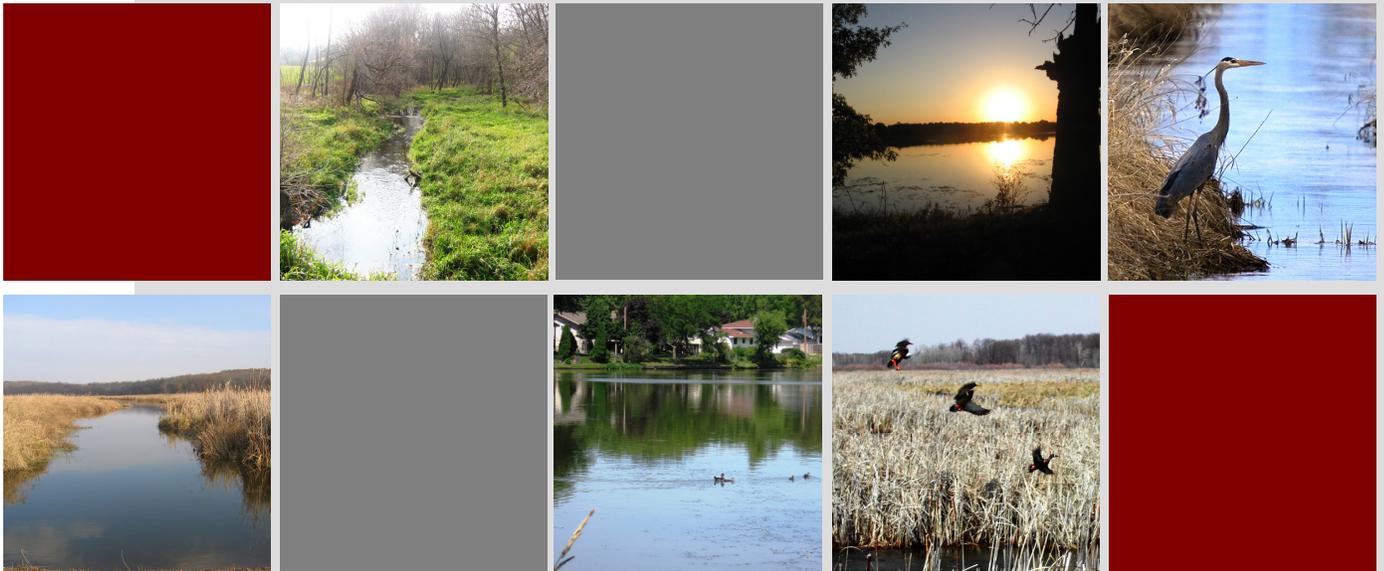


**FINAL PLAN**

# **LOCAL SURFACE WATER MANAGEMENT PLAN**



***City of Columbus, Minnesota***

September 2010  
Project No. 14074.000

**TKDA**

ENGINEERS • ARCHITECTS • PLANNERS

# TABLE OF CONTENTS

|   | Page No. |
|---|----------|
| I. EXECUTIVE SUMMARY .....  | 1        |
| Section 1. Purpose and Scope .....  | 2        |
| 1.1 Purpose.....  | 2        |
| 1.2 Scope .....   | 2        |
| 1.3 Surface Water Related Agreements .....  | 2        |
| Section 2. Physical Setting.....  | 5        |
| 2.1 Location, Population and History .....  | 5        |
| 2.2 Topography .....  | 5        |
| 2.3 Soils.....  | 6        |
| 2.4 Groundwater.....  | 9        |
| 2.5 Climate .....   | 9        |
| 2.6 Surface Water Resources .....   | 12       |
| 2.7 Floodplains.....  | 17       |
| 2.8 Natural Resources .....   | 19       |
| 2.9 Public and Private Drainage Systems .....   | 24       |
| 2.10 Planning and Development .....   | 27       |
| Section 3. Regulatory Setting .....   | 30       |
| 3.1 City of Columbus .....  | 30       |
| 3.2 Anoka County .....  | 31       |
| 3.3 Anoka County Department of Parks and Recreation .....   | 31       |
| 3.4 Anoka Conservation District.....  | 31       |
| 3.5 Watershed Management Organizations .....  | 32       |
| 3.6 Metropolitan Council .....  | 36       |
| 3.7 State Board of Water and Soil Resources (BWSR) .....  | 36       |
| 3.8 Minnesota Pollution Control Agency (MPCA) .....   | 37       |
| 3.9 Minnesota Department of Natural Resources (MNDNR).....  | 37       |
| 3.10 Minnesota Department of Health (MDH) .....   | 38       |
| 3.11 Minnesota Environmental Quality Board (EQB).....   | 38       |
| 3.12 Minnesota Department of Transportation (MNDOT).....  | 38       |
| 3.13 U.S. Environmental Protection Agency (USEPA).....  | 38       |
| 3.14 U.S. Army Corps of Engineers (USACE).....  | 38       |
| 3.15 Federal Emergency Management Agency (FEMA) .....   | 39       |
| 3.16 Natural Resource Conservation Service (NRCS) .....   | 39       |
| 3.17 U.S. Geological Survey (USGS).....   | 39       |
| 3.18 U.S. Fish and Wildlife Service (USFWS).....  | 39       |
| Section 4. Related Studies, Plans, and Reports.....   | 40       |
| 4.1 Comprehensive Plan.....   | 40       |
| 4.2 Rice Creek Watershed District Watershed Management Plan.  | 40       |
| 4.3 Rice Creek Watershed District Resource Management Plan<br>(RMP) for the Judicial Ditch 4 Area ..... | 40       |
| 4.4 Coon Creek Watershed District Comprehensive Plan .....  | 40       |
| 4.5 Sunrise River Watershed Management Plan.....  | 41       |
| Section 5. Goals and Policies.....  | 42       |

|            |   |    |
|------------|---|----|
| Section 6. | Assessment of Problems and Corrective Actions ..... | 47 |
| 6.1        | Development and Redevelopment .....                 | 47 |
| 6.2        | Water Quantity .....                                | 47 |
| 6.3        | Water Quality .....                                 | 47 |
| 6.4        | Impaired Waters .....                               | 48 |
| 6.5        | Total Maximum Daily Load (TMDL) Studies .....       | 49 |
| 6.6        | Erosion .....                                       | 49 |
| 6.7        | Groundwater .....                                   | 49 |
| 6.8        | Shoreland .....                                     | 50 |
| Section 7. | Implementation .....                                | 52 |
| 7.1        | Actions to Address Identified Issues .....          | 52 |
| 7.2        | Funding Mechanisms .....                            | 54 |
| 7.3        | Capital Improvement Plan (CIP) .....                | 55 |
| 7.4        | City Ordinances .....                               | 55 |
| Section 8. | Administration .....                                | 56 |
| 8.1        | Review and Adoption Process .....                   | 56 |
| 8.2        | Plan Amendments and Updates .....                   | 56 |
| Section 9. | Appendix .....                                      | 57 |

## LIST OF TABLES

|   | Page No. |
|---|----------|
| Table No. 2.1: Columbus Population Trends .....         | 5        |
| Table No. 2.2: Public Waters, Lakes, and Wetlands ..... | 12       |
| Table No. 2.3: Public Ditch Systems .....               | 24       |
| Table No. 6.1: Impaired Waters in Columbus .....        | 48       |

## LIST OF FIGURES

|   | Page No. |
|---|----------|
| Figure No. 2.1: Location Map .....                                  | 4        |
| Figure No. 2.2: Hydrologic Soils Group .....                        | 8        |
| Figure No. 2.3: Normal Monthly Precipitation .....                  | 10       |
| Figure No. 2.4: Average High and Low and Extreme Temperatures ..... | 10       |
| Figure No. 2.5: Average Monthly Snowfall .....                      | 11       |
| Figure No. 2.6: Average Monthly Heating Degree Days .....           | 11       |
| Figure No. 2.7: Average Monthly Cooling Degree Days .....           | 12       |
| Figure No. 2.8: Public Waters .....                                 | 15       |
| Figure No. 2.9: Wetland Types within Columbus .....                 | 16       |
| Figure No. 2.10: FEMA Flood Zones .....                             | 18       |
| Figure No. 2.11: Natural Area Priority .....                        | 21       |
| Figure No. 2.12: Current Land Cover in Columbus .....               | 22       |
| Figure No. 2.13: Greenway Corridors and Hub Areas in Columbus ..... | 23       |
| Figure No. 2.14: Drainage System .....                              | 26       |
| Figure No. 2.15: Existing Land Use .....                            | 28       |
| Figure No. 2.16: Future 2030 Land Use .....                         | 29       |
| Figure No. 3.1: Watershed Authorities .....                         | 35       |
| Figure No. 6.1: Impaired Waters .....                               | 51       |

## LIST OF APPENDICES

|    |   | Pages |
|----|---|-------|
| A. | Lake Information Reports and Ecosystem 2000 Reports ..... | 15    |
| B. | Groundwater Sensitivity to Pollution Map.....             | 1     |
| C. | Hardwood Creek TMDL Fact Sheet.....                       | 2     |
| D. | State-wide Mercury TMDL Fact Sheet .....                  | 2     |
| E. | Carlos Avery Wildlife Management Area Map .....           | 1     |
| F. | Capital Improvement Plan (CIP).....                       | 1     |

## LIST OF ACRONYMS

The following acronyms are used in this Report:

| Acronym | Description  |
|---------|--|
| ACD     | Anoka County Ditch                                 |
| BMP     | Best Management Practice                           |
| BWSR    | Board of Water and Soil Resources                  |
| CCWD    | Coon Creek Watershed District                      |
| CIP     | Capital Improvement Program                        |
| CWA     | Clean Water Act                                    |
| EQB     | Minnesota Environmental Quality Board              |
| FEMA    | Federal Emergency Management Agency                |
| FHBM    | Flood Hazard Boundary Map                          |
| FIRM    | Flood Insurance Rate Map                           |
| FIS     | Flood Insurance Study                              |
| JD      | Judicial Ditch                                     |
| JPA     | Joint Powers Agreement                             |
| LGU     | Local Government Unit                              |
| LID     | Low Impact Development                             |
| LSWMP   | Local Surface Water Management Plan                |
| MCBS    | Minnesota County Biological Survey                 |
| MDH     | Minnesota Department of Health                     |
| METCO   | Metropolitan Council                               |
| MLCCS   | Minnesota Land Cover Classification System         |
| MNDNR   | Minnesota Department of Natural Resources          |
| MNDOT   | Minnesota Department of Transportation             |
| MPCA    | Minnesota Pollution Control Agency                 |
| MS4     | Municipal Separate Storm Sewer System (NPDES)      |
| NFIP    | National Flood Insurance Program                   |
| NPDES   | National Pollutant Discharge Elimination System    |
| NRCS    | Natural Resources Conservation Service             |
| NWI     | National Wetlands Inventory                        |
| OHWL    | Ordinary High Water Level                          |
| PWI     | Public Waters Inventory                            |
| RCWD    | Rice Creek Watershed District                      |
| RMP     | Resource Management Plan                           |
| SCS     | Soil Conservation Service, USDA (replaced by NRCS) |

| <b>Acronym</b> | <b>Description</b>                              |
|----------------|---|
| SDWA           | Safe Drinking Water Act                         |
| SFHA           | Special Flood Hazard Area                       |
| SRWMO          | Sunrise River Watershed Management Organization |
| STIP           | State Transportation Improvement Plan           |
| SWCD           | Soil and Water Conservation District            |
| SWMP           | Surface Water Management Plan                   |
| TMDL           | Total Daily Maximum Load                        |
| TP             | Total Phosphorus                                |
| TSS            | Total Suspended Solids                          |
| USACE          | US Army Corp of Engineers                       |
| USEPA          | United States Environmental Protection Agency   |
| USFWS          | United States Fish and Wildlife Service         |
| USGS           | United States Geological Survey                 |
| WCA            | Wetland Conservation Act                        |
| WD             | Watershed District                              |
| WMA            | Wildlife Management Area                        |
| WMO            | Watershed Management Organization               |

## **I. EXECUTIVE SUMMARY**

This Surface Water Management Plan will help to guide the protection and management of surface waters and related natural resources in the City of Columbus. The plan has been developed as a part of the City's 2030 Comprehensive Plan, to meet the requirements of the Metropolitan Council and State Statutes.

The City is included within three Watershed Management Organizations - the Rice Creek Watershed District, Coon Creek Watershed District, and Sunrise River Watershed Management Organization. The existing plans of these organizations were used to develop several sections of this plan.

The plan includes an inventory of surface waters and natural resources within the City. Columbus has extensive wetland and lake areas, and is part of the headwaters area for Rice Creek. The Carlos Avery Wildlife Management Area, Lamprey Pass Wildlife Management Area, and several other significant areas of natural communities remain within Columbus.

The City has experienced limited commercial and larger-lot residential development to date, and is predicting limited additional development through 2030.

The plan includes a discussion of existing water quantity and quality concerns within the City, identified by the City and the Watershed Management Organizations.

The goals and policies indicate that the Watershed Management Organizations will continue to take the primary role in surface water management within Columbus. The three organizations will take the primary role in permitting for development projects or other zoning and subdivision applications and in recommending Best Management Practices for development and redevelopment. The City will provide comments to the watersheds during the review process.

The goals and policies and Implementation Plan note that the City will enforce its zoning and subdivision ordinances to assist in maintaining or improving the quality of surface and ground waters within Columbus. The City will update its code as noted to ensure that it meets the requirements of the Metropolitan Council and its ordinances are consistent with the rules of the Watershed Management Organizations.

## **Section 1. Purpose and Scope**

### **1.1 Purpose**

The purpose of this Surface Water Management Plan (Plan) is to guide the City of Columbus in conserving, protecting, and maintaining the quality of its natural and water resources. This Plan recognizes the numerous entities involved in water resources management and environmental protection and has been created to meet the provisions of Minnesota Statutes §473.157 and §103B.235. It also conforms to Minnesota Rules 8410, Rice Creek Watershed District Rules, and Coon Creek Watershed District Rules.

The Plan avoids duplicating efforts of others by adopting or referencing the plans, standards and policies of the Rice Creek Watershed District (RCWD), Coon Creek Watershed District (CCWD), and Sunrise River Watershed Management Organization (SRWMO). It is consistent with the requirements of the Metropolitan Council (METCO), State of Minnesota Agencies such as the Minnesota Pollution Control Agency (MPCA), the Minnesota Department of Natural Resources (MNDNR), the Minnesota Department of Health (MDH) and the Board of Soil and Water Resources (BWSR), and Federal Agencies, such as the Environmental Protection Agency (EPA). This plan may be periodically amended to remain current with local practices and policies.

### **1.2 Scope**

To achieve its general goal of protecting and improving the quality of City surface waters, the Plan includes specific goals for surface and ground water management.

Each of the goals has one or more corresponding policies. A **policy** is a specific means for achieving established goals.

The Implementation Plan is prioritized to focus on the policies that the City can most effectively implement. There are several policies such as preserving ground water recharge areas and the management of wetlands where the City does not have direct implementation authority. In these cases, the City has recognized the importance of the issues and pledged cooperation with Anoka County and Watershed Management Organizations. The combination of these Implementation Plans will formulate the overall strategy for implementing the Plan.

### **1.3 Surface Water Related Agreements**

The City of Columbus has informal agreements with the Water Management Organizations within the City regarding cooperative management of water resources within the community. The Rice Creek Watershed District and Coon Creek Watershed District manage permitting within the respective areas of the City within those districts and the City provides comments on development proposals and other permit applications. The City manages permitting within

areas of the City within the Sunrise River Watershed Management Organization. The RCWD and CCWD also serve as the local governmental units (LGU's) for enforcing the Wetland Conservation Act (WCA) in Columbus, and manage the public ditch system in those areas of the City. The City is the LGU for the Wetland Conservation Act in that part of the City within the Sunrise River WMO and the Anoka County Highway Department is the ditch authority in that portion of the City.

The City of Columbus manages a limited amount of stormwater infrastructure, such as culverts under public roads. It also holds drainage and utility easements on some stormwater ponds within private developments.



## Section 2. Physical Setting

### 2.1 Location, Population and History

The City of Columbus is located in east-central Anoka County in the northerly portion of the Minneapolis-St. Paul Metro Area as shown in Figure 2.1. The Town of Columbus was established in 1857 as a predominantly agricultural community, although less than half of the land area was suitable for crop cultivation due to extensive wetland areas. In addition to the large wetland systems, the City is home to six lakes, each over 100 acres in size, and Rice Creek. The City also includes some high quality natural areas and rare species. Many of these areas are within the Carlos Avery Wildlife Management Area.

The City was known as Columbus Township until September 21, 2006, when it was incorporated as the City of Columbus.

Columbus began to experience development pressure in the 1960's, with a significant increase in both residential and commercial development in the 1970's. Development slowed during the 1980's and 1990's and is anticipated to grow slowly through 2030 as shown in Table 2.1:

**Table No. 2.1:  
Columbus Population Trends**

| Year | Population | Households |
|------|------------|------------|
| 1970 | 1,999      | 487        |
| 1980 | 3,232      | 870        |
| 1990 | 3,690      | 1,129      |
| 2000 | 3,957      | 1,328      |
| 2010 | 4,000      | 1,450      |
| 2020 | 4,240      | 1,600      |
| 2030 | 4,680      | 1,750      |

*Sources: U.S. Census, Metropolitan Council, City of Columbus*

### 2.2 Topography

The City of Columbus lies principally within the geologic region known as the Anoka Sandplain and is characterized by nearly level to gently rolling topography interspersed with lakes, streams, and wetlands.

The local topography was shaped by the advance and retreat of glaciers, most recently by the Grantsburg Sublobe of the Wisconsin glaciation. As the glaciers receded, meltwater formed a series of streams and large glacial lake plains. The Anoka Sandplain was created when the glacial lakes gradually filled with fine sands carried by glacial meltwater.

Depressions are common in the Sand Plain and were formed when large blocks of buried ice gradually melted. Beginning approximately 10,000 years ago, peat began to form in many of the depressions, creating wetlands and lakes. These wetlands and lakes are visible throughout Columbus today.

### 2.3 Soils

The Soil Conservation Service (SCS) published the Soil Survey of Anoka County in 1980. The publication provides soil location maps and information on the physical properties of soils found in Anoka County.

The SCS has identified three soil associations (soil patterns) within the City of Columbus. A general description of these associations is given below.

***Rifle-Isanti Association*** - These soil types occupy approximately 53 percent of the City and include the Carlos Avery Wildlife Management Area. These soils are formed in organic material and fine sand, and are generally near level and very poorly drained. These soils are poorly suited to urban, farm, and recreational uses. Natural fertility is moderate to low. If drained, the organic soils may be suited to specialty crops. High water tables limit the capacity of these soils to support septic sewer systems or urban development.

***Zimmerman-Isanti-Lino Association*** - These soil types occupy approximately 40 percent of the City, along areas west and east of Crossways Lake, Howard Lake, and Higgins Lake. These soils are dominated by fine sands and are usually found in broad, undulating plains. The soils range from being excessively drained to very poorly drained and are well suited to urban development. However, both the Isanti and Lino associations are characterized by high water tables that limit their capacity to support on-site septic systems and urban development.

***Nessel-Dundas-Webster Association*** - These soil types are located roughly alongside Interstate 35. The soil association was formed in loamy glacial till and range from being nearly-level to gently sloping and from being moderately well-drained to poorly-drained. These soils are moderately to poorly suited to most urban uses. They are better suited to farming and for recreational facilities. High water tables associated with these soils may be of limited usefulness in accommodating on-site septic systems.

The nature of soils comprising the top layer of unconsolidated material in a watershed is important because soil properties are a primary factor in determining the volume of runoff associated with a given rainfall event. The SCS *Soil Survey* assigns soil types to a hydrologic group depending on the soils ability to infiltrate water during long-duration storms. The four hydrologic soil group classifications are described below.

**Group A** soils have low runoff potential and high infiltration rates even when thoroughly wetted. These consist of deep, well-drained sands or gravels.

**Group B** soils have moderate infiltration rates and the potential for runoff. They consist of moderately-deep to deep, and moderate to well-drained soils.

