates.	Identify hiring needs (ongoing). Ensure that organizations and groups are identified and are made aware of CRWD’s hiring opportunities. Develop schedule for outside consultant to review hiring practices. Gain more insight on emerging best employment practices. Use DEI Watershed Forum to develop recruiting partnerships at colleges and recruiting fairs such as People of Color Career Fair	Indicator 3. b) Research and ensure best practices in hiring are used.	2020, ongoing
	Goal 3. c) Outline and implement recruitment efforts for the CAC in communities of color.	Meet with officials from organizations such as state POCI councils, councils serving people with disabilities, ethnic business chambers, and ethnic community groups to discuss recruiting.	Indicator 3. c) Engage community leaders and organizations to invite participation on the CAC.	2020-2022, ongoing
	Goal 3. d) Develop and implement best practices to increase contracting with Targeted Group/Economically Disadvantaged/Veteran Owned Small Businesses ³ .	Review, benchmark and assess existing CRWD procurement plan; identify and implement procurement strategies.	Indicator 3. d) Increase the number of contracts and vendors from the certified Targeted Group/Economically Disadvantaged/Veteran-Owned Small Businesses.	2020-2022, ongoing
4. Be a Leader in Diversity and Inclusion.	Goal 4. a) Develop and maintain a list of diversity and inclusion partners.	Identify watershed districts and partners that could act as DEI representatives within watershed community; Meet with DEI representatives to identify collaboration opportunities; Create DEI Metro-Wide Watershed Organization Forum. Use DEI Watershed Forum to supplement list of DEI partners.	Indicator 4. a) Invite our partners to explore and implement diversity and inclusion efforts.	2020, ongoing
	Goal 4. b) Create a leadership forum focused on sharing diversity and inclusion work with other watershed districts and partners.	Convene DEI Watershed Forum meeting with watershed districts to: (1) benchmark DEI efforts, (2) identify collaboration opportunities in employment, procurement, and engagement, (3) share best practices, and (4) identify forum infrastructure.	Indicator 4. b) Host semi-annual diversity and inclusion workshops for watershed districts, conservation agencies and environmental non-profit organizations.	2020-2022, ongoing
	Goal 4. c) Advocate for diversity and inclusion.	Present CRWD’s DEI initiatives.	Indicator 4. c) Promote CRWD’s approach and efforts at a variety of forums.	2020-2022, ongoing

¹ Underserved is defined as communities where Capitol Region Watershed District has less presence.

² Thick Engagement is more intensive and interactive. Opportunity for dialogue is offered in small groups, interaction and exploring of diverse perspectives is encouraged, and the options generated by participants are shared with all. Identify evaluation tool for community engagement plan.

³ The MN Office of State Procurement’s Targeted Group/Economically Disadvantaged/Veteran-Owned Small Business Procurement Program supports small businesses owned by a woman, racial minority or person with a substantial physical disability and certified as Economically Disadvantaged or Veteran-Owned.

Appendix E

CRWD Communications and Engagement Plan



Communications and Engagement Plan

February 5, 2020



TUNHEIM

PUBLIC RELATIONS | PUBLIC AFFAIRS
MANAGEMENT CONSULTING | DIGITAL

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Executive Summary

Capitol Region Watershed District (CRWD) is in the process of creating a 10-year Watershed Management Plan (WMP). As part of that process, the District engaged Tunheim to create this Communications and Engagement Plan to be incorporated into the management plan.

Methodology

In order to create the recommended strategies described in this Communications and Engagement Plan, Tunheim reviewed previous plans, talked to internal stakeholders, analyzed current communications and engagement tools and vehicles, and reported preliminary findings. The strategies and tactics recommended in this Plan are based on those findings.

Key Audiences

Because Tunheim's analysis showed that many of CRWD's key audiences had low levels of existing awareness of CRWD and/or low levels of engagement, they recommend that audiences hear consistent messages about CRWD from multiple channels. In order to reach District residents, CRWD should focus first on community, who will in turn communicate directly with the media, community organizations, their constituents and the general public. The second priority audience is the media, which broadcasts to all other audiences. The next priority will be community organizations, and the final priority is communicating directly with District constituents via direct mail, email or social media.

Communications and Engagement Strategies

To achieve effective external communications and engagement, Tunheim recommends a phased approach where tactics are designed cross-functionally to leverage each other.

The communications strategies include:

- 1) Identify Keystone Projects and Programs
- 2) Build Upon Communications and Engagement Infrastructure
- 3) Track and Leverage Community Partnerships
- 4) Create Content and Target Social Media with Paid Ads and Message Boosts
- 5) Conduct Ongoing Proactive Communications and Engagement

Conclusions

Because Tunheim found that current understanding of CRWD within the District is limited, all communication and engagement activity needs to reflect a consistent CRWD brand and ensure that the content is created with the intent of serving the needs of residents, business owners, public officials and other stakeholders.

Situation Analysis

Capitol Region Watershed District (CRWD) is a local unit of government charged with protecting, managing and improving water resources within its 40 square miles. The District includes portions of Falcon Heights, Lauderdale, Maplewood, Roseville and St. Paul. CRWD has a population of approximately 225,000 people and is located within Ramsey County. The Mississippi River is the predominant water resource to which the entire district drains. Como Lake, Crosby Lake, Little Crosby Lake, Loeb Lake and Lake McCarrons are also located within the District.

The District's overall goals are:

- Cleaner waters
- Stormwater managed to mimic natural hydrology
- Communities connected to water
- Community awareness and action for water quality
- Resilient watershed management strategies
- Improved, consistent water governance
- Equity in the work of CRWD
- Organizational excellence

The District engaged Tunheim to create this Communications and Engagement Plan which will be integrated into the overall Watershed Management Plan. All strategies and tactics in this Plan are based on current best practices and are designed to further the mission of the District.

Previously, CRWD put emphasis on promoting its projects and partnerships, but is now moving toward elevating the visibility of the organization (impacts on quality of life, etc.). The District has a long history of communicating about projects and programs to constituents on a case by case basis and reaching out to priority audiences (including those that have typically been underserved).

The addition of a communications and engagement division manager to CRWD's staff has made significant progress toward improving Districtwide communications and engagement. However, the amount of infrastructure work that is required in addition to ongoing projects, coupled with the new priorities on improving Districtwide branding, diverse citizen engagement and social media outreach exceeds the capacity of the District's current staff.

Communications and Engagement Goals

The objectives for the District's communications and engagement activity over the next 10 years are:

- Support the Watershed Management Plan;
- Increase community participation in activities that improve the quality of the water in the District;
- Promote general Districtwide awareness of CRWD, including traditionally underserved areas; and
- Develop advocates for CRWD who will actively participate in improving the watershed and advocate for projects and programs and activities that improve District water quality.

Key Audience Matrix

CRWD's primary stakeholders are the residents of the District. For the purpose of the Communications and Engagement Plan, the following audiences have been identified:

- Public Officials
- Business Communities
- Media
- Community Organizations
- Academic Organizations
- CRWD Participants/Ambassadors

The goal is to proactively communicate with these key audiences with the intention that they will share CRWD's messages with their stakeholder groups so that residents hear CRWD's messages from a variety of trusted sources.

Audiences have been prioritized based on the size of the reach with the residents they have—audiences with greater communications reach have been ranked as higher priorities. It is important to work with each of these audiences to ensure CRWD's key messages are amplified consistently across all channels.

Primary Audience: Residents	Secondary Audience, priority one (High communication reach)	Secondary Audience, priority two (Medium communication reach)	Secondary Audience, priority three (Low communication reach)
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Key Audience	Current Communications Vehicles	Proposed Additional Communications Vehicles
Public		
Residents (primary)	Events Partnerships and grants Website Social media Emails	Encourage communications and engagement through multiple channels including: Public officials, Media, Businesses, Community Organizations, Academic and CRWD ambassadors
Public Officials		
Community Leaders	One-to-one meetings Emails Phone calls	Regular updates by mail In person meetings Newsletters
City and County Staff	One-to-one meetings Emails Phone calls	Regular updates by mail Annual in-person meetings Newsletters Resume Annual City Directors' Meeting (Discontinued)
District Planning Councils	One-to-one meetings Emails	Events Newsletters Social Media
Regulators	One-to-one meetings Emails	Newsletters Social Media
Business		
Business organizations (such as local chambers and neighborhood business associations)	One-to-one meetings Events	Events Newsletters Social Media
Independent businesses		Letters Newsletters Social Media
Developers	Permitting outreach	Newsletters Social Media
Media		
Newspapers, including outlets serving non-English speaking communities in the District	Press Releases Events	Hold deskside meetings
Community newspapers	Press Releases	Hold deskside meetings

Key Audience	Current Communications Vehicles	Proposed Additional Communications Vehicles
	Events	
Television	Press Releases Events	Hold deskside meetings
Radio	Press Releases Events	Hold deskside meetings
Community Organizations		
Water and Environment Focused Organizations	One-to-one meetings	Newsletters Social Media
Community Organizations (such as Optimus Clubs, Rotaries, Scouts, Churches, Unions, etc.)	Partnerships Grants	Letters Newsletters Social Media
Other Watershed Districts and Minnesota Association of Watershed Districts	Coalition Meetings	Newsletters Social Media Ads
Academic Community		
K-12 Schools	Partnerships Grants	Newsletters Social Media
Colleges and Universities	Partnerships Grants	Newsletters Social Media Ads
CRWD Participants/Ambassadors		
Project Partners	Partnerships	Newsletters Social Media Ads
Grantees	Grants	Newsletters Social Media Ads
Master Water Stewards	Partnerships	Newsletters Social Media Ads
Volunteers	Emails Newsletters	Newsletters Social Media Ads
Permittees	Letters In-person follow-up	Newsletters Social Media Ads

Communications and Engagement Plan: Recommended Phased Approach

To achieve effective external communications and engagement, Tunheim recommends focusing all communications and engagement work on the District's keystone projects and programs. All additional strategies will be rolled-out in a phased approach and are designed cross-functionally to leverage each other and engage priority audiences.

The five communications and engagement strategies will be rolled-out in the following order:

- 1) Identify Keystone Projects and Programs
- 2) Build Upon Communications and Engagement Infrastructure
- 3) Track and Leverage Community Partnerships
- 4) Create Content and Target Social Media with Paid Ads and Message Boosts
- 5) Conduct Ongoing Proactive Communications and Engagement

Phased Strategies

Strategy One: Identify Keystone Projects and Programs

Rationale: In order to amplify the District's key messages over the next 10 years, it will be necessary to prioritize communications and engagement work. Projects and programs will ebb and flow over the decade, so setting criteria for focusing work is important for the success of the Communications and Engagement Plan.

Based on review of CRWD's Strategic Plan and the Diversity Strategic Plan, Tunheim recommends that CRWD adopt the following criteria for identifying keystone projects and programs:

High visibility projects that impact people Districtwide, such as the following current projects:

- Como Lake Golf Course Best Management Practices
- Como Lake In-Lake Treatments
- Ford Site Redevelopment
- Allianz Field
- CRWD building

Projects and programs that are either based on or include partnerships with organizations that are respected within traditionally underserved communities. We have identified the following projects in communities currently underserved by CRWD:

- Trout Brook Nature Sanctuary
- Willow Reserve Restoration
- Midway Peace Park
- Swede Hollow Park
- Lower Phalen Creek

- Bruce Vento

Programs offered Districtwide, such as:

- Master Water Stewards
- Adopt a Drain
- CRWD Grants
- Watershed Artist in Residence

Timing: As soon as work on the Communications and Engagement Plan commences, CRWD should adopt criteria for evaluating communications and engagement priorities. Projects and programs should be reassessed annually based on these criteria.

Tactics and Measurement:

Tactics

- 1.1. Focus communications and engagement activities each year on the keystone projects and programs.

Measurement

Keystone projects and programs are redefined annually

Strategy Two: Build upon Communications and Engagement Infrastructure

Rationale: Our research shows that previously, CRWD put emphasis on promoting its projects, programs and partnerships, but is now working to engage more of the Districts' constituents by elevating the visibility of the organization. CRWD needs consistent branding and messaging standards to serve as foundational infrastructure for all communications and engagement activities.

Timing: Tunheim recommends that CRWD focus primarily on developing and upgrading its infrastructure in the first year. Once branding and processes are in place, less time will need to be invested in infrastructure, yet it will require ongoing attention throughout the decade.

Tactics:

- 2.1 Create standard branding and messaging
 - 2.1.1 Create brand standards and common language for projects, including developing a process to review the branding before printing or sharing information externally.
 - 2.1.2 Translate scientific text to plainspoken language to better engage and inform a wide variety of stakeholders.
 - 2.1.3 Create individual communications and engagement mini-plans for each keystone project and program affiliated with CRWD's brand.
 - Create individual messaging particular to each project, continuing to build on the District's new common language and brand standards.
 - Take ownership of message delivery to stakeholders across channels, including in cases

Measurement:

Create brand standards

Use focus groups to determine if text is understandable

Implement mini-plan for each keystone project

	where there are partnerships and other organizations in the mix.	
	- Focus ongoing emphasis on the District's keystone projects and programs.	
2.1.4	Make an online depository for communications assets for internal access (photos, profiles, videos, story maps and augmented reality).	Create one depository for communications assets
2.1.5	Create informational videos, virtual/augmented reality demonstrations and animated educational videos to share on social media, website and at informational kiosks.	Create three pieces of digital content for each keystone project and program
2.1.6	Finalize the District's crisis communications plan so that in the event of an incident, there is a standard procedure to follow.	Crisis plan finalized
2.2	Standardize external and internal communications processes	
2.2.1	Maintain and execute a strategic year-long editorial calendar for all communications and engagement activities. Regularly update the editorial calendar for media, engagement, events, blogs, electronic newsletters and social outreach.	Editorial calendar created and maintained
2.2.2	Develop clear guidelines on the use of CRWD language and brand standards and require all external communications to be reviewed by the Communications and Engagement Division.	Guidelines developed
2.2.3	Create a Communications Playbook that standardizes CRWD's communications processes. Include toolkits (with materials, timing, approval process and other necessary information) for the organization and keystone projects.	Playbook created
2.2.4	Clarify and standardize communications expectations and brand standards in partner contracts. Standardize project signage and educational displays.	Contractual requirements standardized

Strategy Three: Track and Leverage Community Partnerships

Rationale: In the past, many of CRWD's stakeholder relationships have been one-and-done, but the District now wants to prioritize strategic community engagement. By developing and tracking professional relationships, CRWD will be able to engage all audiences. The goal of this strategy is for more residents to be aware of, promote and engage with CRWD's mission. This will be achieved by establishing meaningful and dependable allies in the media, among colleagues, with public officials, community leaders and policymakers.

Once the foundation is laid, CRWD should routinely engage with these stakeholders. Ongoing outreach needs to be maintained to strengthen and leverage these relationships. Over time, CRWD will become a valued, community thought leader and position itself as an expert for the public, the media and public officials. As awareness of CRWD increases, so will participation and engagement.

Timing: Focusing on engagement should occur once CRWD has its infrastructure and messaging in place. Creating a system for managing and categorizing relationships will be a foundational investment which must be consistently built upon going forward.

Tactics:

3.1 Track stakeholder contacts

- Identify individuals and organizations that CRWD has existing relationships with or needs to develop.
- Prioritize stakeholder outreach.
- Record status of key relationships.
- Track communication touch points with each stakeholder.
- Assist in the planning of audience communication.
- Establish ownership of relationships to ensure that CRWD establishes and strengthens priority contacts.

3.2 Establish and strengthen media relationships

3.2.1 Identify critical media contacts who are most important for the District's keystone projects and programs.

- Offer regular project updates and background conversations on District activities.
- When CRWD does not have news to share, there are still opportunities to build media relationships.
- Strive to meet with key media contacts at least once per year to check in about the District and hear about what they are working on, what the latest is in the newsroom, and what their current interests are.
- Reach out to comment on or praise a recent story.
- Share other story ideas and tips outside of your work so they consider you a trusted source.
- Organize newsworthy media events such as a Green Line ride between Allianz and CHS Field to learn about major CRWD projects across Saint Paul.
- When water management-related news stories hit, proactively offer CRWD experts to media for context and interviews, and eventually they will become a go-to source for news outlets.
- Connect clean water resources to personal priorities - community health, cost of drinking water, neighborhood greenspace, property value, etc.
- Create standards for publicizing District activities and accolades it receives for awards, partnerships, grants, etc.

3.2.2 Expand the media list to include radio and TV as well as outlets that communicate with non-English speaking Saint Paul residents.

- The District's media list should be around 100 media-specific contacts and continue to grow over time.

Measurement:

Develop a contact management database track stakeholder relationships weekly

Update contact management database weekly to track media outreach

Reach out to at least one member of media each month.

Expanded media list

<p>3.2.3 Create personal stories of Master Water Stewards, Watershed Steward Award winners and board managers.</p> <ul style="list-style-type: none"> - Promote and capitalize on CRWD’s new building and its educational components. - Urgent, call-to-action stories about challenges to the watershed. - Mutual promotion of CRWD grants. - Use of virtual and augmented reality to bring visibility to underground work. - Food and water system connections, like Frogtown Farms. - Personal and community health, and the connection to greenspaces. 	<p>At least two new pieces of content created monthly</p>
<p>3.3 Find events and opportunities to position CRWD as an innovative leader in water management for all audiences, such as:</p> <p>3.3.1 Presentations</p> <ul style="list-style-type: none"> - White papers - Speaking engagements - Op-eds - Authoring blogs and other content - Serving as subject matter experts for water management issues - Enhance public affairs and community relationships 	<p>Create calendar of events and create thought leadership content.</p>
<p>3.4 Conduct strategic community outreach to all District audiences as prioritized:</p> <ul style="list-style-type: none"> - Leverage relationships with other Watershed Districts. - Strengthen relationships with other water and environmentally focused organizations. - Develop relationships with neighborhood organizations. - Execute CRWD’s diversity plan to focus on diverse and underserved areas. - Partner with chambers of commerce and local business associations, including developers and realtors. - Invite schools to visit CRWD to learn about water stewardship. - Send CRWD ambassadors into K-12 schools for demonstrations. - Partner with colleges and universities in the District on research studies. - Form lasting relationships with diverse community leaders by meeting with them regularly and partnering on projects. 	<p>Conduct at least five outreach meetings each month.</p>

- Look at the intersection of cultural traditions and water resources and find ways to link them with joint projects.
- 3.5 Develop, manage and evaluate programs to engage District audiences, such as:
- Master Water Stewards
 - Adopt a Drain
 - CRWD Grants
 - Watershed Artist in Residence
 - Identify new and less obvious partnerships to establish, especially in underserved geographic areas of the District.
- 3.6 Increase external communications to permit holders to decrease the need for annual follow-up.

Create mini-plans for each program

Send annual email update to all permit holders.

Strategy Four: Create Content and Target Social Media with Paid Ads and Message Boosts

Rationale: CRWD must take responsibility for communicating the purpose and success rates of the work it does with the people who live in the District. In order to do that, it must become more strategic and targeted with its use of its own communication channels to distribute its content and messages Districtwide using paid advertising and boosting social media posts.

Timing: Creating a plan for distributing targeted paid social media ads and boosting social media content should wait until after the infrastructure and relationship-building strategies are complete.

Tactics:

Measurement:

- 4.1 CRWD Website
- 4.1.1 Integrate stories and calls-to-action into the website that leverage blog and social posts.
- Continually update newsroom feature of CRWD's website with links to all positive news stories.
- 4.2 Email Newsletters
- 4.2.1 Continue sending a monthly newsletter to key stakeholders by email.
- 4.3 Social Media
- 4.3.1 Utilize videos and photography to enhance stories that educate and engage District residents and businesses.
- 4.3.2 Include paid social media posts that boost views in targeted areas.
- 4.3.3 Continually monitor external posts on your social media accounts using digital analytics to quantify campaign successes.
- 4.3.4 Develop and share engaging content.

Website updated monthly

Newsletters are distributed monthly

Two new stories about keystone projects or programs posted monthly

Strategy Five: Conduct Ongoing Proactive Communications and Engagement

Rationale: Continual communication and engagement activity evaluation and prioritization that focuses on proactively leveraging key relationships and creating consistent key messages that will drive engagement in District watershed improvement.

Timing: Once the first four strategies have been established, communications and engagement need to be proactively maintained, improved and adapted to meet the District's needs over time.

Tactics:

Measurement:

- | | |
|--|---|
| <ul style="list-style-type: none">1.1 Continue to use owned communications channels (newsletters, social media, website) to tell CRWD's story and engage with the community.<ul style="list-style-type: none">5.1.1 As relationships build over time, pursue third-party storytelling, particularly feeding stories about the District to key public officials to share with their constituents.1.1.2 Continually measure and reevaluate materials, initiatives, projects and programs.1.2 Regularly review your communications infrastructure to ensure it is current and update as needed.<ul style="list-style-type: none">1.2.1 After every big initiative, pause and reflect on the process, what worked well and where there are opportunities for growth in the future.1.2.2 Every third-year build in time for evaluation of communications and engagement programs to plan for the future. | <p>Information about keystone projects and programs are broadcast via all communications channels at least once quarterly</p> <p>Infrastructure is reviewed quarterly</p> |
|--|---|

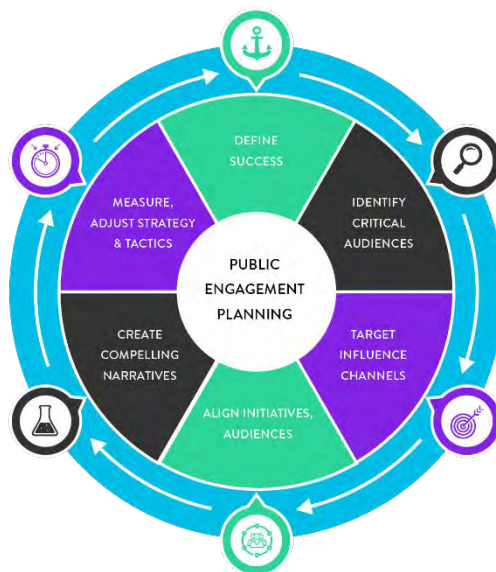
Appendices

Methodology

Tunheim's methodology for creating this Communications and Engagement Plan was as follows:

1. Review CRWD guiding documents:
 - CRWD Watershed Management Plan
 - Relevant active project plans
 - Relevant completed project plans
 - Organization newsletters
 - News releases
 - Review history videos
 - Review CAC Minutes (past two years)
 - Review existing CRWD communication plans and policies
2. Review past audits of stakeholders:
 - Conduct one-on-one interviews with key CRWD staff
 - Audit existing communications and engagement tools and processes
 - Report findings
 - Create plan with strategies and measurable tactics

As part of the planning phase, Tunheim followed the precepts of our public engagement planning process described in the diagram below.



Key Audiences for Communications and Engagement

The objective of the communications and engagement plan is to educate, engage and inspire individuals and community organizations to work with CRWD to help achieve its mission. The preliminary matrix of CRWD's key audiences serves as a launching point for community outreach planning.

In order to reach CRWD's primary stakeholders (residents) we recommend that CRWD focus communications and engagement efforts on the secondary audiences, who will in turn inform the residents. When the secondary audiences promote the goals of the District, those statements can be leveraged through social media and direct communication to engage and inform residents.