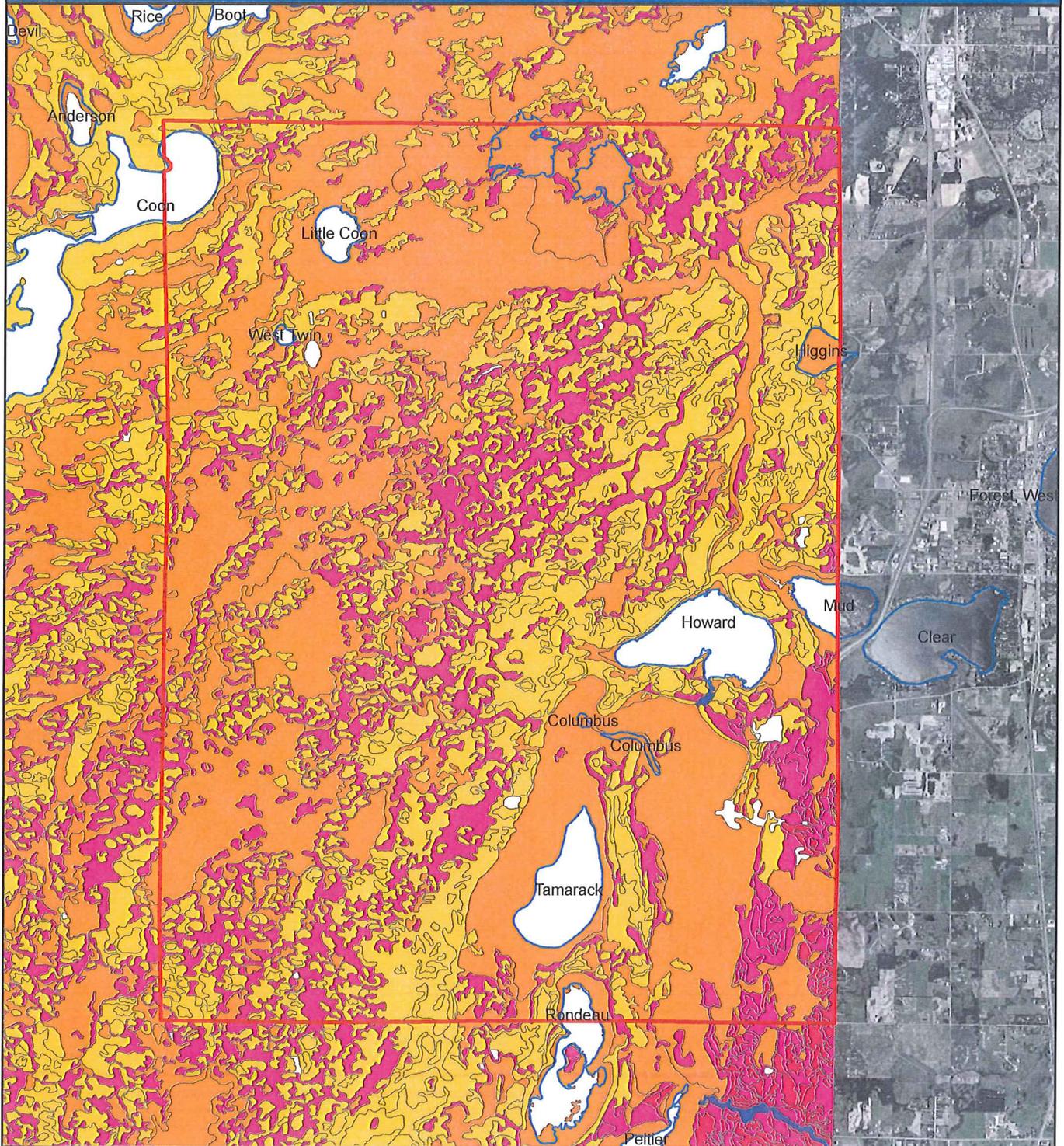
**Group C** soils have low infiltration rates and generally impede the downward movement of water. These soils have more moderately-fine to fine textures and provide greater amounts of runoff volumes when thoroughly wetted.

**Group D** soils have very low infiltration rates and very high runoff potential. These soils are associated with clays with high swelling potential and soils with a high permanent water table.

The hydrologic soil groups located within the City are shown on Figure 2.2. Land disturbing activities can change a soil's physical properties; therefore, actual conditions of a particular site may vary somewhat from the general conditions identified on the hydrologic soils map.

## 2.2 Hydrologic Soil Groups

Columbus- Water Resources Management Plan



### Legend Hydrologic Soils Group

|   |     |   |           |   |          |
|---|-----|---|-----------|---|----------|
|  | A   |  | B/D       |  | Columbus |
|  | A/D |  | D         |  | Lakes    |
|  | B   |  | Not Rated |   |          |



Source: Natural Resources Conservation Service



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Map date: August 2009

## **2.4 Groundwater**

The City is located over substantial ground water reserves. The predominant aquifer that underlies Columbus is the Prairie-du-Chien aquifer, which lies 200 feet below the surface. A glacial drift aquifer and the Mt. Simon-Hinckley aquifer also underlie the City.

The Minnesota Geological Survey has established aquifer sensitivity ratings, related to the ability of a contaminant to reach the aquifer. The majority of the City, with the exception of the area along Interstate 35, lies within areas that are very highly susceptible to pollution. The Geologic Sensitivity of the Uppermost Aquifer to Pollution Map attached in the Appendix of this Report identifies these areas within the City.

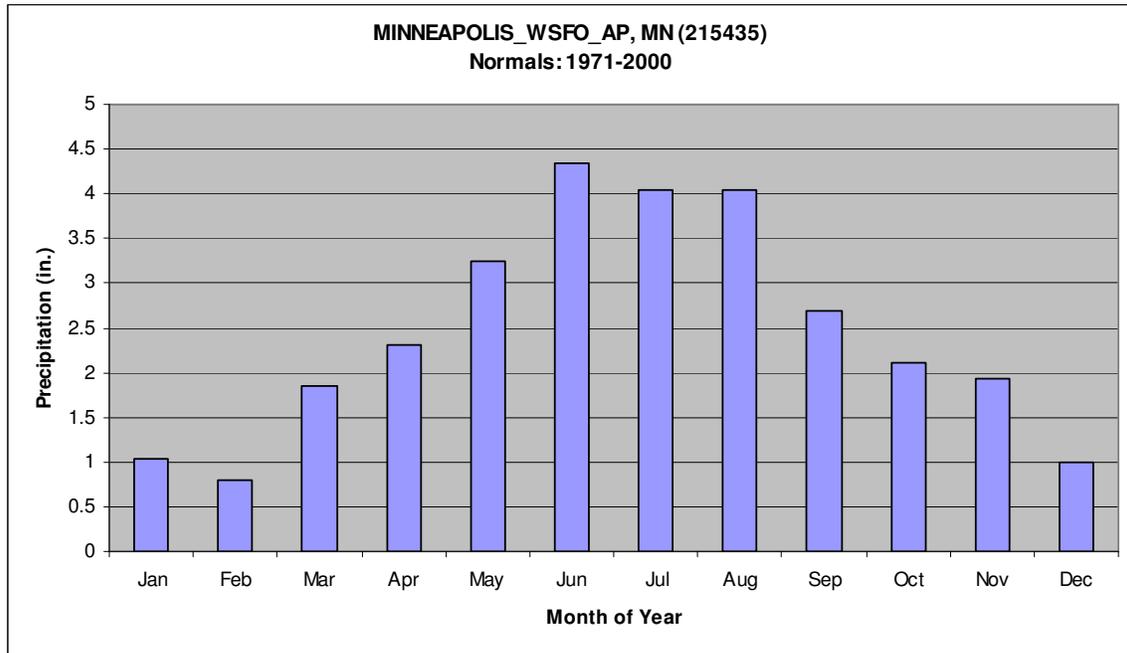
The City of Columbus recognizes the importance of groundwater sensitivity and will work with Anoka County, local Watershed Districts, and other agencies to protect local groundwater resources. The City will implement its land use plan, ordinances, and the policies included in this surface water management plan to protect groundwater resources.

## **2.5 Climate**

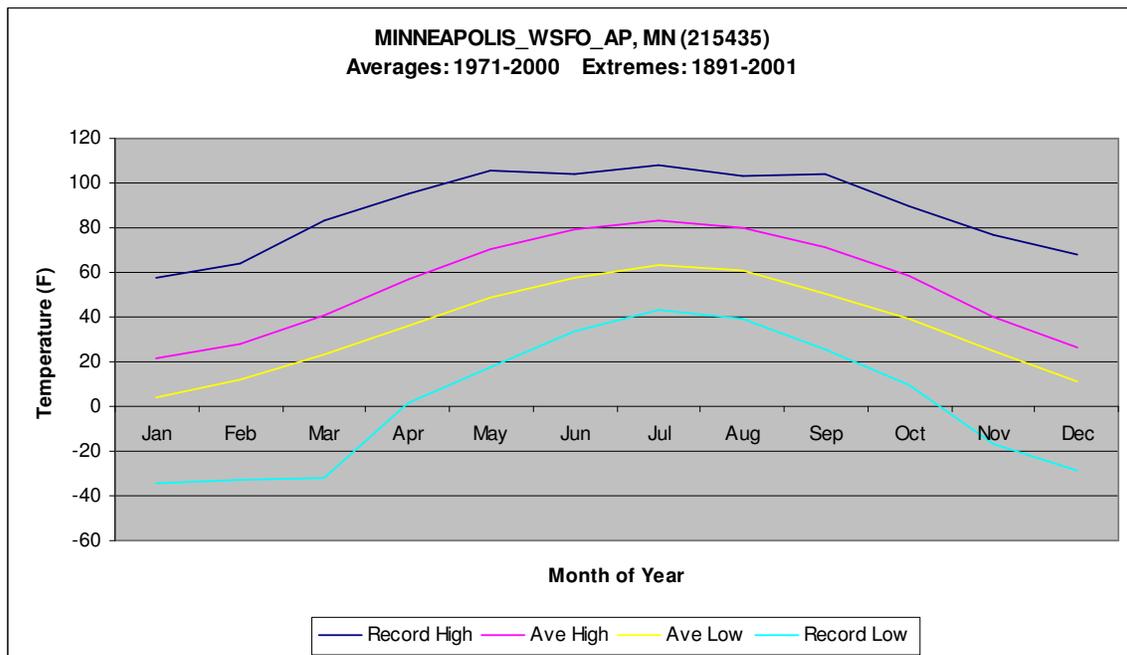
This City is located near the center of the North American continent, which greatly influences climate. The climate is continental, meaning cold winters and mild summers characterize the area, the result of being near the center of a large land mass. Polar air masses dominate during the winter season resulting in cold, dry weather. Warm and moist air masses, originating from the Gulf of Mexico, share predominance during the summer with tropical air masses from the desert southwest resulting in warm days and nights. The spring and fall seasons are transition periods, characterized by alternating intrusions of air from various sources. The diverse nature of the air masses impacting Minnesota's climate leads to seasonal temperature extremes within the City.

The National Weather Service station at Chanhassen has published climatic summaries of precipitation, temperatures, snowfall, heating degree days and cooling degree days; all of which are summarized in Figure Nos. 2.3 through 2.7.

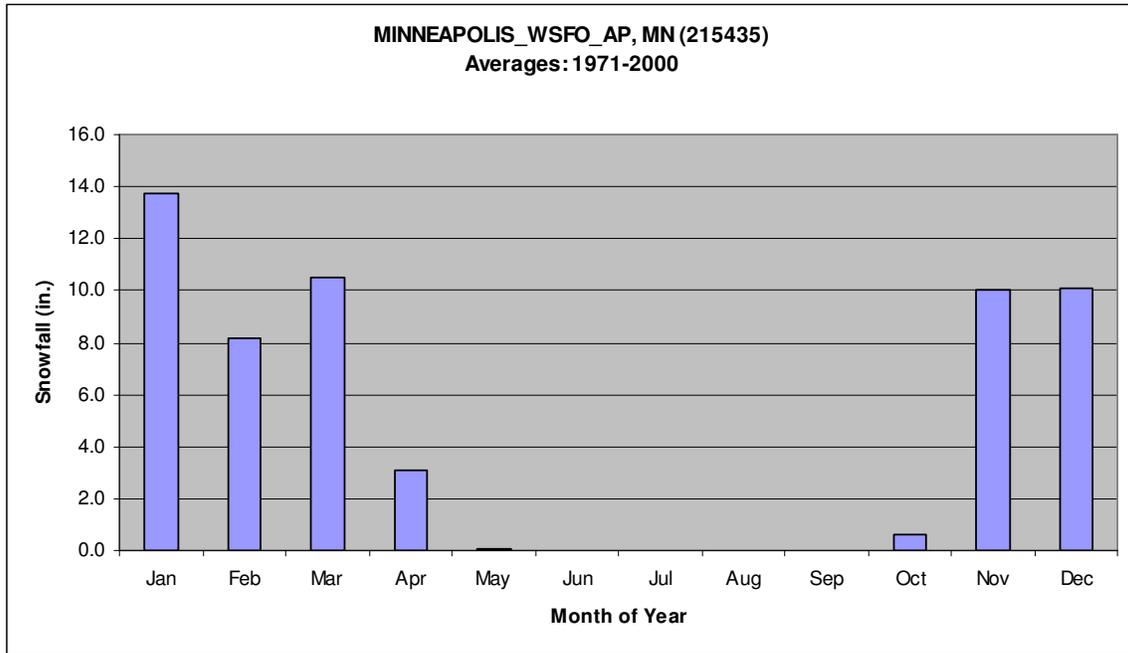
**Figure No. 2.3:  
Normal Monthly Precipitation**



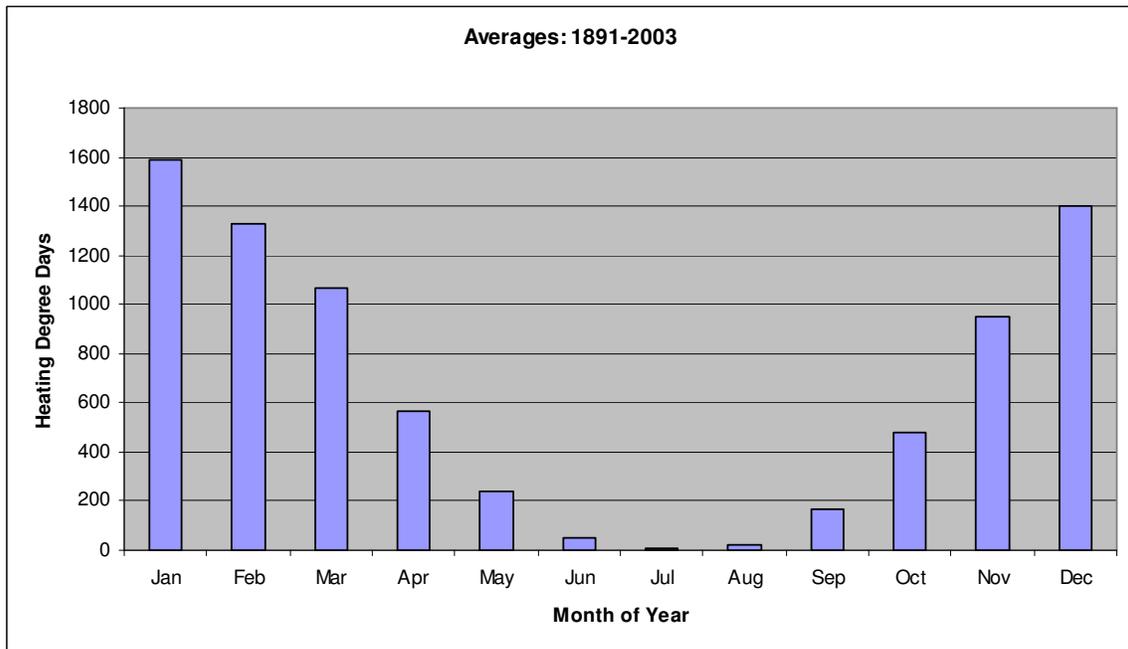
**Figure No. 2.4:  
Average High and Low and Extreme Temperatures**



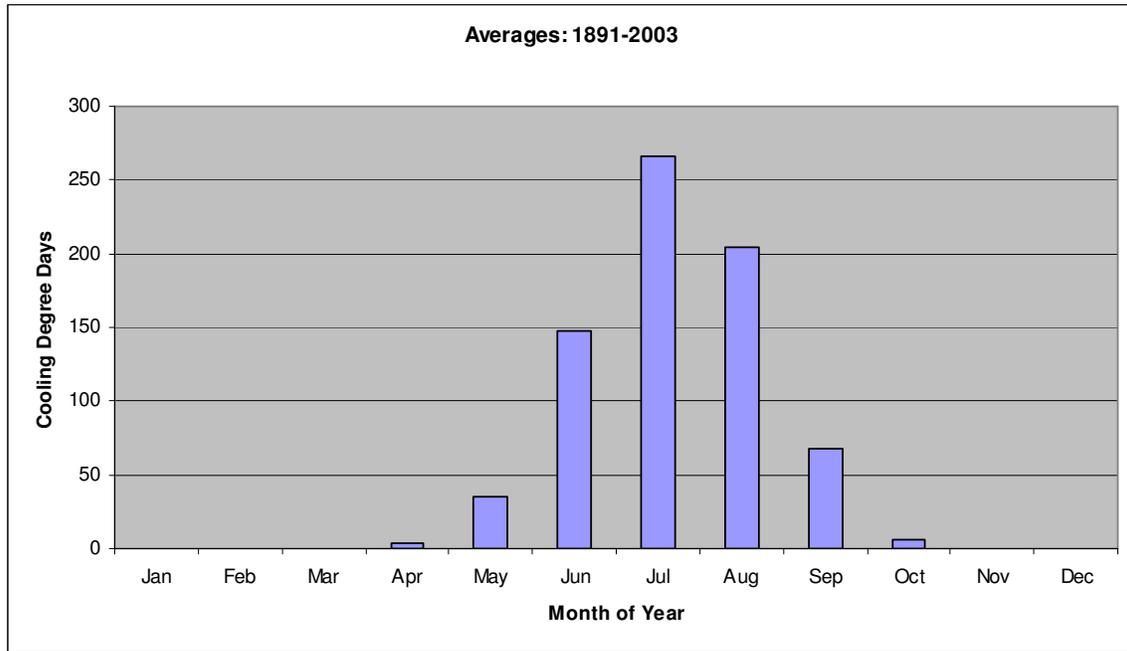
**Figure No. 2.5:  
Average Monthly Snowfall**



**Figure No. 2.6:  
Average Monthly Heating Degree Days**



**Figure No. 2.7:  
Average Monthly Cooling Degree Days**



**2.6 Surface Water Resources**

Wetlands and open water dominate the landscape and constitute nearly two-thirds of the City. The Minnesota Department of Natural Resources has regulatory authority over all lakes, wetlands, and watercourses defined as public waters within the state. Figure 2.8 and Table 2.2 identify the major public waters located in the City of Columbus.

**Table No. 2.2:  
Public Waters, Lakes, and Wetlands**

| Lake Name                | DNR Public Waters No. | Surface Area (Acres) | Maximum Depth (Feet) |
|--------------------------|-----------------------|----------------------|----------------------|
| Columbus                 | 2-18                  |                      |                      |
| Crossways                | 2-19                  | 365                  | 9                    |
| Higgins*                 | 2-2                   |                      |                      |
| Howard                   | 2-16                  | 488                  | 6.5                  |
| Mud                      | 82-168                |                      |                      |
| Rondeau*                 | 2-15                  | 275                  | 7                    |
| East and West Twin Lakes | 2-20 and 2-33         |                      |                      |
| Coon Lake*               | 2-42                  | 1,259                | 27                   |
| Little Coon Lake         | 2-32                  | 107                  | 4                    |
| Rice Creek Marsh         | 2-740                 |                      |                      |

| Lake Name  | DNR Public Waters No.  | Surface Area (Acres) | Maximum Depth (Feet) |
|--|--|----------------------|----------------------|
| Unnamed Lakes  | 2-30, 2-31, 2-483, 2-502, 2-504, 2-505, 2-510, 2-515, 2-520, 2-529 |                      |                      |
| Unnamed wetlands   | 2-508, 2-517, 2-518, 2-521, 2-522, 2-528, 2-531, 2-533             |                      |                      |
| <i>* Only a small portion of these Lakes lie within the City Limits.</i> |  |                      |                      |

### 2.6.1. Lakes

There are 29 lakes and wetlands within Columbus that are listed as public waters by the MNDNR. Twenty of these are classified as lakes. The public waters lakes are listed in the table above. Size and depth of these water bodies is included where available from the MNDNR.

Lake Information Reports for named lakes in this area are included in the Appendix of this Report. These reports are a summary of MNDNR and MPCA data and describe available public access information, lake characteristics, water level histories, and water quality information. Additional information on these lakes is available from the RCWD, CCWD, and SRWMO.

The Metropolitan Council has identified Coon Lake as the only Priority Lake within Columbus. The “priority lake” designation is used to focus the Council’s limited resources, and to identify lakes that will require completion of a nutrient budget analysis during environmental review processes.

### 2.6.2. Wetlands

The relatively flat topography and wet soil conditions in Columbus result in extensive wetland areas. Wetland community types within the City include a full range of wetlands, from wet meadows and seasonally-flooded wetlands to marshes and deep marshes, shrub and forested wetland types (Figure 2.9). Many of the highest quality wetlands remaining in the community are within the Carlos Avery Wildlife Management Area.

The City’s Comprehensive Plan identifies wetlands as valuable resources that provide many benefits to the City and surrounding areas. Some of these benefits include groundwater recharge, filtration of sediments and nutrients, flood control, wildlife habitat, and scenic value.

The Coon Creek Watershed District conducted a functional assessment of wetlands within the District as a part of its adopted Watershed Management Plan.