Primary Audiences:

- Residents of the District

Secondary Audiences/Amplifiers:

- Public Officials
- Media
- Community Organizations
- CRWD Participants
- Education: K-12 through Higher Ed
- Business Sector

1. PRIORITY COMMUNITIES AUDIENCES

Frogtown	North End	East Saint Paul, Payne-Phalen	Summit- University	Rice- Larpenteur	Midway
Media: Pioneer Press St. Paul Monitor Insight News MN Spokesman-Recorder	Media: Pioneer Press St. Paul Monitor Insight News MN Spokesman-Recorder	Media: Pioneer Press Hmong Times Asian American Press	Media: Pioneer Press St. Paul Monitor Insight News MN Spokesman-Recorder Hmong Times Asian American Press	Media: Pioneer Press Hmong Times Asian American Press St. Paul Monitor Insight News MN Spokesman-Recorder	Media: Pioneer Press St. Paul Monitor Insight News MN Spokesman-Recorder
Community: <ul style="list-style-type: none"> • Caty Royce, co-chair, Frogtown Neighborhood Association; • Tia Williams, co-chair, Frogtown Neighborhood Association; • Frogtown Green; • Frogtown Park and Farm; • St. Paul Area Chamber of Commerce; • Mt. Olivet Baptist Church; • St. Paul College; • St. Paul Public Schools; • Charter & Private Schools; • Boys & Girls Club of St. Paul; • District Council 7 	Community: <ul style="list-style-type: none"> • St. Paul Area Chamber of Commerce; • North End Neighborhood Association; • Mt. Olivet Baptist Church; • St. Paul College; • St. Paul Public Schools; • Charter & Private Schools; • Boys & Girls Club of St. Paul; • District Council 6 	Community: <ul style="list-style-type: none"> • Jack Byers, executive director, Payne-Phalen Neighborhood Association; • Hmongtown Market; • Lower Phalen Creek Project; • Minnesota Hmong Chamber of Commerce; • St. Paul Area Chamber of Commerce; • Metro State; • Residents of Phalen Creek; • St. Paul Public Schools; • Charter & Private Schools; • Boys & Girls Club of St. Paul; • District Council 5 	Community: <ul style="list-style-type: none"> • Erica Valliant, Summit-University Planning Council; • Mark Tande, Ramsey Hill Association; • Urban Farm & Garden Alliance; • ASANDC; • Hallie Q. Brown, Unity Church-Unitarian; • St. Paul College; • St. Paul Public Schools; • Charter & Private Schools; • Boys & Girls Club of St. Paul; • District Council 8 	Community: <ul style="list-style-type: none"> • Kim O'Brien, Rice & Larpenteur Alliance; • Hmongtown Market • Minnesota Hmong Chamber of Commerce; • St. Paul Area Chamber of Commerce; • Lake McCarron's Neighborhood Association; • St. Paul Public Schools; • Charter & Private Schools; • Boys & Girls Club of St. Paul 	Community: <ul style="list-style-type: none"> • Hamline Midway Coalition; • Minnesota United; • University United Citizen Coalition; • Midway Chamber of Commerce; • Quorum – Twin Cities Gblta Chamber of Commerce; • Concordia University; • Hamline University; • Somali Museum – Traveling Exhibit; • Eritrean Community Center; • Como Community Council; • Hamline Midway Coalition; • St. Paul Public Schools;

Frogtown	North End	East Saint Paul, Payne-Phalen	Summit- University	Rice- Larpenteur	Midway
					<ul style="list-style-type: none"> • Charter & Private Schools • Boys & Girls Club of St. Paul • District Council 11
Elected Officials: <ul style="list-style-type: none"> • Melvin Carter, Mayor • Dai Thao, City Council; • Council President Amy Brendmoen; • Commissioner MatasCastillo; • MN Representative Rena Moran; • MN Senator Sandy Pappas 	Elected Officials: <ul style="list-style-type: none"> • Melvin Carter, Mayor; • Dai Thao, City Council; • Council President Amy Brendmoen; • Commissioner MatasCastillo; • MN Representative Rena Moran; • MN Senator Sandy Pappas 	Elected Officials: <ul style="list-style-type: none"> • Melvin Carter, Mayor • Nelsie Yang, City Council; • Council President Amy Brendmoen; • Commissioner MatasCastillo; • MN Representative Tim Mahoney; • MN Senator Fong Hawj 	Elected Officials: <ul style="list-style-type: none"> • Melvin Carter, Mayor • Dai Thao, City Council; • Council President Amy Brendmoen; • Commissioner Carter • MN Representative Rena Moran; • MN Senator Sandy Pappas 	Elected Officials: <ul style="list-style-type: none"> • Melvin Carter, Mayor of St. Paul; • Dan Roe, Mayor of Roseville; • Marylee Abrams, Mayor of Maplewood; • Council President Amy Brendmoen; • Commissioner McGuire • MN Representative Peter Fischer • MN Senator Charles Wiger 	Elected Officials: <ul style="list-style-type: none"> • Melvin Carter, Mayor; • Dai Thao, City Council; • Council President Amy Brendmoen; • Commissioner Carter • MN Representative Kaohly Her • MN Senator Dick Cohen
Foundations: <ul style="list-style-type: none"> • St. Paul and MN Foundation; • St. Paul Audubon Society 	Foundations: <ul style="list-style-type: none"> • St. Paul and MN Foundation; • St. Paul Audubon Society 	Foundations: <ul style="list-style-type: none"> • St. Paul and MN Foundation; • St. Paul Audubon Society 	Foundations: <ul style="list-style-type: none"> • St. Paul and MN Foundation; • St. Paul Audubon Society 	Foundations: <ul style="list-style-type: none"> • St. Paul and MN Foundation; • St. Paul Audubon Society 	Foundations: <ul style="list-style-type: none"> • St. Paul and MN Foundation; • St. Paul Audubon Society
Events: <ul style="list-style-type: none"> • Rondo Days; • Frogtown Arts Festival; • Little Mekong; Night Market; • Art at Rondo; Block Party; • Jazz Festival; • National Night Out 	Events: <ul style="list-style-type: none"> • Rondo Days; • Little Mekong Night Market; • Art at Rondo; Block Party; • Jazz Festival; • National Night Out 	Events: <ul style="list-style-type: none"> • East Side Community Festival; • Hmong New Year; • Festival of Nations; • National Night Out 	Events: <ul style="list-style-type: none"> • Grand Old Day; • Rondo Days; • Frogtown Arts Festival; • Little Mekong; Night Market; • Art at Rondo; Block Party; • Jazz Festival; 	Events: <ul style="list-style-type: none"> • Rice Street Gardens; • Farmer's Market; • Frogtown Arts Festival; • National Night Out 	Events: <ul style="list-style-type: none"> • Somali Health Summit; • Somali Week; • Festival of Nations; • MN State Fair; • National Night Out

Frogtown	North End	East Saint Paul, Payne-Phalen	Summit- University	Rice- Larpenteur	Midway
			<ul style="list-style-type: none"> • National Night Out; • Farmers Market; • Marathon 		

Communications Toolkit

CRWD Elevator Speech Template

Capitol Region Watershed District (CRWD) is a local unit of government dedicated to protecting, managing and improving the water resources of the Saint Paul area. The region has abundant water resources, but its lakes, rivers, streams and wetlands are under constant pressure from stormwater runoff and pollution. CRWD works with partners and residents to help keep our water resources clean and beautiful, benefiting residents and supporting the local economy.

One-Page CRWD Overview

Capitol Region Watershed District (CRWD) is a local unit of government dedicated to protecting, managing and improving water resources in the Saint Paul area.

The Saint Paul region has abundant water resources, but its lakes, rivers, streams and wetlands are under constant pressure from stormwater runoff and pollution. CRWD originated from a small group of dedicated residents who wanted to protect Como Lake and the Mississippi River, and has expanded to protect all the waterways in its 40 square mile district.

CRWD works with local partners and residents to help keep our water resources clean and beautiful, providing economic and recreational benefits. CRWD accomplishes its mission through the following programs, projects and partnerships:

- Water resource improvement projects, such as the restoration of Como Lake and the green infrastructure at Allianz Field;
- Stormwater, lake, river and Best Management Practice (BMP) monitoring;
- Education and outreach programs;
- Providing technical assistance and funding through our grant programs; and
- Watershed rules and permitting.

Funding for CRWD, and the other 45 watershed districts that span across Minnesota, comes from levies and permit fees, as well as through federal and state funds. These funds are awarded through competitive watershed funding such as federal Section 319, state Clean Water Partnership grants and loans, and the Clean Water Fund.

CRWD Q and A

Question:	Answer:
General Questions	
What is CRWD?	Capitol Region Watershed District (CRWD) is a local unit of government dedicated to protecting, managing and improving the water resources of the 40 square miles of the District.
What does CRWD do?	CRWD works across geographic and political boundaries to protect the health of the District's natural water resources. Through research, planning and action, CRWD helps solve and prevent water-related problems within the region.
Who leads CRWD?	CRWD is governed by a five-member Board of Managers that guides the District in carrying out its Watershed Management Plan. A Citizen Advisory Committee also helps shape the work of the District by reviewing annual budgets, work plans, project and program priorities and leading the annual CRWD Watershed Steward Awards.
Am I in CRWD?	If you live in the State of Minnesota, you may reside in a watershed district. Minnesota is the only state that has been divided into watershed districts. Find out if you live in Capitol Region Watershed District at this link: https://www.capitolregionwd.org/about-crwd/
How are Minnesota's Watershed Districts funded?	Watershed Districts are local units of government. Funding comes from levies and permit fees, as well as through federal and state grants. These grants are awarded through competitive watershed funding such as federal Section 319, state Clean Water Partnership grants and loans, and the Clean Water Fund.
Program-Related Questions	
What programs does CRWD manage?	<ul style="list-style-type: none"> • Watershed rules and permitting; • Stormwater and Best Management Practice (BMP) monitoring; • Water resource improvement projects; • Education and outreach; • Providing technical assistance; and • Funding water quality improvement projects and programs through our grants program.
How can I get involved with CRWD?	There are many different ways District residents help CRWD accomplish its mission. We encourage all residents, businesses and organizations to partner with CRWD to protect our lakes, rivers and streams. The District offers tips for residents, an Adopt a Drain program, Master Water Stewards certification, opportunities to join our Citizen Advisory Committee and much more.
Grant-Related Questions	
Does CRWD offer grants to watershed residents?	CRWD grants provide financial and technical assistance to help build projects and programs that protect local lakes and the Mississippi River. Polluted runoff is a leading cause of water pollution in lakes and rivers, particularly in urban areas like the District. As

	much of the land in CRWD is already developed and privately owned, working with residents who build clean water projects and programs is essential for improving water quality.
Which different CRWD grants are available?	<p>CRWD offers a variety of grant programs for its residents:</p> <ul style="list-style-type: none"> • Stewardship Grants help businesses, schools, community organizations and homeowners build projects that prevent stormwater pollution. Click here for a complete list of grants offered by CRWD. • Water Quality Planning Grants provide financial assistance for feasibility and design of cost-effective and/or innovative projects that protect and improve the water quality of waterbodies within CRWD. • Water Quality Capital Improvement Grants provide financial assistance for final engineering and construction of cost-effective and/or innovative projects that protect and improve the water quality of waterbodies within CRWD. • Partner Grants fund programs led by schools, arts, environmental or faith groups that educate residents and promote clean water actions. • Rain Barrel Workshop Grants provide assistance to neighborhood groups who organize a community rain barrel construction workshop. • Abandoned Well Sealing Grants are used for sealing abandoned wells that are located within CRWD.
How do I apply for a CRWD grant?	To apply for a CRWD grant, the first step is to learn the specific application requirements for each grant. Then, grant applicants will work with CRWD and its partners to determine the projects they want to pursue and submit the appropriate application materials.
How do I check the status of my CRWD grant application?	To check the status of a submitted grant application, please contact the staff member listed on the grants page.
Water Monitoring, Research and Data-Related Questions	
How does CRWD monitor watershed health?	CRWD monitors water quality to identify pollution sources in stormwater runoff as well as in the District's lakes and stormwater best management practices (BMPs). This information helps CRWD and its partners create water quality improvement solutions, develop educational programming and initiate research and project management for other organizations.
How can I access water quality monitoring data collected in CRWD?	CRWD conducts ongoing monitoring and reporting to assess lake health. Our Water Data Reporting Tool (WDRT) is an interactive way for the public to see how our work is having an impact on water quality. WDRT also helps CRWD meet its reporting requirements and incorporates data from all of the District's water quality monitoring stations
What research projects does CRWD manage?	CRWD monitoring helps inform research studies that analyze different aspects of water quality in the District. We work with third-party organizations – including government, higher education, charitable foundations and community partners – to conduct research and gather results. Research helps CRWD assess the success of its stormwater improvements throughout the District and establish best practices for future management.
Where can I find CRWD research reports?	CRWD reports can be found on the relevant pages (for example, the 2016 Lakes Monitoring Report is on the Lakes page) or by using the search tool.
Permit-Related Questions	

What permits does CRWD issue?	CRWD issues permits to ensure that stormwater runoff from development and redevelopment projects does not negatively affect our water resources. Our permitting program regulates construction activity by requiring erosion and sediment control, as well as stormwater Best Management Practices (BMPs) to capture and treat runoff leaving the site. Permit coverage is also required for impacts to wetlands, floodplain and connections to the Trout Brook Interceptor storm sewer system.
What is CRWD's permit application process?	<p>Our permitting program regulates construction activity by requiring erosion and sediment control, as well as stormwater Best Management Practices (BMPs) to capture and treat run-off leaving the site.</p> <p>Permit applications are reviewed by District staff and presented to the Board of Managers at meetings, typically held the first and third Wednesday of every month. Applicants must submit the permit application at least 21 days before a regularly scheduled board meeting in order to be considered</p>
How can I check the status of my permit application?	Contact CRWD to check the status of your permit application or view the CRWD Active Permits map.
Contact Information	
How do I contact CRWD?	<ul style="list-style-type: none"> • Address: 595 Aldine Street in Saint Paul, Minnesota 55104 • Phone: 651-644-8888 • Email: https://www.capitolregionwd.org/contact/ • Social Media: <ul style="list-style-type: none"> Facebook – www.facebook.com/CapitolRegionWD Twitter – twitter.com/CapitolRegionWD Instagram – www.instagram.com/capitolregionwatershed/ LinkedIn – www.linkedin.com/company/capitol-region-watershed-district/

CRWD Overall Key Messages:

- CRWD is working to protect, manage and improve the water resources of Capitol Region Watershed District and the Mississippi River.
- Through research, planning and action, CRWD helps solve and prevent water-related problems within the 40 square mile District.
- The boundary of CRWD includes most of Saint Paul, and parts of Falcon Heights, Lauderdale, Maplewood and Roseville.
- Protecting our shared water resources benefits all Minnesotans by creating a healthy, thriving environment for recreation, commerce and natural beauty.
- CRWD actively looks for opportunities to collaborate with diverse and underserved communities to ensure the benefits of our water resources are available to all residents.
- CRWD works with local partners to help keep our water resources clean and beautiful, providing economic and recreational benefits to the District's residents and businesses.

Communications and Engagement Audit – As of July 1, 2019

COMMUNICATIONS VEHICLES			
Comms toolkit		2	
Comms plan	1		
Press releases		2	
Media list	1		
Print materials			3
Displays for events		2	
Key messages	1		
FAQ		2	
Boilerplate		2	
Content planner		2	
Crisis Plan		2	
Video/photo reservoir		2	
Website:			
- News room			3
- Blogs		2	
- Story maps		2	
Social Media:			
- Facebook		2	
- Instagram	1		
- LinkedIn		2	
- Twitter	1		
- Newsletter	1		
Media relations		2	
Project signage		2	
ENGAGEMENT STRATEGIES			
Thought leadership	1		
CRWD Ambassadors			3
Education: K-12 and Colleges		2	
Public Affairs		2	
Engagement with Community Organizations		2	

Status Level: 1
Does not exist, is in infancy or is not functioning

Status Level: 2
May exist and function, but needs improvement or refinement

Status Level: 3
Accomplished, successful

COMMUNICATIONS AND ENGAGEMENT ANALYSIS

Project Overview

The District is working with Tunheim to create a Communications and Engagement Plan that will be annually reviewed for the next five years, as well as integrated into the strategic plan. All recommendations will be designed to further the mission of the District and propel it toward its goals.

As a first step, Tunheim conducted a communications and engagement audit. Following is a summary of our key findings and recommendations.

Key Findings

- 1) Previously, CRWD put emphasis on promoting its projects, programs and partnerships, but is now moving toward elevating the visibility of the organization (impacts on quality of life, etc.).
- 2) Communications and partnerships have traditionally been one-and-done, but CRWD would like to build more consistent stakeholder relationships and messaging long-term.
- 3) CRWD needs consistent branding and wording. Public-facing communications need to be in plain language.
- 4) To cut through the din of messages, CRWD needs clarity of communications priorities, boundaries and objectives:
 - a) Create ongoing mini communications and engagement plans around major projects: CRWD's new building, Allianz Field and the Ford Site.
 - b) CRWD gathers a huge amount of data—these findings should be translated to the public, so they understand what's going on under their feet and in the water.
 - c) To motivate the general public to become active and engaged water stewards, CRWD needs more:
 - i) Overall name recognition and increased understanding of CRWD;
 - ii) Personalized stories--what CRWD means to people and how they can get involved;
 - iii) Stories that highlight water issues and those that celebrate successes;
 - iv) Stories that engage previously underserved neighborhoods and/or cultures; and
 - v) Social media needs to be strategically utilized to leverage CRWD's mission.
- 5) Each division of CRWD has developed its own outreach calendar, collateral and outreach lists, which means CRWD as a whole is not strategic about voicing consistent messages.
- 6) No database of the stakeholders that the District has interacted with in the past exists, and no ongoing strategic outreach is maintained to strengthen and leverage these relationships.
- 7) The general public doesn't understand what the "capital region" is, what a watershed district is and how they can help.

Initial Recommendations

To achieve effective external communications and engagement, Tunheim recommends a layered approach where activities are designed cross-functionally to leverage each other. Our proposed Communications and Engagement Plan will include:

1) Communications

a) Branding

- i) Brand high visibility, long-term projects like Como Lake and Ford Site so people recognize them as CRWD programs.
- ii) Create Brand Standards and common language for programs and projects, including developing a process to review the branding before printing or sharing information externally.

b) Develop Communications and Engagement Infrastructure and Tools

- i) Create a suite of communications tools:
 - (1) FAQ
 - (2) One-pager
 - (3) Boilerplate
 - (4) Expanded media lists
 - (5) Social media platforms
- ii) Make online depository for communication assets (photos, profiles, videos, story maps and augmented reality).
- iii) Create informational videos, virtual/augmented reality demonstrations and animated educational videos to share on social media, website and at informational kiosks.
- iv) Create an annual editorial calendar for media, engagement, events, blogs, electronic newsletters and social outreach.
- v) Prioritize which stories and activities are of primary importance.

c) Owned Communications

- i) Website:
 - (1) Integrate stories and calls-to-action into the website.
 - (2) Update newsroom feature of CRWD's website with links to all positive news stories.
- ii) Email Newsletters:
 - (1) Reestablish a quarterly newsletter that will be sent to key stakeholders by email.

iii) Social Media:

- (1) Utilize videos and photography to enhance stories that educate and engage District residents and businesses.
- (2) Include paid social media posts that boost views in targeted areas.
- (3) Continually monitor external posts on your social accounts.
- (4) Use social media analytics to quantify campaign successes.

iv) Programs and Partnerships:

- (1) Feature more storytelling through partners.
- (2) Clarify and standardize communications expectations and brand standards in partner contracts at various level projects.
 - (a) Consider incorporating educational opportunities such as augmented reality engagement.
- (3) Increase external communications to permit holders to decrease the need for annual follow-up.

v) Internal communications:

- (1) Centralize the management of CRWD branding and stakeholder lists within the Communications and Engagement Division
- (2) Develop a system for prioritizing key external communications activities and stories.
- (3) Create and execute a strategic year-long editorial calendar for all communications and engagement activities.

d) *Earned Media*

- i) Establish CRWD as go-to experts for media.
- ii) Create mini media plans for keystone projects like Como Lake and the Ford Site redevelopment.
 - (1) Find opportunities to sit down with media and build relationships.
- iii) Conduct media events such as a Green Line ride between Allianz and CHS fields to learn about major CRWD projects.
- iv) Connect clean water resources to personal priorities -- community health, cost of drinking water, neighborhood greenspace, property value, etc.
- v) Create a standard playbook to publicize different actions: awards, partnerships, grants, successes, challenges, etc.

- vi) Expand media list to include radio and TV as well as outlets that communicate with non-English speaking residents.
- vii) Develop content and story pitches for media, such as:
 - (1) Personal stories of Master Water Stewards, community award-winners and board managers.
 - (2) Promote and capitalize on new CRWD building.
 - (3) Urgent, call-to-action stories about challenges to the watershed.
 - (4) Mutual promotion of partner grants.
 - (5) Use of virtual and augmented reality to bring visibility to underground work.
 - (6) Food and water system connections, like Frogtown Farms.
 - (7) Personal and community health, and the connection to greenspaces.
 - (8) Training all city employees, expand to county and state maintenance crew.

2) Community Engagement

a) Develop Community Engagement Infrastructure and Tools

- i) Create a database of community leaders, individual supporters and organizations for outreach.
- ii) Expand list of community events.
- iii) Consider creating enticing, educational outreach activities, such as a mobile water bottle filling vehicle to take to community events that incorporate CRWD information about stormwater.
- iv) Leverage K-12 curriculum surrounding water education.

b) Thought Leadership

- i) Position CRWD as an innovative leader in water management.
- ii) Form lasting relationships with diverse community leaders.
- iii) Look at the intersection of cultural traditions and water resources.
- iv) Create a strategic outreach plan to keep CRWD ambassadors such as Master Water Stewards, CAC members and volunteers engaged, appreciated and motivated.
- v) Identify new and less obvious partnerships to establish, especially in underserved geographic areas of the District.

- c) *Conduct Strategic Community Outreach to all District Audiences*
 - i) Strategically cultivate relationships with key public officials.
 - ii) Leverage relationships with other Watershed Districts.
 - iii) Strengthen relationships with other water and environment focused organizations.
 - iv) Develop relationships with neighborhood organizations.
 - v) Execute diversity plan to focus on diverse and underserved areas.
 - vi) Create a plan for outreach around keystone projects: Como Park, CRWD neighborhood, Ford Site Redevelopment, Green Line.
 - vii) Partner with chambers of commerce and local business associations, including developers and realtors.
 - viii) Invite schools to visit CRWD to learn about water stewardship.
 - ix) Send CRWD ambassadors into K-12 schools for demonstrations.
 - x) Partner with colleges and universities in the District on research studies.

SWOT Analysis

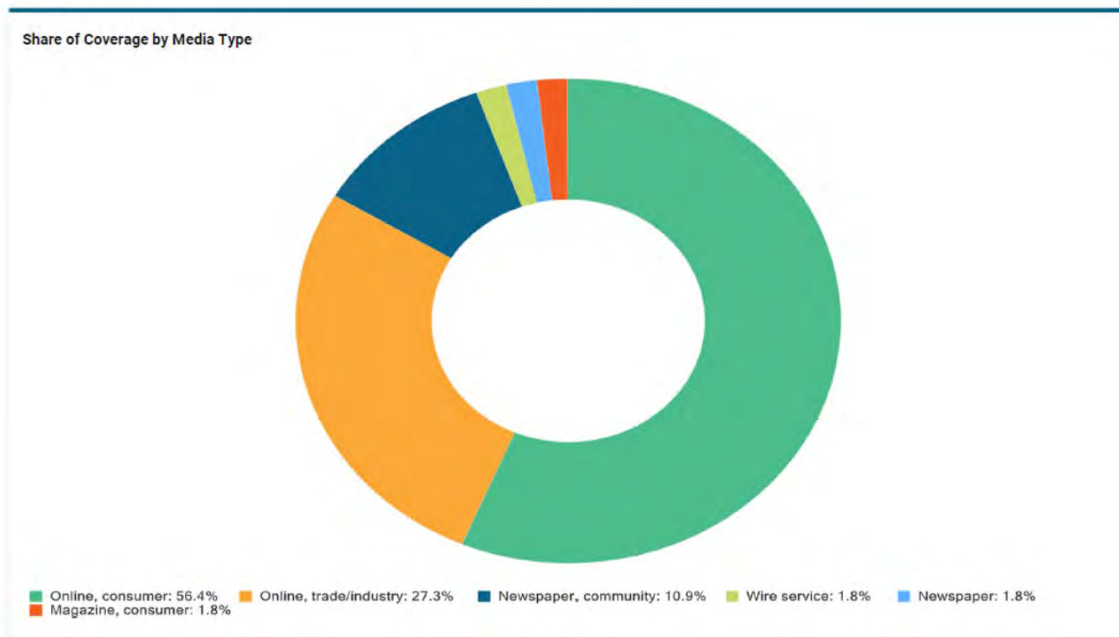
STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • Robust research and data to share • Strong mission and vision • Dedicated advocate-partners like volunteers and Citizen Advisory Committee • National innovation in water management systems • Strong photography and video capabilities • Strong digital storytelling capabilities, such as VR and the Como Lake story map 	<ul style="list-style-type: none"> • No overarching plan for organizational communications that encompasses timing and action, and planning across calendars and channels • Ad hoc media relations • Lack of foundational messaging for use across channels and materials • Confusion surrounding watershed definition • Lack of prioritization of communications targets 	<ul style="list-style-type: none"> • Editorial calendar integrating social media, blogs, events and media opportunities • Links to social and environmental justice in district communities • Connection between watersheds, improved quality of life and greenspace • Messaging framework for the organization • Introduction to communities who have not participated in the past • Grand opening of the new building 	<ul style="list-style-type: none"> • Crisis Communication Plan in development, but needs to be finalized • No central oversight of communications activities across divisions

Media Channels

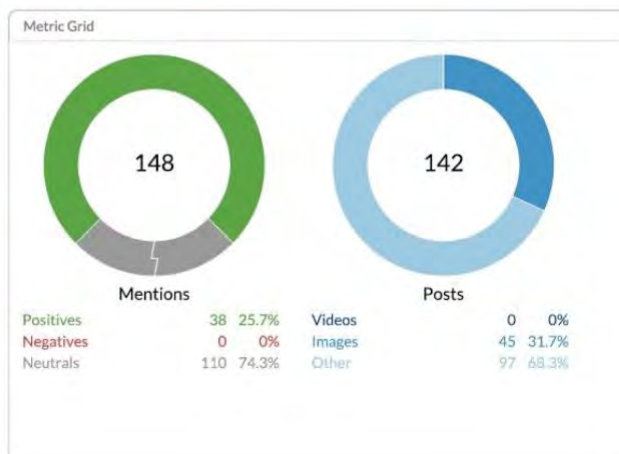
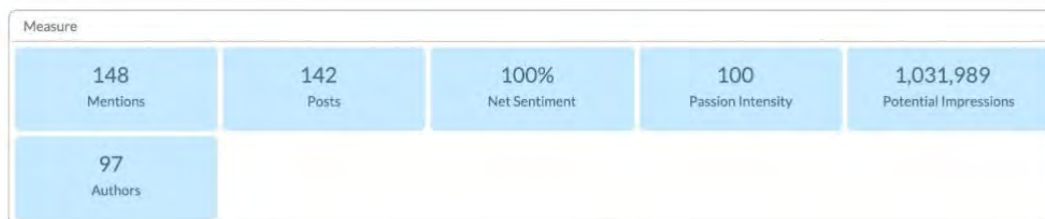
Coverage between June 2018 – June 2019

MEDIA TYPE	SHARE
Online, consumer	56.4%
Online, trade/industry	27.3%
Newspaper, community	10.9%
Wire service	1.8%
Newspaper	1.8%
Magazine	1.8%

CRWD Media and Social Coverage



Social Media Channels Conversation between June 2018 – June 2019



CRWD Media List

Outlet	Name	Title	Email	Phone	Notes
AfricaPaper	Issa A. Mansaray	Editor	Executive Editor	(763) 568-4335	Target audience: African community
Asian American Press	Nghi Huynh	Publisher/Editor	nghi@aspress.com	(651) 755-6864	Target audience: Asian community
The Circle	Cat Whipple	Managing Editor	thecirclenews@gmail.com	(612) 722-3686	Target audience: Native American community
Ensa	Mary Hoff	Editor in Chief	mary@ensa.com	(612) 626-2670	Environmental leadership, non-profit outlet, Minnesota-based
Ensa	David Doody	Senior Editor	david@ensa.com	(612) 626-9553	Environmental leadership, non-profit outlet, Minnesota-based
Greening Frogtown	Patricia Chmains	Editor	info@onenationnews.com	(651) 757-5970	Target audience: Frogtown community
Hmong Times	Steve Wetzel	Owner/Editor	hmongtimes@gmail.com	(651) 224-9395	Target audience: Hmong community
Hmong Today	Wameng Moua	Chief Editor	hmongtoday@gmail.com	(651) 489-0021	Target audience: Hmong community
Insight News	Al McFarlane	Editor in Chief; Host of KFAI "Conversations with Al McFarlane"	al@insightnews.com	(612) 588-1313	Target audience: African American community
KARE-TV	Rita Hathaway	Managing Editor	rhathaway@kare11.com	(763) 546-1111	
KARE-TV	John Simon	Assignment Editor	josimon@kare11.com	(763) 797-7215	
KARE-TV	Kristin Wagner	Assignment Editor	kwagner@kare11.com	(763) 797-7215	
KARE-TV	Gail Knox	Producer	gknox@kare11.com	(763) 546-1111	
KFAI-FM	Mason Butler	Interim Program Director	mason@kfaifm.org	(612) 941-3144	
KMOJ-FM	Kevin Charles	General Manager	info@kmoj.com	(612) 377-0534	Target audience: African American community
KMSP-TV	Kelly Huffman	News Assignment Manager	kelly.huffman@foxtv.com	(352) 946-5654	
KMSP-TV	Mike Durkin	Editor, Digital Content	mike.durkin@foxtv.com	(352) 944-9999	
KMSP-TV	Jeff Orcutt	EP, Fox 9 Buzz and Jason Show	jeff.orcutt@foxtv.com	(352) 946-5688	
KMSP-TV	Nick Lambert	News Assignment Editor	nick.lambert@foxtv.com	(352) 946-5767	
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Recommendations for Improving and Coordinating Internal Communications Across All Divisions

To date, we have found that CRWD has done a very good job of communicating project work and engaging the community on a case-by-case basis. The addition of a communications and engagement division manager to CRWD's staff has made significant progress toward improving Districtwide communications and engagement. However, the amount of infrastructure work that is required in addition to ongoing projects and programs coupled with the new priorities of improving Districtwide branding, diverse citizen engagement and social media outreach exceeds the capacity of the current staff.

With regard to the overall workload implicated with this set of recommendations, we appreciate that to carry out the recommended strategies and tactics the District will have to ramp up the number of staff or outside resources dedicated to communications and engagement. As indicated in our recommendations, the foundation for this work depends upon the creation of a centralized infrastructure that is at least closely coordinated, if not outright controlled, through one primary lead. In our view, this centralized coordinating role should reside with the Communications & Engagement Division Manager.

This encompasses ultimate approval for all external messaging and outreach activity, inclusive of key messaging, consistent branding and nomenclature, tracking and qualification of external relationships, media relations, and collaboration with other division leads around priority community projects. These are essential components necessary to effectively promote the overall visibility of the organization.

Within the attached CRWD Timing Map detailing FTEs, the primary assumption is that focus of the communications and engagement work will be on generating key messaging, creating and managing processes internally, and collaborating with other division leads. Hence the dedicated headcount of approximately one to two full time staff. Also baked into the assumptions is an expected prioritization of key projects, such as the Como Lake restoration, as well as relationships with media contacts. With the addition of other projects and programs under the communications and engagement outreach efforts, there will likely be a need for further consideration of staffing resources, internal or external.

The District can elect to utilize existing staff resources to conduct outreach and build messaging but may also want to consider additional assistance per project or more broadly pertaining to the organization's outreach. It is impractical to try and capture the exact extent of additional staff resources required to carry out each successive layer of engagement activity as competing priorities, urgency, duration, scope and quality of relationships are taken into consideration. But the District should anticipate that effective engagement will be on-going and cumulative, requiring additional dedicated resources to deliver results with each additional project.

Appendix F

Wetland Management Strategy

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Acknowledgements

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- Capitol Region Watershed District Technical and Advisory Groups
- Ramsey Conservation District (RCD)
- City of St. Paul

Of particular mention, the District would like to thank the Ramsey Conservation District for the use of the protocols they developed in association with the District for the Wetland Restoration Site Data and Ranking System. The District would also like to thank the City of St. Paul for sharing the data and guidelines they recently collected and developed for their own Wetland Management Plan.



Introduction

The purpose of this document is to evaluate the wetland resources of the District, describe the approach to protecting their functions and diversity, and lay the groundwork to improve these resources. This document is NOT, however, a Local Comprehensive Wetland Protection and Management Plan as per MN Rule Chapter 8420.0830.

The mission of the District is to “protect, manage, and improve the water resources of the Capitol Region Watershed District.” These goals are consistent with the intent of State and Federal rules for wetland protection. The strategy for addressing these goals is to evaluate wetland resources on an individual basin scale, and on a watershed scale. The watershed scale of analysis allows ecological functions and values to be realized that are lost at a smaller scale. The Wetland Management Plan provides a mechanism to address local wetland management and preservation of aquatic resource functions and values at an individual wetland scale and a watershed scale.



The District currently implements its Watershed Rules through the permitting process. The District issues permits to ensure that runoff from development and redevelopment activity does not adversely affect its water resources. The District’s Rule E governs wetlands but since the WCA was revised on 8/3/2009 the Districts Rules will need to be updated. Since the District is not the Local Government Authority (LGU) for implementing WCA, its Rules work in conjunction with the local governments and State wetland law. Additionally, the MN Department of Transportation (Mn/DOT) is the LGU administering WCA for wetlands on the Mn/DOT right-of-way and the U.S. Army Corps of Engineers governs wetland activities on a Federal level through Section 404 of the Clean Water Act.

Concurrent with the development of this Wetland Management Strategy, the District is also developing the overall Watershed Management Plan along with an extensive public involvement component. Through this public involvement process, concerns and issues revolving around its wetland resources were identified. The implementation activities identified within this wetland management strategy are included in the overall Watershed Management Plan.

Overall Goals and Objectives for Wetland Management

This document provides additional protection and strategies in managing wetlands in the District. The overall goal of this document is, at a minimum, to protect the functions and diversity of the District’s wetlands and lay the groundwork to improve these resources. The District will work with local municipalities, State agencies, and Ramsey County to achieve their goals and objectives. Emphasis is placed on recommending and prioritizing efforts that can be implemented through three main mechanisms: wetland protection, wetland improvement, and wetland reestablishment.

Existing District Wetlands

Existing Wetland Resources

Most of the District has been developed for commercial, roadway, industrial or residential use. However, areas of natural and semi-natural vegetation remain near significant water bodies like the Mississippi River and Lake McCarrons. Less than 5% of the District contains wetlands, and the majority of these wetland resources exist in either small scattered remnants, or are located as larger entities within undeveloped parcels or existing regional parks (e.g. Hidden Falls-Crosby Farm Regional Park, Mississippi Gorge Regional Park).



To some degree, all wetlands within the District are degraded. The District's wetlands do provide opportunities for enhancement and improvement. Many of these lower quality wetlands with potential for improvement are in the northern half of the District. The section titled "Wetland Improvement" discusses options for these lower quality wetlands. The District also contains areas that formerly held wetlands but now provide excellent opportunities for wetland reestablishment. The methodology used to define potential wetland reestablishment sites focused on sites containing historic wetland resources. Potential areas for wetland reestablishment are discussed further in the section titled "Wetland Reestablishment". The District will prioritize wetlands to reestablish in coordination with the greater effort to "Bring Water Back to St. Paul". Wetland reestablishment will be considered along with stream daylighting and green corridor creation opportunities.

Inventory and Functional Assessment Methodology

In 1999 all wetlands within the District were inventoried and their functions were assessed. The District's Wetland Inventory and Functional Assessment was again reviewed and updated in 2009 by applying the same methodology as used in 1999. The District's Wetland Inventory and Functional Assessment also incorporates the City of St. Paul's recently completed Wetland Inventory. Field visits to each wetland included a functional assessment using the Minnesota Routine Assessment Methodology for Evaluating Wetland Functions. All stormwater ponds identified as such by MnDOT and the City of St Paul have also been identified as stormwater ponds for the District's Wetland Inventory and Functional Assessment. The only exceptions are the wetlands at Willow Reserve which function as natural wetlands in addition to serving a stormwater function.

Table 3 contains the format for data collection and the resulting classification and detailed assessment for each wetland. Wetland functions evaluated included Vegetative Diversity/Integrity, Maintenance of Hydrologic Regime, Flood and Stormwater Storage/Attenuation, Water Quality/Shoreline Protection, Groundwater Interaction, Wildlife Habitat, Fisheries Habitat, and Aesthetics/Recreation.

The functional assessment methodology is a state-approved method for evaluating wetland functions.

The wetland resources in the District are highly valued by its residents. The public's opinion on wetland values was solicited in the process of developing the Watershed Management Plan and during the course of several recent resource planning projects. Wetland functions cover a range of "services" wetlands provide. "Values" are a priority-based selection of functions that meets the specific interest/need of the geographic area or public constituency. Based on input from the District and participants in the public involvement process for the watershed management plan, the District places the highest value on wildlife habitat and aesthetics functions of wetlands. Following is a discussion of each function evaluated in the Wetland Management Strategy.

Vegetative Diversity and Integrity

Vegetative diversity and integrity is the measure of the wetland compared to a an undisturbed reference wetland. Diversity refers to the amount of plant species present, and integrity refers to whether or not the plant species should be present within the wetland community. This type of assessment is specific to each wetland community. Most of the wetlands in the District have low vegetative diversity and/or integrity. Many are monotypic stands of cattail or reed canary grass. Others are open water wetlands with little or no vegetation. Most of the wetlands that do have some vegetative diversity also have invasive or exotic species present. Exotic and invasive species include reed canary grass, purple loosestrife, and buckthorn.



The District and its residents understand the importance of vegetative diversity and integrity of wetlands. Exotic and invasive species along with other anthropogenic influences such as stormwater runoff has significantly impacted wetland resources within the District. Restoration of degraded wetlands and performance-based buffer standards will help improve this function over time. The District could set one of their goals to enhance Vegetative Diversity and Integrity through carrying out hydrologic and vegetative improvement and reestablishment projects such as the restoration of Willow Reserve.

Maintenance of Hydrologic Regime

Wetlands of different types have different hydrologic regimes. For example, ponds and marshes have fairly stable water levels throughout the year and conversely floodplain wetlands and ephemeral basins may fluctuate significantly based on rainfall and season. This function ranks the current hydrologic regime of a wetland compared its representative hydrologic regime if it were in an unaltered setting. Factors such as land use within the drainage area and upland buffer condition are factored into the scoring of this function. The majority of wetlands within the District no longer have the ability to maintain their natural hydrologic regime. This is due to the highly developed nature of the District, the removal of a significant portion of its drainage area, and the use of wetlands for stormwater storage.

Hydrologic regime changes to a wetland can cause changes to the vegetative community and affect watershed runoff characteristics. Oftentimes wetlands are used to control stormwater rate and volume from developed areas thus negatively impacting this function. The District realizes the importance of maintaining or reestablishing hydrologic regimes that fit the existing or targeted wetland community. Buffer and stormwater management rules adopted by the District as well as wetland management and restoration projects could help maintain or enhance this function. The District's relatively new volume control rule could serve to restore the natural hydrologic regime of existing wetland communities.

Flood and Stormwater Storage/Attenuation

Flood/stormwater attenuation is evaluated based upon wetland characteristics such as the wetland plant community's ability to tolerate hydrologic perturbations, adjacent land uses, and the wetland location within the watershed. An exceptional rating for this function is achieved if the wetland is managed to maximize stormwater retention in an area with the potential for flood damages. The wetlands within the District store stormwater to varying degrees. Some store large amounts of stormwater, while others have large outlet structures and have little capacity for stormwater attenuation.

It is a goal of the District to utilize the natural storage capacity and function of wetlands while also preserving the ecological diversity and integrity of the wetlands. However; proper stormwater management practices are needed to ensure this function is balanced with other functions, such as vegetative integrity, that appear to be in conflict. The District's regulatory program and implementation projects could contribute to the enhancement of this function without completely relying on natural wetland systems which can be impacted by excessive stormwater volume.

Water Quality/Shoreline Protection

Water quality protection is evaluated according to the wetland's primary water source, the potential impact of surrounding land uses, estimated storage capacity, vegetation and detritus density, position with respect to other surface waters and evidence of excess nutrient loading. The water quality within wetlands includes numerous chemical, biological and physical processes. When any of these processes are disrupted sufficiently to change the character of the wetland, the wetland water quality is diminished. In general, there are very few wetlands within the District that are directly connected to a lake in the District. There are also few wetlands which are a direct tributary to the lakes of the District.



The District sees value in wetland water quality and believes it should be preserved when possible. In some cases, wetlands may be needed to provide water quality protection/treatment for high priority aquatic resources. If this is the case, planning and design options will be evaluated to ensure the wetland being used for water quality improvement purposes is of suitable type and hydrologic regime to maximize nutrient removal. This will be accomplished by utilizing natural nutrient absorption (via soils and vegetation) and transpiration to ultimately reduce downstream pollutant loading.

Groundwater Interaction

The groundwater interaction function is the most difficult to assess with the rapid methodology used for the Districts inventory and assessment. It usually requires gathering additional hydrologic and geologic data. Lack of time and data availability typically precludes a detailed assessment of the groundwater interaction function. It is included in this method for continuity, and for those instances when more detailed investigation is required or more data are available. Some of the wetlands of the District have a strong correlation to groundwater. This is evident by consistent water levels throughout the growing season despite periods of very low precipitation.



By enforcing sound stormwater management, erosion control and wetland management, the District can help support resources such as springs and seepage wetlands. An inventory of groundwater-dependant features as well recharge areas, will help the District better manage these resources.

Wildlife Habitat

Wildlife habitat refers to the ability of a wetland to provide food and protective cover for animal species, including mammals, birds, reptiles, amphibians, and invertebrates. The assessment methodology assumes that the quality of the wildlife habitat provided by a wetland is related primarily to the level of disturbance or degradation compared to an undisturbed or least disturbed wetland of the same type within the study area. [“Disturbance,” as used here refers to human activities or human-induced conditions that tend to reduce natural diversity or disrupt natural processes. Management activities designed to mimic natural processes (e.g., burning, water level management) or to restore natural diversity (e.g., exotic species control) would not be considered “disturbances” in this context.] The functional level of the habitat can also be influenced by the size of the wetland and its position in the landscape relative to other wetlands and habitat types. The methodology assumes that all wildlife species are ecologically important and that low species diversity is not necessarily a sign of poor wildlife habitat. Some wetland types naturally support a lower diversity of wildlife species or numbers. The assessment of wildlife habitat quality accounts for the fact that some wetlands are used only seasonally or intermittently by certain species but are nonetheless important or even critical for those species. Wetlands ranking high for wildlife habitat would have high quality wetland vegetation, a high level of wetland vegetation and community interspersions, very wide and vegetated upland buffer zones, a natural hydrologic regime, and a low level of wildlife corridor barriers. Very few of the wetlands of the District provide high quality habitat for a variety of wildlife species. Despite the urban setting, the wetlands in the District do provide habitat for many wildlife species. Ramsey County Parks has published a document titled “A Guide to Birding in Ramsey County. In addition to avian species, the guide book provides species lists of animals known to exist within the urban landscape of Ramsey County.

Wildlife habitat is a valued wetland function in the District. The District Rules, projects and programs enhance wetland habitat. Buffers, restoration projects as well as public education all help support wildlife habitat by improving existing natural areas.

Fisheries Habitat

Generally, the function of a wetland for fish habitat is related to its connection to lakes, rivers or streams. A wetland receives a high or exceptional rating for fish if it provides spawning/nursery habitat, or refuge for native fish species. Some isolated deep marshes may intermittently support populations of sunfish and northern pike as a result of colonization during flood events. Such wetlands are rated high to moderate for fish habitat. Permanently flooded isolated wetlands that support native populations of minnows are given a moderate rating. Wetlands with exclusive, high carp populations are given a low rating for fish habitat because carp cause extreme degradation of the wetland.



Isolated wetlands that are not permanently flooded do not generally support fish populations. It is important to note that some wetlands can indirectly contribute to the maintenance of fish populations in lakes, streams and rivers if they are providing high levels of water quality protection or flood storage. Most of the District's wetlands have become less connected from lakes and the river and do not serve a high fisheries habitat function.

The District will evaluate which wetlands serve as important fishery resources for native species. Wetlands that support populations of exotic minnow species, such as carp, and high densities of forage species, such as fat head minnows, can be a significant detriment to water quality. Without top predators (such as bass and pike) to control their population, planktivore species such as bluegill, that prey on algae-feeding plankton, can also cause water quality problems.

Aesthetic/Recreation

The aesthetics/recreation function of a wetland is evaluated based on its visibility, accessibility, evidence of recreational uses, evidence of human influences (e.g. noise and air pollution) and any known educational or cultural purposes. The wetlands within the District have a strong ranking for aesthetic/recreation for the fact that many of them are located within public lands or are highly visible to the public. The aesthetic of many wetlands are degraded due to human influences such as the presence of trash or by encroaching landscaping practices.

The aesthetic/recreation function is a top priority for the District. Resident perception of wetland resources can be greatly influenced by their visual appearance. Visually appealing areas then become higher valued from a recreational perspective. Regulatory controls such as buffer standards and programmatic approaches such as education or "adopt-a-wetland" will help the District improve this function. The District will also work with its partners to more effectively monitor and control illegal dumping into wetlands.

Coordination with District Partners

The City of St. Paul recently completed a Wetland Inventory and Wetland Management Plan. The St. Paul technical data was incorporated into the District's wetland data so that the inventory and Functional Assessment Rankings were exactly the same. Several wetlands in the District inventory were not mapped in the St. Paul inventory. After consultation with the City of St. Paul it was determined that these basins were classified as functioning stormwater ponds. St. Paul's protocol to inventory and assess wetlands intentionally excluded stormwater ponds whereas the District's inventory included evaluation of these resources. This is in part due to the fact that many older stormwater treatment areas were originally low areas and wetlands that may have been dredged and/or altered for stormwater treatment. If feasible, The District will look for alternative treatment and restoration. The basins in the City of St. Paul functioning as stormwater ponds, including wetland basins that are historically used for stormwater management are included in the maps that are found at the end of this document. The basins that are believed to have been constructed within historically upland area are denoted as stormwater ponds whereas the remaining areas used for stormwater management are mapped as wetlands whereas the remaining areas used for stormwater management are mapped as wetlands.

Data were updated for wetlands in Roseville, Maplewood, Lauderdale, and Falcon Heights by conducting field surveys to collect additional data. Please refer to the wetland maps for the results of the Wetland Functional Assessment.

Wetland Protection

The Wetland Conservation Act (WCA) provides many measures to protect wetland resources from filling and draining. The District has rules to provide additional protection to wetlands. Wetlands are currently protected under the District's Rule E ("Wetland Management") to a higher level than the WCA's regulations.

In addition to these existing measures for protection, the District will consider adopting further measures to increase the protection of high quality wetland resources including the following strategies:

Buffer Standards

The District Rules currently require a “minimum buffer of 25 feet of permanent District approved non-impacted vegetative ground cover abutting and surrounding a wetland.” In order to provide more functional enhancement throughout the District, and effective and productive buffer standards; modifications to the existing wetland buffer rule could be made. Permit applications could be required to establish permanent buffers adjacent to all existing and created wetlands within the geographic scope of the project. In addition, the District could utilize existing inventory data to prioritize locations for buffer establishment projects. Project selection will be weighted for areas that provide the greatest range of functional enhancement.



Vegetative Performance Standards: The District will consider adding qualitative standards to its current numeric standard for wetland buffers. The updated language will require buffers consist of vegetated land, primarily of plant species native to this region. Designated buffer areas shall not be mowed; fertilized, used as a site for depositing snow, subject to the placement of mulch or yard waste; or otherwise disturbed. Exceptions to this standard would be made for periodic cutting or burning that promotes the health of the buffer or upland habitat area, actions to address disease or invasive species, or other actions to maintain or improve buffer or habitat area quality. Vegetation diversity and density will be important establishment requirements that enhance a range of wetland functions particularly wildlife and aesthetics.

Water Quality Performance Standards: The District will consider including components to the buffer Rule to include requirements that enhance the water quality benefits wetland buffers provide. Specifications will include details on recommended buffer widths appropriate for a range of soil types, slopes and vegetation density.

Signage: Free standing signs clearly delineating the boundary of the established buffer may be required by the District.

Volume Control for discharging into wetlands

Standards may be developed to regulate the amount of bounce sustained by a wetland according to its sensitivity to stormwater input. Standards could also be developed to strategically protect wetlands that are currently receiving too much stormwater discharge but have the potential for improvement once the discharge volume is controlled. These standards would also require mitigation for excess stormwater bounce.

- Proposed projects that have the potential to impact downstream wetlands will be evaluated against hydroperiod standards adapted from “Stormwater and Wetlands Planning and Evaluation Guidelines for Addressing Potential Impacts of Urban Stormwater and Snowmelt Runoff on Wetlands,” (Minnesota Stormwater Advisory Group, June 1997).

Pretreatment of stormwater runoff into wetlands

Currently the District does not expressly regulate stormwater runoff entering all wetlands. Standards could be developed to address the pretreatment of stormwater prior to discharge for all wetlands for both new and existing discharges.

The District will consider regulating all stormwater runoff rates by requiring performance standards for a proposed project. For a proposed project, the District could require specific water quality and infiltration performance standards to be sized to infiltrate and/or retain the runoff volume generated within the contributing area by a certain storm volume under the developed condition. Performance standards may be selected on the basis of site-specific conditions, including soil types, depth to water table and the presence of known or suspected contaminated soils.

Pretreatment standards may be developed to be based on wetland types. Wetlands that are sensitive to stormwater runoff could be identified based on the Wetland Susceptibility Classifications as described in the previous section addressing standards for Volume Control.

Offsite Replacement

Background

The District understands the importance of replacing lost wetlands as close to the location of the impact as possible. In many cases that means on-site. In other case the best and most feasible location for replacement may be within the immediate watershed. The developed conditions of the watershed make finding sites for replacement extremely difficult. To assist in finding appropriate replacement sites, the District will proactively work with landowners to identify potential replacement sites. By taking a programmatic approach to wetland replacement, the District is able to assist parties in need of wetland credits, find appropriately sited locations that provide the greatest wetland functional replacement within the Watershed. Having a program to facilitate meaningful offsite replacement does obviate the applicant's need to follow sequencing as defined by the Wetland Conservation Act and Section 404 of the Clean Water Act.

Wetland Banking

Wetland Banks are established by applicants through a Wetland Conservation Act LGU as an official process to create wetland credits. Most frequently banks are established by land owners. The credits generated from that effort are then deposited in the bank after successful restoration standards are met. As a general rule, wetland banks are not generated for the purpose of replacing impacts identified in a current project. There are legal restrictions on the use of public dollars to generate credits for sale to private entities. Along with the WCA LGU, the District will provide technical assistance to parties interested in establishing a wetland bank in the CRWD. Assistance will come in the form of site selection and prioritization as well as helping identify restoration efforts that provide high wetland functional replacement. The CRWD does not intend to undertake wetland restoration projects with the purpose of depositing credits into the State Wetland Bank.

Offsite Wetland Replacement

For reasons mentioned above, the District sees value in assisting parties, in need of wetland replacement, find acceptable locations to create credits. Unlike banking, where the credits are created in advance of the impact, offsite wetland replacement typically occurs at the same time as the impact. In order for offsite replacement to be effective, parties in need of credit must have access to known locations where restoration activities are possible. The District will work

proactively to find locations where restoration activities are possible such that parties needing replacement credit can coordinate their development activities with restoration. By doing this, wetland replacement is properly sited in the watershed and can provide the greatest wetland functional replacement.

Wetland Improvement

Background

The existing wetland resources in the District provide excellent improvement opportunities for some functions including: Vegetative Diversity and Integrity, Maintenance of Hydrologic Regime, and Wildlife Habitat. In order to achieve the wetland improvement goals of the District, a mechanism for selecting wetland sites with enhancement opportunities has been developed. A monitoring and maintenance commitment from the District and other potential project partners will ensure wetland improvement goals are achieved. Currently, the District is involved with a wetland monitoring program which follows the protocols as outlined in the Minnesota Pollution Control Agency's Biological Monitoring Program for "Macroinvertebrate Community Sampling Protocol for Depressional Wetland Monitoring Sites" and "Aquatic Plant Community Sampling Procedures for Depressional Wetland Monitoring Sites."



Methodology used to determine Wetland Improvement Sites

Several methodologies have been reviewed for identifying and prioritizing Wetland Improvement opportunities for wetlands in the District.

MnRAM 3.2 Protocol

The first of such methodologies is taken directly from MnRAM 3.2 protocol, and assesses attributes such as the number of landowners that would be affected by a potential restoration, the feasibility and potential ease of hydrologic and vegetative restoration, the potential acreage of restorable wetland area, etc. This is the methodology used by the City of St. Paul to rank their potential restoration and improvement projects, and did not identify many wetlands for restoration potential. The wetlands ranked by the City of St. Paul as having wetland improvement/restoration potential are included in Figure 1.



Watershed-based Goals Protocol

Watershed-based approaches to identifying key wetland improvement sites include protocols that direct efforts toward improving and managing water quality and quantity to optimize watershed benefit. This analysis identifies wetland sites where improvement work can realistically be

achieved. It is also based on local in-depth knowledge of the District's existing wetland resources and goals. The following criteria consider realistic goals to define potential Wetland Improvement sites:

- (1) Proximity to a lake needing improvements and management of water quality and quantity (contained within that specific subwatershed)
- (2) Proximity to the Mississippi River
- (3) Ownership by a public entity
- (4) Potential for wildlife habitat enhancement
- (5) Public Visibility/Use

Many communities take a similar approach to identifying and evaluating potential Wetland Improvement opportunities. Given the urbanized setting of the District, it is somewhat difficult to directly apply MnRAM 3.2 protocols for identifying the restoration potential of the District's wetland resources. Additionally, this standardized protocol does not tend to capture optimizing watershed-wide benefits and could possibly overlook some of the long-term improvement potential of wetland sites. Therefore additional protocols were used to evaluate potential Wetland Improvement opportunities.