The RCWD has completed a wetland inventory and assessment for portions of the City within the JD4/ACD15 Resource Management Plan (RMP) Area defined by the District. The RCWD, in partnership with the City of Columbus, is currently undertaking the development of a Resource Management Plan (RMP) for that portion of the City located within the RCWD boundary that is not covered by the existing JD4/ACD15 RMP. The RMP will provide a focused watershed-based approach to wetland management in the context of wetland functions and anticipated future land use. The plan will be submitted to the Board of Water and Soil Resources and serve as a Comprehensive Wetland Protection and Management Plan (CWMP) under the Minnesota Wetland Conservation Act and will be implemented by the adoption of a specific rule by the RCWD. This RMP is expected to be complete in 2009.

The SRWMO has not yet completed a functional assessment of wetlands within its District.

### 2.6.3. Rivers and Streams

*Rice Creek.* Rice Creek is the dominant stream that flows through Columbus. Extensive information about Rice Creek can be found in the Rice Creek Watershed District's Water Resource Management Plan. Columbus is close to the "headwaters" of Rice Creek at Clear Lake.

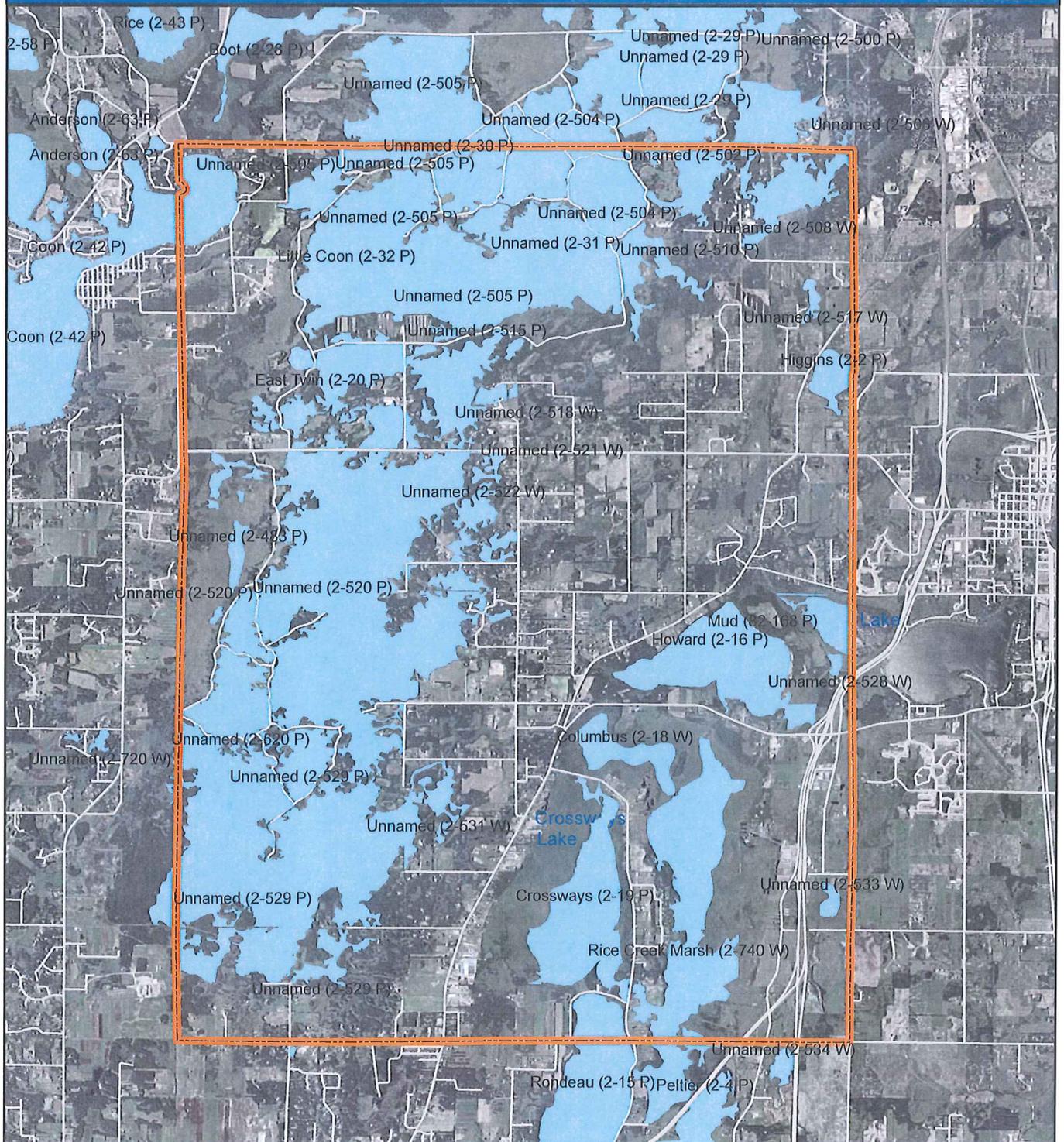
Several County Judicial Ditches that drain the City of Columbus and neighboring communities are tributary to Rice Creek. These include Anoka County Ditch 46 (with several branches) and Anoka/Washington Judicial Ditch 4.

Another system of County Ditches - Anoka County Ditch 31 and its branches - drain to Howard Lake.

*Sunrise River.* The South Branch of the Sunrise River flows through the City of Columbus, primarily in the Carlos Avery WMA. The river begins in Coon Lake. A dam on the northeast end of the lake regulates the discharge from the lake. The river is regulated by a series of dikes and dames, which create pools within the WMA that are used for waterfowl habitat. The Sunrise River WMO plan describes the River as in "fair" condition in this area.

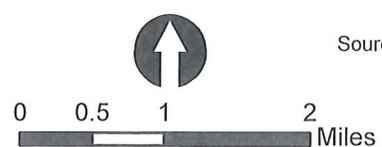
## 2.8 Public Waters

### Columbus- Water Resources Management Plan



### Legend

-  Public Waters
-  Columbus



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Source: MN Dept of Natural Resources

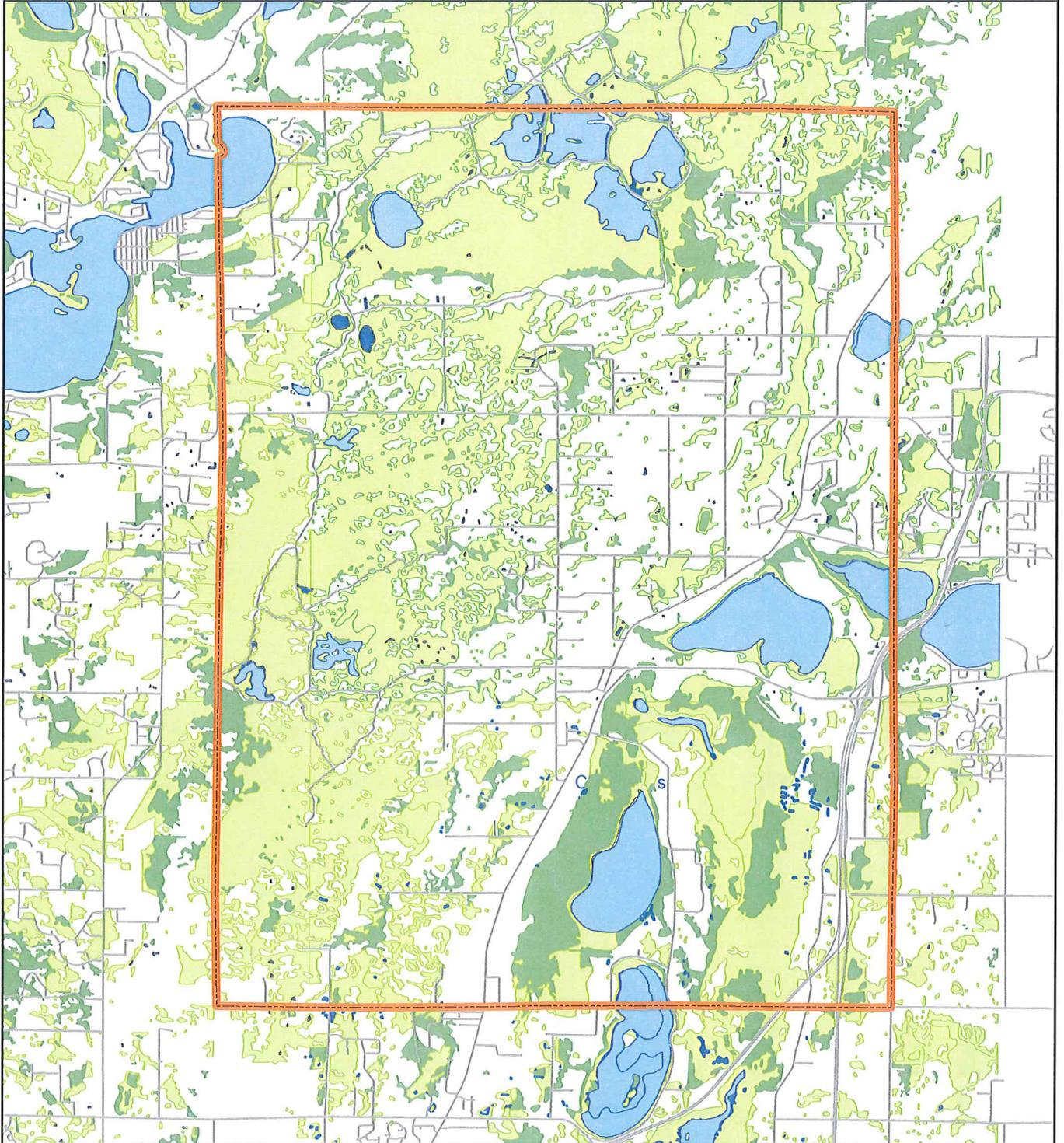
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Map date: August 2009

## 2.9 Wetland Types within Columbus

Columbus- Water Resources Management Plan



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### Legend

-  Columbus
-  Freshwater Emergent Wetland
-  Freshwater Forested/Shrub Wetland
-  Freshwater Pond
-  Lake



Source: MN Dept of Natural Resources,  
National Wetland Inventory

0 0.5 1 2  
Miles

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## 2.7 Floodplains

Land use regulations define the floodplain as the area covered by the flood that has a one percent chance of occurring each year, also known as the 100-year flood. The floodplain is divided into two zoning districts: the floodway and flood fringe. The floodway includes the river channel and nearby land areas which must remain open to discharge the 100-year flood. The flood fringe, while in the flood plain, lies outside the floodway. Regulations usually allow development in the flood fringe but require flood-proofing or raising to the legal flood protection elevation.

In 1968, Congress created the National Flood Insurance Program (NFIP) to make flood insurance available to property owners at federally subsidized rates. The NFIP required communities to adopt local laws to protect lives and future development from flooding. The Federal Emergency Management Agency (FEMA) first must formally notify a community that it has special flood hazard areas (SFHA) before it can join the NFIP. FEMA notifies communities by issuing a Flood Hazard Boundary Map (FHBM). This map shows the approximate boundaries of the community's 100-year flood plain. Each participating community has a special conversion study or a Flood Insurance Study (FIS). The FIS includes a flood plain map depicting the community's flood hazard areas.

*Local Issues.* The Sunrise River WMO Management Plan notes that local and regional flooding have been identified as problems within the watershed, particularly during spring snowmelt. The WMO indicated that the problems are usually the result of culvert blockages, beaver activity, culvert sizing and elevation, other obstructions, and lack of outlets for isolated basins. The WMO notes that many of the problems have occurred in undeveloped areas, and that future development needs to be managed to protect floodplains within the District.

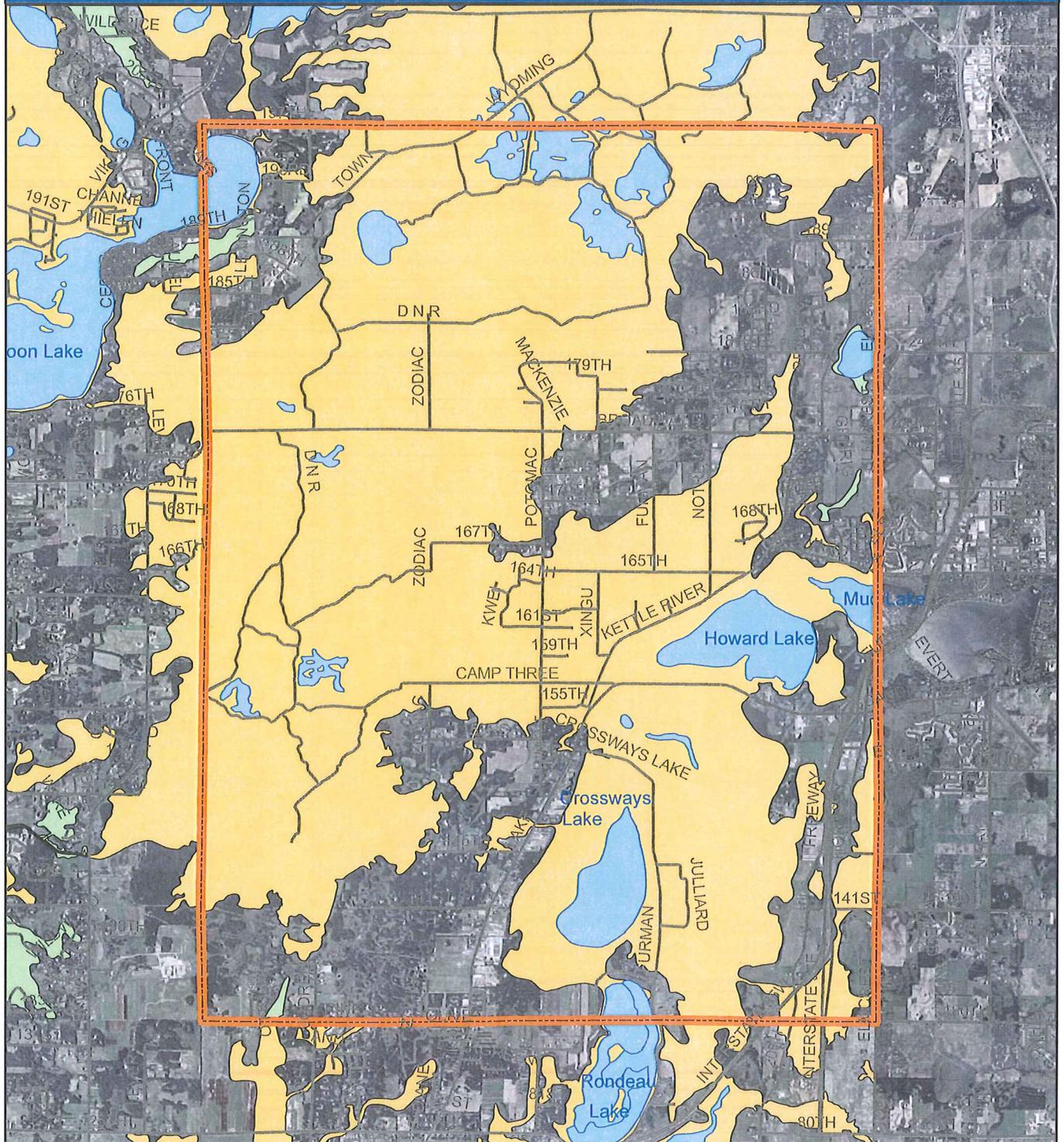
The Rice Creek Watershed District has completed extensive hydrologic modeling for the Watershed. This modeling indicates that the 100-year runoff event during snowmelt is also the critical flood event in this watershed. The 100-year rainfall event model and hydrographs are also available for planning purposes.

The Coon Creek Watershed District Plan indicates that the District has not recently experienced significant flooding problems. The District notes that development in some urbanizing areas has the potential to cause flooding problems. These areas are outside Columbus.

Designated FEMA Floodplain areas in Columbus are identified on Figure 2.10. The City has adopted a Floodplain Ordinance to protect and manage these areas.

## 2.10 FEMA Flood Zones

Columbus- Water Resources Management Plan



### Legend

#### FEMA Flood Zones

#### Flood Plain

-  100 Year
-  500 Year



0 0.5 1 2 Miles

#### Limitation of Liability

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K:\gis\Columbus\Figures\FloodZones.mxd

Source: Minnesota Pollution Control Agency

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## 2.8 Natural Resources

### 2.8.1. Land Cover, Natural Resources and Fish and Wildlife Habitat

The original vegetation of Columbus included a mix of Hardwood Forests, Oak Savanna and Aspen-Oak Lands, and a variety of wetland communities, including wet prairies, marshes, sloughs, conifer bogs and swamps. The Minnesota County Biological Survey (MCBS) has identified significant areas of these natural communities that still remain in the City. These communities are identified on Figure 2.11. Columbus has a relatively large area of natural communities, in comparison to most communities in the Twin Cities Metro Area. The communities are located throughout the City - including significant areas within the Carlos Avery Wildlife Management Area, and around the Rice Creek Chain of Lakes. Similar areas of high quality resources are located just to the north and west in Linwood Township and East Bethel.

The DNR's *St. Croix River Valley and Anoka Sandplain: A Guide to Native Habitats* provide detailed descriptions of the natural communities remaining in the Columbus area, as well as a history of landscape development and change.

The County Biological Survey maps also include the approximate locations of several rare species of animals and plants found within the City of Columbus. In general, the rare species locations coincide with the remaining natural communities in the City.

Howard Lake is home to two large heron colonies. The colony within the Lamprey Pass Wildlife Management Area is among the larger and more diverse colonies in Minnesota. The colony includes Great blue herons, Great egrets, Black-crowned night herons, and Double-breasted cormorants.

The Carlos Avery Wildlife Management Area (WMA) was established in 1933, and includes large areas within Columbus and Linwood Township. It is an extensive area of wetlands and other habitats managed to support wildlife and allow public uses, such as hunting and trapping. The area includes a variety of upland and wetland habitat types. Sixteen of the large wetland pools within the WMA are in the Sunrise River WMO. Each wetland pool contains a control structure monitored by the DNR. Following a large storm event, these structures require monitoring to maintain a desired water elevation for waterfowl habitat management. A map showing the number and location of these wetland pools is included in the Appendix. The WMA provides some of the best wildlife habitat remaining in the Twin Cities Area.

The current land cover in Columbus is identified on Figure 2.12. Agricultural and residential land uses predominate, along with the numerous wetlands, lakes and natural communities remaining in the City.

### 2.8.2. Greenway Corridors

The Metropolitan Council and Anoka County have mapped and identified Greenway and Wildlife Corridors throughout the County. The greenway corridors are shown on Figure 2.13. Several of these corridors are mapped in Columbus, and connect the significant natural areas identified by the County Biological Survey and the major water and natural resource areas (called “hubs” on Figure 2.13). Rice Creek and its tributaries are important natural linkages within the Corridor network. The corridors follow Rice Creek, chains of wetlands, and other natural corridors to connect the habitat areas within Columbus and to surrounding communities. The WMAs within the City, (Carlos Avery, Houles, and Lamprey Pass) are within the City’s overall Greenway Corridor. These corridors also provide a natural wildlife corridor due to the connection of lakes, streams, and natural areas.

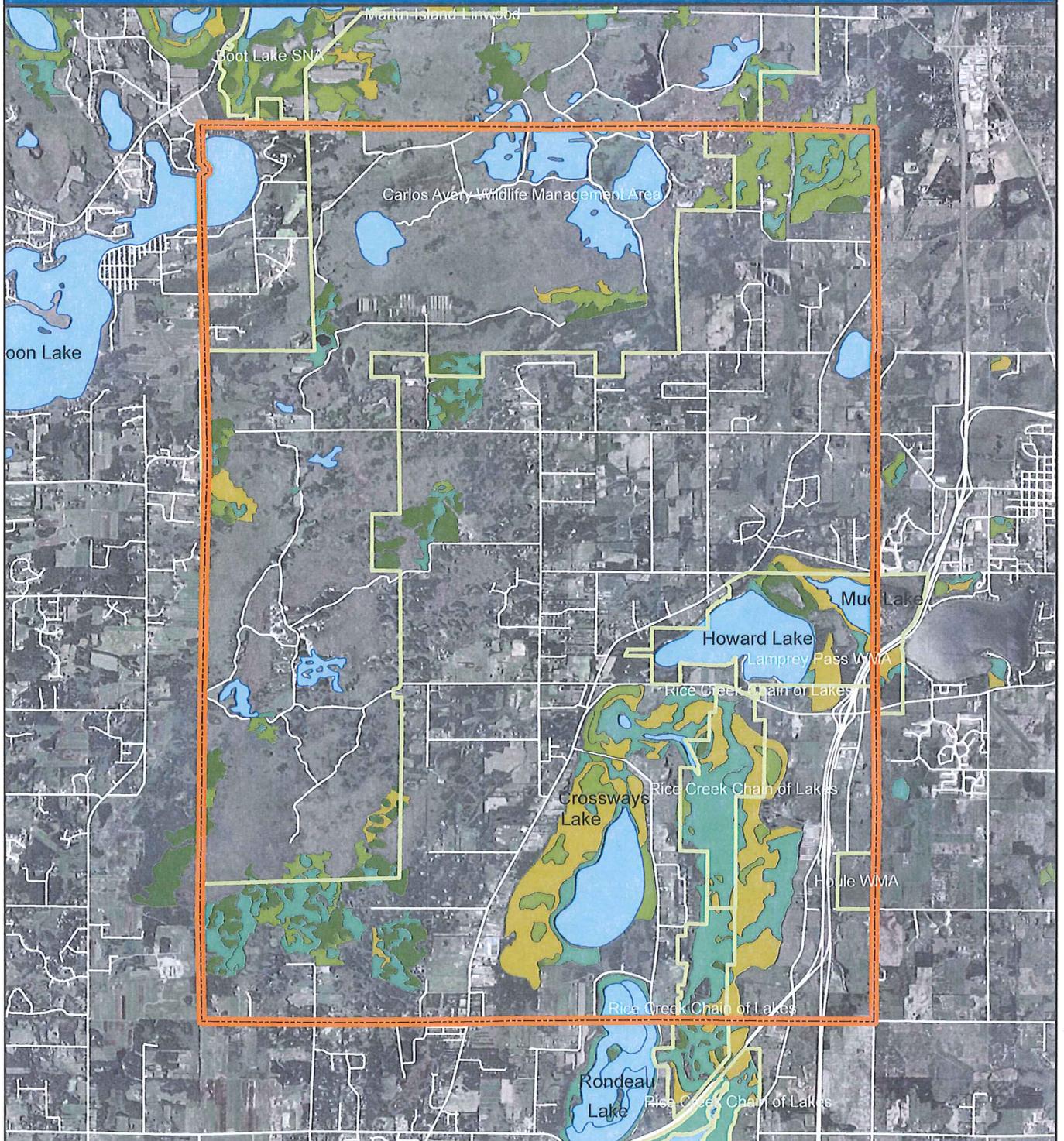
### 2.8.3. Surface Water Based Recreation and Access

Water bodies within Columbus provide a variety of opportunities for recreation. Coon Lake County Park on the east end of Coon Lake provides for boating access to the lake. Coon Lake is also a popular fishing lake.