Function and Value Protocol

The following steps articulate a programmatic approach for determining potential Wetland Improvement sites:

- (1) Identified wetlands with low Vegetative Diversity and Integrity function
Please refer to Appendix B for a map of wetlands that rank LOW for Vegetative Diversity and Integrity
- (2) Identified all wetlands which rank LOW for Maintenance of Hydrologic Regime
Please refer to the map of wetlands that rank LOW for Maintenance of Hydrologic Regime wetlands
- (3) Identified all wetlands which rank LOW for Wildlife Habitat
Please refer to the map of wetlands that rank LOW for Wildlife Habitat wetlands
- (4) Identified all wetlands which rank LOW for Aesthetics and Recreation
Please refer to the map of wetlands that rank LOW for Aesthetics and Recreation

A ranking system was developed based on the above rankings and is depicted in Figure 1. Wetlands with three or more low rankings for the four functions listed above were given a high rating for wetland improvement priority. Wetlands with low rankings for two functions were rated medium and wetlands with only one low ranking were rated low for wetland improvement priority. These four wetland functions were chosen as a best reflection of the priorities of the District and its stakeholders.

Ramsey Conservation District Protocols

The Ramsey Conservation District (RCD) created a Wetland Management Strategy for the District through a Wetland Restoration Site Data and Ranking System as described in the following Wetland Reestablishment section. The higher the numerical ranking, the greater the priority RCD placed on potential for Wetland Improvement.

Combining these protocols resulted in the following list of potential wetland improvement sites:

- (1) Wetland basins contained within Willow Reserve

- (2) Wetland basins and river banks along the Mississippi River that exist along Randolph Ave (runs northeast/southwest adjacent to Shepard Road near downtown St. Paul)
- (3) Areas at the Sarita Wetland Property as a future priority once stormwater treatment is implemented
- (4) High Priority Ranking Wetland Restoration Sites from the RCD analysis
- (5) Sites with Wetland Restoration Potential from the City of St. Paul's Wetland Management Plan

The wetlands identified through this methodology were given a high rating for wetland improvement as depicted in Figure 1.

Figure 1 depicts the priority rating for wetland improvement sites based on each of the protocols described above. It is a goal of the District to prioritize Wetland Improvement projects above Wetland Reestablishment projects. It is also a goal to evenly distribute the Wetland Improvement projects throughout the District.

CRWD 2010 Watershed Management Plan – 9/1/2010



Wetland Reestablishment

Background

The creation of additional wetland resources within a watershed enhances overall wetland functions. Especially in an urban setting, the contribution of additional wetlands provide additional wildlife habitat, improve water quality of adjacent waterbodies, increase local vegetative diversity, and reduce the amount of pollutants that ultimately reach the Mississippi River or District Lakes. The District has committed staff and resources to identifying opportunities for reestablishment of historic wetland resources within the District. The District refers to this process as wetland 'reestablishment' in an effort to distinguish it from the terms 'restoration' or 'creation' which have specific definitions is MN Rules 8420 Wetland Conservation Act. The District is also committed to monitoring and maintenance of created wetland features.



Wetland Reestablishment Site Identification Methodologies

The methodology used to define potential Wetland Reestablishment sites focused on sites containing historic wetland resources. This process began with a review of historic maps generated for the District Land and Water Resource Inventory from the 2010 Watershed Management Plan. The following section expands upon the protocol designed by the Ramsey Conservation District specifically for the District.

Ramsey Conservation District Protocol for Wetland Reestablishment Site Identification

Parcels were given priority rankings based on a numerical score (0-10) through GIS analysis. The Ramsey Conservation District's (RCD's) protocol gave the highest weight to "Historical Wetlands" that had been documented in the 1945 Wetland Inventory for CRWD and from the 1850's Original Land Survey. The RCD's protocol for identifying parcels with Wetland Reestablishment potential next looked at Soil Survey data for Ramsey County. All areas mapped as having hydric (wet) soils were prioritized. Hydric soils will usually hold water and therefore meet the wetland hydrology requirements and indicate depressional areas for large historic catchments. The next area of prioritization for Wetland Reestablishment sites assigned weight to areas adjacent to public parks to promote greenway corridors. Areas adjacent to an existing wetland also received priority ranking because a wetland site reestablished within close proximity to other wetlands provides a much greater wildlife habitat benefit. Priority was also given to potential Wetland Reestablishment sites on public parcels because it is usually easier to acquire access for wetland sites when compared to private land. Therefore the higher the numerical ranking, the greater the priority RCD placed on potential for Wetland Reestablishment.

Combined Protocol:

The analyses by Ramsey Conservation District and the information from the City of St. Paul's Wetland Management Plan were combined to develop the District's protocol for evaluating the restoration of existing and potential wetland resources. The following is a map of Wetland Reestablishment opportunity sites identified through this process. PLEASE NOTE there are some large parcels that come up with a potential for Wetland Reestablishment because they are large parcels with components that trigger prioritization; however this does not necessarily mean that the entire parcel could become a wetland.

Figure 2. Wetland Reestablishment Sites

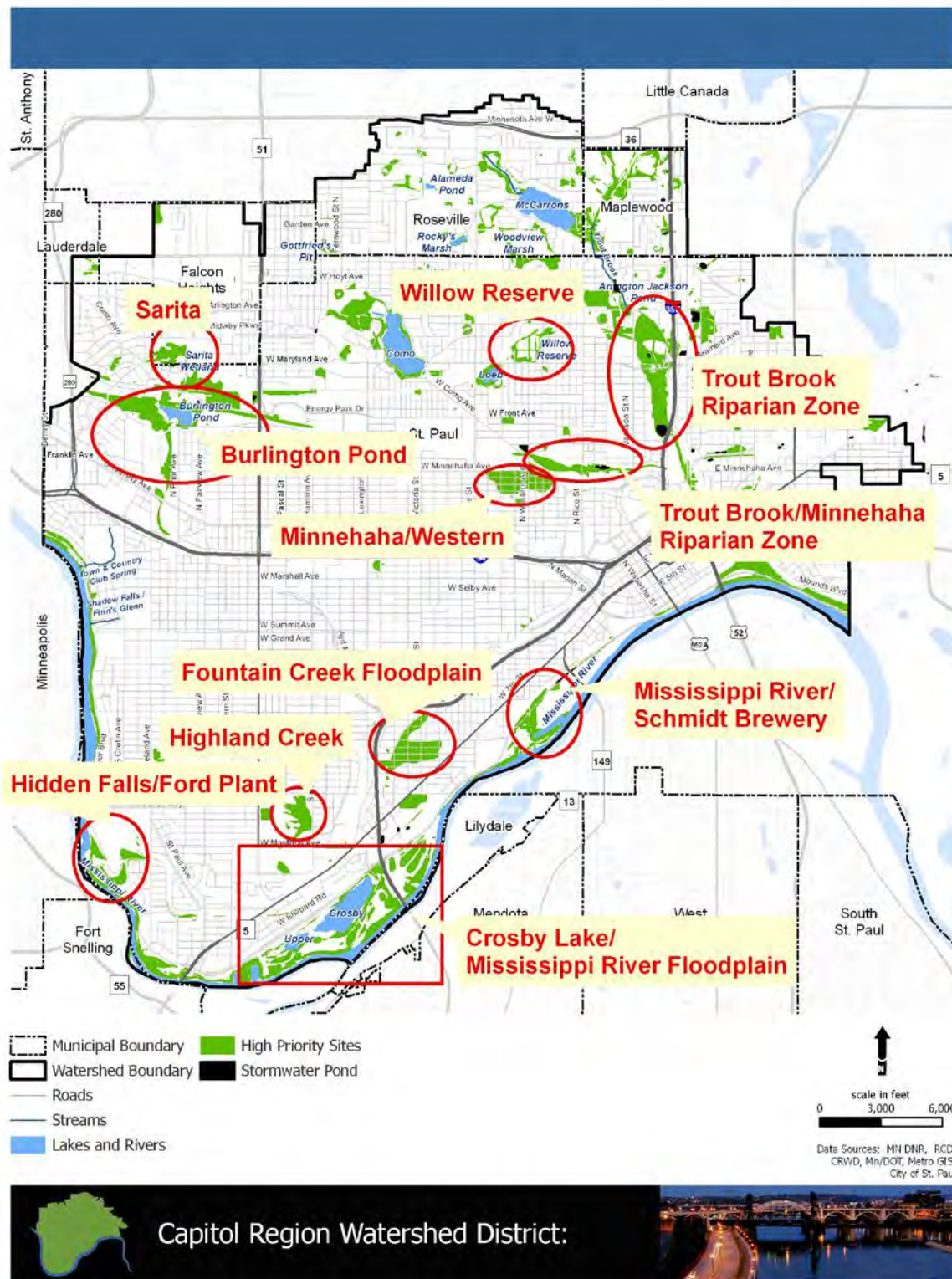


Table 1. Wetland Reestablishment Sites Prioritization Table

Wetland reestablishment feature name	Location	Coincides with Stream restoration features	MnRAM ranked high	City priority high
Trout Brook Riparian Zone	Restoration of the riparian zone of upper Trout Brook	Yes		
Highlights	Trout Brook Interceptor owned by CRWD; constant inflow (water treatment plant); possible redevelopment southeast of LaFayette Bridge and I-94; proximity to Bruce Vento Nature Sanctuary; partnership and public support/financing likely; existing Trout Brook Greenway Plan (City of St. Paul) identifies restoration; Trout Brook is largest historical stream in CRWD.			
Trout Brook/ Minnehaha Riparian Zone	Restoration of the riparian zone of potential 'daylighting' lower Trout Brook to Mississippi River	Yes		
Highlights	Trout Brook Interceptor owned by CRWD; constant inflow (water treatment plant); possible redevelopment southeast of LaFayette Bridge and I-94; proximity to Bruce Vento Nature Sanctuary; partnership and public support/financing likely; existing Trout Brook Greenway Plan (City of St. Paul) identifies restoration; Trout Brook is largest historical stream in CRWD.			
Hidden Falls/Ford Plant	Through Ford Plant/redevelopment site to Mississippi River	Yes		
Highlights	Likely redevelopment site; good visibility; full site redevelopment gives design flexibility; identified for restoration by Saint Paul on the Mississippi Design Center; potential to include entire historic creek.			
Sarita	Further restoration of Sarita Wetland	Yes		
Highlights	Local flooding and water quality corrections needed; amenity for State Fair; high visibility and collaboration; connects to Sarita Wetland; open areas (UM farms, Fair parking) provides flexibility in restoration footprint.			

Willow Reserve	Restoration of the wetlands within Willow Reserve	No	Yes	
Highlights	Willow Reserve is owned by the City and is prioritized by CRWD			
Mississippi River/ Schmidt Brewery	Restoration of the floodplain areas at the old Schmidt Brewery site and along riparian corridor to Mississippi River	No		
Highlights	Likely redevelopment site; good visibility; full site redevelopment gives design flexibility			

Crosby Lake/ Mississippi River Floodplain	Restoration of Wetlands in Crosby Farm Regional Park, around Crosby Lake, and adjacent riparian zone to Mississippi River	No	Yes	
Highlights	Crosby Farm Regional Park owned by the City, many opportunities on public land to conduct wetland restoration activities			
Highland Creek	Highland Golf Course to Mississippi River	Yes		
Highlights	Through open space; potential park/golf course amenity; some design flexibility; close approximation of historical stream.			
Burlington Pond	Restoration of wetlands adjacent to Burlington Pond	No		
Highlights	owned by the City, adjacent to and area of historical wetlands in an old railroad corridor			
Fountain Creek Floodplain	Along Ayd Mill Road to Mississippi River	Yes		
Highlights	Existing plan for Ayd Mill bike path ; access to Fountain Cave; steady flow possible due to collection of spring water; close approximation of historical Cascade Creek and Fountain Creek.			
Minnehaha/Western	Restoration of areas along Minnehaha Avenue and Western Avenue	No		
Highlights	location of historical wetland areas along an otherwise urban corridor			

Implementation Costs

The costs to implement the wetland improvement and reestablishment components of the Wetland Management Plan are shown in Table 2. Citizen participation will play a key role in selecting sites for wetland improvement and reestablishment projects. Areas with active, interested citizen groups will be weighted in the site-selection process.

Table 2. Implementation Costs

Implementation Program	Description	Budget
Wetland Improvement		
Programmatic (425C)	CRWD Staff conducting ongoing maintenance, weeding etc.	\$10,000 per year (2011 through 2020)
Implementation of Projects (425C)	Environmental Consultant and Contractor performing implementation of projects	\$20,000 per year (2011 through 2020)
Wetland Reestablishment (
Feasibility Study (325B)	Feasibility Study for 6 Wetland Reestablishment Sites	\$50,000 per year (2011 through 2013)
Implementation of Projects (425D)	Implementation of 2 Wetland Reestablishment Sites	\$100,000 per year (2014 through 2019)
Numbers parenthetically listed are from the Watershed Management Plan Implementation table		



Table 3. Wetland Function and Value Assessment Database

WETLAND ID	Mgmt Class	VEGDIVQ	HYDREGQ	F_SQ	WQSHQ	GIQ	WHQ	FHQ	ARQ
62-029-22-19-071-A	M1	Medium	Medium	High	Medium	Recharge	High	N/A	Exceptional
62-029-23-24-053-A	M2	Medium	Medium	High	Medium	Combination	Medium	Medium	Medium
62-029-22-20-078-A	M1	Low	Medium	High	Medium	Recharge	Medium	N/A	Medium
62-029-22-19-072-A	M2	Medium	Medium	High	Medium	Combination	Medium	Medium	Medium
62-029-23-24-055-A	M2	Low	Medium	High	Medium	Recharge	Medium	N/A	Medium
62-029-22-19-070-A	M1	Medium	Medium	High	Medium	Recharge	High	N/A	Exceptional
62-029-23-25-052-A	M1	Medium	Medium	High	Medium	Recharge	Medium	Medium	Exceptional
62-029-22-32-093-A	P	Exceptional	High	High	Exceptional	Combination	Exceptional	High	Exceptional
62-029-22-32-187-A	M1	Medium	High	High	High	Recharge	High	Medium	High
62-029-23-28-033-A	M2	Low	Medium	High	Medium	Combination	Medium	Medium	Medium
62-029-23-28-032-A	M2	Low	Medium	Medium	Medium	Combination	Medium	Medium	Medium
62-028-23-09-028-A	M3	High	Medium	High	High	Recharge	High	Medium	Exceptional
62-029-22-19-068-A	M2	Low	Medium	High	Medium	Recharge	Medium	N/A	Exceptional
62-029-22-19-062-A	M3	Medium	Medium	High	Medium	Combination	Medium	Medium	Medium
62-029-22-19-065-A	M3	Low	Medium	High	Low	Recharge	Medium	N/A	Medium
62-029-22-20-080-A	M2	Low	Low	High	Low	Recharge	Low	N/A	Medium
62-029-22-29-088-A	M2	Medium	Low	High	Medium	Recharge	Medium	N/A	Medium
62-029-23-28-034-A	M2	Low	Low	High	Low	Combination	Medium	Low	Medium
62-029-23-28-037-A	M2	Low	Medium	High	Medium	Recharge	Medium	N/A	Medium
62-028-23-15-043-A	M2	Medium	Medium	Medium	Medium	Combination	Medium	N/A	Medium
62-029-22-20-079-A	M2	Low	Medium	High	Low	Recharge	Medium	N/A	Medium
62-029-23-25-058-A	M2	Low	Low	High	Low	Combination	Medium	Low	Medium
62-029-22-19-059-A	M2	Medium	Low	High	Medium	Recharge	Medium	N/A	Medium
62-028-22-05-094-A	M2	Low	Medium	High	Low	Recharge	Medium	N/A	High
62-029-22-32-095-A	M2	Low	Medium	High	Low	Recharge	Medium	N/A	High
62-029-22-19-063-A	M3	Low	Medium	High	Medium	Combination	Medium	N/A	Medium
62-029-23-28-031-A	P	Medium	Medium	High	Medium	Recharge	Medium	N/A	Medium
62-028-23-14-045-A	M2	Low	Medium	High	Low	Recharge	Low	Low	Medium
62-028-23-14-048-A	M2	Medium	Low	High	Medium	Recharge	Medium	Medium	Medium
62-028-23-15-044-A	M1	High	Medium	High	Medium	Combination	High	N/A	High
62-028-23-17-014-A	M2	Medium	Medium	High	Medium	Recharge	Medium	N/A	Medium
62-029-22-19-069-A	M2	Low	Medium	High	Medium	Combination	Medium	N/A	Exceptional
62-029-22-19-060-A	M3	Low	Low	High	Low	Recharge	Low	N/A	Medium
62-029-22-20-084-A	M2	Low	High	High	Medium	Recharge	Medium	N/A	Exceptional
62-029-22-19-066-A	M2	Medium	Medium	High	Medium	Recharge	Medium	Medium	High
62-029-22-30-075-A	M2	Low	Low	High	Low	Recharge	Low	N/A	Medium
62-028-23-09-029-A	P	Medium	Medium	High	Medium	Recharge	Medium	N/A	Exceptional
62-029-22-28-097-A	M2	Low	Medium	High	Low	Recharge	Medium	N/A	Low
62-029-23-29-011-A	M2	Low	Low	High	Low	Recharge	Low	N/A	Low
62-029-23-25-057-A	M2	Low	Low	High	Low	Combination	Low	Low	Medium
62-028-23-14-109-A	P	Exceptional	Medium	High	High	Combination	Exceptional	N/A	Medium
62-029-22-32-186-A	P	Medium	High	High	High	Recharge	Exceptional	High	High
62-029-22-32-185-A	P	Medium	High	High	High	Recharge	Exceptional	High	High
62-029-22-32-184-A	P	Medium	High	High	High	Recharge	Exceptional	High	High
62-029-23-23-042-A	M1	High	Medium	High	Medium	Recharge	Medium	Medium	Exceptional
62-029-23-28-036-A	M2	Low	Low	Medium	Low	Recharge	Low	N/A	Low
62-029-23-27-039-A	P	Medium	Medium	High	Medium	Recharge	High	N/A	Exceptional
62-029-23-27-040-A	M2	Low	Low	High	Low	Recharge	Low	N/A	Medium
62-029-23-25-051-A	P	High	High	High	High	Combination	Medium	High	Exceptional
62-029-22-19-067-A	M2	Medium	Medium	High	Medium	Combination	Medium	Medium	Exceptional
62-029-22-19-064-A	M3	Low	Low	High	Low	Recharge	Low	N/A	Medium
62-029-23-28-108-A	M2	Low	Medium	High	Medium	Recharge	Medium	Medium	Medium
S112923-1-A	M1	Medium	High	Medium	High	Low	Medium	Low	Low
S112923-1-B	M1	Medium	High	Medium	High	Low	Medium	Low	Low
S122923-2-B	M1	Low	Low	High	Medium	Low	High	Low	Medium
S122923-2-A	M1	Low	Low	High	Medium	Low	High	Low	Medium
S122923-2-C	M1	Low	Low	High	Medium	Low	High	Low	Medium
S122923-1-A	M2	Low	Low	High	Medium	Low	Medium	Low	Medium

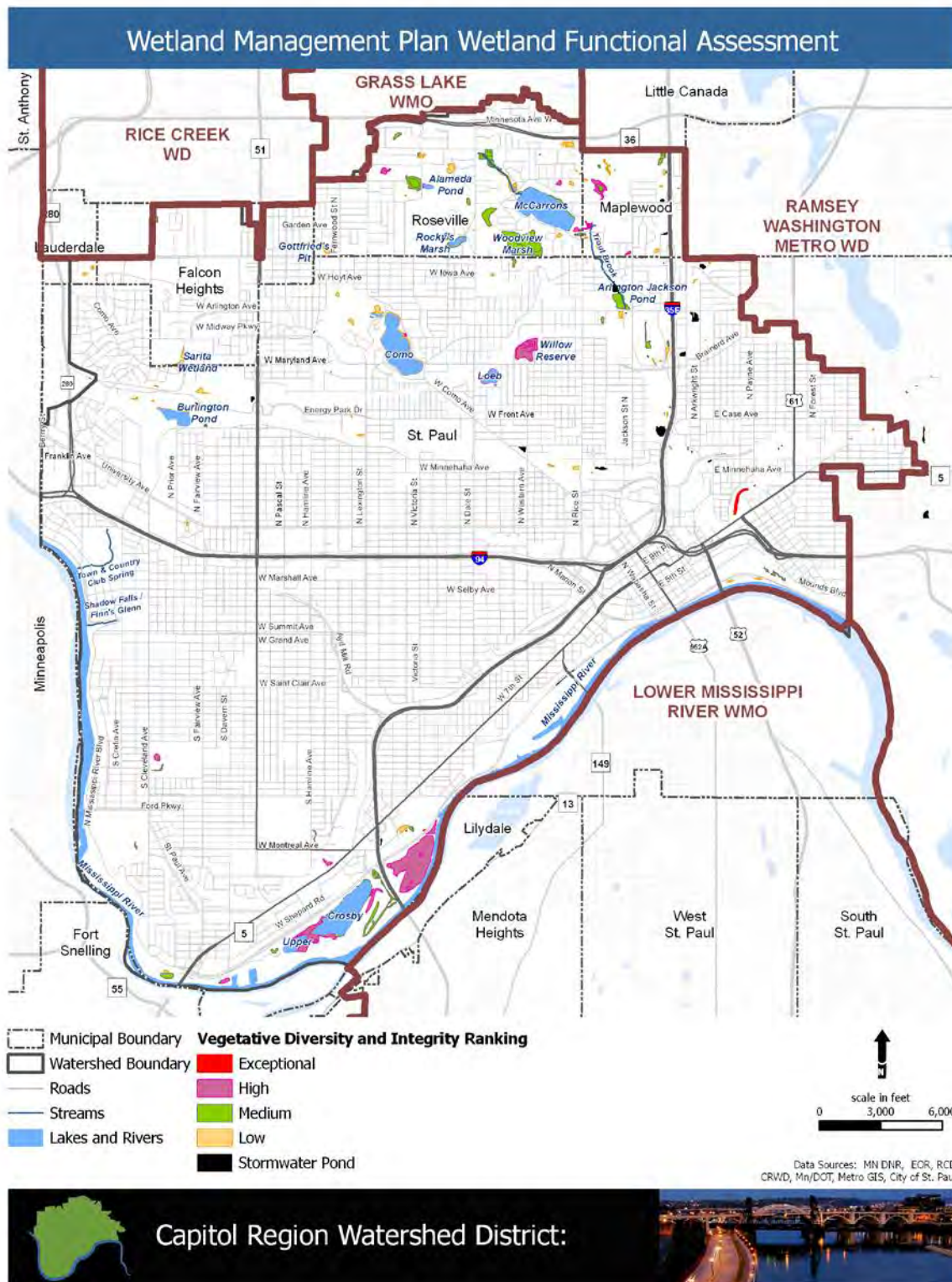
WETLAND ID	Mgmt Class	VEGDIVQ	HYDREGQ	F_SQ	WQSHQ	GIQ	WHQ	FHQ	ARQ
S162923-1-A	M1	Medium	High	Medium	Low	Low	High	Low	High
S162923-1-B	M1	Medium	High	Medium	Low	Low	High	Low	High
S152923-1-A		Low	Medium	High	High	Medium	Low	Low	Low
N142923-1-A	M2	Low	Medium	Medium	Medium	High	Low	Low	Medium
N142923-2-A	M2	Low	Medium	High	Medium	Low	Medium	Low	Low
N142923-3-A	M1	Low	Medium	Medium	Medium	Medium	High	Low	Medium
N142923-3-B	M1	Medium	Medium	Medium	Medium	Medium	High	Low	Medium
N142923-4-A	P	High	High	High	High	Medium	High	Low	Low
N142923-4-B	P	High	High	High	High	Medium	High	Low	Low
N142923-4-C	P	High	High	High	High	Medium	High	Low	Low
N142923-5-B	M2	Medium	Medium	Medium	Medium	Medium	Medium	Low	Low
N142923-5-B	M2	Medium	Medium	Medium	Medium	Medium	Medium	Low	Low
N142923-5-A	M2	Medium	Medium	Medium	Medium	Medium	Medium	Low	Low
N142923-6-B	M1	Medium	High	High	High	Medium	High	Low	Medium
N142923-6-A	M1	Medium	High	High	High	Medium	High	Low	Medium
N142923-8-A	P	High	High	High	High	High	High	Medium	High
N142923-8-B	P	High	High	High	High	High	High	Medium	High
N142923-8-C	P	High	High	High	High	High	High	Medium	High
N142923-7-A	M3	Low	Medium	Medium	Low	Low	Low	Low	Low
N142923-7-B	M3	Low	Medium	Medium	Low	Low	Low	Low	Low
S142923-3-A	M1	Medium	Medium	High	High	Low	High	Low	Medium
S142923-3-B	M1	Medium	Medium	High	High	Low	High	Low	Medium
S142923-3-C	M1	Medium	Medium	High	High	Low	High	Low	Medium
S142923-4-A	M1	Medium	Medium	Medium	Medium	Medium	High	Medium	Medium
S142923-4-B	M1	Medium	Medium	Medium	Medium	Medium	High	Medium	Medium
S142923-2-A	M2	Low	Low	Low	Low	Low	Medium	Low	Low
S142923-1-A	M1	Medium	High	High	Medium	Low	High	Low	Medium
N132923-1-A	M1	Medium	High	Low	Low	Low	High	Low	Medium
N132923-2-E	M1	Medium	Medium	Low	High	High	High	High	High
N132923-2-E	M1	Medium	Medium	Low	High	High	High	High	High
N132923-2-F	M1	Medium	Medium	Low	High	High	High	High	High
N132923-2-D	M1	Medium	Medium	Low	High	High	High	High	High
N132923-2-C	M1	Medium	Medium	Low	High	High	High	High	High
N132923-2-B	M1	Medium	Medium	Low	High	High	High	High	High
N132923-2-G	M1	Medium	Medium	Low	High	High	High	High	High
N132923-2-A	M1	Medium	Medium	Low	High	High	High	High	High
N132923-2-I	M1	Medium	Medium	Low	High	High	High	High	High
N132923-2-H	M1	Medium	Medium	Low	High	High	High	High	High
N132923-2-J	M1	Medium	Medium	Low	High	High	High	High	High
N132923-3-A	M1	Low	Medium	Medium	Medium	High	Medium	High	High
N132923-3-A	M1	Low	Medium	Medium	Medium	High	Medium	High	High
N132923-4-A	M1	Low	Medium	Medium	High	High	Low	High	Medium
N132923-5-A	M2	Low	Medium	High	High	Medium	Medium	Low	Low
N132923-6-A	P	High	High	Medium	Medium	Medium	High	Medium	Low
N132923-7-A	M1	Low	Low	Medium	Medium	Low	Low	Low	Low
N132923-8-A	M1	Low	Low	Medium	Medium	Low	Low	Low	Low
N132923-9-A	M1	Medium	High	High	High	High	High	High	High
N132923-9-B	M1	Medium	High	High	High	High	High	High	High
S132923-2-A	M1	Medium	Medium	Medium	High	High	High	High	High
S132923-2-A	M1	Medium	Medium	Medium	High	High	High	High	High
S132923-3-A	M1	High	Low	Medium	High	High	High	High	High
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S132923-1-A	M1	Medium	Medium	Medium	High	High	High	High	High
S132923-1-A	M1	Medium	Medium	Medium	High	High	High	High	High
S132923-4-A	M2	Low	Medium	Medium	Low	Low	Medium	Low	Low
S132923-4-A	M2	Low	Medium	Medium	Low	Low	Medium	Low	Low
S132923-5-B	M1	Medium	Low	Medium	Medium	Medium	Medium	High	High
S132923-5-A	M1	Medium	Low	Medium	Medium	Medium	Medium	High	High
S132923-5-C	M1	Medium	Low	Medium	Medium	Medium	Medium	High	High
S132923-6-A	M1	Medium	High	Medium	Medium	Medium	High	Low	High
S132923-6-A	M1	Medium	High	Medium	Medium	Medium	High	Low	High