The Carlos Avery WMA and Lamprey Pass WMA provide opportunities for hunting, fishing, trapping, and nature observation. The wetlands and impoundments within the WMA are important recreation areas. Houle WMA is a small Wildlife Management Area on the east side of the City.

## 2.11 Natural Area Priority

Columbus- Water Resources Management Plan



### Legend

|   |                  |   |                      |
|---|------------------|---|----------------------|
|  | Columbus         |  | Mesic Prairie        |
|  | Regional Parks   |  | Wetland Prairie      |
|  | Hardwood Forest  |  | Dry Savannah Prairie |
|  | Forested Wetland |  | Rock Outcrop         |
|  | Scrub Wetland    |  | Inland Beach         |



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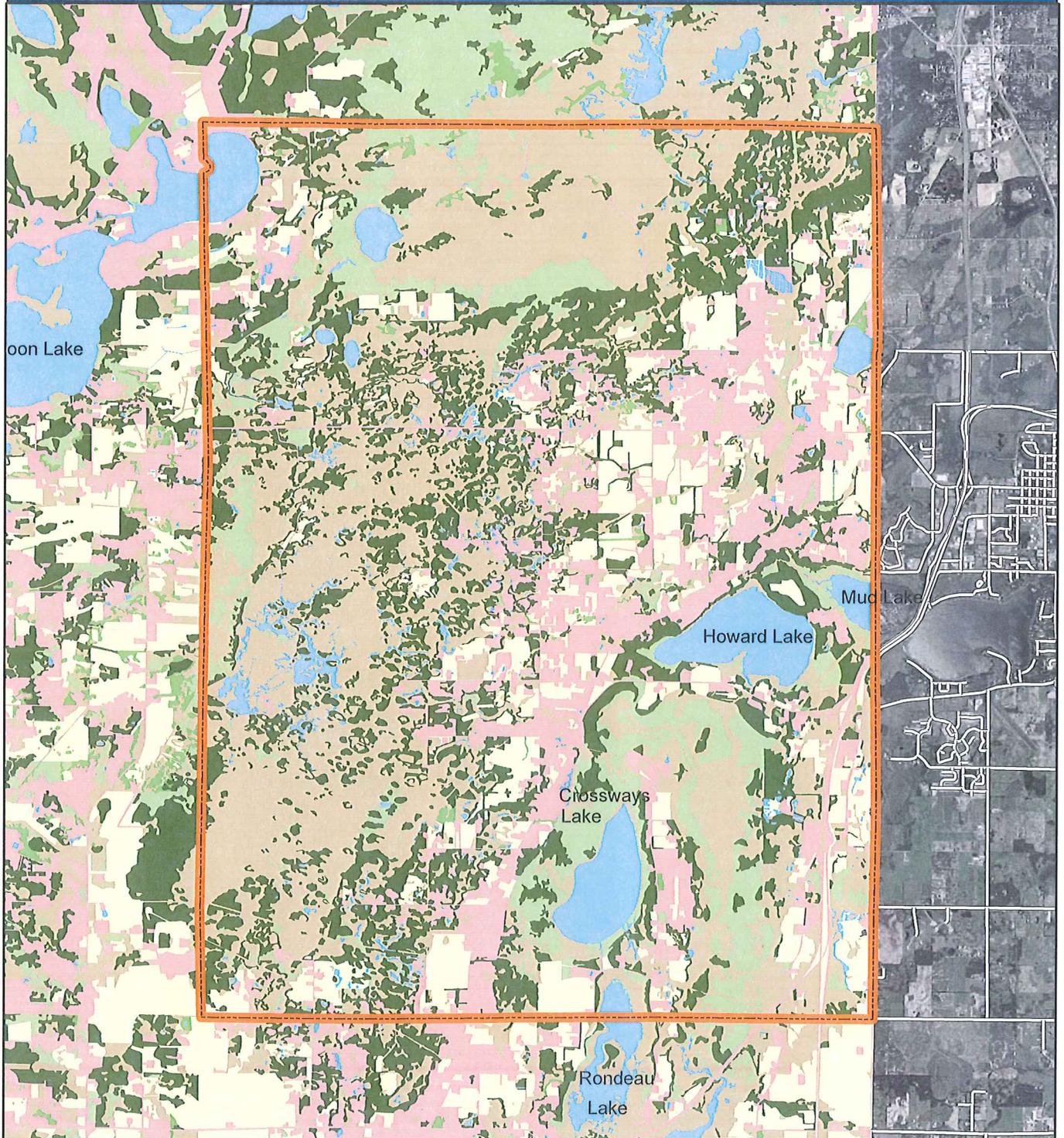
K:\gis\Columbus\Figures\NaturalAreaPriority.mxd  
 Source: MN Dept of Natural Resources,  
 County Biological Survey

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## 2.12 Current Land Cover in Columbus

Columbus- Water Resources Management Plan



### Legend

- |   |   |
|---|---|
|  Columbus                                    |  Shrublands            |
| <b>Land Cover</b>   |  Herbaceous Vegetation |
|  Artificial surfaces & associated structures |  Sparse Vegetation     |
|  Planted or cultivated vegetation            |  Open Water            |
|  Forests                                     | Undefined   |
|  Woodlands                                   |   |



0 0.5 1 2 Miles

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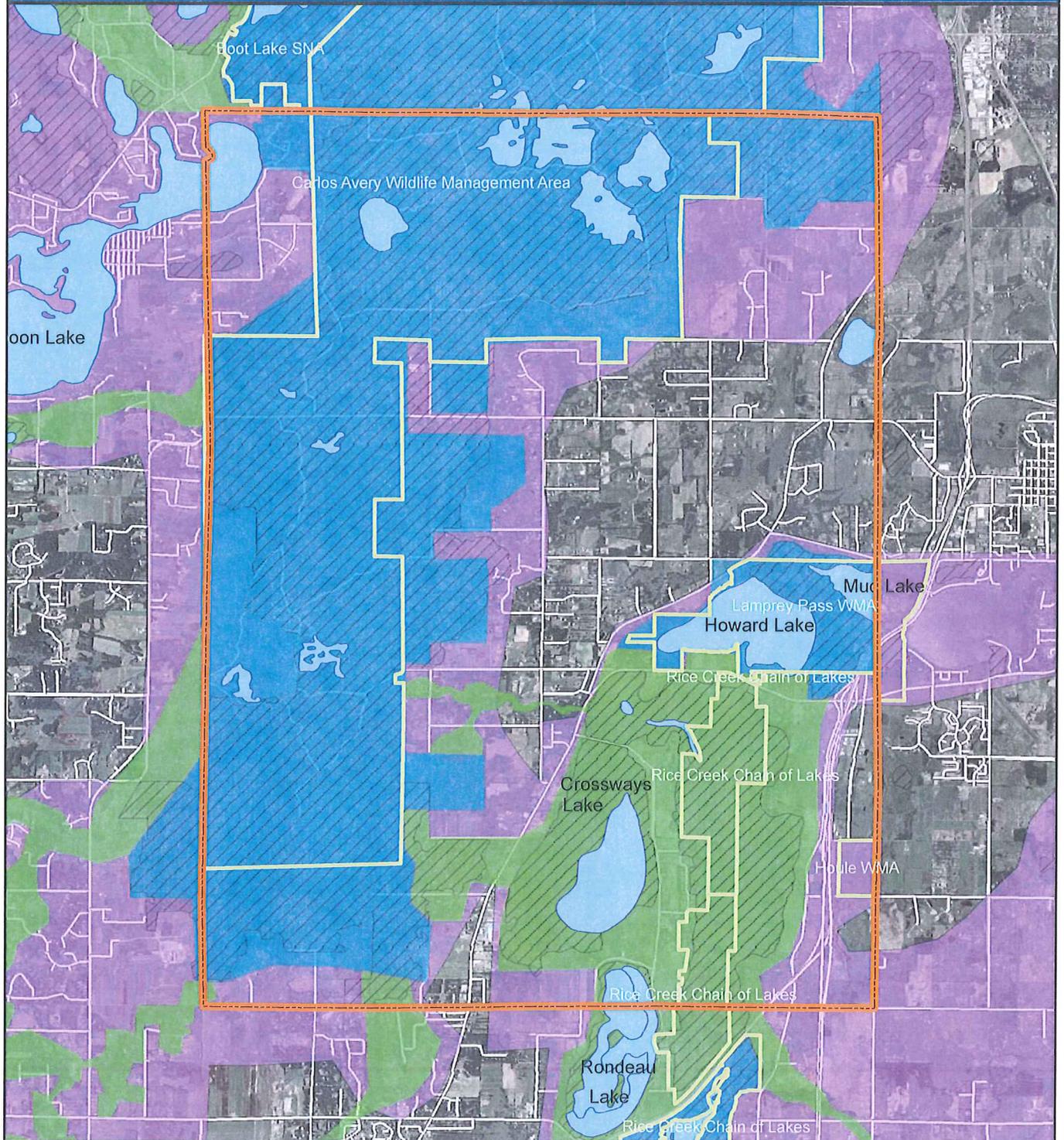
Source: MN Dept of Natural Resources, MLCCS

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## 2.13 Greenway Corridors and Hub Areas in Columbus

Columbus- Water Resources Management Plan



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Source: MN Dept. of Natural Resources,  
Anoka County Conservation District

### Legend

-  Columbus
-  Regional Parks
-  MCBS Sites of Biological Significance
-  Anoka SWCD Corridors
-  Anoka SWCD Hubs
-  DNR Metro Conservation Corridors



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## 2.9 Public and Private Drainage Systems

The first public drainage system was constructed in Columbus in the 1890's. Anoka County Ditch 15 (ACD 15) was excavated in 1891 and is located entirely within the City of Columbus in Anoka County. The headwaters of ACD 15 are in the Lamprey Pass Wildlife Management Area. In 1914, the majority of ACD 15 was incorporated into Judicial Ditch 4 (JD4). JD4 is located in Anoka and Washington Counties and crosses the Houle Wildlife Management Area (WMA).

There are a numerous County Ditches and one Judicial Ditch that run through the City. Many of the ditch systems (ACD 15, 46, and JD 4) are tributary to Rice Creek and ultimately flow to Peltier Lake. ACD 31 discharges into Howard Lake and ACD 10-22-32 discharges to Marshan The MPCA has listed Howard, Peltier and Marshan Lakes as impaired waters, as noted in Section 6.4. Table 2.3 describes the public drainage systems located within the City.

In addition to the public ditch system, there are also numerous private ditches that drain the community. Historically, much of the area drained by the ditch system was agricultural land. As the land area shifts toward suburban residential, new demands will be placed on the traditional drainage system. With the evolution of environmental regulation and water resources protection, drainage systems in the City of Columbus will continue to become more complex. As development occurs, systems will be required to meet regulations for runoff rate and volume reduction, pollutant removal, groundwater recharge, and stream protection.

While some concerns related to poor maintenance of private ditches and impacts on downstream areas have been noted, maintenance of these ditches is still the responsibility of private landowners. As development occurs on land with private ditches, the City may utilize a Developer's Agreement or other mechanisms to obtain public easements over the ditch systems and to require improvements if repairs are needed..

**Table No. 2.3:  
Public Ditch Systems**

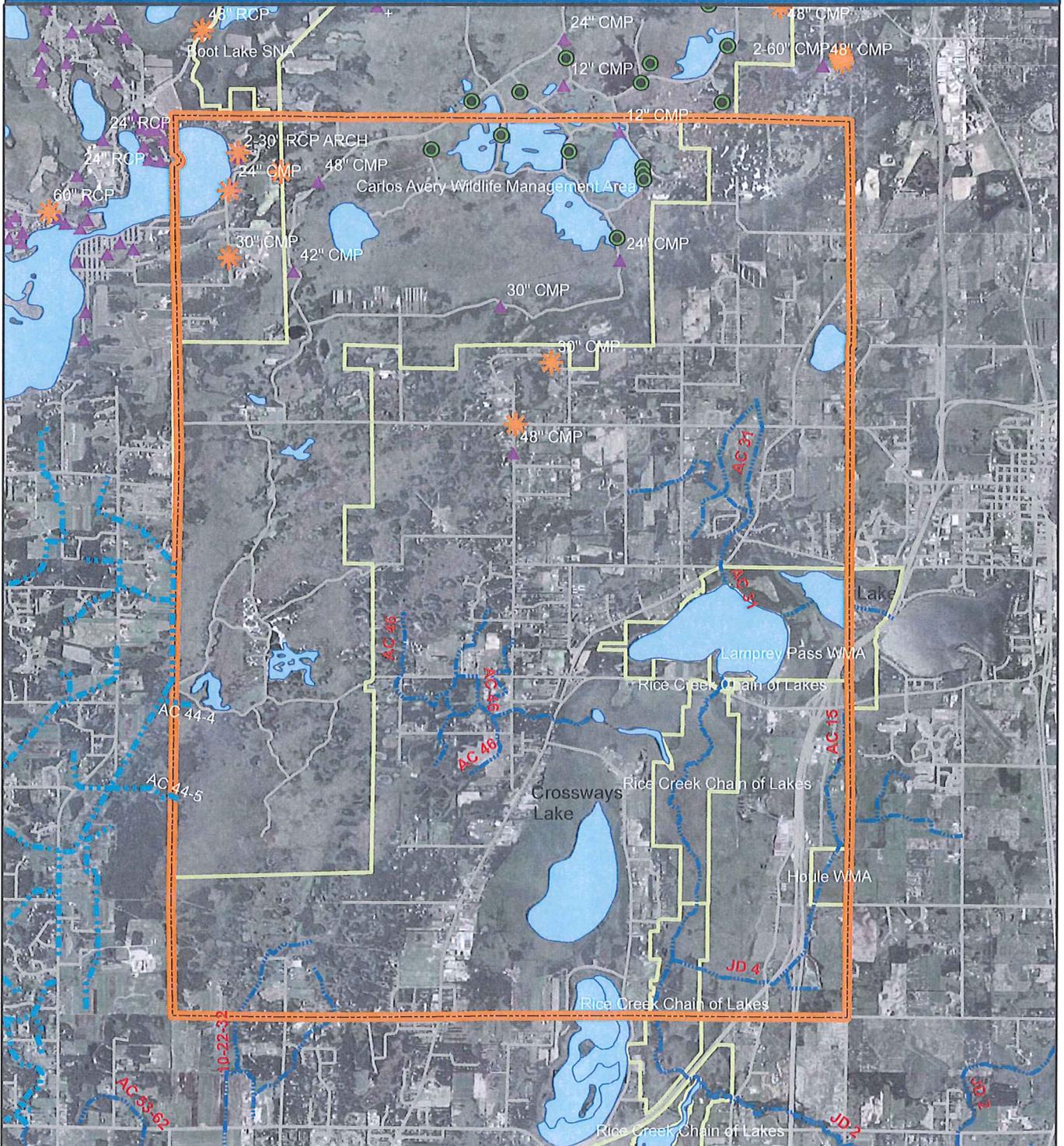
| Number                           | Year Established | Discharge Location      |
|----------------------------------|------------------|-------------------------|
| <b>Anoka County</b>              |                  |                         |
| 15                               | 1891             | Rice Creek/Peltier Lake |
| 31                               | 1898             | Howard Lake             |
| 46                               | 1907             | Rice Creek/Peltier Lake |
| 10-22-32                         | 1893             | Marshan Lake            |
| <b>Anoka/Washington Counties</b> |                  |                         |
| JD4                              | 1915             | Rice Creek/Peltier Lake |

The existing mapped stormwater conveyance system and stormwater treatment system in Columbus is identified on Figure 2.14 Drainage System. The City is in the process of mapping all of the culverts and other elements of its stormwater

system. The City is adopting a goal in this Local Surface Water Management Plan to map all of the elements of the stormwater system in the City, to be completed in 2009.

## 2.14 Drainage System

Columbus- Water Resources Management Plan



### Legend

- Stop Logs
- ★ Drain
- ▲ Culverts
- Ditches
- Columbus
- Regional Parks
- CCWD Public Ditches
- RCWD Public Ditches



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K:\gis\Columbus\Figures\DrainageSystem.mxd

Source: Anoka County, Anoka Conservation District, Rice Creek Watershed District, Coon Creek Watershed District

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## **2.10 Planning and Development**

### **2.10.1. Comprehensive Plan and Land Use**

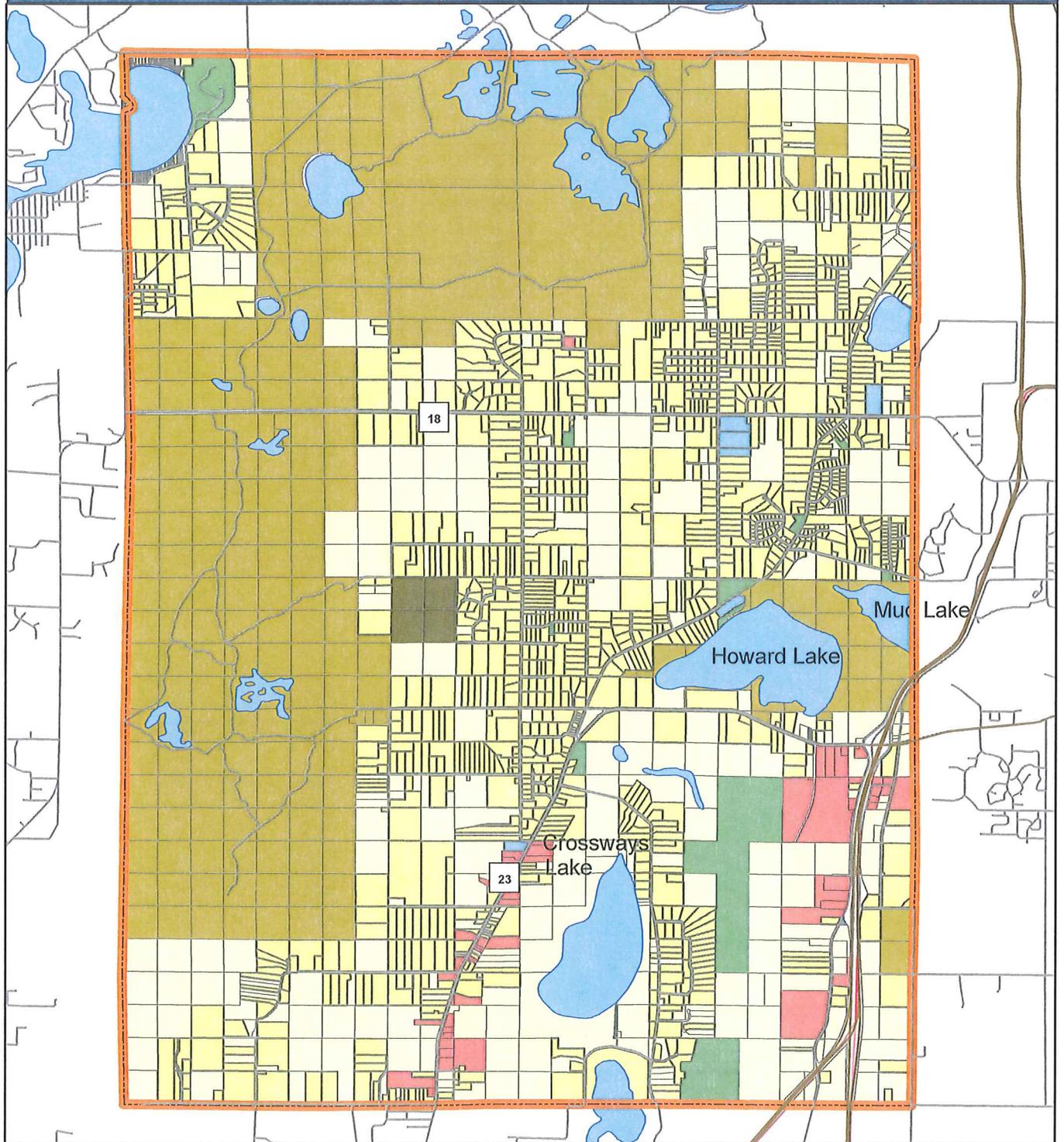
The City of Columbus is currently updating its Comprehensive Plan. This Surface Water Management Plan will be adopted as an element of the Comprehensive Plan. The new Comprehensive Plan was approved by the City Council at the May 13th City Council meeting, subject to review by the Metropolitan Council.