WETLAND ID	Mgmt Class	VEGDIVQ	HYDREGQ	F_SQ	WQSHQ	GIQ	WHQ	FHQ	ARQ
N182922-5-A	M1	Medium	High	High	Low	High	High	Low	High
N182922-5-D	M1	Medium	High	High	Low	High	High	Low	High
N182922-22-A	M2	Low	Medium	High	Medium	Low	Medium	Low	Low
N182922-5-E	M1	Medium	High	High	Low	High	High	Low	High
N182922-5-B	M1	Medium	High	High	Low	High	High	Low	High
N182922-6-A	M1	Medium	Medium	High	Medium	Medium	High	Medium	Medium
N182922-5-C	M1	Medium	High	High	Low	High	High	Low	High
N182922-19-A	M1	Low	Medium	Low	Low	Low	Medium	Low	High
N182922-18-A	M2	Low	Medium	Low	Low	Low	Low	Low	Medium
N182922-17-A	M2	Low	Medium	Low	Low	Low	Low	Low	Medium
N182922-20-A	M1	Medium	High	High	Low	Low	Medium	Low	Low
N182922-16-B	M3	Low	Medium	Low	Low	Low	Low	Low	Low
N182922-16-A	M3	Low	Medium	Low	Low	Low	Low	Low	Low
N182922-3-A	M2	Low	Medium	High	Low	Medium	Low	Low	Medium
N182922-15-A	M2	Low	High	High	Low	Low	Low	Low	Low
N182922-4-A	M2	Low	Medium	Low	Low	Low	Low	Low	Medium
N182922-7-A	M1	Medium	Medium	High	Medium	Medium	High	Medium	Medium
N182922-21-A	M2	Low	Low	Medium	Medium	Low	Medium	Low	Medium
N182922-14-A	M1	High	Medium	High	Medium	High	High	Medium	Medium
N182922-13-A	M1	Medium	Medium	High	Medium	Medium	High	Medium	Medium
N182922-8-A	M1	Medium	Medium	High	Medium	Medium	High	Medium	Medium
N182922-14-D	M1	High	Medium	High	Medium	High	High	Medium	Medium
N182922-14-C	M1	High	Medium	High	Medium	High	High	Medium	Medium
N182922-2-A	M2	Low	Medium	High	Low	Medium	Low	Low	Medium
N182922-14-B	M1	Medium	Medium	High	Medium	High	High	Medium	Medium
N182922-9-A	M1	Medium	Medium	High	Medium	Medium	High	Medium	Medium
N182922-14-E	M1	High	Medium	High	Medium	High	High	Medium	Medium
N182922-12-A	M1	Medium	Medium	High	Medium	Medium	High	Medium	Medium
N182922-10-A	M1	Medium	Medium	High	Medium	Medium	High	Medium	Medium
N182922-14-G	M1	High	Medium	High	Medium	High	High	Medium	Medium
N182922-14-F	M1	High	Medium	High	Medium	High	High	Medium	Medium
N182922-11-A	M1	Medium	Medium	High	Medium	Medium	High	Medium	Medium
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N182922-1-B	M2	Low	Medium	Medium	Medium	Low	Low	Low	Medium
S182922-5-B	M1	High	Medium	High	Medium	Low	High	Low	Medium
S182922-5-D	M1	High	Medium	High	Medium	Low	High	Low	Medium
S182922-5-A	M1	High	Medium	High	Medium	Low	High	Low	Medium
S182922-5-C	M1	High	Medium	High	Medium	Low	High	Low	Medium
S182922-5-E	M1	High	Medium	High	Medium	Low	High	Low	Medium
S182922-2-A	M2	Low	Medium	Medium	Low	Medium	Low	Medium	Low
S182922-6-A	M2	Medium	Medium	High	High	Low	Medium	Low	Medium
S182922-6-B	M2	Medium	Medium	High	High	Low	Medium	Low	Medium
S182922-4-A	M1	Low	Low	High	Medium	Low	Low	High	High
S182922-7-A	M3	Low	Low	High	Low	Medium	Low	Low	Low
S182922-1-A	M2	Low	Medium	Medium	Medium	Medium	Low	Medium	High
S182922-3-A	M1	High	High	High	High	Medium	High	Low	Medium
S212923-1-A	M2	Low	Low	Low	Low	Low	Low	Low	Medium
N222923-1-A	M1	Low	High	High	Medium	Low	Low	Low	Low
S222923-1-A	M3	Low	Low	Low	Medium	Low	Low	Low	Low
S232923-3-A	M3	Low	Low	Low	Low	Low	Low	Low	Low
S232923-2-A	M3	Low	Low	Low	Low	Low	Low	Low	Low
S232923-4-A	M3	Low	Low	Low	Low	Low	Low	Low	Low
S232923-6-A	M2	Medium	Low	Medium	Low	Low	Medium	Low	Low
S232923-5-A	M3	Low	Low	Medium	Low	Low	Low	Low	Low
S232923-1-A	P	Low	Low	Low	Medium	High	Medium	Medium	High
S242923-1-C	M1	High	Medium	High	High	High	High	High	High
S242923-1-E	M1	High	Medium	High	High	High	High	High	High
S242923-1-A	M1	High	Medium	High	High	High	High	High	High
S242923-1-A	M1	High	Medium	High	High	High	High	High	High
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S242923-1-D	M1	High	Medium	High	High	High	High	High	High

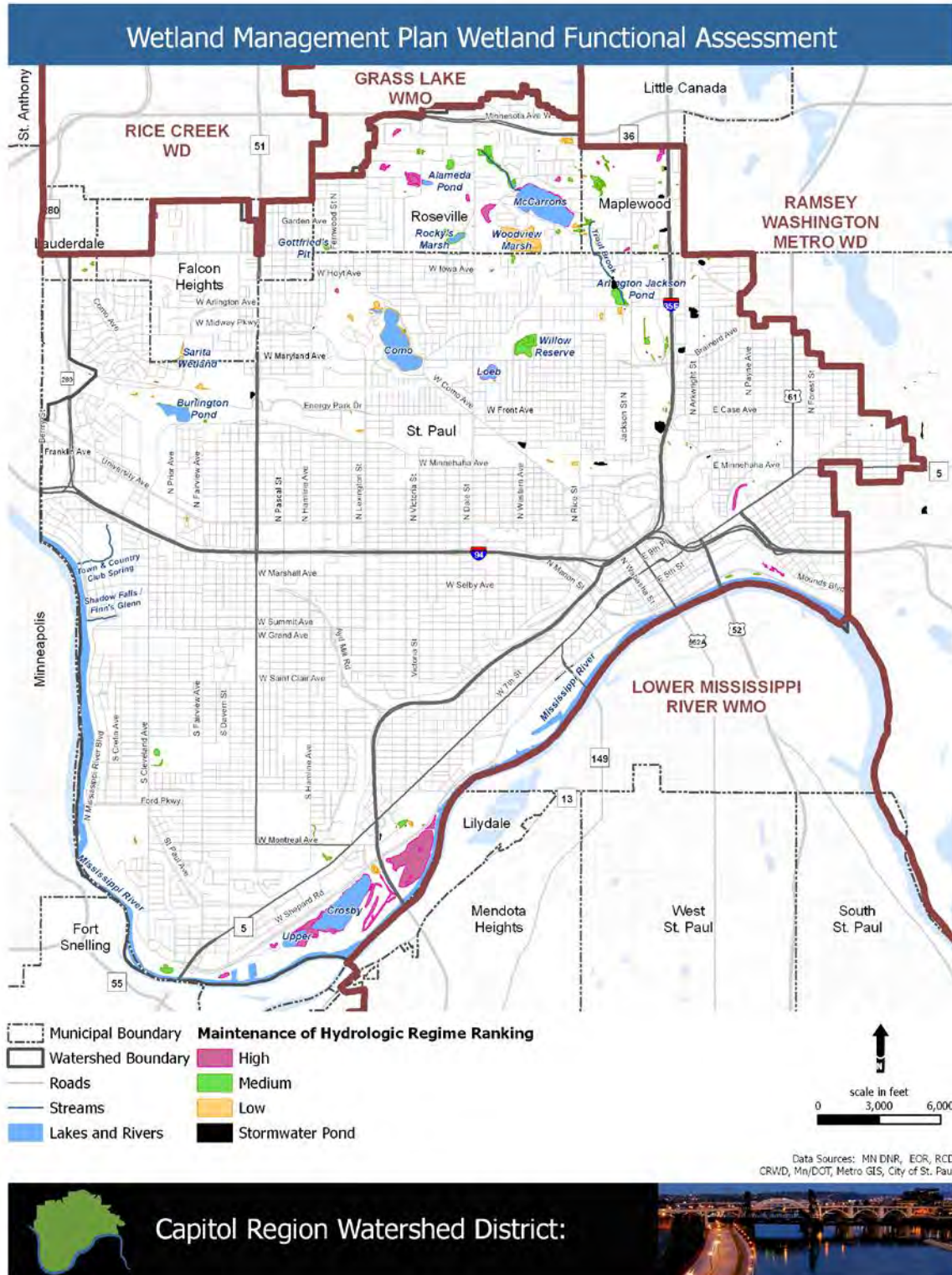
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N182922-23-A	M1	Low	Medium	High	Medium	Low	Low	Low	Low
N202922-1-A	M2	Low	High	High	Medium	Low	Low	Medium	Medium
N202922-1-A	M2	Low	High	High	Medium	Low	Low	Medium	Medium
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S202922-1-A	M1	Low	High	High	Medium	Low	Low	Low	Low
N272923-2-A	M1	Low	Low	High	Medium	Low	Low	Low	Low
N272923-1-A	M2	Low	Medium	High	Medium	Low	Medium	Low	Medium
S272923-1-A	M2	Low	Low	Low	Low	Low	Low	Low	Medium
S252923-1-A	M1	Low	Medium	High	Medium	Low	Low	Low	Low
S302922-2-A	M2	Low	Medium	High	Low	Low	Low	Low	Low
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N302922-1-A	M2	Medium	Low	Medium	Low	Low	Low	Low	Medium
S302922-1-B	M2	Low	Medium	High	Medium	Low	Medium	Low	Medium
S302922-1-A	M2	Low	Medium	High	Medium	Low	Medium	Low	Medium
S302922-3-A	M3	Low	Low	Low	Low	Low	Low	Low	Low
N332923-1-A	M2	Low	Low	Medium	Low	Low	Low	Low	Medium
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N312922-1-A	M3	Low	Low	Medium	Low	Low	Low	Low	Low
S162923-2-A	M2	Medium	Medium	Medium	Medium	Low	Medium	Low	High
S162923-3-A	M2	Low	High	High	High	Low	Medium	Low	High
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N222823-1-A	M1	Medium	High	High	High	Low	Medium	Low	High
S212823-3-A	P	High	High	Low	Low	Low	High	Low	High
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S142823-1-C	M1	Medium	Low	High	High	Low	Medium	High	High
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Wetland Function and Value Assessment Maps

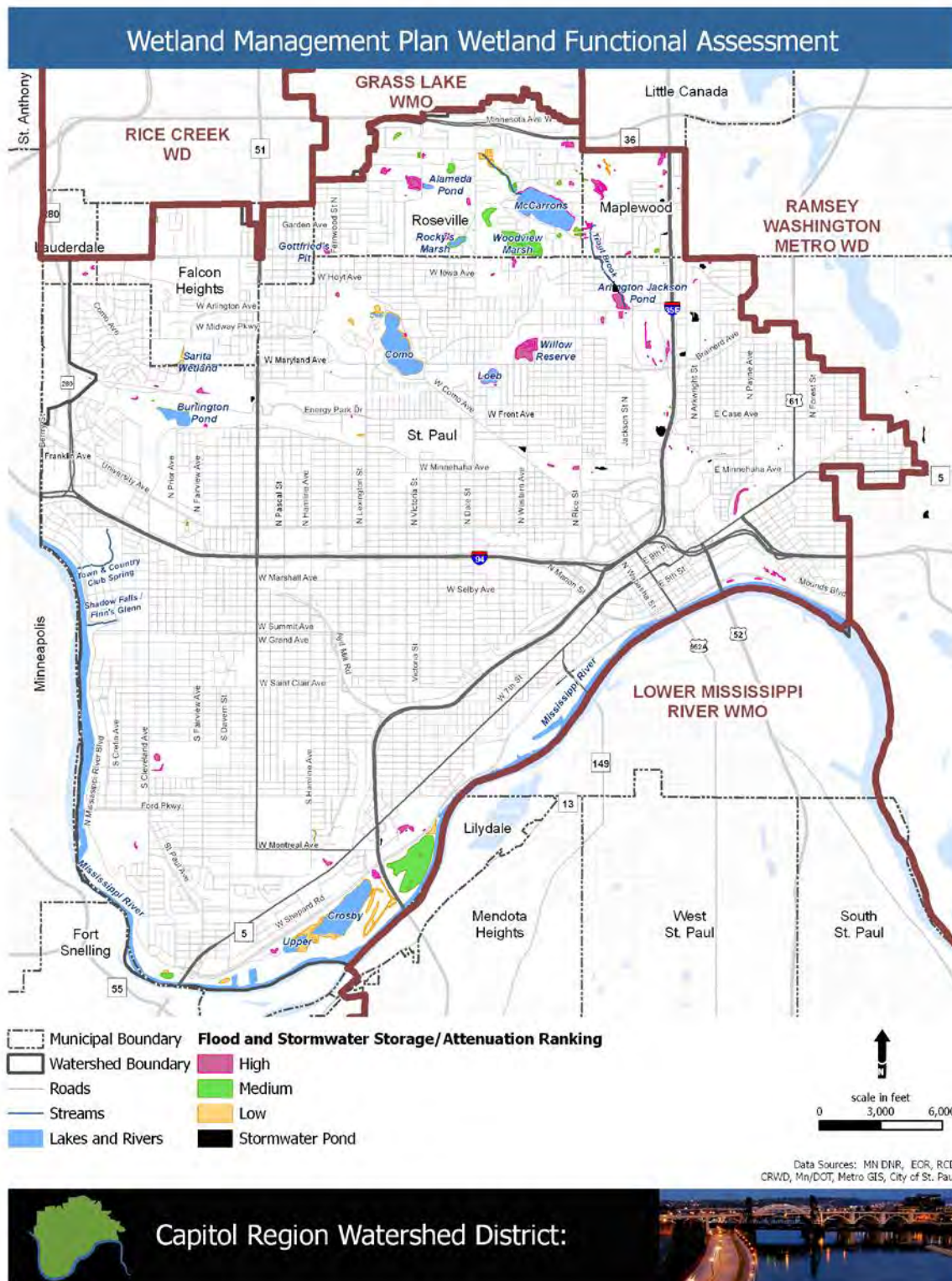
Vegetative Diversity and Integrity Ranking



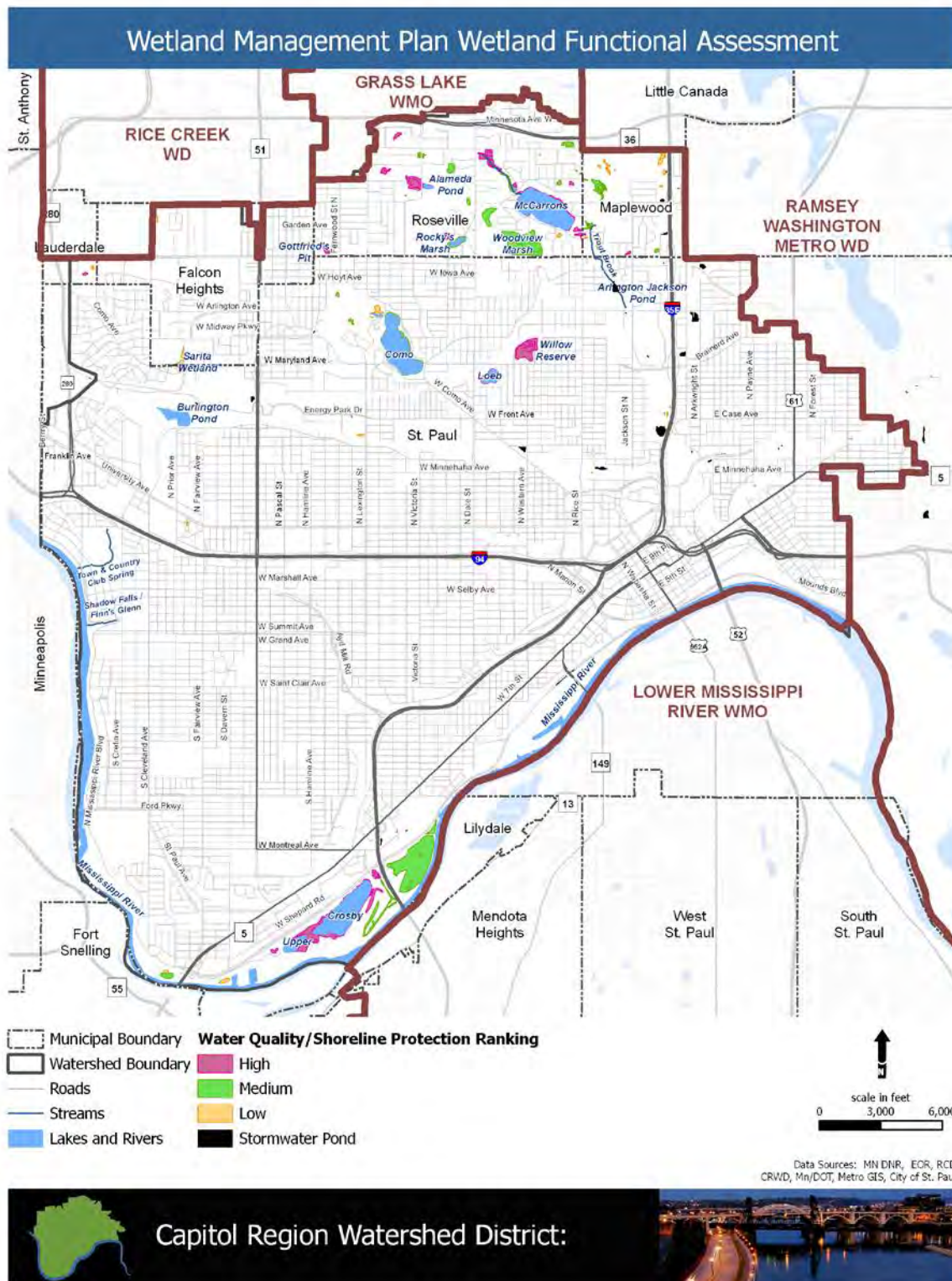
Maintenance of Hydrologic Regime Ranking



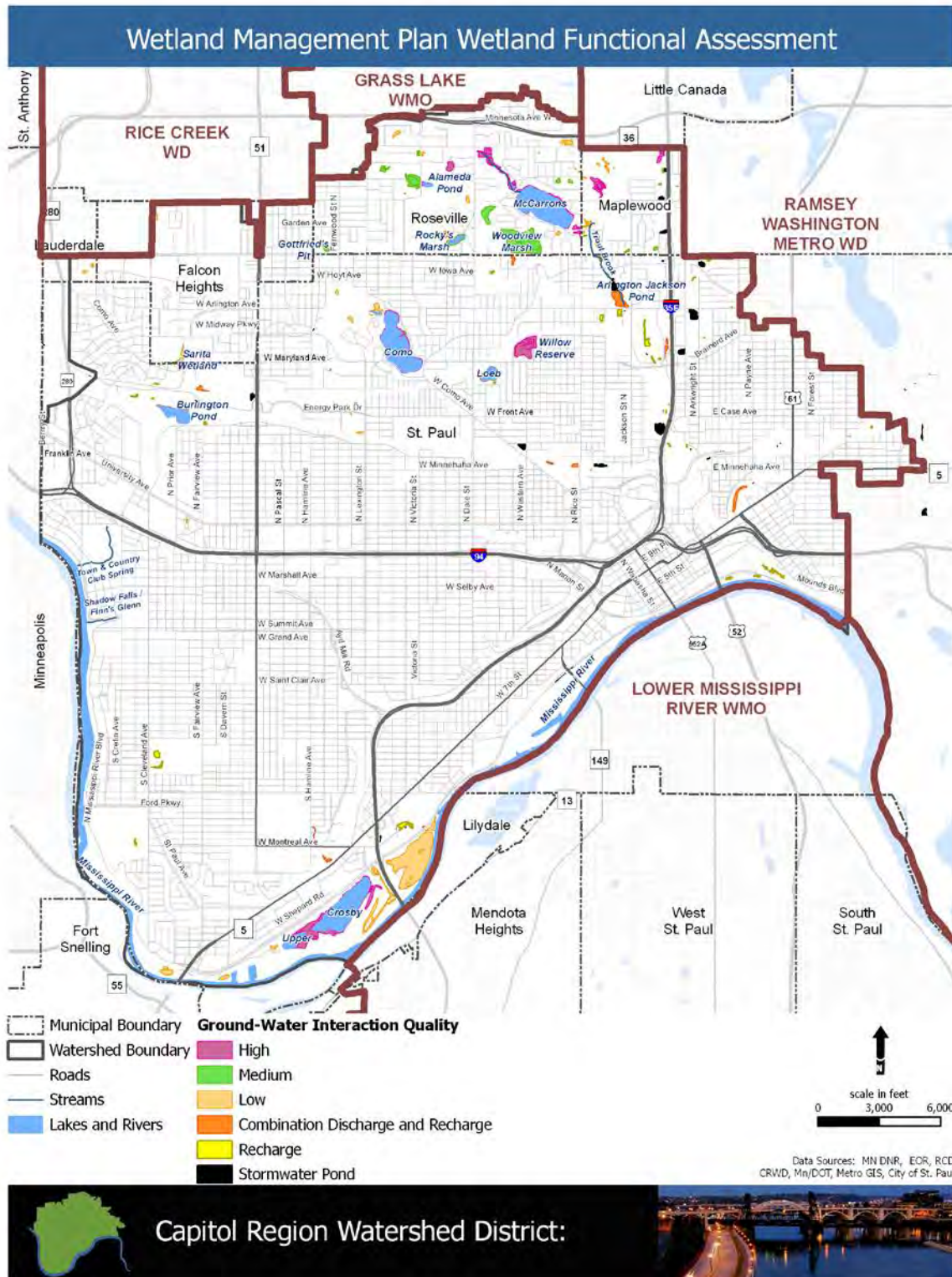
Flood and Stormwater Storage/Attenuation Ranking



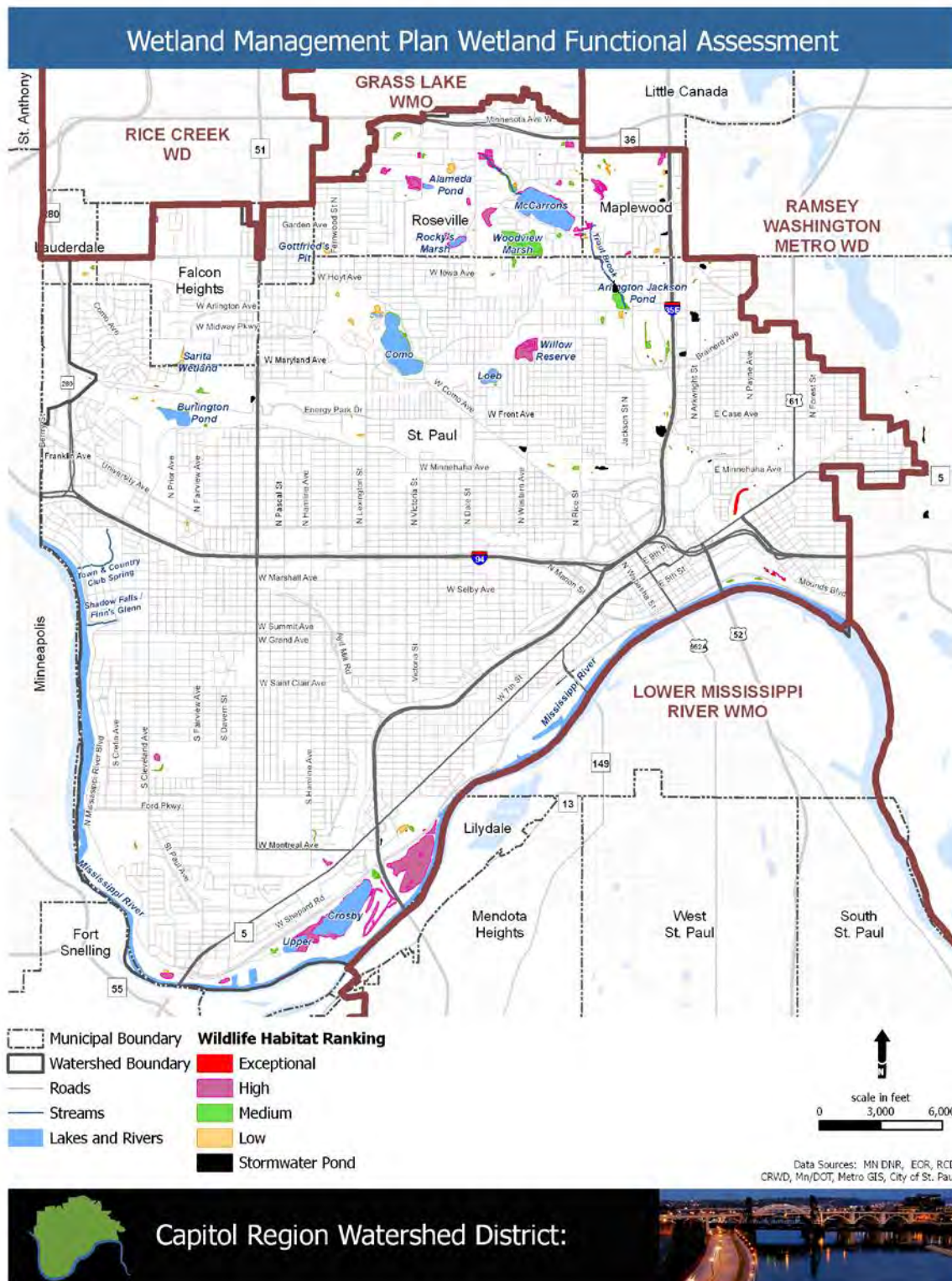
Water Quality/Shoreline Protection Ranking



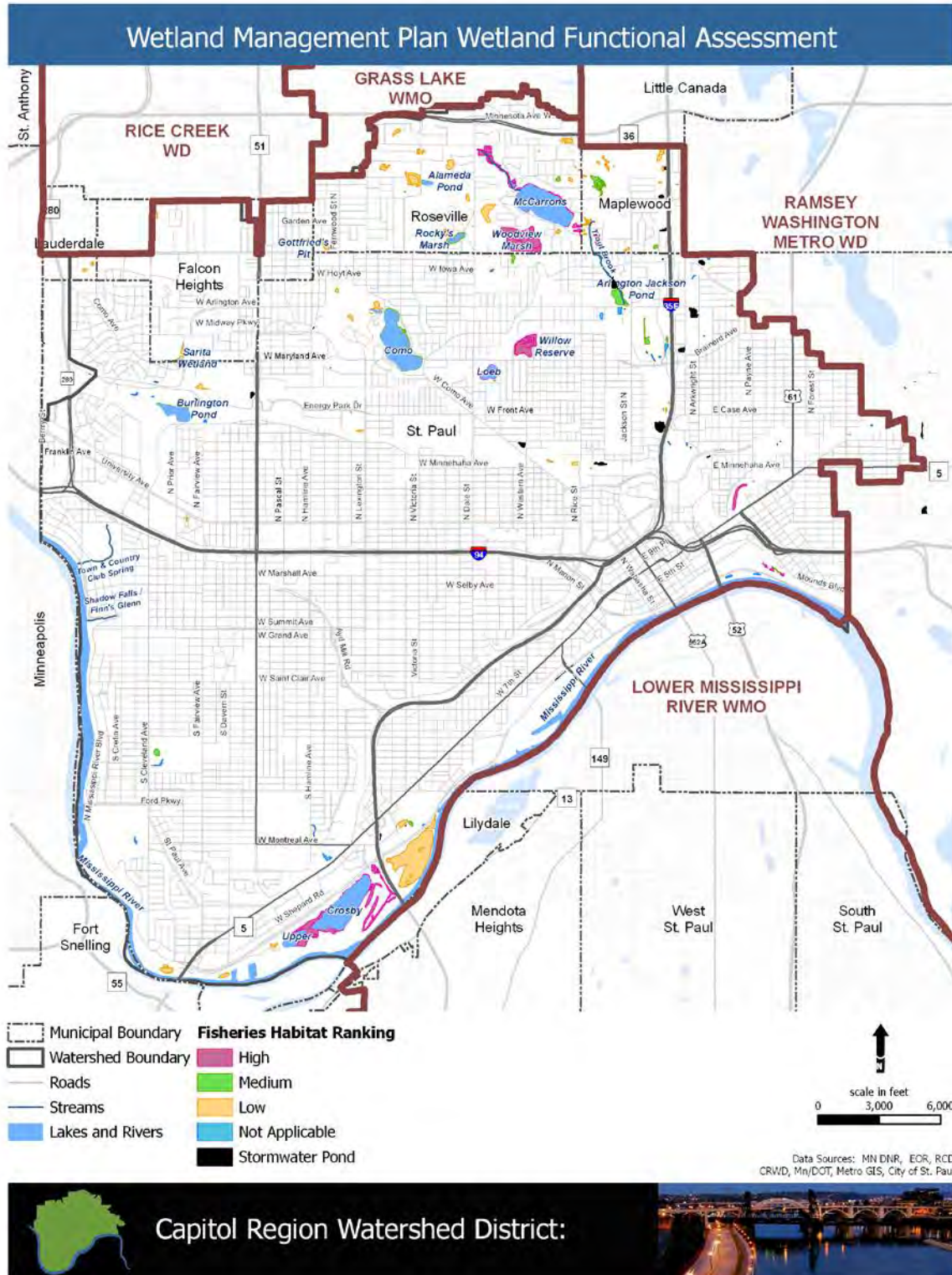
Groundwater Interaction Ranking



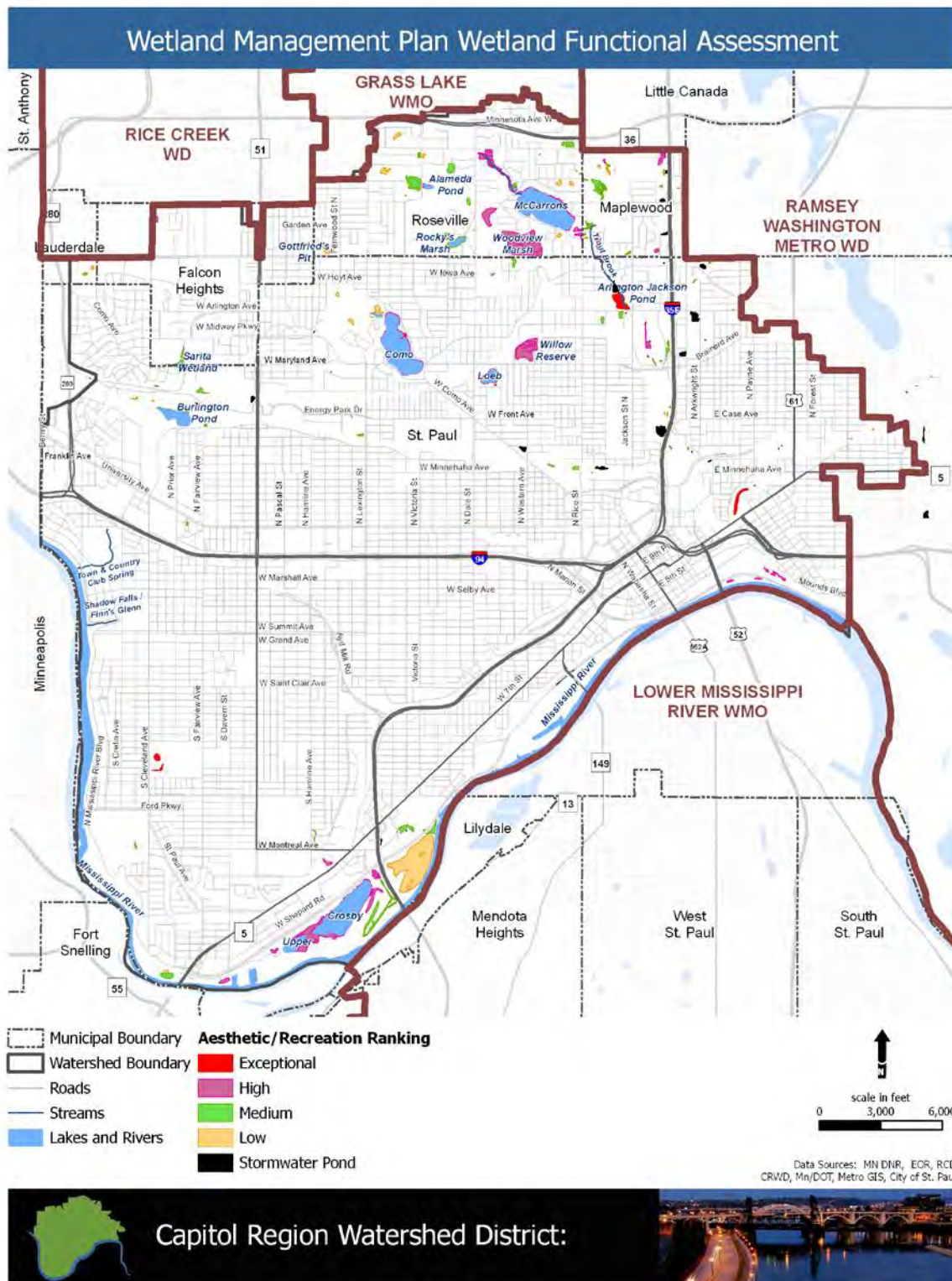
Wildlife Habitat Ranking



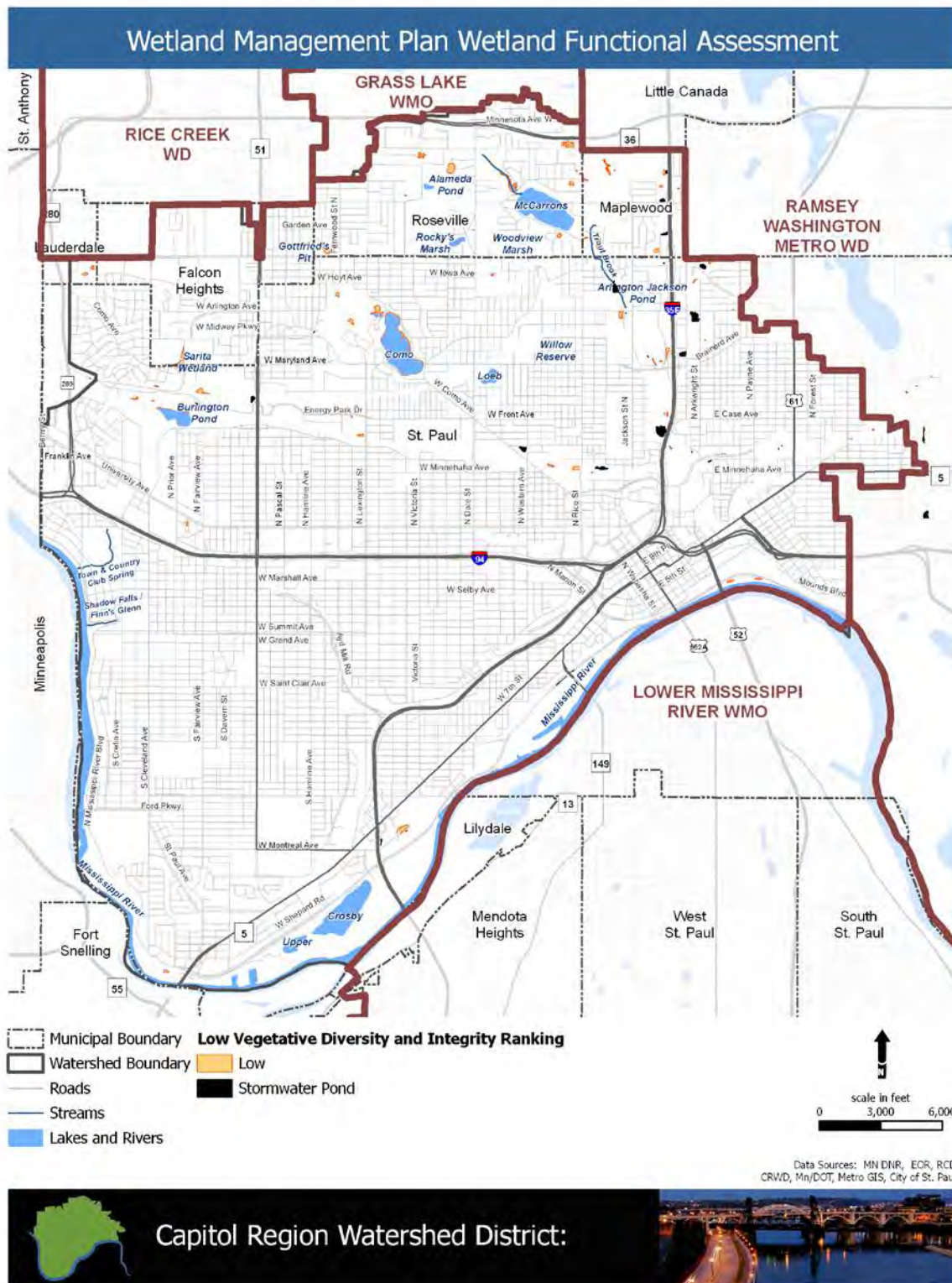
Fisheries Habitat Ranking



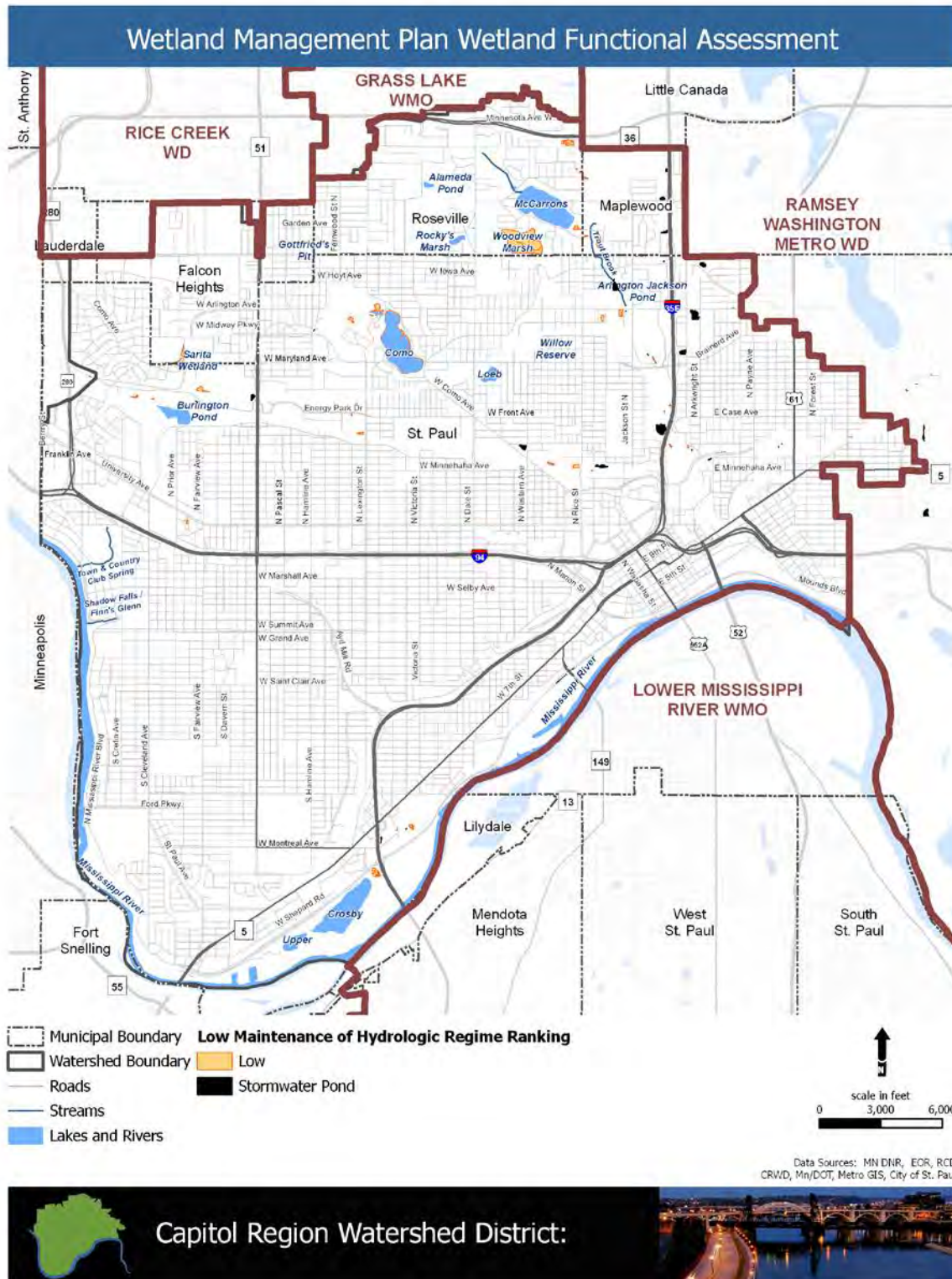
Aesthetics/Recreation Ranking



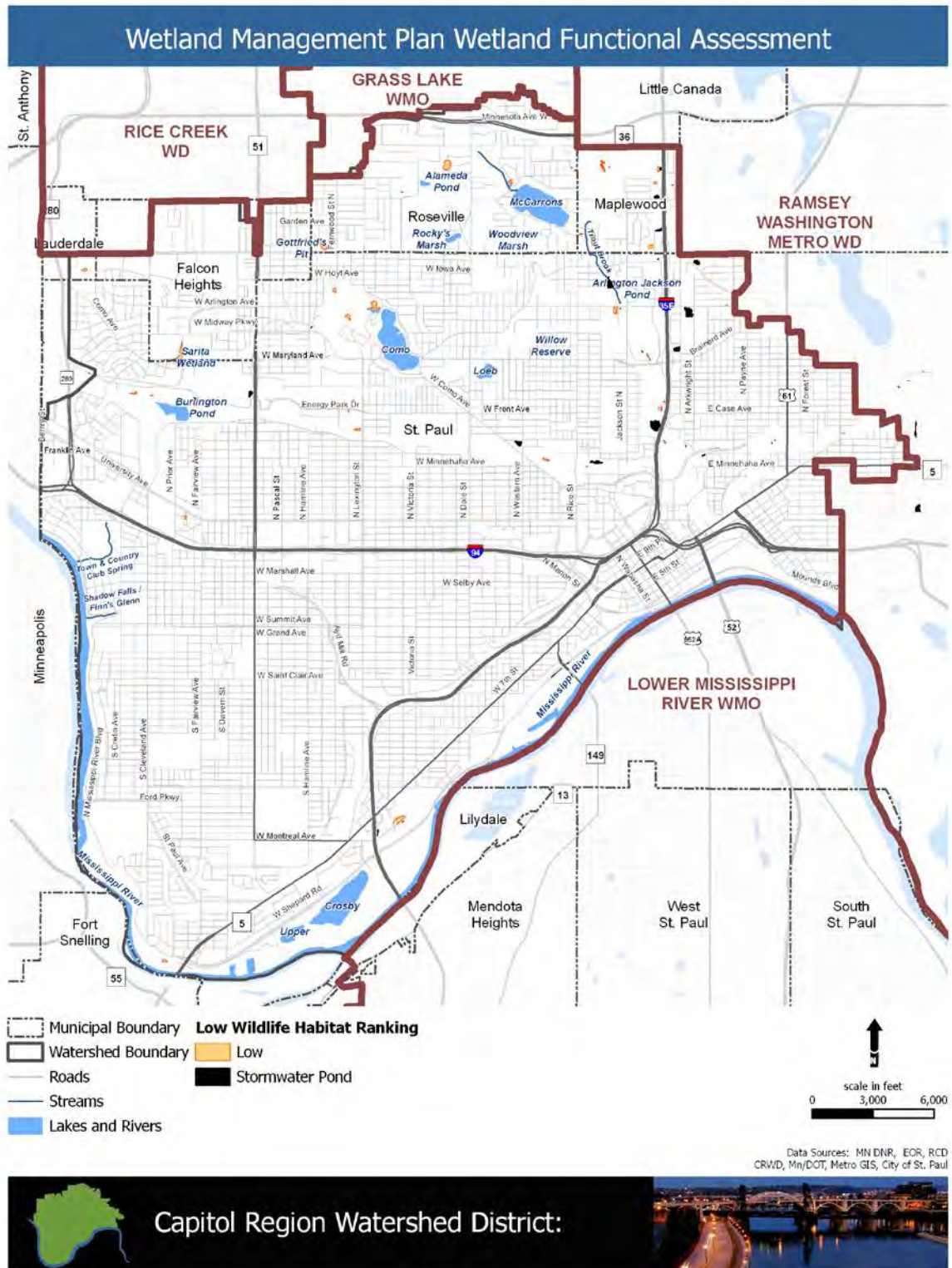
Wetlands with LOW Vegetative Diversity and Integrity Value



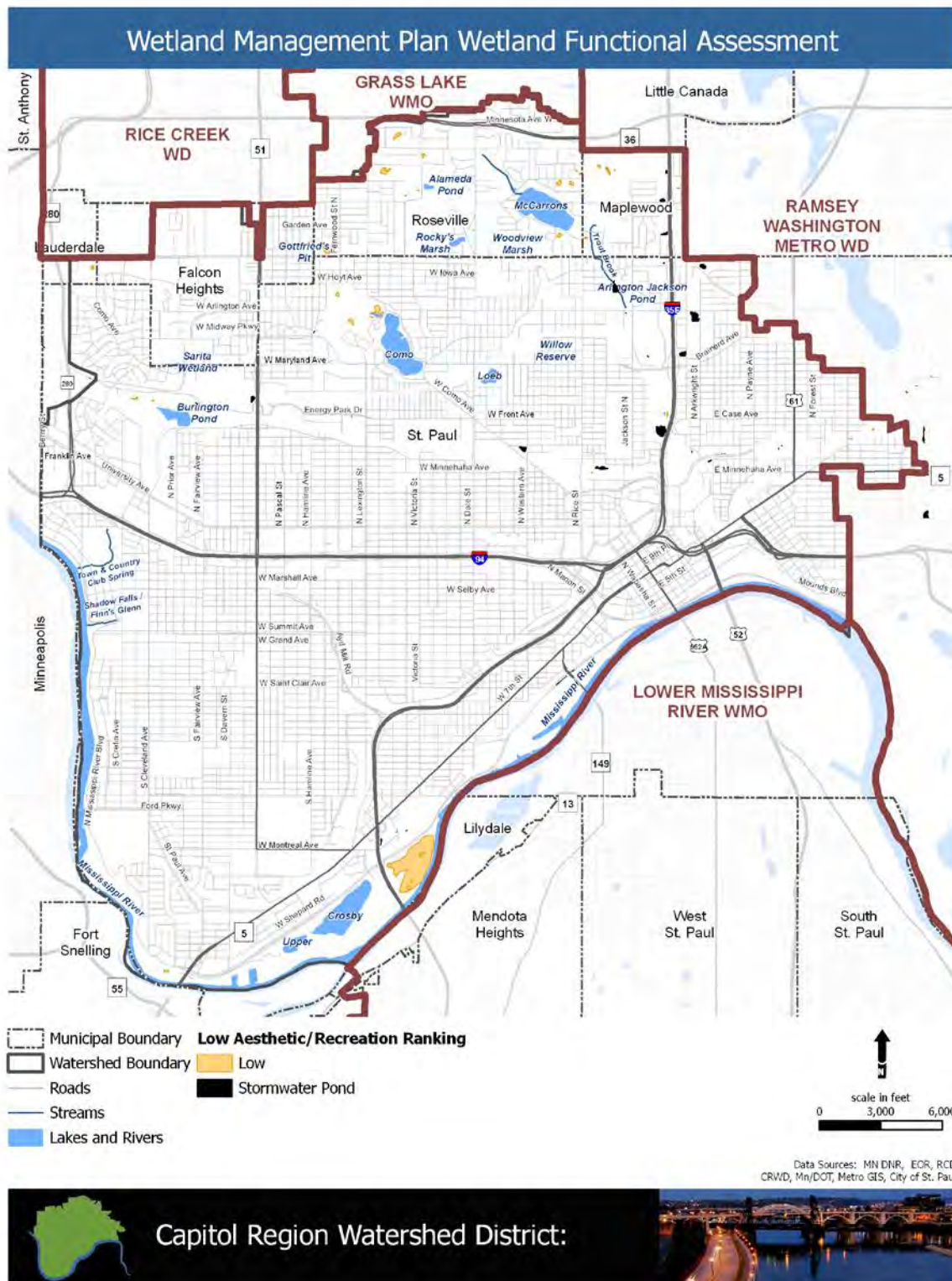
Wetlands with LOW Maintenance of Hydrologic Regime Value



Wetlands with LOW Wildlife Habitat Value



Wetlands with LOW Aesthetic/Recreation Value



Appendix G

Correlation Table of Plan Goals to Implementation Activities and Measurable Outputs

Appendix G - Correlation Table of Plan Goals to Implementation Activities and Measurable Outputs

Note: It is the desire and intent of the District to achieve the measurable outputs listed below. However, achievement is highly dependent on partner interest, opportunity, funding, schedule and capacity.