The City's land use plan through 2030 is similar to the existing land use plan. The largest land use within the City is Rural Residential. A small area of the community in the southeast corner is planned for commercial and industrial land uses. Significant open space areas are included within WMAs and parks. Wetlands, lakes, and extensive woodland areas within the community result in few remaining areas of developable land available in the City. These characteristics help retain the rural landscape in much of the City. Land use changes are primarily planned within the RCWD area of the community along the I-35 corridor and the CR 23 corridor. The areas around these roadways are planned for expanded commercial and industrial land uses with access to public utilities along the I-35 corridor.

Figures 2.15 and 2.16 show the City's existing and proposed land use maps.

## 2.15 Existing Land Use

Columbus- Water Resources Management Plan



### Legend

|   |  |
|---|--|
|  Columbus Bdy          |  ROW                      |
| <b>Existing Land Use</b>  |  Rural Residential        |
|  Vacant/Agriculture    |  State Forest             |
|  Commercial/Industrial |  Utility                  |
|  Public/Industrial     |  Wildlife Management Area |
|  Park                  |  |



0 0.5 1 2 Miles

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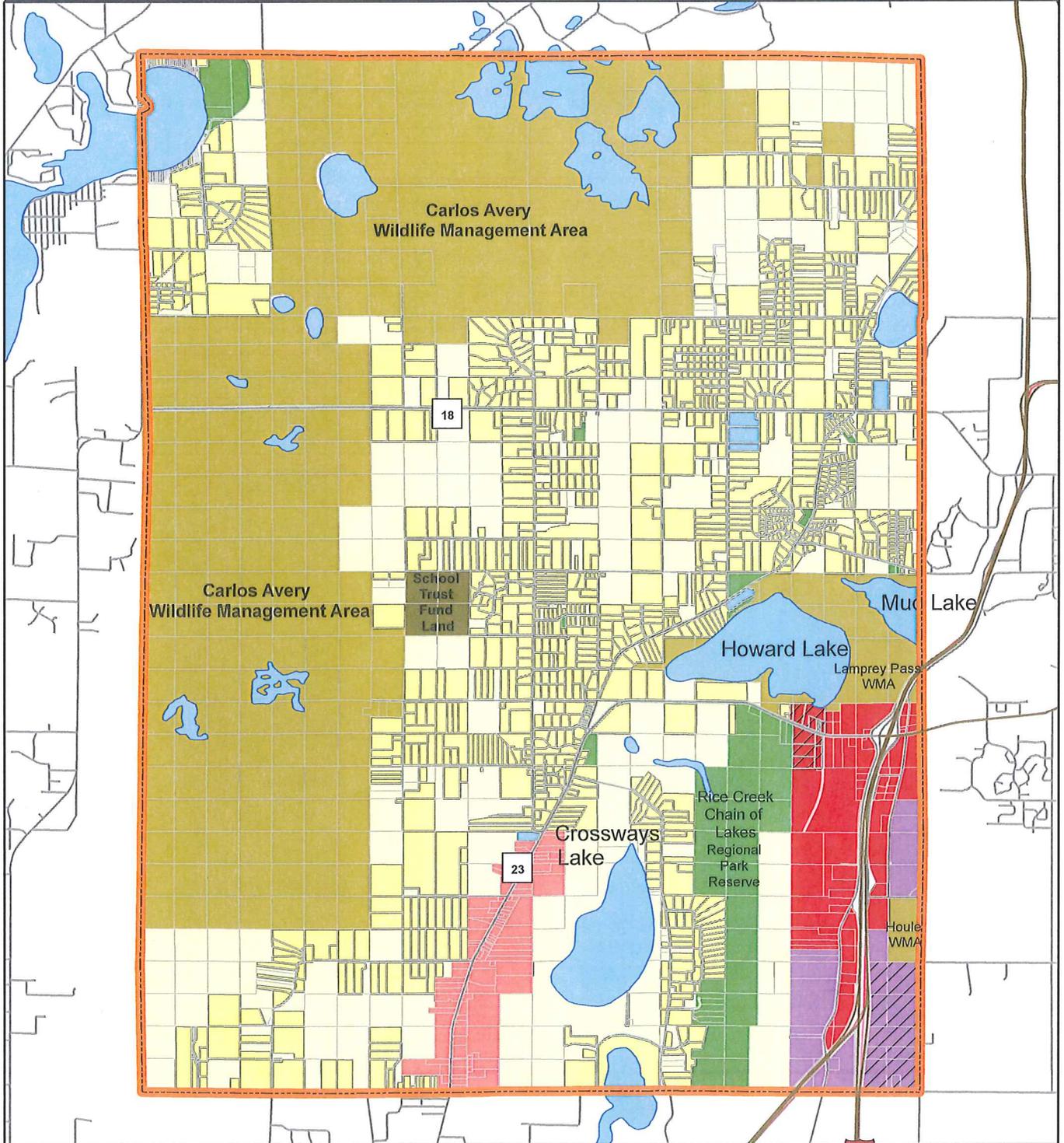
K:\gis\Columbus\Figures\ExistingLanduse.mxd  
 Source: Resource Strategies Corp.

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## 2.16 Future 2030 Land Use

Columbus- Water Resources Management Plan



### 2030 Land Use Category

- |                       |                              |
|-----------------------|------------------------------|
| Rural Residential     | Suburban Residential Overlay |
| Commercial            | Park                         |
| Commercial/Industrial | Wildlife Management Area     |
| Light Industrial      | School Trust                 |
| Public/Industrial     | Lakes                        |



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K:\gis\Columbus\Figures\Future2030Landuse.mxd

Source: Resource Strategies Corp.

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## **Section 3. Regulatory Setting**

### **3.1 City of Columbus**

The Zoning Administrator manages comprehensive planning, zoning controls and city ordinances, in conjunction with the Planning Commission and City Council. The zoning code contains the following regulations related to surface water management and protection:

- Chapter 07C Wetland Zoning Regulations
- Chapter 07D Stormwater Management Regulations
- Chapter 07E Shoreland Management
- Chapter 07F Floodplain Management
- Chapter 8-709 Drainage
- Chapter 8-714 Dedications of Public Lands
- Chapter 09 Excavation, Mining
- Chapter 14 Public Health, Wells, Sewers, and Utilities (includes ISTS)
- Chapter 20 Forestry Regulations

The City's zoning and subdivision regulations form the basis by which City-wide goals and policies for land use, development and environmental protection are implemented. As development applications are presented to the City, the City utilizes the code as a means to communicate minimum requirements, encourage best management practices, and require permits for certain activities. Permits and development reviews are often completed in partnership with other agencies such as the County, watersheds, conservation districts, and regional, state and federal agencies.

As it relates to stormwater management, the City's land use regulations (listed above) seek to preserve water quality and natural drainageways, manage floodplains, support retention and infiltration practices, protect surface and groundwater supplies and minimize impacts on water quality and encourage infiltration. These regulations recognize the permit authority of the RCWD and CCWD in the areas government by those Districts. The City's Code will be revised as needed to incorporate the goals and policies identified in this Local Surface Water Management Plan as part of implementing the City's Comprehensive Plan.

### **3.2 Anoka County**

Anoka County is the primary local planning entity for ground water planning. State Statute §103B.255 - Ground water plans, Subdivision 1, requires that Watershed and Local Water Management Plans comply with the provisions of the County's Groundwater Plan.

The County also has specific programs and policies relating to drainage issues on its highway systems and county ditch systems. The County has adopted a shoreland zoning ordinance and floodplain ordinance for areas outside incorporated cities.

Counties have the option to delegate authority over drainage systems to watershed districts. Anoka County has delegated the jurisdiction over all public ditches within Columbus to the RCWD and CCWD for those areas of the City. Thus, the water management organizations are the ditch authority for the purposes of implementing Minnesota Statute §103E (Drainage Law). The Anoka County Highway Department is the ditch authority in that portion of the City within the SRWMO.

### **3.3 Anoka County Department of Parks and Recreation**

The Anoka County Department of Parks and Recreation oversees fourteen parks throughout the County, including the Coon Lake County Park located in the City of Columbus. This 125-acre park offers recreational amenities on Coon Lake such as hiking trails, boat launch, swimming beach, canoeing, and fishing.

### **3.4 Anoka Conservation District**

The Anoka Conservation District is a Soil and Water Conservation District, established under Chapter 103C of Minnesota Statutes. The purpose of these Districts is to promote programs and policies which can conserve the soil and water resources within their territorial limits. Historically, SWCDs focused on identification, implementation, and financial support of practices that effectively reduce or prevent erosion, sedimentation, siltation, and agriculturally-related pollution. As formerly rural counties in the Metropolitan Area have become more urban, SWCDs have expanded their roles to address the impacts of urban development on water and natural resources.

The Anoka Conservation District and other SWCD's frequently act as local sponsors or provide cost-share resources for water management projects that include a variety of BMP's. The Districts also are actively involved in educational programs which promote water, natural resource, and soil conservation practices. The SWCDs receive a great deal of technical assistance from the United States Natural Resource Conservation Service.

In 1998, Minnesota Legislature established the Metro Greenways Program. The goal of this program is to establish a regional network of connected open space

and natural areas for the purpose of protecting diverse plant and animal habitat while providing aesthetic and economic benefits to communities. The Anoka Conservation District has prepared a Resource Inventory for the City and other communities in Anoka County as part of the Metro Greenways Project. This inventory may be used as a tool for greenways planning within the City. The proposed greenways map is shown on Figure 2.13.

### **3.5 Watershed Management Organizations**

The State of Minnesota adopted the Minnesota Watershed District Act in 1955. This Act, now codified in Minnesota Statutes §103D (formerly Chapter 112), provides for establishment of watershed districts to regulate water resource planning, flood control, and other conservation issues.

In 1982, the State approved the Metropolitan Surface Water Act, Minnesota Statutes §103B. This act requires all metropolitan area local governments to address surface water management through participation in a Water Management Organization. A WMO can be organized as a Watershed District, a joint powers agreement (JPA) among municipalities, or as a function of county government.

The City of Columbus is divided into multiple drainage basins that flow to three separately managed watersheds. The Rice Creek Watershed and Coon Creek Watershed are managed by Watershed Districts. The Sunrise River Watershed is managed by a joint powers Watershed Management Organization. Figure 3.1 shows the three watershed management organizations with jurisdiction in the City.

#### **3.5.1. Rice Creek Watershed District (RCWD)**

Rice Creek Watershed District was formed in 1972, under the authority of Minnesota Statutes §103D. RCWD covers approximately 201 square miles and is composed of 28 communities: Arden Hills, Birchwood Village, Blaine, Centerville, Circle Pines, Columbia Heights, Columbus, Dellwood, Falcon Heights, Forest Lake, Fridley, Grant, Hugo, Lauderdale, Lexington, Lino Lakes, Mahtomedi, May Township, Mounds View, New Brighton, Scandia, Roseville, Shoreview, Spring Lake Park, Saint Anthony, White Bear Lake, White Bear Township, and Willernie.

RCWD has been authorized by the Minnesota State Legislature to act as the local government unit responsible for administering the Wetland Conservation Act. RCWD does not have a local wetland-banking program and relies on the state program for mitigation purposes. It uses methods and procedures outlined in the WCA to determine replacement of wetland values in mitigation proposals. RCWD implements its stormwater and wetland permitting authority in those areas of the City under jurisdiction of the RCWD through the RCWD's General Rules (adopted February 2008) and Rule RMP-2 (adopted June 2008).

The RCWD is the ditch authority for public ditches within Columbus for the purposes of implementing Minnesota Statute §103E (Drainage Law).

The RCWD adopted its General Rules in February 2008 and Rule RMP-2 in June 2008, implementing the RCWD's authority for stormwater and wetland permitting in those areas of the City under the jurisdiction of the RCWD.

### 3.5.2. Coon Creek Watershed District (CCWD)

Coon Creek Watershed District was formed in 1959, under the authority of Minnesota Statutes §103D. CCWD covers approximately 94 square miles and is composed of 5 communities: Andover, Blaine, Columbus, Coon Rapids, and Ham Lake.

CCWD has been authorized by the Minnesota State Legislature to act as the local government unit responsible for administering the Wetland Conservation Act. CCWD does not have a local wetland-banking program and relies on the state program for mitigation purposes. It uses methods and procedures outlined in the WCA to determine replacement of wetland values in mitigation proposals.

The CCWD Watershed Management Plan notes that the number and length of public drainage systems within the CCWD have remained constant at about 125 miles since 1917. The Watershed also includes approximately 130 miles of private ditches. The District expects that the length of the public ditch system will remain stable in the future. Population growth and land use change in portions of the District will lead to an increased emphasis on the use of ditches for stormwater conveyance, and a desire for improved aesthetics. There may be some decreases in the length of private ditches as land is developed, and stormwater is routed to the public ditch system.

CCWD implements its stormwater and wetland permitting authority in those areas of the City under jurisdiction of the CCWD through the CCWD's Rules (adopted May 2009). The rules include requirements for permits for all land disturbing activities and standards for permit applicants. Approval standards are identified for Drainage, Floodplain, Groundwater, Soils and Erosion Control, Stormwater, Water Quality, Wetlands, and Wildlife. The District's Plans and Rules may be reviewed in detail on its website at [www.cooncreekwd.org](http://www.cooncreekwd.org).

This LSWMP adopts the rules and standards of the watershed districts and watershed management organization by reference and requires that applicants for obtain permits and approvals from the Watershed District.

The City will update its existing ordinances as needed to be consistent with the Watershed Rules and Standards, after its Comprehensive Plan is approved. This includes an update of the Erosion and Sediment control ordinance.

Existing ordinances require compliance with watershed permitting. Examples of these requirements and coordination with District plans include the following:

- Chapter 7D-500 requires that “If a stormwater, surface water or drainage alteration plan has already been approved by another reviewing governmental agency, then such plan shall be utilized by the City of Columbus in lieu of a duplicate application.”
- Chapter 9 of the City’s Ordinances, Section 9-108 regarding Excavation and Mining states “Land owners are advised that the limited scope of this Chapter does not relieve them of the responsibility to ensure that their small excavation or fill meets the requirements of the local watershed management, the county, or the state or federal government.”

### 3.5.3. Sunrise River Watershed Management Organization (SRWMO)

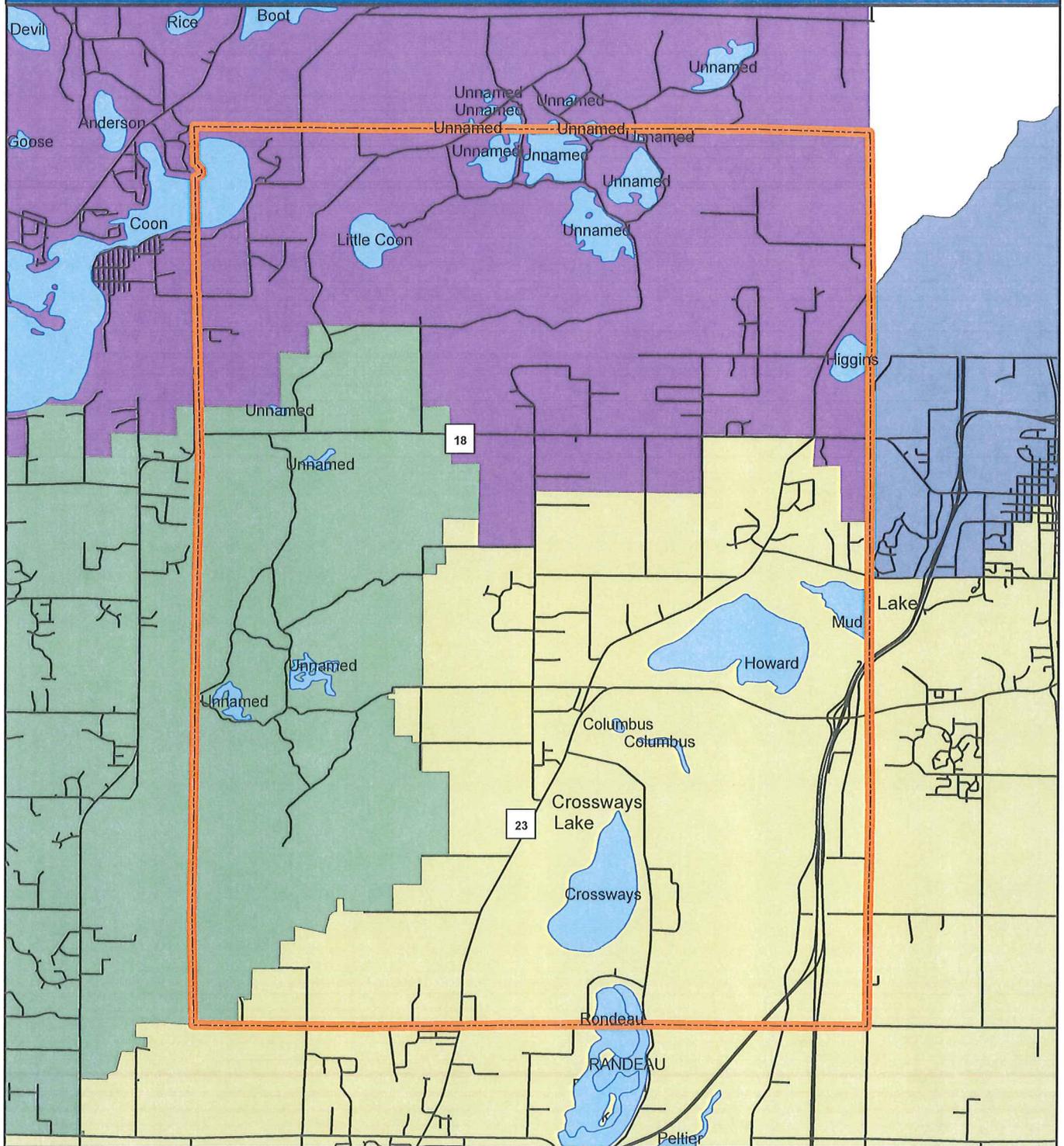
SRWMO was formed in 1985 through a Joint Powers Agreement ratified by three local units of government: Columbus, East Bethel, and Linwood Township in order to cooperatively develop a Watershed Management Plan. An amended Joint Powers Agreement was executed in 1995 to include the City of Ham Lake.

SRWMO’s plan includes goals and associated policies that form the framework for water resource management decisions.

The South and West Branches of the Sunrise River are the major drainage features of the Watershed. The South Branch is also known as County Ditch No. 12.

### 3.1 Watershed Authorities

Columbus- Water Resources Management Plan



#### Legend

##### Watershed Authorities

- COON CREEK
- FOREST LAKE/COMFORT LAKE
- RICE CREEK
- SUNRISE RIVER

  Columbus



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Source: MN Dept of Natural Resources

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### **3.6 Metropolitan Council**

The Metropolitan Council, created in 1963, is the regional governmental body responsible for planning within the seven-county Minneapolis-St. Paul metropolitan area. The Metro Area includes Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington Counties. The Council plans for major regional systems, including the following:

- Transportation and Mass Transit
- Wastewater and Public Water Supply Systems
- Housing, Re-development, and Urban Growth
- Regional Parks and Open Space
- Water Resource Management

The Council has review authority for City and County Comprehensive Plans within the 7-County Area, to assure that they are consistent with the regional system plans. The Council provides extensive data analysis and information to local communities, and completes forecasts of regional and local population growth that are used in the development of local plans.

The Council's activities specific to water resources management include:

- Region-wide Surface and Ground water Planning and Non-point Source Pollution Abatement
- Industrial Wastewater Management
- Sewage Collection and Treatment

The Council provides guidance for developing local water resource plans in its "Water Resource Management Policy Plan" adopted December 19, 1996. The Plan identifies broad region-wide objectives for water management, and its Appendices detail the requirements for Local Surface Water Management Plans.

### **3.7 State Board of Water and Soil Resources (BWSR)**

The BWSR was created by State Legislature in 1986. Three functioning state boards were eliminated by this legislation and their duties were transferred to BWSR on October 1, 1987. BWSR's duties include oversight programs and funding of State Soil and Water Conservation Districts, formation and guidance of watershed districts, and the direction and assistance to counties in developing their Comprehensive Water Plans. The BWSR is the State agency responsible for implementation of the Wetland Conservation Act (WCA). The BWSR reviews

and approves water management plans and project activity of watershed districts and soil and water conservation districts.