Goal #	Goal	Activity ID #	Implementation Activity	Activity Measureable Outputs	Status (to be updated biennially)
BE-1	Manage stormwater runoff from District-owned, permitted, and grant funded projects with green infrastructure practices and other approaches that mimic natural hydrology by retaining a minimum volume equivalent to 1.1 inches over new, redeveloped, or existing impervious surfaces	208A	General Permitting Implementation	30 permits approved and 7 acre-feet retained annually	
		208I	Green infrastructure incentives in District rules	1 adopted green infrastructure incentive rule	
		210A	Stewardship grants	10 projects annually; stormwater volume retention in the amount equivalent to 1.1"runoff and 90% TSS removal	
		210E	ROW projects - boulevard raingardens	5 projects annually; stormwater volume retention in the amount equivalent to 1.1"runoff and 90% TSS removal	
BE-2	Work with partners to identify, evaluate, and carryout opportunities for regional stormwater management systems on at least one large-scale redevelopment project (e.g., Ford Site, Towerside, Creative Enterprise Zone) over 10 years	331A	Towerside Innovation District stormwater management planning	Towerside stormwater planning study	
		431A	Towerside Innovation District stormwater management planning	1 water quality CIP in Towerside Innovation District	
		331B	Creative Enterprise Zone stormwater management planning	CEZ stormwater planning study	
		431B	Creative Enterprise Zone stormwater management planning	1 water quality CIP in Creative Enterprise Zone	
		332B	Ford redevelopment site comprehensive stormwater planning	Advance stormwater designs at Ford redevelopment site	
		332D	Snelling-Midway Phase II redevelopment planning	Properties connected to District rainwater reuse system	
		432B	Ford redevelopment district stormwater system and central water feature	Stormwater runoff retained and sediment and phosphorus reductions; central stormwater featured constructed	
		333A	Sears Redevelopment Site stormwater planning	Sears redevelopment site stormwater planning study	
		433A	Sears Redevelopment Site	1 Sears site water quality CIP	
		375A	Transportation Redevelopment Projects - Stormwater Feasibility Studies/Preliminary Engineering	1 Transportation-oriented stormwater feasibility studies	
		475A	Transit Redevelopment Stormwater CIPs	1 transportation-related water quality CIP	
		375G	Public private partnership opportunities	2 meetings per year	
BE-3	Explore private-public partnerships on redevelopment projects to implement shared, stacked green infrastructure (SSGI) projects with environmental, economic, and social benefits	210G	Large-scale site planning grants	3 planning grants annually	
		331A	Towerside Innovation District stormwater management planning	Towerside stormwater planning study	
		431A	Explore private-public partnerships on redevelopment projects to implement shared, stacked green infrastructure (SSGI) projects with environmental, economic, and social benefits	1 water quality CIP in Towerside Innovation District	
		331B	Creative Enterprise Zone stormwater management planning	CEZ stormwater planning study	
		431B	Creative Enterprise Zone stormwater management planning	1 water quality CIP in Creative Enterprise Zone	
		332B	Ford redevelopment site comprehensive stormwater planning	Advance stormwater designs at Ford redevelopment site	
		432B	Ford redevelopment district stormwater system and central water feature	Stormwater runoff retained and sediment and phosphorus reductions; central stormwater featured constructed	
		333A	Sears Redevelopment Site stormwater planning	Sears redevelopment site stormwater planning study	
		433A	Sears Redevelopment Site	1 Sears site water quality CIP	
		375A	Transportation Redevelopment Projects - Stormwater Feasibility Studies/Preliminary Engineering	1 Transportation-oriented stormwater feasibility study	
		475A	Transit Redevelopment Stormwater CIPs	1 transportation-related water quality CIP	
		375B	Great River Passage Project - Feasibility Studies/Preliminary Engineering	1 Great River Passage stormwater feasibility study	
		475B	Great River Passage CIPs	1 Great River Passage water quality CIPs	
		375G	Public private partnership opportunities	2 meetings per year	
BE-4	Identify and prioritize improvement projects in each of the District’s high-priority subwatersheds (Trout Brook, Saint Anthony Hill, and Phalen Creek) (see Section 3.2) through development of at least one subwatershed study in each subwatershed	315D	TBI flood mitigation and water quality improvement studies	3 flood mitigation and water quality improvement studies	
		333C	Phalen Creek subwatershed water quality and quantity study	1 Phalen Creek subwatershed water quality and quantity study	
		333D	Saint Anthony Hill subwatershed water quality and quantity study	1 Saint Anthony Hill subwatershed water quality and quantity study	

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Note: It is the desire and intent of the District to achieve the measurable outputs listed below. However, achievement is highly dependent on partner interest, opportunity, funding, schedule and capacity.

Goal #	Goal	Activity ID #	Implementation Activity	Activity Measureable Outputs	Status (to be updated biennially)
BE-5	Support the voluntary implementation of green infrastructure practices with a target of 10 BMPs installed per year by continuing to offer grant programs and considering other types of incentives	210A	Stewardship grants	10 projects annually; stormwater volume retention in the amount equivalent to 1.1"runoff and 90% TSS removal	
		210E	ROW projects - boulevard raingardens	5 projects annually; stormwater volume retention in the amount equivalent to 1.1"runoff and 90% TSS removal	
BE-6	Annually monitor and report effectiveness of at least five District green infrastructure practices and other stormwater BMPs in reducing stormwater runoff volumes and pollutant loads	211C	BMP performance monitoring	8 BMPs monitored; volume and pollutant reductions	
		211F	Monitoring data trend analysis and reporting for public	Monitoring trend analysis report	
		211J	Non-structural BMPs effectiveness	Technical memo	
BE-7	Identify and address top 5 sediment or phosphorus pollutant loading hot spot areas for targeted source control (e.g., street sweeping)	210D	Targeted site identification	12 suitable sites identified over the 10-year plan	
		208H	Illicit Discharge Detection and Elimination (IDDE) plan implementation	20 illicit discharges removed over 10 years	
		220C	Clean Streets	300 storm drains adopted and 200 new participants over the 10-year plan; 5,000 lbs. of trash, sediment and organics removed collected in 300 hours per year	
WQ-1	Establish Como Lake as an ecologically healthy shallow lake and achieve the following long-term water quality goals identified in the Como Lake Management Plan:	See subgoals below			
WQ-1a	a. Achieve and maintain in-lake summer average total phosphorus (TP) concentration less than 60 µg/L	211B	Lake monitoring and data collection	5 lakes monitored; lake quality, and quantity data, and biological data	
		305A	Como Lake water quality model	Como Lake water quality model	
WQ-1b	b. Reduce watershed phosphorus loading by 60% relative to year 2000 baseline	305E	Shoreline management plan and implementation	Shoreline management plan and all of lakeshore maintained in a restored state	
		305F	Street sweeping enhancement	Street sweeping plan and sediment and phosphorus reduction	
		305G	Innovative treatment facility feasibility study (i.e. spent lime)	Study report	
		405J	Como Golf Course BMPs	Infiltration and iron-enhanced pond 55 lbs/year TP reduction 34 acre-ft/year volume reduction	
		405K	Como Pavilion BMPs	1 CIP and stormwater volume retained and sediment and phosphorus reductions	
		405L	McMurray Field	1 water quality CIP	
		405N	East Como Lake Drive BMPs	1 water quality CIP	
		305P/405 P	Future capital improvement projects (CIPs)	1 future water quality CIP	
WQ-1c	c. Reduce internal phosphorus loading by 95%	305A	Como Lake water quality model	Como Lake water quality model	
		405M	Como Lake alum treatment	24,000 gallons of Alum applied to Como Lake	
WQ-1d	d. Reduce other non-point source pollutants (e.g., bacteria, chloride, trash, sediment)	305F	Street sweeping enhancement	Street sweeping plan and sediment reduction	
		208F	Deicing practices rule	1 chloride reduction rule or ordinance assistance package	
		220C	Clean Streets	300 storm drains adopted and 200 new participants over the 10-year plan; 5,000 lbs. of trash, sediment and organics removed collected in 300 hours per year	
WQ-2	Manage Lake McCarrons to improve and sustain its ecological health as a deep lake and achieve the following water quality goals identified in the Lake McCarrons Management Plan:	See subgoals below			
WQ-2a	a. Maintain in-lake summer average total phosphorus (TP) concentration less than 33 µg/L	211B	Lake monitoring and data collection	5 lakes monitored; lake quality, and quantity data, and biological data	
		310C	Watershed Hydraulic/Hydrologic Modeling	Updated model	
WQ-2b	b. Maintain watershed phosphorus loading of 0.25 lbs/acre/yr (no increase from 2008-2018 baseline)	310B	Villa Park wetland system evaluation	VPWS evaluation report with existing phosphorus reductions	
		410B	Villa Park performance improvements	1 Villa Park CIP project	
		310F	Shoreline management plan and implementation	Shoreline management plan	
		310G/410 G	Future capital improvement projects (CIPs)	1 future water quality CIPs	
WQ-2c	c. Maintain hypolimnetic TP concentrations below 300 µg/L	310A	Alum treatment evaluation	Alum treatment evaluation report	
		410A	Alum treatment	1 alum treatment	
		211B	Lake monitoring and data collection	5 lakes monitored; lake quality, and quantity data, and biological data	
WQ-2d	d. Work with partners to ensure in-lake chloride concentrations do not exceed 230 mg/L more than once every 3 years	211B	Lake monitoring and data collection	5 lakes monitored; lake quality, and quantity data, and biological data	
		208F	Deicing practices rule	1 chloride reduction rule or ordinance assistance package	
		208F	Deicing practices rule	1 chloride reduction rule or ordinance assistance package	

Appendix G - Correlation Table of Plan Goals to Implementation Activities and Measurable Outputs

Note: It is the desire and intent of the District to achieve the measurable outputs listed below. However, achievement is highly dependent on partner interest, opportunity, funding, schedule and capacity.

Goal #	Goal	Activity ID #	Implementation Activity	Activity Measureable Outputs	Status (to be updated biennially)
WQ-2e	e. Reduce other non-point source pollutants (e.g., bacteria, chloride, trash, sediment)	220C	Clean Streets	300 storm drains adopted and 200 new participants over the 10-year plan; 5,000 lbs. of trash, sediment and organics removed collected in 300 hours per year	
WQ-3	Establish Crosby Lake as an ecologically healthy shallow lake appropriate for its proximity to the Mississippi River and achieve the following long-term water quality goals identified in the Crosby Lake Management Plan:	See subgoals below			
WQ-3a	a. Achieve and maintain in-lake summer average total phosphorus (TP) concentration less than 60 µg/L	211B	Lake monitoring and data collection	5 lakes monitored; lake quality, and quantity data, and biological data	
		317C	Update Crosby Lake Management Plan	Updated Crosby Lake Management Plan	
WQ-3b	b. Reduce watershed phosphorus loading by 47% relative to 2000-2009 baseline of 92 lbs/yea	317A	Crosby Farm bluff stabilization plan	Bluff erosion study updates	
		317C	Update Crosby Lake Management Plan	Updated Crosby Lake Management Plan	
		317D	35E Regional stormwater BMP feasibility study	Stormwater feasibility study	
		317E	Shoreline management plan and implementation	Shoreline management plan and # feet of restored shoreline	
		417A	Crosby Farm Park bluff stabilization projects	1 bluff stabilization project	
		317H/417 H	Future capital improvement projects (CIPs)	1 future water quality CIP	
WQ-4	Manage Loeb Lake to improve and sustain its ecological health as a shallow lake and maintain or improve water quality of Loeb Lake that meets the following shallow lake water quality standards: a. Maintain in-lake summer average TP concentration less than 60 µg/L b. Maintain clarity of 1 meter c. Maintain chlorophyll a concentration of less than 20 µg/L	211B	Lake monitoring and data collection	5 lakes monitored; lake quality, and quantity data, and biological data	
		313A	Update Loeb Lake Management Plan	Updated Loeb Lake Management Plan	
		313C	Shoreline management plan and implementation	Shoreline management plan	
		313D	Loeb Lake sedimentation pond investigation	Study completed	
		313E/413 E	Future capital improvement projects (CIPs)	1 feasibility study and 1 CIP	
WQ-5	Reduce sediment loading from the District to the Mississippi River to less than 154 pounds/acre/year (South Metro Mississippi River Turbidity TMDL), through ongoing practices (e.g., regulation) and capital improvements (e.g., assessment, prioritization, and stabilization of eroded ravines)	211A	Stormwater monitoring and data collection	10 monitoring sites; stormwater quality and quantity data	
		210A	Stewardship grants	10 projects annually; stormwater volume retention in the amount equivalent to 1.1"runoff and 90% TSS removal	
		210E	ROW projects - boulevard raingardens	5 projects annually; stormwater volume retention in the amount equivalent to 1.1"runoff and 90% TSS removal	
		315I/415I	Future Trout Brook Subwatershed studies and CIPs	2 studies and CIPs	
		417A	Crosby Farm Park bluff stabilization projects	1 bluff stabilization project	
		417H	Crosby Lake Subwatershed CIPs	1 CIP	
		431A	Towerside Innovation District stormwater management planning	1 water quality CIP in Towerside Innovation District	
		431B	Creative Enterprise Zone stormwater management planning	1 water quality CIP in Creative Enterprise Zone	
		431C	UM/MN State Fair Cooperative Projects	1 water quality CIP with UMN/MN State Fair	
		431D	Seminary Pond and ravine stormwater improvements	2 tons of sediment removed and 17 pounds of phosphorus removed annually	
		331E/431 E	Future Mississippi River Gorge Subwatershed studies and CIPs	1 study and CIP	
		332A/432 A	East Kittsondale subwatershed project prioritization and stormwater BMPs	1 East Kittsondale study and water quality CIP	
		432B	Ford redevelopment district stormwater system and central water feature	Stormwater runoff retained and sediment and phosphorus reductions; central stormwater featured constructed	
		432E	Victoria Park stormwater improvements	Stormwater runoff retained and sediment and phosphorus reductions; stormwater featured constructed	
		332F/432F	Future Mississippi River Confluence Subwatershed studies and CIPs	1 study and CIP	
		433A	Sears Redevelopment Site	1 Sears site water quality CIP	
		333B/433 B	Swede Hollow feasibility study and CIP	1 study and CIP	
		433E	Science Museum of Minnesota	1 Science Museum of Minnesota water quality CIP	
		333F/433F	Future Mississippi River Downtown Subwatershed study and CIPs	1 study and 3 CIPs	
		375J	Municipal source control/good housekeeping planning and implementation assistance	Municipal source control and good housekeeping plan	

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Note: It is the desire and intent of the District to achieve the measurable outputs listed below. However, achievement is highly dependent on partner interest, opportunity, funding, schedule and capacity.

Goal #	Goal	Activity ID #	Implementation Activity	Activity Measureable Outputs	Status (to be updated biennially)
		475A	Transit Redevelopment Stormwater CIPs	1 transportation-related water quality CIP	
		475B	Great River Passage CIPs	1 Great River Passage water quality CIP	
WQ-6	Reduce total phosphorus loading to the Mississippi River to 0.35 lb/acre/year and achieve total phosphorus concentrations of 125 µg/L and 100 µg/L in the Mississippi River and Lake Pepin, respectively (draft Lake Pepin TMDL)	211A	Stormwater monitoring and data collection	10 monitoring sites; stormwater quality and quantity data	
		210A	Stewardship grants	10 projects annually; stormwater volume retention in the amount equivalent to 1.1"runoff and 90% TSS removal	
		210E	ROW projects - boulevard raingardens	5 projects annually; stormwater volume retention in the amount equivalent to 1.1"runoff and 90% TSS removal	
		415F	Future Trout Brook Subwatershed CIPs	2 CIPs	
		417A	Crosby Farm Park bluff stabilization projects	1 bluff stabilization project	
		417H	Crosby Lake Subwatershed CIPs	1 CIP	
		431A	Towerside Innovation District stormwater management planning	1 water quality CIP in Towerside Innovation District	
		431B	Creative Enterprise Zone stormwater management planning	1 water quality CIP in Creative Enterprise Zone	
		431C	UM/MN State Fair Cooperative Projects	1 water quality CIP with UMN/MN State Fair	
		431D	Seminary Pond and ravine stormwater improvements	2 tons of sediment removed and 17 pounds of phosphorus removed annually	
		431E	Future Mississippi River Gorge CIPs	1 CIP	
		432A	East Kittsondale stormwater BMPs	1 East Kittsondale water quality CIP	
		432B	Ford redevelopment district stormwater system and central water feature	Stormwater runoff retained and sediment and phosphorus reductions; central stormwater featured constructed	
		432E	Victoria Park stormwater improvements	Stormwater runoff retained and sediment and phosphorus reductions; stormwater featured constructed	
		432F	Future Mississippi River Confluence Subwatershed CIPs	1 CIP	
		433A	Sears Redevelopment Site	1 Sears site water quality CIP	
		433B	Swede Hollow CIP	1 Swede Hollow water quality CIP	
		433E	Science Museum of Minnesota	1 Science Museum of Minnesota water quality CIP	
		433F	Future Mississippi River Downtown Subwatershed CIPs	3 CIPs	
		375J	Municipal source control/good housekeeping planning and implementation assistance	Municipal source control and good housekeeping plan	
		475A	Transit Redevelopment Stormwater CIPs	1 transportation-related water quality CIP	
		475B	Great River Passage CIPs	1 Great River Passage water quality CIP	
WQ-7	Quantify and reduce the amount of trash entering District lakes, wetlands, ponds, and the Mississippi River	211I	Emerging contaminants and water quality issues	New monitoring parameters and results	
		375I	Trash management planning and implementation for areas surrounding District infrastructure and water and natural resources	Trash management plan	
WQ-8	Achieve bacterial water quality standards (126 CFU/mL monthly geometric mean, April–October) in the Mississippi River (Upper Mississippi River Bacteria TMDL)	211A	Stormwater monitoring and data collection	10 monitoring sites; stormwater quality and quantity data	
		211J	Non-structural BMPs effectiveness	Technical memo	
		220L	Partner grant program	10 Partner Grant projects; 5,000-10,000 participants served; types of products created; pollution reduction; acres of greenspace restored per year	
WQ-9	Establish a baseline and reduce chloride loading to Como Lake and make progress towards meeting the 2,233 pounds/day MS4 waste load allocation to Como Lake through actions identified in the Twin Cities Metro Area Chloride Management Plan	211B	Lake monitoring and data collection	5 lakes monitored; lake quality, and quantity data, and biological data	
		208F	Deicing practices rule	1 chloride reduction rule or ordinance assistance package	
		210H	Chloride reduction grants	5 chloride reduction grants annually	
		305F	Street sweeping enhancement	Street sweeping plan and sediment and phosphorus reduction	
		375K	District Chloride Source Assessment and Prevention Plan	Chloride reduction plan	
	Reduce loading of chloride, metals, pesticides, organic	208E	Rules evaluation and update	5 Rules TAC meetings; # updates to District Rules	
		208F	Deicing practices rule	1 chloride reduction rule or ordinance assistance package	
		208H	Illicit Discharge Detection and Elimination (IDDE) plan implementation	20 illicit discharges removed over 10 years	
		208J	Industrial stormwater permittee coordination	10 industrial stormwater site meetings	
		210H	Chloride reduction grants	5 chloride reduction grants annually	
		211A	Stormwater monitoring and data collection	10 monitoring sites; stormwater quality and quantity data	

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Goal #	Goal	Activity ID #	Implementation Activity	Activity Measureable Outputs	Status (to be updated biennially)
WQ-10	Reduce loading of chloride, metals, pesticides, organic contaminants, and other pollutants to District lakes, wetlands, ponds, and the Mississippi River	211B	Lake monitoring and data collection	5 lakes monitored; lake quality, and quantity data, and biological data	
		211I	Emerging contaminants and water quality issues	New monitoring parameters and results	
		220C	Clean Streets	300 storm drains adopted; 200 new participants; 5,000 lbs. of trash, sediment and organics removed collected in 300 hours per year	
		332C	Area C Ford site planning	Environmental investigation study	
		375J	Municipal source control/good housekeeping planning and implementation assistance	Municipal source control and good housekeeping plan	
		375K	District Chloride Source Assessment and Prevention Plan	Chloride reduction plan	
WQ-11	Research the prevalence, extent and impacts of at least two emerging water quality issues (e.g., microplastics, pharmaceuticals, PFAS compounds, and other anthropogenic contaminants)	211I	Emerging contaminants and water quality issues	New monitoring parameters and results	
WQ-12	Document baseline conditions, identify trends, and target areas for reducing pollutant loading and evaluate progress towards achieving water quality goals by monitoring quality and quantity of District water resources annually (five lakes, seven subwatershed stormwater outfalls) and periodically (nine wetlands)	211A	Stormwater monitoring and data collection	10 monitoring sites; stormwater quality and quantity data	
		211B	Lake monitoring and data collection	5 lakes monitored; lake quality, and quantity data, and biological data	
		211D	Monitoring database and reporting tool	Stormwater and lake data available on monitoring database and reporting tool	
		211E	Wetland biological integrity monitoring	18 wetlands monitored; wetland health grades	
		211F	Monitoring data trend analysis and reporting for public	Monitoring trend analysis report	
WQ-13	Support and collaborate with Ramsey County, the Minnesota Department of Natural Resources (MDNR), Saint Paul Regional Water Services, community suppliers, and other appropriate partners on groundwater quality monitoring and protection efforts	210F	Well-sealing Grants	12 wells sealed annually	
		302A	Groundwater seepage and springs study	Seepage and springs study report	
		302B	Beneficial infiltration study and demonstration projects	Beneficial infiltration study report	
		302C	Infiltration and groundwater quality study	Infiltration-groundwater quality study report	
		302D	Groundwater monitoring well network in the District	Groundwater monitoring well network map	
		302E	Karst area study	Karst study report	
		302F	Ramsey County groundwater study	Updated County groundwater plan	
		402G	Future groundwater projects	1 groundwater project	
FL-1	Maintain critical event (i.e., 10 or 100 year) flood control for all District-sponsored CIPs and permitted redevelopment projects	208A	General permitting implementation	30 permits approved and 7 acre-feet retained annually	
		315I/415I	Future CIPs - Trout Brook Subwatershed	2 CIPs	
FL-2	Ensure that the Trout Brook storm sewer system, a District-owned and operated storm sewer system, adequately and safely conveys stormwater flows by inspecting at least once every five years and conducting two major repairs over the 10-year plan.	222A	District-owned facility management	6 BMPs inspected and maintained	
		315A	TBI 5-year inspection and CIP development	Inspection and CIP reports every five years	
		315B	NPDES stormwater program	Annual MS4 report and updated SWPPP	
		315C	TBI hydrologic and hydraulic model update and expansion	Expanded, updated TBI H/H model	
		415F	TBI Repairs Station 28+65 - 50+72	2200 feet of TBI repaired	
		415G	TBI Repairs Station 135+06 - 180+29	4500 feet of TBI repaired	
		415H	Major sediment removal	1700 cubic feet of sediment removed	
FL-3	Minimize flood risk and reduce impacts to stormwater infrastructure and property in three high-priority flood-prone areas in the Trout Brook subwatershed by investigating the issues and implementing flood-mitigation solutions	315C	TBI hydrologic and hydraulic model update and expansion	Expanded, updated TBI H/H model	
		315D	TBI flood mitigation and water quality improvement studies	3 flood mitigation and water quality improvement studies	
		415D	Future flood mitigation and/or water quality improvement projects	3 flood mitigation/water quality improvement projects	
FL-4	Reduce the likelihood and/or consequences of flooding consistent with partner objectives by working with partners to identify, prioritize, and address existing and potential infrastructure capacity and other contributing issues throughout the District	375H	District Flooding Prioritization and Solution Identification	List of priority flood mitigation sites and potential solutions	
		375M	Mixed use neighborhood node drainage and water quality study	1 study	
		305I	Como Park area drainage infrastructure analysis and planning	Como Park area drainage infrastructure study	
		310C	Watershed Hydraulic/Hydrologic Modeling (McCarrons Watershed)	Updated model	
		331C	UM/MN State Fair Cooperative Projects	1 subwatershed study	
		331D	Saint Anthony Hill subwatershed water quality and quantity study	1 subwatershed study	
		433F	Future Mississippi River Downtown subwatershed CIPs	3 CIPs	
		405O	Gottfried's Pit Improvements	1 CIP	
FL-5	Maintain existing floodplain capacity (i.e., no net loss) through implementation of the District's Rules and identify opportunities to increase floodplain capacity and functionality along Crosby Lake and other areas along the Mississippi River	208A	General permitting implementation	30 permits approved and 7 acre-feet retained annually	
		317G	Floodplain and wetland restoration opportunities around Crosby Lake	Floodplain and wetland restoration plan	
		417G	Floodplain and wetland restoration projects	1 floodplain and wetland restoration project	

Appendix G - Correlation Table of Plan Goals to Implementation Activities and Measurable Outputs

Note: It is the desire and intent of the District to achieve the measurable outputs listed below. However, achievement is highly dependent on partner interest, opportunity, funding, schedule and capacity.