### **3.8 Minnesota Pollution Control Agency (MPCA)**

The MPCA has created by State Legislature in 1967. The MPCA has both regulatory and enforcement authority relative to potential actions which could affect the quality of the ground waters and surface waters of the State. Since future City projects will likely involve water quality considerations, the MPCA may become an active participant in these projects. The MPCA is also involved with other governmental units, such as municipalities, in the construction and operation of wastewater treatment plants and the control of non-point source pollution. The MPCA is the key state agency that regulates the management of wastewater, stormwater, and solid waste in the City of Columbus.

The MPCA is required to publish a list of impaired waters in the state not meeting federal water quality standards. For each waterbody on the list, the MPCA is required to conduct a study to determine the allowable Total Maximum Daily Load (TMDL) for each pollutant that exceeds the standard. Local governments will be required to incorporate completed TMDL Studies into their surface water management plans. Impaired waters in Columbus are summarized in Table 6-1.

Another important function of the MPCA is implementing the National Pollutant Discharge Elimination System (NPDES) program. This program regulates not only traditional wastewater discharges but also construction activities and storm water.

The MPCA NPDES Phase II general permit establishes conditions for discharging storm water, and specific other related discharges, to waters of the State. This permit is required for discharges that are from Small Municipal Separate Storm Sewer Systems. The Rule identifies a number of implementation options for regulated small municipal separate storm sewer system (MS4) operators. Columbus is not yet an MS4 community.

The MPCA has also published the *Minnesota Stormwater Manual*. The manual serves as a unified stormwater guidance document for the entire state.

### **3.9 Minnesota Department of Natural Resources (MNDNR)**

The MNDNR was originally created in 1931 as the Department of Conservation. The MNDNR has both regulatory and enforcement authority over the natural resources of the State. The principal divisions of MNDNR include the Division of Waters, the Division of Forestry, and the Division of Fish and Wildlife (which includes the sections of Wildlife, Fisheries, and Ecological Services). The Division of Fish and Wildlife is responsible for the management of Minnesota's 1.2 million acres of wildlife management areas (WMA), including the Carlos Avery Wildlife Management Area, Houle Wildlife Management Area, and Lamprey Pass Wildlife Management Area located in the City of Columbus.

The MNDNR has permit authority for any change in cross-section or work below the Ordinary High Water (OHW) level of regulated water bodies. This often includes protected waters and wetlands. The MNDNR is also actively involved in helping local units of government administer floodplain management ordinances and standards.

### **3.10 Minnesota Department of Health (MDH)**

The MDH manages programs to protect the public health, including implementation of the Safe Drinking Water Act (SDWA). It has permit authority and regulatory authority for monitoring water supply facilities. These facilities include water wells, surface water intakes, water treatment, and water distribution for public use. The MDH also is responsible for the development and implementation of the Wellhead Protection Program.

### **3.11 Minnesota Environmental Quality Board (EQB)**

The EQB is comprised of five citizen members and the heads of ten state agencies that play an important role in Minnesota's environment and development. The EQB develops policy, creates long-range plans and reviews proposed projects that may significantly influence Minnesota's environment.

### **3.12 Minnesota Department of Transportation (MNDOT)**

Within the City, MNDOT administers several state highway systems. Since highway systems cross drainage patterns of natural and artificial waterways, there is opportunity for frequent interaction between Cities and MNDOT. City projects requiring structures through MNDOT regulated highways require coordination and approval by MNDOT. Anticipated activities of MNDOT are periodically published in their State Transportation Improvement Plan (STIP).

### **3.13 U.S. Environmental Protection Agency (USEPA)**

The EPA develops and enforces regulations that implement environmental laws enacted by congress. Responsibilities of the EPA within Minnesota have largely been delegated to the MPCA. The NPDES Program and Impaired Waters List are both the result of the Clean Water Act (CWA), administered by the EPA.

### **3.14 U.S. Army Corps of Engineers (USACE)**

The USACE can have permit and regulatory authority over projects in the City under Section 404 of the Clean Water Act. Wetlands are considered waters of the United States and are regulated by the U.S. Army Corps of Engineers (USACE) under the Clean Water Act (CWA). Section 404 authorizes the USACE to issue permits for the placement of fill into all wetlands of the U.S.

### **3.15 Federal Emergency Management Agency (FEMA)**

FEMA manages federal disaster mitigation and relief programs, including the National Flood Insurance Program (NFIP). This program includes floodplain management and flood hazard mapping. FEMA published the Flood Insurance Rate Map (FIRM) in Columbus in 1980.

### **3.16 Natural Resource Conservation Service (NRCS)**

The Natural Resources Conservation Service (formally called the Soil Conservation Service (SCS)), is a division of the U.S. Department of Agriculture. The NRCS provides technical advice and engineering design services to local conservation districts across the nation. The *Soil Survey of Anoka County* was published by the NRCS in 1977. The NRCS also developed hydrologic calculation methods that are widely used in water resources design.

### **3.17 U.S. Geological Survey (USGS)**

The USGS provides mapping and scientific study of the nation's landscape and natural resources. USGS maps provide the basis for many local resource management plan efforts.

### **3.18 U.S. Fish and Wildlife Service (USFWS)**

The mission of the USFWS is to conserve, protect, and enhance the nation's fish, wildlife, plants and habitat. The USFWS developed the National Wetlands Inventory (NWI) in 1974 to support federal, state, and local wetland management work.

## **Section 4. Related Studies, Plans, and Reports**

### **4.1 Comprehensive Plan**

The City's 2030 Comprehensive Plan has been submitted to the Metropolitan Council for review. The plan includes goals and policies for land use, infrastructure and community systems, and for protection of water and natural resources. The Comprehensive Plan will serve as the basis for updating the City's land use map, zoning map, and City Code.

This Local Surface Water Management Plan will be adopted as an element of the City's 2030 Comprehensive Plan.

### **4.2 Rice Creek Watershed District Watershed Management Plan**

The original RCWD Plan for water management was prepared in 1974. A "second generation" Plan was completed in 1990, in compliance with the Metropolitan Surface Water Management Act (Minnesota Statutes §103B). The Second Generation Plan has been updated in 1994, 1997, and 2000. The RCWD is currently working on a "third generation" watershed management plan. The District expects to complete the plan in 2009 or 2010. The plan will include a summary of water and natural resources within the district and identify key issues for water resource management. These may include management of storm water runoff (quantity and quality), public ditches, wetlands, shoreland, floodplains, erosion and sedimentation, groundwater, and public education. The plan will identify objectives, policies, management strategies, and an implementation plan to address these issues.

The current watershed management plan for RCWD is located on its website at <http://ricecreek.org/>.

### **4.3 Rice Creek Watershed District Resource Management Plan (RMP) for the Judicial Ditch 4 Area**

RCWD, in accordance with WCA requirements, has prepared a Comprehensive Wetland Management Plan for the purpose of maintaining ditches in the Judicial Ditch 4 system located in the Cities of Columbus, Forest Lake, and Lino Lakes. The intent of this plan is to meet stormwater needs while improving wetland ecological integrity and wildlife habitat. RCWD has adopted a special rule (RMP-2) to implement wetland and stormwater permitting and banking in the RMP area.

### **4.4 Coon Creek Watershed District Comprehensive Plan**

The Coon Creek Watershed District Comprehensive Plan is a second generation plan developed in compliance with the Metropolitan Surface Water Management Act (Minnesota Statutes 103B). The Plan will govern management of resources in the District through 2010. The CCWD Comprehensive Plan provides an

assessment of water and natural resources, identifies key factors and major issues facing the watershed, and includes goals and policies for the protection and enhancement of the water and related land resources within the district. CCWD adopted revised rules on May 9, 2009.

The current watershed management plan and rules for CCWD are located on its website at <http://www.cooncreekwd.org/>.

#### **4.5 Sunrise River Watershed Management Plan**

The SRWMO was created through a joint powers agreement, signed in 1995. The current Watershed Management Plan was approved by the Minnesota Board of Water and Soil Resources and adopted by SRWMO in October 2000. This Plan sets forth goals, policies, management strategies, and implementation criteria for the Watershed. The SRWMO is currently updating their Watershed Management Plan which expires at the end of 2009.

The current watershed management plan for SRWMO is located on its website at <http://www.anokanaturalresources.com/srwmo/planning.htm>.

## Section 5. Goals and Policies

The following are the adopted Surface Water Management *goals and policies* for the City of Columbus:

### 5.1 The City of Columbus is committed to a goal of no adverse impacts to ground and surface water resources in the area.

#### *Policies:*

- The City will work cooperatively with local water management organizations, state agencies, and landowners to protect local wetlands, lakes, streams, and groundwater to preserve the values of these resources for future generations.
- The City concurs with the District and WMO surface water plans and rules. The Watershed Districts will continue to enforce surface water regulations and permitting within the City within the boundaries of their districts. The City will coordinate its review of development proposals with the Watershed Organizations, by providing review comments to the districts. The City will adopt and enforce the rules of the Sunrise River WMO in that geographic area of the community.
- The City will manage land use to support protection of surface and ground waters through the following elements of its Zoning and Subdivision Ordinance:
  - Chapter 07C Wetland Zoning Regulations
  - Chapter 07D Stormwater Management Regulations
  - Chapter 07E Shoreland Management
  - Chapter 07F Floodplain Management
  - Chapter 8-709 Drainage
  - Chapter 8-714 Dedications of Public Lands
  - Chapter 09 Excavation, Mining
  - Chapter 14 Public Health, Wells, Sewers, and Utilities (ISTS)
  - Chapter 20 Forestry Regulations
- The City will review its existing stormwater management and erosion and sediment control regulations, and will update its ordinances to be consistent with NPDES Construction Stormwater Permit requirements for erosion and

sediment control. Ordinance updates will occur after adoption of the 2030 Comprehensive Plan Update. The City will make the requirements consistent with those of the Watershed Management Organizations.

- The City will update its ordinances to adopt and enforce the rules and performance standards of the Sunrise River WMO after final adoption by the WMO.
- The City will cooperate with the County and the Watershed Organizations in managing land use to protect ground water resources. Additional goals and policies for groundwater protection are included in the Water Supply element of the Comprehensive Plan.
- The City encourages the use of best management practices for agricultural land uses to minimize erosion and to protect the quality of surface and groundwater resources.
- The City supports and will encourage developers and landowners to use storm water practices that promote infiltration/filtration and decrease impervious areas through site design and use of Low Impact Development (LID) techniques and Green Design. (City Code 7D—707 and 708)
- The City will complete an inventory of water control structures and storm water ponds within the City, including structure elevation and facility condition, and update its Stormwater System map to include this inventory information. This will be completed in 2009.
- The City will cooperate with the Watershed Management Organizations and surrounding communities to address potential flooding issues and erosion issues on public and private ditches, such as Anoka County Ditch 10-22.
- The City will cooperate with the Watershed Management Organizations and Minnesota DNR on water level management issues in the Carlos Avery WMA.
- The City supports the efforts of the Watershed Management Organization to educate the public on water resource and management issues. If requested, the City will consider providing information to the public through its newsletters and website.

**5.2 Protect the quality of local lakes by supporting the Rice Creek Watershed District, Coon Creek Watershed District, and Sunrise River WMO's goals for managing lakes in the City.**

*Policies:*

- The City will update and implement its land use plan, zoning and subdivision ordinances to protect shoreland areas and lake water quality, and work with the Watershed Organizations to achieve the lake management goals identified in the WMO Water Management Plans.
- The City will cooperate with the WMOs to implement the recommendations resulting from the WMOs TMDL studies, through implementing its land use plan and enforcing its ordinances to assist in protection and improvement of these resources.

**5.3 Protect wetland resources by requiring functions and values assessments of the wetlands in the City, and implementing wetland management requirements.**

*Policies:*

- The City will cooperate with the Watershed Organizations as they serve as the LGU for the WCA within the City. The City will serve as the LGU within the Sunrise River WMO area.
- The City will support Watershed Organization requirements for pretreatment of stormwater prior to discharge into all wetlands.
- Wetlands that have not been inventoried by the Watershed Organizations will be required to complete a functions and values assessment as a part of the development application. Watershed rules regarding wetland management will be applied based on the results of the assessment and the wetland classification.
- The City will adopt and enforce requirements for management of wetlands (such as buffer zones) in its Zoning and Subdivision Code. The requirements will be consistent with Watershed Organization standards.
- The City supports inspection of on-site individual sewage treatment systems by an MPCA certified inspector at the time of property sale or transfer and requirements that these systems meet state standards.

#### **5.4 Protect endangered species and significant natural communities**

##### *Policies*

The City will support efforts of the Minnesota DNR to protect endangered species and significant natural communities within the City.

#### **5.5 Support the implementation of Watershed Organization management requirements for stormwater quality and quantity, volume control, infiltration and filtration of stormwater, standards for wet detention basins, and other best management practices.**

##### *Policies:*

- The City will support the Watershed Organizations’ implementation of their adopted standards for water quantity and quality management, such as control of peak runoff, volume control, infiltration and filtration, and best management practices to control Total Suspended Solids (TSS), Total Phosphorus (TP), and runoff from development or redevelopment within the City. The Watershed Districts will play the primary role in reviewing the stormwater plans for development applications within the City, and implement their rules through the review and permit process. The City will provide comments on development applications to the Watershed Districts during the review process.
- The City will adopt and enforce the rules and performance standards of the Sunrise River WMO within that geographic area of the City. The City will seek comments on development proposals and proposals for land alteration within the Sunrise River WMO area from the WMO, and incorporate the WMOs comments in development reviews.
- The City supports and will encourage landowners to use stormwater practices that promote infiltration/filtration and decrease impervious areas through site design and use of Low Impact Development techniques, where feasible.
- In accordance with SRWMO policy, the City of Columbus will require sweeping of streets with curb and gutter once annually in all areas, and twice annually in priority areas in the area of the City within the SRWMO. Priority areas shall be areas that drain directly to waterbodies and/or natural wetlands without pretreatment of stormwater runoff. Roadside ditches in rural areas will constitute treatment.
- In accordance with SRWMO policy, the City of Columbus will inspect stormwater treatment basins by 2012 and at 5 year intervals thereafter in the area of the City within the SRWMO. Sump catch basins will be inspected every year as required by the SRWMO.

- The City supports educational efforts of the SRWMO as a best management practice. Support of these efforts may include posting notices from the WMO in the City newsletter or on the City’s website, or providing meeting space in City facilities for educational opportunities that benefit City residents.
  
- The SRWMO is considering phosphorus reduction as a watershed-wide goal. The City will share information about projects that may affect water quality with the WMO, as requested by the watershed and as available to the City.

## **Section 6. Assessment of Problems and Corrective Actions**

### **6.1 Development and Redevelopment**

The majority of the land area of Columbus is zoned for Rural Residential or Agricultural Uses. Minimum lot size in the Rural Residential districts is one unit per five acres. The southeast corner of the community is zoned for Commercial and Industrial uses.

Limited development is currently occurring in Columbus. A new Harness Race Track was built in 2007. The community expects development to occur at a relatively slow pace for the foreseeable future.

No specific water management problems currently exist related to development, redevelopment or public facilities. The City and Watershed Organizations have identified some existing flooding problems related to private ditches in Columbus. If development is proposed in these areas, the City will work in cooperation with the local Water Management Organizations to review proposed development, and ensure that surface water and natural resource management for new development and redevelopment meet both City and Watershed requirements.

### **6.2 Water Quantity**

Flooding problems have been noted on some private ditches within the City in the past. The City will need to work with the Districts and WMO if future development or redevelopment has the potential to impact flooding or water quantity in the future. The Watershed Organization plans noted the following water quantity issues within Columbus:

- Potential flooding issues related to public and private ditches. For example, Anoka County Ditch 10-22, which crosses the Columbus/Lino Lakes border may need an inter-jurisdictional solution to flooding issues in the future.
- Need to coordinate with Minnesota DNR on their management of water levels in Carlos Avery WMA to ensure needs of the general public are considered.
- Need for an inventory of water control structures within the City, including structure elevation and condition.

### **6.3 Water Quality**

Water quality issues identified in Coon Creek Plan:

- Increases in ditch and bank erosion causing an increased demand for bank stabilization projects.
- Wetland quality continues to decline in developing areas.

Sunrise River WMO Plan and Rice Creek and Coon Creek WD Plans:

- All on-site individual sewage treatment systems within the watershed should be inspected by an MPCA certified inspector.

#### 6.4 Impaired Waters

Four lakes located within the City and its drainage area are currently on the Minnesota Pollution Control Agency’s 303(d) impaired waters list, Coon Lake, Howard Lake, Marshan Lake and Peltier Lake. The 303(d) list is comprised of lakes and streams that do not meet Federal water quality standards.

Hardwood Creek and Coon Creek, located just south and west of the City, are also identified as impaired.

Peltier and Marshan Lakes are located south of the City. While these lakes are not within Columbus, the portion of the City within the RCWD drains to either Peltier Lake or Marshan Lake. Both of these lakes are listed on the MPCA’s 303(d) list.

Impaired waters discussed here are identified on Figure 6.1 and listed in the table below.

**Table No. 6.1:  
Impaired Waters in Columbus**

| Impaired Water | Affected Use                               | Pollutant/<br>Stressor  | Impaired Biota | TMDL Target Start Date | TMDL Target Complete Date |
|----------------|--|---|----------------|------------------------|---------------------------|
| Coon Creek     | Aquatic life                               | Aquatic macroinvertebrate bioassessments                                    |                | 2014                   | 2018                      |
| Coon Lake      | Aquatic consumption                        | Mercury in fish tissue  |                | Plan approved in 2008  |                           |
| Hardwood Creek | Aquatic life                               | Oxygen dissolved/<br>Impaired biota /Fish bioassessments                    | Fish           | Plan approved in 2009  |                           |
| Howard Lake    | Aquatic recreation                         | Nutrient/Eutrophication<br>Biological Indicators                            |                | 2014                   | 2018                      |
| Marshan Lake   | Aquatic recreation                         | Nutrient/Eutrophication<br>Biological Indicators                            |                | 2005                   | 2009                      |
| Peltier Lake   | Aquatic consumption/<br>Aquatic recreation | Nutrient/Eutrophication<br>Biological Indicators/<br>Mercury in fish tissue |                | 2005                   | 2009                      |

Source: 2008 MPCA 303(d) List of Impaired Waters

## **6.5 Total Maximum Daily Load (TMDL) Studies**

The local Watershed Districts will be completing TMDL studies and developing plans to address the “impaired waters” issues in the lakes and streams listed in Section 6.4. The City will cooperate with the Districts as they complete these studies, and implement its land use plan and enforce its ordinances to assist in protection and improvement of these resources.

The TMDL study for Coon Lake was approved in 2008 as part of the state-wide mercury TMDL Plan. The Hardwood Creek TMDL was approved in June 2009. Fact sheets prepared by the MPCA which summarize these studies are included in the Appendix.

Studies for Marshan and Peltier Lake are anticipated to be complete in 2009. Marshan Lake is included in the Rice Creek Chain of Lakes TMDL study. TMDL studies for Howard Lake and Coon Creek are scheduled to begin in 2014.

As TMDL studies are complete, an implementation plan and strategies are included with each plan. The City acknowledges that future actions and expenditures may be required to address the TMDL implementation plans. The City will participate as required.

## **6.6 Erosion**

The following erosion issues were identified in Columbus in the Watershed District Plans:

Coon Creek Plan:

- Increases in ditch and bank erosion causing an increased demand for bank stabilization projects

Sunrise River Plan

- Procedures and protocols to enforce erosion control standards on construction sites should be revised to ensure proper implementation of BMP’s and construction site erosion control.

## **6.7 Groundwater**

The following groundwater-related issues were identified in the Watershed District Plans:

- The long term effects of climate change, groundwater use, and changes in precipitation patterns on shallow ground water availability and wetlands is a concern.