Goal #	Goal	Activity ID #	Implementation Activity	Activity Measureable Outputs	Status (to be updated biennially)
FL-6	Adapt to changing climate by evaluating flood risk and designing all new applicable District projects under present and anticipated climate and precipitation trends	211H	Research program	Stormwater research reports	
		208E	Rules evaluation and update	5 Rules TAC meetings; # updates to District Rules	
		315C	TBI hydrologic and hydraulic model update and expansion	Expanded, updated TBI H/H model	
		315D	TBI flood mitigation and water quality improvement studies	3 flood mitigation and water quality improvement studies	
		415D	Future flood mitigation and/or water quality improvement projects	3 flood mitigation/water quality improvement projects	
		375O	Climate science and community resiliency	Local climate change and adaption study report	
FL-7	Identify and address groundwater quantity issues by supporting and collaborating with appropriate agencies and coordinating with partners at least annually	302A	Groundwater seepage and springs study	Seepage and springs study report	
		302E	Karst area study	Karst study report	
		302F	Ramsey County groundwater study	Updated County groundwater plan	
EH-1	Establish Como Lake as an ecologically healthy shallow lake and achieve the following long-term ecosystem health goals identified in the Como Lake Management Plan:	See subgoals below			
	a. Reduce the occurrence of curly-leaf pondweed to <10% during period of peak abundance	305B	AIS management	< 10% frequency of occurrence of curlyleaf pondweed	
	b. Establish and maintain native aquatic vegetation with species richness greater than eight and at least three species with greater than 20% frequency of occurrence	305C	Lake vegetation management plan and implementation	species richness >8; 3 species having FOC >20%	
	c. Establish and maintain a fishery with balanced populations of piscivorous, planktivorous, and benthivorous fish	305D	Balanced fishery target development	Fishery targets from Como Lake Management Plan	
	d. Maintain existing areas of native vegetation along the shoreline to capture surface runoff, minimize shoreline erosion, and promote wildlife habitat	305E	Shoreline management plan and implementation	Shoreline management plan and all of lakeshore maintained in a restored state	
EH-2	Manage Lake McCarrons to improve and sustain its ecological health as a deep lake and maintain the following ecosystem health goals identified in the Lake McCarrons Management Plan:	See subgoals below			
EH-2a	a. Prevent introduction of new aquatic invasive species and control existing invasive species populations	310D	Lake vegetation management plan; type and abundance of aquatic plants	Lake vegetation management plan; type and abundance of aquatic plants	
		211B	Lake monitoring and data collection	5 lakes monitored; lake quality, and quantity data, and biological data	
EH-2b	b. Maintain or increase abundance and distribution of native submersed aquatic plants throughout the growing season	310D	Lake vegetation management plan and AIS response plan	Lake vegetation management plan; type and abundance of aquatic plants	
		211B	Lake monitoring and data collection	5 lakes monitored; lake quality, and quantity data, and biological data	
EH-2c	c. Create and maintain stable shoreline buffers around Lake McCarrons	310F	Shoreline management plan and implementation	Shoreline management plan	
EH-2d	d. Maintain a healthy, balanced fishery	310E	Balanced fishery targets	Fishery targets	
		210	Lake monitoring and data collection	5 lakes monitored; lake quality, and quantity data, and biological data	
EH-3	Establish Crosby Lake as an ecologically healthy shallow lake appropriate for its proximity to the Mississippi River and achieve the following ecosystem health goal identified in the Crosby Lake Management Plan: a. Develop and work towards achieving long term targets for fish and aquatic plant diversity	317C	Update Crosby Lake Management Plan	Updated Crosby Lake Management Plan	
		317E	Shoreline management plan and implementation	Shoreline management plan and # feet of restored shoreline	
		317F	Terrestrial and aquatic invasive species management	Type and abundance of invasive species	
EH-4	Manage reestablished native plant communities and control invasive species in Willow Reserve, Highland Ravine, Trout Brook Nature Sanctuary, and other	313A	Update Loeb Lake Management Plan	Updated Loeb Lake Management Plan	
		313B	AIS management	AIS management plan included in Loeb Lake management plan	
EH-5	Improve ecosystem health in the District's high priority-watersheds of, Trout Brook, Saint Anthony Hill, and Phalen Creek by conducting at least one natural resource inventory and developing and implementing a management plan in each priority subwatershed	325C	Swede Hollow Water Resource and Natural Resources Plan	Swede Hollow water and natural resources plan	
		325F	District 6 Natural Resource Management Plan	1 NRI recommendation investigated and feasibility report created	
		325H	Natural resource inventories and/or management plans	2 natural resource inventories and plans	
		425C	Swede Hollow restoration	1 Swede Hollow restoration project	
		425H	Future wetland/stream/ natural resource restoration projects	2 Acres of restored wetland and other natural resource areas	
EH-6	Investigate and pursue opportunities to restore portions of historic streams in the Phalen Creek, Hidden Falls, and East Kittsondale subwatersheds, targeting two projects implemented over 10 years	325A	Phalen Creek Daylighting	Concept design report for daylighted Phalen Creek	
		325B	Hidden Falls Creek Restoration Planning	Planning and design report for restored Hidden Falls Creek	
		325D	Cascade Creek/Fountain Creek daylighting feasibility study	Cascade Creek/Fountain Creek daylighting feasibility study report	
		425A	Phalen Creek daylighting	1 Phalen Creek daylighting project	
		425B	Hidden Falls Creek restoration	1 Hidden Falls Creek restoration project	
		425D	Cascade Creek/Fountain Creek restoration	1 Cascade Creek/Fountain Creek restoration project	
		425H	Future wetland/stream/natural resource restoration projects	2 Acres of restored wetland and other natural resource areas	

Appendix G - Correlation Table of Plan Goals to Implementation Activities and Measurable Outputs

Note: It is the desire and intent of the District to achieve the measurable outputs listed below. However, achievement is highly dependent on partner interest, opportunity, funding, schedule and capacity.

Goal #	Goal	Activity ID #	Implementation Activity	Activity Measureable Outputs	Status (to be updated biennially)
EH-7	Pursue wetland restoration and local banking opportunities in the top three priority areas identified in the District’s future Wetland Management Plan	317G	Floodplain and wetland restoration opportunities around Crosby Lake	Floodplain and wetland restoration plan	
		417G	Floodplain and wetland restoration projects	1 floodplain and wetland restoration project	
		325G	Wetland Restoration Planning	Saint Paul wetland restoration plan	
		325H	Natural resource inventories and/or management plans	2 natural resource inventories and plans	
		425H	Future wetland/stream/natural resource restoration projects	2 Acres of restored wetland and other natural resource areas	
EH-8	Promote native vegetated buffers around all water resources beyond the minimum requirements of CRWD and other applicable rules through grant opportunities and communication and engagement efforts	210A	Stewardship Grant Program	10 projects annually; stormwater volume retention in the amount equivalent to 1.1"runoff and 90% TSS removal	
		220A	General communications and engagement	Brand standards and common language; 5 outreach meetings per month; contact database	
EH-9	Foster the expansion of native plant communities in the District through conversion of turf grass by promoting District and partner grant opportunities and highlighting native plant benefits	210A	Stewardship Grant Program	15 projects annually; stormwater volume retention in the amount equivalent to 1.1"runoff and 90% TSS removal	
		220L	Partner grant program	10 Partner Grant projects; 5,000-10,000 participants served; types of products created; pollution reduction; acres of greenspace restored per year	
CE-1	Increase the visibility of the District and its work to better engage a variety of stakeholders through the following actions:	See subgoals below			
CE-1a	a. Create standard branding and messaging	220A	General communications and engagement	Brand standards and common language; 5 outreach meetings per month; contact database; translate 3 pieces of District materials into at least three languages	
CE-1b	b. Create and implement individual communications and engagement plans, including three pieces of digital content, for District keystone projects and programs	220E	Digital communications	18,000 website visitors/65,000 pageviews, 10,400 engagements on social media, 1,000-3,000 newsletter subscribers per year	
		220B	Project Communication	Project specific communication plans and tools; 3 pieces of digital content per project per year	
CE-1c	c. Proactively engage at least one member of the media each month to amplify the District’s work	220A	General communications and engagement	Brand standards and common language; 5 outreach meetings per month; contact database	
CE-2	Increase community understanding of, and connection to, natural resources, environmental issues and public health through the following actions:	See subgoals below			
CE-2a	a. Develop and share at least two pieces of accessible and engaging District-owned content each month that ties District goals to the interests of stakeholders	220A	General communications and engagement	Brand standards and common language; 5 outreach meetings per month; contact database	
		220E	Digital communications	18,000 website visitors/65,000 pageviews, 10,400 engagements on social media, 1,000-3,000 newsletter subscribers per year	
CE-2b	b. Create and share information that promotes actions to improve water quality and ecosystem health	220A	General communications and engagement	Brand standards and common language; 5 outreach meetings per month; contact database	
		220B	Project Communication	Project specific communication plans and tools; 3 pieces of digital content per project per year	
		220E	Digital communications	18,000 website visitors/65,000 pageviews, 10,400 engagements on social media, 1,000-3,000 newsletter subscribers per year	
		220M	Public art program	1-2 arts related projects, activities, events per year; demographics of audiences when available	
		220N	595 Aldine communications and engagement	4-5 BMP and interactive exhibit signs; 1-2 exhibits, and activities at District office per year	
CE-2c	c. Host or support events to further understanding and encourage clean water actions, targeting 25 events per year	210B	Stewardship grant outreach	12 community events with translated Stewardship Grant outreach materials; engage with 3 organizations that serve BIPOC residents	
		220A	General communications and engagement	Brand standards and common language; 5 outreach meetings per month; contact database	
		220C	Clean Streets	300 storm drains adopted; 200 new participants; 5,000 lbs. of trash, sediment and organics removed collected in 300 hours per year	
		220D	Maintenance workshops for water quality	2-4 workshops with 20-45 attendees per year	
		220M	Public art program	1-2 arts related projects, activities, events per year; demographics of audiences when available	
		220N	595 Aldine communications and engagement	4-5 BMP and interactive exhibit signs; 1-2 exhibits, and activities at District office per year	
		220I	Events	25 community events attended by the District; 2,000 people reached per year	
CE-3	Enhance the District’s public affairs and community relationships and increase community engagement through the following actions:	See subgoals below			
	a. Build community engagement infrastructure and	211G	Citizen Science Monitoring Program	Citizen science monitoring program	
		220F	Volunteer programs	15-20 volunteers, 100-200 hours served at 50 or more community events or site visits per year	

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Goal #	Goal	Activity ID #	Implementation Activity	Activity Measureable Outputs	Status (to be updated biennially)
CE-3a	tools, including long-term program opportunities (e.g., K 12 curriculum, regular volunteer opportunities, citizen science, etc.)	220I	Events	25 community events attended by the District; 2,000 people reached per year	
		220A	General communications and engagement	Brand standards and common language; 5 outreach meetings per month; contact database	
		220K	Youth programs	500 youth engaged; types of youth programs; 5 schools worked with per year	
CE-3b	b. Expand outreach to neighborhood groups, environmental organizations, local businesses, K 12 schools, colleges and universities, and other District audiences through 5 outreach meetings per month	210I	District "watercorps" position	1 position offered annually	
		220H	Partnerships	50 hours spent collaborating with 10 key community partners per year	
		220K	Youth programs	500 youth engaged; types of youth programs; 5 schools worked with per year; career mentorship to at least 3 youth groups per year	
		220L	Partner grant program	10 Partner Grant projects; 5,000-10,000 participants served; types of products created; pollution reduction; acres of greenspace restored per year	
CE-3c	c. Gather information from audiences where engagement is lacking to identify barriers to adoption of clean water behaviors and develop strategies to overcome those barriers.	101H	Diversity and inclusion program	1 -2 workshops for staff annually; outreach and communication plan for two underserved communities; engage 3-5 organizations/schools working with BIPOC; implement best practices in hiring; semi-annual diversity and inclusion workshops for partners	
		220H	Partnerships	50 hours spent collaborating with 10 key community partners per year	
CE-3d	d. Increase recruitment and support of volunteers who will promote programs and activities that align with District goals and actively participate in improving our water resources, targeting 300 adopted storm drains, 200 new participants, and 300 volunteer hours per year	220F	Volunteer programs	15-20 volunteers, 100-200 hours served at 50 or more community events or site visits per year	
		220G	Sponsorships	5-10 District sponsored events/activities; 1,000-5,000 people served per year	
		220H	Partnerships	50 hours spent collaborating with 10 key community partners per year	
		220J	Awards program	Annual awards program to recognize up to six individuals or organizations.	
CE-4	Connect with members of Dakota, Ojibwe, and other indigenous communities to build relationships and develop materials that acknowledge their history and ongoing engagement in the stewardship of the land and water in the District.	220A	General communications and engagement	Brand standards and common language; 5 outreach meetings per month; contact database	
		101H	Diversity and inclusion program	1 -2 workshops for staff annually; outreach and communication plan for two underserved communities; engage 3-5 organizations/schools working with BIPOC; implement best practices in hiring; semi-annual diversity and inclusion workshops for partners	
CE-5	Support the continued integration of the arts, technology and storytelling as a vibrant means to communicate, educate, and enliven the experiences of District residents.	220E	Digital communications	18,000 website visitors/65,000 pageviews, 10,400 engagements on social media, 1,000-3,000 newsletter subscribers per year	
		220M	Public art program	1-2 arts related projects, activities, events per year; demographics of audiences when available	
CE-6	Support the creation of recreational access points and programming to better connect people with Willow Reserve and other water and natural resources of the District	220B	Project Communication	Project specific communication plans and tools; 3 pieces of digital content per project per year	
		305H	Water-based recreational activities support	Support of partner water-based recreational activities	
		317B	Hidden Falls/Crosby Farm trail reconstruction planning	Trail reconstruction plan	
		325E	Willow Reserve signage and access	Willow Reserve interpretive signage and access	
		325H	Natural resource inventories and/or management plans	2 natural resource inventories and plans	
		425H	Future wetland/stream/natural resource restoration projects	2 Acres of restored wetland and other natural resource areas	
CE-7	Increase communication and engagement efforts to help address chloride and trash pollution.	220A	General communications and engagement	Brand standards and common language; 5 outreach meetings per month; contact database	
		220C	Clean Streets	300 storm drains adopted; 200 new participants; 5,000 lbs. of trash, sediment and organics removed collected in 300 hours per year	
		220F	Volunteer programs	15-20 volunteers, 100-200 hours served at 50 or more community events or site visits per year	
		220G	Sponsorships	5-10 District sponsored events/activities; 1,000-5,000 people served per year	
		375I	Trash management planning and implementation for areas surrounding District infrastructure and water and natural resources	Trash management plan	
		375K	District Chloride Source Assessment and Prevention Plan	Chloride reduction plan	
R-1	Achieve the District's 1.1 inch volume retention standard and other performance standards on 100% of redevelopment projects disturbing 1 acre or more of land	208A	General permitting implementation	30 permits approved and 7 acre-feet retained annually	
		208C	Permittee post construction BMP inspections	20 inspected BMPs and BMP conditions status reports per year	
		475P	Stormwater impact fund implementation	Stormwater impact fund CIP(s)	

Appendix G - Correlation Table of Plan Goals to Implementation Activities and Measurable Outputs

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Goal #	Goal	Activity ID #	Implementation Activity	Activity Measureable Outputs	Status (to be updated biennially)
R-2	Work with agency partners to provide consistent and efficient stormwater regulations and controls across jurisdictions	208A	General permitting implementation	30 permits approved and 7 acre-feet retained annually	
		208D	Engagement activities with permittees, developers, engineers, and applicants	5 meetings with private developers during the plan period	
		208E	Rules evaluation and update	5 Rules TAC meetings; # updates to District Rules	
		208K	Water reuse policy support	Adopted water reuse guidance document	
		375F	Saint Paul watershed governance exploration	Technical memorandum evaluating water governance in Saint Paul	
R-3	Meet with agency partners every 2 years to ensure that stormwater regulations reflect the most pressing water quality issues, current research, and science to make progress in protecting and improving water and natural resources	208E	Rules evaluation and update	5 Rules TAC meetings; # updates to District Rules	
		208F	Deicing practices rule	1 chloride reduction rule or ordinance assistance package	
		208G	Stormwater rule requirements on sites less than one acre	1 Rule Revision for Small Sites	
		208I	Green infrastructure incentives in District rules	1 adopted green infrastructure incentive rule	
R-4	Work with agency partners to evaluate and consider regulations for deicing practices	208F	Deicing practices rule	1 chloride reduction rule or ordinance assistance package	
R-5	Work with agency partners to evaluate and develop requirements for stormwater management on sites disturbing less than 1 acre of land	208G	Stormwater rule requirements on sites less than one acre	1 Rule Revision for Small Sites	
R-6	Support the State's efforts to develop comprehensive water reuse policy and guidance and updates to the State plumbing code.	208K	Water reuse policy support	Adopted water reuse guidance document	
R-7	Work with partners to improve coordination and processes on overlapping aspects of regulatory programs:	See subgoals below			
R-7a	a. review of permit applications early in the project design phase	208D	Engagement activities with permittees, developers, engineers, and applicants	5 meetings with private developers during the plan period	
		208E	Rules evaluation and update	5 Rules TAC meetings; # updates to District Rules	
R-7b	b. detection and elimination of at least 20 illicit discharges over 10 years	208H	Illicit Discharge Detection and Elimination (IDDE) plan implementation	20 illicit discharges removed over 10 years	
R-7C	c. inspection and enforcement of all projects during and after construction	208B	Coordinated erosion and sediment control inspections	(% compliance) Active Sites Visited once per week during construction	
		208C	Permittee post construction BMP inspections	20 inspected BMPs and BMP conditions status reports per year	
R-8	Identify and implement ways to improve engagement with developers, engineers and applicants	208D	Engagement activities with permittees, developers, engineers, and applicants	5 meetings with private developers during the plan period	
R-9	Identify and leverage opportunities that combine incentives for green infrastructure with regulations to address District and partner goals	208A	General permitting implementation	30 permits approved and 7 acre-feet retained annually	
		208E	Rules evaluation and update	5 Rules TAC meetings; # updates to District Rules	
		208I	Green infrastructure incentives in District rules	1 adopted green infrastructure incentive rule	
IM-1	Achieve desired performance of District-owned and funded stormwater infrastructure through regular inspection of all District-owned and funded infrastructure, consistent routine and non-routine maintenance, and replacement according to individual infrastructure operation and maintenance plans	222A	District-owned facility management	6 BMPs inspected and maintained	
		222B	Shared ownership (District/partner) facility management	4 BMPs inspected and maintained	
		222C	Partner owned facility management and ownership evaluation	Evaluation report	
		222E	BMP database	BMP database	
		315E	TBI easement verification, acquisition and documentation	8 acres of additional easement	
IM-2	Establish effective and efficient long-term management approach(es) for publicly owned stormwater management systems, including individual, shared, and/or regional systems	222B	Shared ownership (District/partner) facility management	4 BMPs inspected and maintained	
		222C	Partner owned facility management and ownership evaluation	Evaluation report	
IM-3	Support our public and private partners in the maintenance of stormwater infrastructure by developing and implementing a stormwater infrastructure maintenance service program	220D	Maintenance workshops for water quality	2-4 workshops with 20-45 attendees per year	
		222C	Partner owned facility management and ownership evaluation	Evaluation report	
		222D	Cooperative BMP maintenance service program	6 BMPs inspected and maintained	
		375J	Municipal source control/good housekeeping planning and implementation assistance	Municipal source control and good housekeeping plan	
IM-4	Offer BMP inspection and maintenance support to District grantees to ensure at least 90% of District grant-funded projects meet their design goals annually	210C	Stewardship grant project inspection and maintenance assistance	90% BMPs rated fair or better for functionality	
		222D	Cooperative BMP maintenance service program	6 BMPs inspected and maintained	
IM-5	Develop and implement program(s) for inspection of District-permitted and other privately owned stormwater infrastructure	222B	Shared ownership (District/partner) facility management	4 BMPs inspected and maintained	
		222C	Partner owned facility management and ownership evaluation	Evaluation report	

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Goal #	Goal	Activity ID #	Implementation Activity	Activity Measureable Outputs	Status (to be updated biennially)
IM-6	Work with partners to assess inspection and maintenance needs and costs for regional stormwater management systems, identify partner roles, and develop an approach/program for regional stormwater systems	222C	Partner owned facility management and ownership evaluation	Evaluation report	
IM-7	Increase public and private sector knowledge of stormwater BMP inspection and maintenance by offering or promoting annual education and training programs by others	210C	Stewardship grant project inspection and maintenance assistance	90% BMPs rated fair or better for functionality	
		222D	Cooperative BMP maintenance service program	6 BMPs inspected and maintained	
		220C	Clean Streets	300 storm drains adopted; 200 new participants; 5,000 lbs. of trash, sediment and organics removed	
		220D	Maintenance workshops for water quality	2-4 workshops with 20-45 attendees per year	
O-1	Foster equitable implementation of all District programs and projects across the watershed by engaging traditionally underserved populations and expanding geographic reach into the Trout Brook, Saint Anthony Hill, and Phalen Creek subwatersheds	101H	Diversity and inclusion program	1 -2 workshops for staff annually; outreach and communication plan for two underserved communities; engage 3-5 organizations/schools working with BIPOC; implement best practices in hiring; semi-annual diversity and inclusion workshops for partners	
		210B	Stewardship grant outreach	12 community events with translated Stewardship Grant outreach materials; engage with 3 organizations that serve BIPOC residents	
		220B	Project Communication	Project specific communication plans and tools; 3 pieces of digital content per project per year	
		315I/415I	Future Trout Brook subwatershed stormwater management planning and CIPs	2 studies and CIPs	
		333C	Phalen Creek subwatershed water quality and quantity study	1 Phalen Creek subwatershed study	
		333D	Saint Anthony Hill subwatershed water quality and quantity study	1 Saint Anthony Hill subwatershed study	
		433F	Future CIPs	3 CIPs	
O-2	Assess District programs, activities, and water governance within and adjacent to the District through an equity lens on a bi-annual basis and make recommendations for consistent, equitable, and efficient water resource management	101B	Citizen Advisory Committee	12 CAC members and monthly meetings	
		101D	Program effectiveness assessment	Bi-annual assessment report	
		101H	Diversity and inclusion program	1 -2 workshops for staff annually; outreach and communication plan for two underserved communities; engage 3-5 organizations/schools working with BIPOC; implement best practices in hiring; semi-annual diversity and inclusion workshops for partners	
		375C	Watershed management plan update	Updated WMP	
		375D	Partner agency plan review and comment	5 comment letters on draft updates to District cities' local surface water management plans comment letters	
		375F	Saint Paul watershed governance exploration	Technical memorandum evaluating water governance in Saint Paul	
		375L	District boundary corrections	Corrected District boundaries	
O-3	Ensure that high value and multiple benefits are derived from funds spent on District projects and programs through planning, adaptive management and biannual evaluation of progress	101A	General administration	Annual budget, audit and report	
		101C	External funding opportunities	1 external funding opportunities study	
		101D	Program effectiveness assessment	Bi-annual assessment report	
		101E	Office operations	Annual office operations	
		375C	Watershed management plan update	Updated WMP	
		375E	GIS Program	Updated GIS information and data	
		375F	Saint Paul watershed governance exploration	Technical memorandum evaluating water governance in Saint Paul	
		375N	Tools for quantification of non-SW benefits of green infrastructure	Technical memorandum of green infrastructure cost-benefit tools	
O-4	Advance the field of water management through demonstration, research, and monitoring of innovative technologies and practices with partners	211C	BMP performance monitoring	8 BMPs monitored; volume and pollutant reductions	
		211H	Research program	Stormwater research reports	
		302B	Beneficial infiltration study and demonstration projects	Beneficial infiltration study report	
		211J	Non-structural BMPs effectiveness	Technical memo	
O-5	Maintain and enhance the capacity of the District to achieve water and natural resource management goals through:	See subgoals below			
O-5a	a. Expanding existing and creating new partnerships with government agencies, institutions, and non-profits to expand water resource management	375D	Partner agency plan review and comment	5 comment letters on draft updates to District cities' local surface water management plans comment letters	
		375G	Public private partnership opportunities	2 meetings per year	
		210B	Stewardship grant outreach	12 community events with translated Stewardship Grant outreach materials; engage with 3 organizations that serve BIPOC residents	

Appendix G - Correlation Table of Plan Goals to Implementation Activities and Measurable Outputs

Note: It is the desire and intent of the District to achieve the measurable outputs listed below. However, achievement is highly dependent on partner interest, opportunity, funding, schedule and capacity.

Goal #	Goal	Activity ID #	Implementation Activity	Activity Measureable Outputs	Status (to be updated biennially)
		101H	Diversity and inclusion program	1 -2 workshops for staff annually; outreach and communication plan for two underserved communities; engage 3-5 organizations/schools working with BIPOC; implement best practices in hiring; semi-annual diversity and inclusion workshops for partners	
O-5b	b. Identifying and expanding public-private partnership opportunities for incorporating water and natural resource improvements into redevelopment projects (i.e., local chambers of commerce and business councils, Saint Paul Port Authority, redevelopment companies)	208D	Engagement activities with permittees, developers, engineers, and applicants	5 meetings with private developers during the plan period	
		210G	Large-scale site planning grants	3 planning grants annually	
		375G	Public private partnership opportunities	2 meetings per year	
O-5c	c. Pursuing non-traditional state grant funding and explore other funding mechanisms to support District and partner activities	101C	External funding opportunities	1 external funding opportunities study	
		475Q	Debt and loan service	Semi-annual debt service payments	
O-5d	d. Expanding the District’s role as a thought leader and advocate for sustainable water resource management	101D	Program effectiveness assessment	Bi-annual assessment report	
		101F	MAWD support	Annual MAWD support	
		211H	Research program	Stormwater research reports	
		375N	Tools for quantification of non-SW benefits of green infrastructure	Technical memorandum of green infrastructure cost-benefit tools	
		211I	Emerging contaminants and water quality issues	New monitoring parameters and results	
O-5e	e. Recruiting and retaining high quality staff and volunteers including Citizen Advisory Committee members and resident volunteers	101B	Citizen Advisory Committee	12 CAC members and monthly meetings	
		101E	Office operations	Annual office operations	
		101G	Safety Program	Annual training and monthly staff meeting safety reminders	
		210I	District "watercorps" position	1 position offered annually	
		220F	Volunteer programs	15-20 volunteers, 100-200 hours served at 50 or more community events or site visits per year	