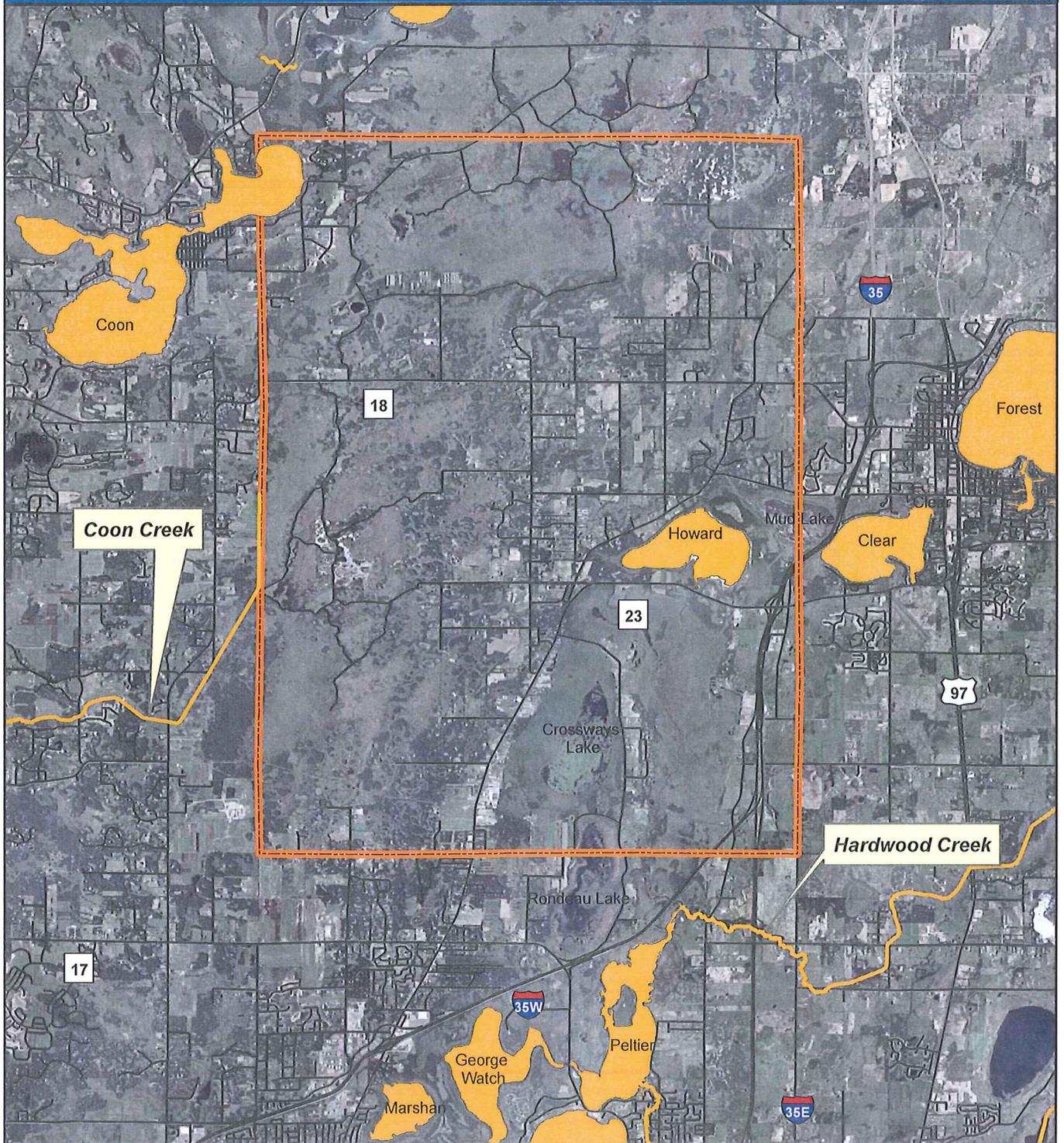
## **6.8 Shoreland**

The following shoreland-related issue was identified by the SRWMO:

- The SRWMO supports municipal efforts to replace septic systems in shoreland areas with municipal sewer, community septic systems, or new or retrofitted individual septic systems. As stated in the Comprehensive Plan, Columbus has attended meetings with the Metropolitan Council and the City of East Bethel to discuss potential municipal sewer service in the Coon Lake area. There are approximately 50 residences in Columbus that are located on Coon Lake. The City is interested in continuing discussions with East Bethel and the Metropolitan Council to participate in potential municipal sewer service to the Coon Lake area.

# 6.1 Impaired Waters

Columbus- Water Resources Management Plan



## Legend

- Impaired Streams
- Impaired Water
- Columbus City Limits



0 0.5 1 2 Miles

### Limitation of Liability

This document is not a legally recorded map of survey and is not intended to be used as one. This map is a compilation of records and information from various state, county, and township offices, and other sources.

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Source: Minnesota Pollution Control Agency

**TKDA**  
ENGINEERS • ARCHITECTS • PLANNERS

Map date: August 2009

## **Section 7. Implementation**

### **7.1 Actions to Implement this Plan and Address Identified Issues**

Section 6 identified water resource management issues related to water quantity, quality, erosion and sediment control, lakes, wetlands, groundwater, and other issues. The City will complete the following specific implementation actions to implement the LSWMP and address issues identified in Section 6:

#### **7.1.1. Surface Water Regulation and Permitting**

- This plan adopts the plans and rules of the RCWD and CCWD as the water resource management rules for the City within the areas governed by those districts. The City supports the District’s enforcement of these rules and requirements for BMP’s to manage water quantity and quality.
- The City concurs with the District and WMO surface water plans and rules. The Watershed Districts will continue to enforce surface water regulations and permitting within the City within their geographic areas. The City will coordinate its review of development proposals with the Watershed Districts and will manage land use to support protection of surface and ground waters through its Zoning and Subdivision Ordinance.
- The City will adopt and enforce the rules and performance standards of the Sunrise River WMO within that geographic area of the City. The City will seek comments on development proposals and proposals for land alteration within the Sunrise River WMO area from the WMO, and incorporate the WMO’s comments in development reviews.
- The City will support the Watershed Organizations’ implementation of their standards for management of water quantity and quality, including control of peak runoff, volume control, infiltration and filtration, wetland quality, and best management practices to control Total Suspended Solids (TSS), Total Phosphorus (TP), and runoff from development or redevelopment within the City. The Organizations will play the primary role in reviewing the stormwater plans for development applications within the City, and implement their rules through the review and permit process. The City will provide comments on development applications to the Watershed Organizations during the review process.

#### 7.1.2. Ordinance Updates

- The City will review existing zoning and subdivision ordinances to identify opportunities to further incorporate the goals and policies of this plan and to ensure that the standards and rules of the watershed districts and watershed management organizations are addressed.. This will be done in conjunction with ordinance amendments as a part of completion of the City's Comprehensive Plan.
- The City will update its erosion and sediment control ordinances to be consistent with NPDES Construction Stormwater permit requirements for erosion and sediment control.

#### 7.1.3. Stormwater System Inventory, Mapping and Maintenance

- The City will complete an inventory of water control structures (culverts) and storm water ponds within the City, and create a map of its Stormwater System. The initial inventory and map will be complete in 2009. The inventory will identify the conditions of the structures, water resource issues, and needs for maintenance. Maintenance will be completed as needed to address issues identified in the inventory. The City will update its drainage system map and inventory as new components are added to the system.

#### 7.1.4. Columbus is a rural community with a rural drainage system primarily made up of culverts and ditches. Columbus is not an MS4 community and so does not have an adopted schedule for the repair and inspection of outfalls and other stormwater system structures. However, the City will continue to monitor and inspect outfalls as problems are reported and make repairs as needed. Water Quantity Management

- The City will cooperate with the WMO's and neighboring communities in managing flooding and erosion issues related to public and private ditches. The City will review the effects of high intensity rainfalls to determine if problems related to flooding occur.
- As development and redevelopment occur the City may consider acquisition of public easements over private ditches as part of a Developer's Agreement.

#### 7.1.5. Impaired Waters

- The City will participate and cooperate with the Watershed Management Organizations to address concerns related to impaired waters and as the Organizations complete TMDL studies, and will manage land use to avoid impacts to water resources within the City. The City will implement its zoning ordinances, subdivision regulations, and encourage BMP's that assist in the protection and improvement of impaired resources.

#### 7.1.6. Permit Process

- The City will coordinate reviews of land use and zoning applications and permits with Local Watershed Districts, Watershed Management Organizations, and County staff. The City will provide copies of land use and zoning applications and permit requests to the appropriate District, Anoka County, Anoka Conservation District, and other agencies as appropriate for review and comment. The City will incorporate the comments of the County, District, ACD, and other agencies along with its own staff comments in its staff reports, recommendations, and conditions.

#### 7.1.7. Shoreland Regulations

- The City will implement its existing ordinances related to management of lakes, streams, and wetlands, including the following:
  - Shoreland Management Regulations Ordinance. The Shoreland Management Regulations include the following setback requirements for structures, on-site sewage treatment systems, and structures in sewer areas:
    - ◆ Natural Environment Lakes - 150' setback for structures; 150' septic systems; and 150' for sewer structures.
    - ◆ General Development Lakes - 75' setback for structures; 75' for septic systems; and 50' setback for sewer structures.
    - ◆ Rivers and Streams - 100' for structures; 75' for septic systems; and 50' for sewer structures.
    - ◆ The City will review these and other ordinance requirements related to stormwater management as part of the Implementation of the Comprehensive Plan.

## 7.2 **Funding Mechanisms**

Columbus owns and manages a limited number of storm water management facilities, including culverts under public roadways, and drainage easements over a limited number of ponds within private developments. The City uses general fund revenues to fund improvements when needed to address water quality and quantity concerns and maintain these facilities in good working order.

The City requires that developers finance the improvements that are required to ensure that private developments meet City and watershed requirements.

The City's annual budget includes funding for maintenance of roads. If stormwater problem areas are identified related to road culverts, ditches, or other road-related stormwater needs, the City addresses these issues through its road maintenance budget.

### **7.3 Capital Improvement Plan (CIP)**

The City budgets for any capital improvements on an ongoing basis and will annually review capital expenditures that may arise as a result of implementing the Comprehensive Plan and this LSWMP. The capital improvements plan includes public investments in infrastructure, park expenditures, infrastructure repair and replacement, building maintenance and repair, and other planned capital expenditures. The capital improvements planning process is ongoing and subject to modification, as appropriate. As included in the Comprehensive Plan, the current capital improvements plan expenditures, excluding public sewer and water expenditures, are included in the Appendix.

No surface water management projects are currently identified in the City's Capital Improvement Plan. When the City completes its inventory of culverts and storm water ponds, needed improvements will be included in the City's CIP or annual budgets.

### **7.4 City Ordinances**

The City has adopted ordinances that provide standards and regulations to manage water resources. These include the following:

- Chapter 07C Wetland Zoning Regulations
- Chapter 07D Stormwater Management Regulations
- Chapter 07E Shoreland Management
- Chapter 07F Floodplain Management
- Chapter 8-709 Drainage
- Chapter 8-714 Dedications of Public Lands
- Chapter 09 Excavation, Mining
- Chapter 14 Public Health, Wells, Sewers, and Utilities (ISTS)
- Chapter 20 Forestry Regulations

After the SWMP and 2030 Comprehensive Plan are adopted, the City will revise or update its ordinances as described in the Goals and Policies section of this plan, to ensure that they meet state requirements and are consistent with the goals of this Plan.

## **Section 8. Administration**

### **8.1 Review and Adoption Process**

The City will provide draft copies of this Local Surface Water Management Plan to the local Watershed Districts and WMO for review and comment. The plan will be submitted to the Metropolitan Council as part of the City's Comprehensive Plan, and will be adopted by the City when approved by the Metropolitan Council.

### **8.2 Plan Amendments and Updates**

City Comprehensive Plans are updated every ten years. Local Surface Water Management Plans must be updated within two years of completion of Watershed Organization Management Plans. The City will update its Local Surface Water Plan along with its Comprehensive Plan, or as needed to comply with state rules related to LSWMP updates to be consistent with Watershed Plans.

The Rice Creek Watershed District expects to complete its Third Generation Watershed Plan in 2009 or 2010. The City will update this LSWMP within two years of adoption of the RCWD Water Resource Management Plan.

The existing Coon Creek and Sunrise River Watershed Plans will govern water management throughout 2010 and 2009, respectively, and will then be updated.

Substantive revisions to the goals and objectives, the adoption of new or revised standards or rules, and major revisions to the CIP or administrative procedures of the watershed plans will require an amendment to this plan. Plan amendments require review and approval by the City Council and the watershed organizations.

Annual work plans completed during the beginning of the calendar year by the City Council will serve to guide the immediate activities of the City. The periodic CIP updates will help focus the work plans by identifying projects requiring substantial planning and financial resources for successful completion. Capital storm water improvements may be proposed by other local, state, and federal agencies as well. Understanding capital improvements planned by others is important because of the potential impact to the water resources of the City.

### Capital Improvements Plan (CIP)

| <u>Year</u> | <u>Expenditure</u>            | <u>Total Cost</u> | <u>Annual Cost</u> | <u>Funding</u> | <u>Total Levy</u>  |
|-------------|-------------------------------|-------------------|--------------------|----------------|--------------------|
| 2009        | Public Works Equipment        | -                 | \$85,030           | Levy           | \$85,030           |
| 2009        | Pickup Truck                  | -                 | \$36,550           | Levy*          | -                  |
| 2009        | Seal-coating                  | -                 | \$36,045           | Levy           | \$36,045           |
| 2009        | Patching/filling              | -                 | \$20,000           | Levy           | \$20,000           |
| 2009        | Overlay                       | -                 | \$74,800           | Levy           | \$74,800           |
| 2009        | Ladder Truck                  | -                 | \$24,930           | Levy           | \$24,930           |
| 2009        | First Engine & Fire Rescue    | -                 | \$19,215           | Levy           | \$19,215           |
| <b>2009</b> | <b>TOTAL</b>                  |                   |                    |                | <b>\$260,020</b>   |
| 2010        | Public Works Equipment        | -                 | \$85,030           | Levy           | \$85,030           |
| 2010        | Small Dump Truck              | -                 | \$56,135           | Levy*          | -                  |
| 2010        | Seal-coating                  | -                 | \$36,045           | Levy           | \$36,045           |
| 2010        | Patching/filling              | -                 | \$20,000           | Levy           | \$20,000           |
| 2010        | Overlay                       | -                 | \$74,800           | Levy           | \$74,800           |
| 2010        | Ladder Truck                  | -                 | \$24,930           | Levy           | \$24,930           |
| 2010        | First Engine & Fire Rescue    | -                 | \$19,215           | Levy           | \$19,215           |
| 2010        | Community Park/Trail          | -                 | \$10,000           | Levy           | \$10,000           |
| <b>2010</b> | <b>TOTAL</b>                  |                   |                    |                | <b>\$270,020</b>   |
| 2011        | Public Works Equipment        | -                 | \$85,030           | Levy           | \$85,030           |
| 2011        | Seal-coating                  | -                 | \$36,045           | Levy           | \$36,045           |
| 2011        | Patching/filling              | -                 | \$20,000           | Levy           | \$20,000           |
| 2011        | Overlay                       | -                 | \$74,800           | Levy           | \$74,800           |
| 2011        | Ladder Truck                  | -                 | \$24,930           | Levy           | \$24,930           |
| 2011        | First Engine & Fire Rescue    | -                 | \$19,215           | Levy           | \$19,215           |
| 2011        | Community Park/Trail          | -                 | \$10,000           | Levy           | \$10,000           |
| <b>2011</b> | <b>TOTAL</b>                  |                   |                    |                | <b>\$270,020</b>   |
| 2012        | Public Works Equipment        | -                 | \$85,030           | Levy           | \$85,030           |
| 2012        | Grader                        | -                 | \$151,261          | Levy*          | -                  |
| 2012        | Plow Truck                    | -                 | \$135,000          | Levy*          | -                  |
| 2012        | Seal-coating                  | -                 | \$36,045           | Levy           | \$36,045           |
| 2012        | Patching/filling              | -                 | \$20,000           | Levy           | \$20,000           |
| 2012        | Overlay                       | -                 | \$74,800           | Levy           | \$74,800           |
| 2012        | Ladder Truck                  | -                 | \$24,930           | Levy           | \$24,930           |
| 2012        | First Engine & Fire Rescue    | -                 | \$19,215           | Levy           | \$19,215           |
| 2012        | Community Park/Trail          | -                 | \$10,000           | Levy           | \$10,000           |
| 2012        | Ground Storage Tank/Pumphouse | -                 | \$779,000          | Bond           | 779,000            |
| <b>2012</b> | <b>TOTAL</b>                  |                   |                    |                | <b>\$1,049,020</b> |
| 2013        | Public Works Equipment        | -                 | \$85,030           | Levy           | \$85,030           |
| 2013        | Ladder Truck                  | -                 | \$24,930           | Levy           | \$24,930           |
| 2013        | First Engine & Fire Rescue    | -                 | \$19,215           | Levy           | \$19,215           |
| 2013        | Seal-coating                  | -                 | \$36,045           | Levy           | \$36,045           |
| 2013        | Patching/filling              | -                 | \$20,000           | Levy           | \$20,000           |
| 2013        | Overlay                       | -                 | \$74,800           | Levy           | \$74,800           |
| 2013        | Community Park/Trail          | -                 | \$10,000           | Levy           | \$10,000           |
| <b>2013</b> | <b>TOTAL</b>                  |                   |                    |                | <b>\$270,020</b>   |
| 2014        | Public Works Equipment        | -                 | \$85,030           | Levy           | \$85,030           |
| 2014        | Ladder Truck                  | -                 | \$24,930           | Levy           | \$24,930           |
| 2014        | First Engine & Fire Rescue    | -                 | \$19,215           | Levy           | \$19,215           |
| 2014        | Seal-coating                  | -                 | \$36,045           | Levy           | \$36,045           |
| 2014        | Patching/filling              | -                 | \$20,000           | Levy           | \$20,000           |
| 2014        | Overlay                       | -                 | \$74,800           | Levy           | \$74,800           |
| 2014        | Community Park/Trail          | -                 | \$10,000           | Levy           | \$10,000           |
| <b>2014</b> | <b>TOTAL</b>                  |                   |                    |                | <b>\$270,020</b>   |

\* Part of average annual levy for all public works equipment  
 Note: Fire equipment costs vary with JPA-member allocation formula

# Lake Water Level Report

**Lake Name: Columbus**

**County: Anoka**

## Water Level Data

Period of record: 03/16/1990 to 03/16/1990  
# of readings: 1  
Highest recorded: 885.62 ft (03/16/1990)  
Lowest recorded: 885.62 ft (03/16/1990)  
Recorded range: 0 ft  
Last reading: 885.62 ft (03/16/1990)  
OHW elevation: 887.2 ft  
Datum: NGVD 29 (ft)

## Benchmarks

Elevation: 891.95 ft    Date Set: 03/06/1990  
Datum: NGVD 29 (ft)

**Benchmark Location**  
Township: 32 Range: 22 Section: 2

Description: 3/8 x 8" spike set at a 45 degree angle in the west root of a 1.9' oak, at the edge of a trail, 111' north of an iron pipe/signpost marked by an "Anoka County Surveyor" sign.

Elevation: 889.12 ft    Date Set: 03/06/1990  
Datum: NGVD 29 (ft)

**Benchmark Location**  
Township: 32 Range: 22 Section: 22

Description: A vertical 3/8" x 8" spike in the south root of a 1.0' Ash 6.5' West of Anoka Co. Survey Marker (iron pipe with marking sign).

# Lake Information Report

**Lake Name: Coon**

**County: Anoka**

Nearest Town: Soderville  
 Primary County: Anoka

Survey Date: 06/20/2005  
 Inventory Number: 02-0042-00

## Public Access Information

| Ownership     | Type     | Description   |
|---------------|----------|---|
| Minnesota DNR | Concrete | North shore west basin, off C.S.A.H. 22.                              |
| County        | Concrete | Concrete ramp in Anoka County Park, east shore east basin, by outlet. |
| County        | Earthen  | Dirt ramp off gravel road on south side of channel between basins.    |

## Lake Characteristics

Lake Area (acres): 1,259.20  
 Littoral Area (acres): 1,098.20  
 Maximum Depth (ft): 27.00  
 Water Clarity (ft): 7.75

Dominant Bottom Substrate: N/A  
 Abundance of Aquatic Plants: N/A  
 Maximum Depth of Plant Growth (ft): N/A

## Fish Sampled up to the 2005 Survey Year

| Species          | Gear Used | Number of fish per net |              | Average Fish Weight (lbs) | Normal Range (lbs) |
|------------------|-----------|------------------------|--------------|---------------------------|--------------------|
|                  |           | Caught                 | Normal Range |                           |                    |
| Black Bullhead   | Gill net  | 2.5                    | 1.0 - 38.0   | 0.75                      | 0.3 - 0.7          |
|                  | Trap net  | 0.7                    | 0.5 - 11.3   | 0.65                      | 0.3 - 0.8          |
| Black Crappie    | Gill net  | 2.2                    | 1.0 - 10.5   | 0.11                      | 0.2 - 0.3          |
|                  | Trap net  | 1.2                    | 0.7 - 4.3    | 0.14                      | 0.2 - 0.6          |
| Bluegill         | Gill net  | 8.7                    | N/A - N/A    | 0.09                      | N/A - N/A          |
|                  | Trap net  | 196.0                  | 4.0 - 28.1   | 0.12                      | 0.1 - 0.3          |
| Bowfin (Dogfish) | Trap net  | 0.7                    | 0.3 - 1.2    | 6.78                      | 3.3 - 5.5          |
| Brown Bullhead   | Trap net  | 0.2                    | 0.5 - 4.3    | 0.88                      | 0.5 - 0.9          |
| Common Carp      | Trap net  | 1.2                    | 0.3 - 1.5    | 4.57                      | 2.6 - 8.3          |
| Hybrid Sunfish   | Gill net  | 0.2                    | N/A - N/A    | 0.07                      | N/A - N/A          |
|                  | Trap net  | 3.0                    | N/A - N/A    | 0.13                      | N/A - N/A          |
| Largemouth Bass  | Gill net  | 0.3                    | 0.3 - 0.9    | 1.07                      | 0.6 - 1.5          |
|                  | Trap net  | 0.2                    | 0.2 - 0.6    | 4.02                      | 0.2 - 1.0          |

| LAKE NAME           |          | Meal Advice |            |      | Contaminants |
|---------------------|----------|-------------|------------|------|--------------|
| Northern Pike       | Gill net | 10.7        | 3.6 - 11.0 | 2.57 | 1.3 - 2.3    |
|                     | Trap net | 0.7         | N/A - N/A  | 3.02 | N/A - N/A    |
| Pumpkinseed Sunfish | Gill net | 3.7         | N/A - N/A  | 0.06 | N/A - N/A    |
|                     | Trap net | 6.5         | 1.5 - 6.8  | 0.13 | 0.1 - 0.3    |
| Smallmouth Bass     | Gill net | 0.2         | N/A - N/A  | 1.45 | N/A - N/A    |
| Walleye             | Gill net | 1.0         | 1.0 - 3.2  | 1.78 | 1.0 - 2.1    |
| White Sucker        | Gill net | 0.5         | 0.7 - 3.5  | 2.47 | 1.5 - 2.4    |
| Yellow Bullhead     | Gill net | 5.7         | 0.6 - 7.0  | 0.50 | 0.3 - 0.7    |
|                     | Trap net | 8.2         | 1.4 - 5.0  | 0.43 | 0.4 - 0.8    |
| Yellow Perch        | Gill net | 1.2         | 3.8 - 22.8 | 0.07 | 0.1 - 0.2    |

*Normal Ranges represent typical catches for lakes with similar physical and chemical characteristics.*

## Length of Selected Species Sampled for All Gear for the 2005 Survey Year

| Species             | Number of fish caught in each category (inches) |     |      |       |       |       |       |     | Total |
|---------------------|---|-----|------|-------|-------|-------|-------|-----|-------|
|                     | 0-5   | 6-8 | 9-11 | 12-14 | 15-19 | 20-24 | 25-29 | >29 |       |
| Black Bullhead      | 0   | 0   | 18   | 1     | 0     | 0     | 0     | 0   | 19    |
| Black Crappie       | 4   | 16  | 0    | 0     | 0     | 0     | 0     | 0   | 20    |
| Bluegill            | 110   | 71  | 0    | 0     | 0     | 0     | 0     | 0   | 181   |
| Brown Bullhead      | 0   | 0   | 0    | 1     | 0     | 0     | 0     | 0   | 1     |
| Hybrid Sunfish      | 12  | 7   | 0    | 0     | 0     | 0     | 0     | 0   | 19    |
| Largemouth Bass     | 0   | 0   | 1    | 1     | 1     | 0     | 0     | 0   | 3     |
| Northern Pike       | 0   | 0   | 0    | 0     | 14    | 40    | 10    | 4   | 68    |
| Pumpkinseed Sunfish | 47  | 14  | 0    | 0     | 0     | 0     | 0     | 0   | 61    |
| Smallmouth Bass     | 0   | 0   | 0    | 1     | 0     | 0     | 0     | 0   | 1     |
| Walleye             | 0   | 0   | 0    | 2     | 4     | 0     | 0     | 0   | 6     |
| Yellow Bullhead     | 1   | 38  | 37   | 7     | 0     | 0     | 0     | 0   | 83    |
| Yellow Perch        | 7   | 0   | 0    | 1     | 0     | 0     | 0     | 0   | 7     |

## Fish Consumption Advisory

These fish consumption guidelines help people make choices about which fish to eat and how often. Following the guidelines enables people to reduce their exposure to contaminants while still enjoying the many benefits from fish.

**Pregnant Women, Women who may become pregnant and Children under age 15**

|                                |                  | Unrestricted | 1 meal/week | 1 meal/month | Do not eat |         |
|--------------------------------|------------------|--------------|-------------|--------------|------------|---------|
| COON<br>Anoka Co.,<br>02004200 | Bluegill Sunfish |              | All sizes   |              |            | Mercury |
|                                | Bullhead         |              | All sizes   |              |            | Mercury |
|                                | Northern Pike    |              | All sizes   |              |            | Mercury |
|                                | White Sucker     | All sizes    |             |              |            |         |

### General Population

| LAKE NAME<br>County,<br>DOWID  | Species          | Meal Advice  |             |              |            | Contaminants |
|--------------------------------|------------------|--------------|-------------|--------------|------------|--------------|
|                                |                  | Unrestricted | 1 meal/week | 1 meal/month | Do not eat |              |
| COON<br>Anoka Co.,<br>02004200 | Bluegill Sunfish | All sizes    |             |              |            |              |
|                                | Bullhead         | All sizes    |             |              |            |              |
|                                | Northern Pike    |              | All sizes   |              |            | Mercury      |
|                                | White Sucker     | All sizes    |             |              |            |              |

DOWID - MN DNR, Division of Waters' lake ID number.

Contaminants listed were measured at levels high enough to warrant a recommendation to limit consumption. Listing of consumption guidelines do not imply the fish are legal to keep, MN DNR fishing regulations should be consulted.

### Status of the Fishery (as of 06/20/2005)

Coon Lake has a typical Northern Pike-Bluegill-Largemouth Bass population structure. Past attempts to introduce Walleye into the system through fry stocking yielded poor results and were discontinued. Walleye yearlings were purchased and stocked under DNR permit in 2004 by the local lake association. Northern Pike were sampled in relatively high numbers for abundance in gill nets. Sampled Northern Pike ranged from 15.3"-32.3" in length with the average fish being 22.3" and 2.6 pounds. Approximately 5% of all Northern Pike captured measured 30" or longer. The 2001 year class made up the majority of the Northern Pike captured. Yellow Perch were sampled in very low numbers. Their abundance has declined significantly since 1993. Bluegill were sampled in the highest abundance recorded for this lake since 1983. The average size of Bluegill sampled was 5.75 inches and 0.125 pounds. Approximately 6% of the Bluegills captured measured 7.0" or larger. The Black Crappie population continues to show signs of decline. The catch rate for Black Crappie in 2005 is the lowest ever observed for this lake. The average Black Crappie sampled was 6.4" and 0.122 pounds. Largemouth Bass were sampled in adequate numbers for all sampling gears. Although the majority of Largemouth Bass sampled averaged small in size, a 19.1" fish weighing 4.0 pounds was captured in a trap net. A 13.8" Smallmouth Bass weighing 1.45 pounds was captured and a second adult was sighted during this assessment. This is the first time Smallmouth Bass have ever been captured during fisheries assessments of this lake.

# Lake Water Level Report

## Lake name: Coon

### Water Level Data

Period of record: 03/30/1938 to 10/04/2008

# of readings: 1528

Highest recorded: 905.11 ft (05/16/1986)

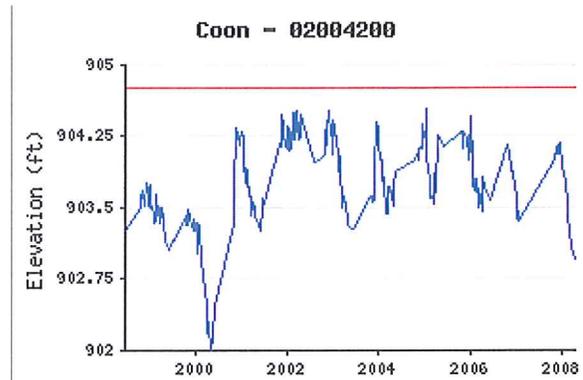
Lowest recorded: 900.27 ft (09/22/1988)

Recorded range: 4.84 ft

Last reading: 902.95 ft (10/04/2008)

OHW elevation: 904.75 ft

Datum: NGVD 29 (ft)



### Benchmarks

Elevation: 907.73 ft      Date Set: 09/18/1996  
Datum: NGVD 29 (ft)

#### Benchmark Location

Township: 33 Range: 23 Section: 25

Description: Found 2008. At the public access in Thielen park on the north side of lake, a 60d spike .08' above ground in the west side of a light pole 10' west of curb of oval island, 4' north of wood enclosure for portable toilet.

Elevation: 907.06 ft      Date Set: 01/06/2000  
Datum: NGVD 29 (ft)

#### Benchmark Location

Township: 33 Range: 23 Section: 27

Description: At 90 degree bend in driveway near south 1/16 corner between sections 27 and 28.

A horizontal 60d spike 1.3' above ground in the north side of a 0.9' aspen, 12' SW of edge of gravel driveway near center outside of bend in drive.

Elevation: 908.79 ft      Date Set: 01/06/2000  
Datum: NGVD 29 (ft)

#### Benchmark Location

Township: 33 Range: 23 Section: 28

Description: At Co.Ditch 38 crossing under Greenbrook Drive. On PK nail in centerline of Greenbrook Drive over 36" CMP.

# Lake Information Report

**Lake Name: Crossways**

**County: Anoka**

Nearest Town: Centerville  
Primary County: Anoka

Survey Date: 06/30/1950  
Inventory Number: 02-0019-00

## Public Access Information

No designated public access

## Lake Characteristics

Lake Area (acres): 365.00  
Littoral Area (acres): 365.00  
Maximum Depth (ft): 9.00  
Water Clarity (ft): N/A

Dominant Bottom Substrate: N/A  
Abundance of Aquatic Plants: N/A  
Maximum Depth of Plant Growth (ft): N/A

## Fish Consumption Guidelines

No fish consumption guidelines are available for this lake. For more information, see the "Fish Consumption Advice" pages at the Minnesota Department of Health.

# Lake Water Level Report

**Lake Name: Crossways**

## Water Level Data

Period of record: 02/07/1995 to 02/07/1995

# of readings: 1

Highest recorded: 887.62 ft (02/07/1995)

Highest known: 888.4 ft

Lowest recorded: 887.62 ft (02/07/1995)

Recorded range: 0 ft

Last reading: 887.62 ft (02/07/1995)

OHW elevation: 888.5 ft

Datum: NGVD 29 (ft)

## Benchmarks

Elevation: 901.91 ft      Date Set: 02/07/1995

Datum: NGVD 29 (ft)

|                           |
|---------------------------|
| <b>Benchmark Location</b> |
|---------------------------|

|                                    |
|------------------------------------|
| Township: 32 Range: 22 Section: 22 |
|------------------------------------|

Description: Horizontal 60d spike 1.0' above ground in the west side of a power pole with transformer, 25' east of Crossways Lake Drive at Se corner of Sec. 2.

Elevation: 892.02 ft      Date Set: 02/08/1995

Datum: NGVD 29 (ft)

|                           |
|---------------------------|
| <b>Benchmark Location</b> |
|---------------------------|

|                                    |
|------------------------------------|
| Township: 32 Range: 22 Section: 27 |
|------------------------------------|

Description: On east side of lake at lakeside of house #14538 (Anderson). Horizontal 3/8 x 8" spike (bent slightly downward) 1.2' above ground in the SE side of a 0.9' aspen, at the south side of a trail to the lake from a horse pen and 21' W-SW of a gate at the west side of the horse pen, tree is leaning and slightly twisted and is the only aspen at this location.

# Lake Information Report

**Name: Howard**

**County: Anoka**

Nearest Town: Forest Lake  
Primary County: Anoka

Survey Date: 09/18/1962  
Inventory Number: 02-0016-00

## Public Access Information

| Ownership     | Type     | Description                                |
|---------------|----------|--|
| Minnesota DNR | Carry-in | Carry-in access located at outlet of lake. |

## Lake Characteristics

Lake Area (acres): 488.00  
Littoral Area (acres): 488.00  
Maximum Depth (ft): 6.50  
Water Clarity (ft): N/A

Dominant Bottom Substrate: N/A  
Abundance of Aquatic Plants: N/A  
Maximum Depth of Plant Growth (ft): N/A

## Fish Sampled for the 1962 Survey Year

| Species             | Gear Used | Number of fish per net |              | Average Fish Weight (lbs) | Normal Range (lbs) |
|---------------------|-----------|------------------------|--------------|---------------------------|--------------------|
|                     |           | Caught                 | Normal Range |                           |                    |
| Yellow Perch        | Trap net  | 0.6                    | 0.3 - 3.8    | 0.10                      | 0.1 - 0.3          |
| White Crappie       | Trap net  | 1.4                    | 0.3 - 6.0    | 0.27                      | 0.3 - 0.6          |
| Pumpkinseed Sunfish | Trap net  | 0.2                    | 0.3 - 4.9    | 0.10                      | 0.1 - 0.2          |
| Northern Pike       | Trap net  | 0.2                    | N/A - N/A    | 0.50                      | N/A - N/A          |
| Golden Shiner       | Trap net  | 0.8                    | 0.2 - 1.1    | 0.10                      | 0.1 - 0.1          |
| Common Carp         | Trap net  | 12.6                   | 1.0 - 5.5    | 0.80                      | 1.4 - 4.6          |
| Brown Bullhead      | Trap net  | 0.2                    | 0.4 - 4.5    | 0.30                      | 0.2 - 0.7          |
| Black Crappie       | Trap net  | 13.4                   | 1.2 - 20.5   | 0.20                      | 0.2 - 0.5          |
| Black Bullhead      | Trap net  | 45.4                   | 11.5 - 132.6 | 0.16                      | 0.2 - 0.4          |

*Normal Ranges represent typical catches for lakes with similar physical and chemical characteristics.*

## Fish Stocked by Species for the Last Five Years

| Year | Species       | Age        | Number  |
|------|---------------|------------|---------|
| 2004 | Northern Pike | Adult      | 251     |
|      | Northern Pike | Fingerling | 2,847   |
| 2005 | Northern Pike | Adult      | 504     |
|      | Northern Pike | Fry        | 112,191 |

## Fish Consumption Advisory

No fish consumption information is available for this lake. For more information, see the "Fish Consumption Advice" pages at the Minnesota Department of Health.

## Status of the Fishery (as of 08/10/1993)

STATUS OF FISHERY: The fish population of this lake is dominated by small crappie and small bluegill. Less than 1% of the crappie sampled and none of the bluegill sampled were large enough for most anglers to keep. Two sub-legal hybrid muskie and two larger northern pike, believed to be migrants from Lake Elmo, were taken during this investigation. Local reports indicate that 30 to 40 inch hybrid muskie are caught quite readily in this lake. The lack of public access and suitable parking area are major limiting factors to fishing on this lake.

# Lake Water Level Report

Lake Name: Howard

## Water Level Data

Period of record: 11/04/1987 to 07/31/2008

# of readings: 514

Highest recorded: 889.36 ft (07/10/1993)

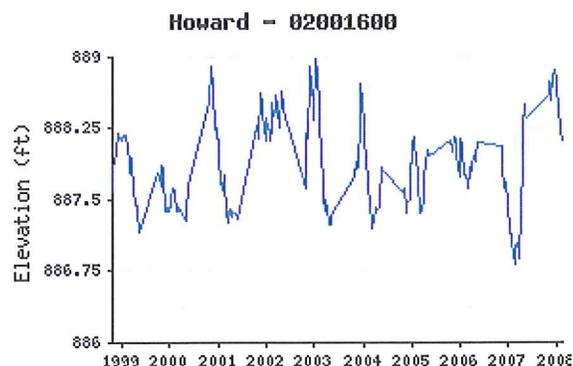
Lowest recorded: 886.81 ft (08/10/2007)

Recorded range: 2.55 ft

Last reading: 888.11 ft (07/31/2008)

OHW elevation: N/A

Datum: (ft)



## Benchmarks

Elevation: 891.93  
(ft)

Date Set:  
07/23/1990

Datum: NGVD 29  
(ft)

### Benchmark Location

Township: 32 Range: 22 Section: 14

Description: 60d spike in landside root of two trunk willow on top of low bank at gage site at end of trail to lake from senior citizens building on NW side of lake.

Elevation: 891.49  
ft

Date Set:  
04/15/2003

Datum: NGVD 29  
(ft)

### Benchmark Location

Township: 32 Range: 22 Section: 23

Description: At the outlet on the southeast side of lake, a rail spike in the west root of a 1.8' basswood, 5' west of the trail from the parking area to the boardwalk near the outlet and about 50' south of the south end of the boardwalk.

Elevation: 892.48  
ft

Date Set:  
12/09/1987

Datum: NGVD 29  
(ft)

### Benchmark Location

Township: 32 Range: 22 Section: 23

Description: Brass Marker set in the top downstream headwall of 6'x10' box culvert in Howard Lake outlet (Rice Creek) at Anoka County Hwy. 23

# Lake Information Report

**Name: Little Coon**

**County: Anoka**

Nearest Town: Soderville  
Primary County: Anoka

Survey Date: 07/20/1956  
Inventory Number: 02-0032-00

## Public Access Information

Public access is restricted Avery Refuge.

## Lake Characteristics

Lake Area (acres): 107.00  
Littoral Area (acres): N/A  
Maximum Depth (ft): 4.00  
Water Clarity (ft): N/A

Dominant Bottom Substrate: N/A  
Abundance of Aquatic Plants: N/A  
Maximum Depth of Plant Growth (ft): N/A

## Fish Consumption Advisory

No fish consumption information is available for this lake. For more information, see the "Fish Consumption Advice" pages at the Minnesota Department of Health.

# Lake Information Report

**Name: Mud**

**County: Washington**

Nearest Town: Forest Lake  
Primary County: Washington

Survey Date: 04/05/1999  
Inventory Number: 82-0168-00

## Lake Characteristics

Lake Area (acres): 187.00  
Littoral Area (acres): 187.00  
Maximum Depth (ft): 4.00  
Water Clarity (ft): N/A

Dominant Bottom Substrate: N/A  
Abundance of Aquatic Plants: N/A  
Maximum Depth of Plant Growth (ft): N/A

## Fish Consumption Advisory

No fish consumption information is available for this lake. For more information, see the "Fish Consumption Advice" pages at the Minnesota Department of Health.

## Status of the Fishery (as of 04/05/1999)

Bullhead species dominated the trapnet catch. Most were black bullhead, followed in abundance by yellow bullhead and then brown bullhead. The three bullhead species made up 82.2% of the fish caught, yellow perch 10.7%, black crappie 3.0%, and northern pike 2.3%. The remaining 1.8% was made up of bluegill, carp, pumpkinseed sunfish, tadpole madtom, and white sucker.

# Lake Water Level Report

**Lake Name: Mud**

## Water Level Data

Period of record: 11/04/1987 to 07/31/2002

# of readings: 50

Highest recorded: 889.05 ft (04/27/1999)

Lowest recorded: 887.11 ft (10/12/1999)

Recorded range: 1.94 ft

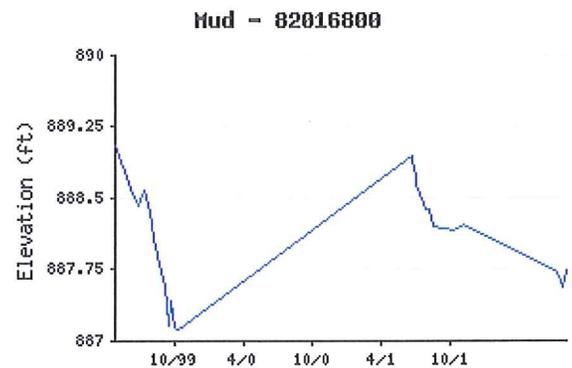
Last reading: 887.73 ft (07/31/2002)

OHW elevation: N/A

Datum: (ft)

## Benchmarks

No benchmark information available.



# Lake Information Report

**Name: Rondeau**

**County: Anoka**

Nearest Town: Centerville  
Primary County: Anoka

Survey Date: 06/28/1950  
Inventory Number: 02-0015-00

## Public Access Information

No designated public access. Possible from outlet ditch on E side.

## Lake Characteristics

Lake Area (acres): 275.00

Littoral Area (acres): 275.00

Maximum Depth (ft): 7.00

Water Clarity (ft): N/A

Dominant Bottom Substrate: N/A

Abundance of Aquatic Plants: N/A

Maximum Depth of Plant Growth (ft): N/A

## Fish Consumption Advisory

No fish consumption information is available for this lake. For more information, see the "Fish Consumption Advice" pages at the Minnesota Department of Health.

## Status of the Fishery (as of 06/28/1950)

A limited number of northern pike are believed to be present in Rondeau lake. Carp and bullheads are also present but their numbers are probably controlled by winter-kills which occur quite frequently.

# Lake Water Level Report

**Lake Name: Rondeau**

## Water Level Data

Period of record: 05/22/1986 to 05/14/2008

# of readings: 459

Highest recorded: 887.17 ft (07/02/1993)

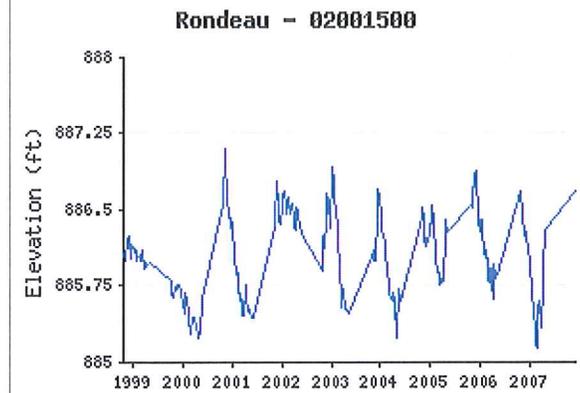
Lowest recorded: 885.13 ft (08/07/2007)

Recorded range: 2.04 ft

Last reading: 886.68 ft (05/14/2008)

OHW elevation: N/A

Datum: (ft)



## Benchmarks

Elevation: 888.57 ft

Date Set: 06/08/1992

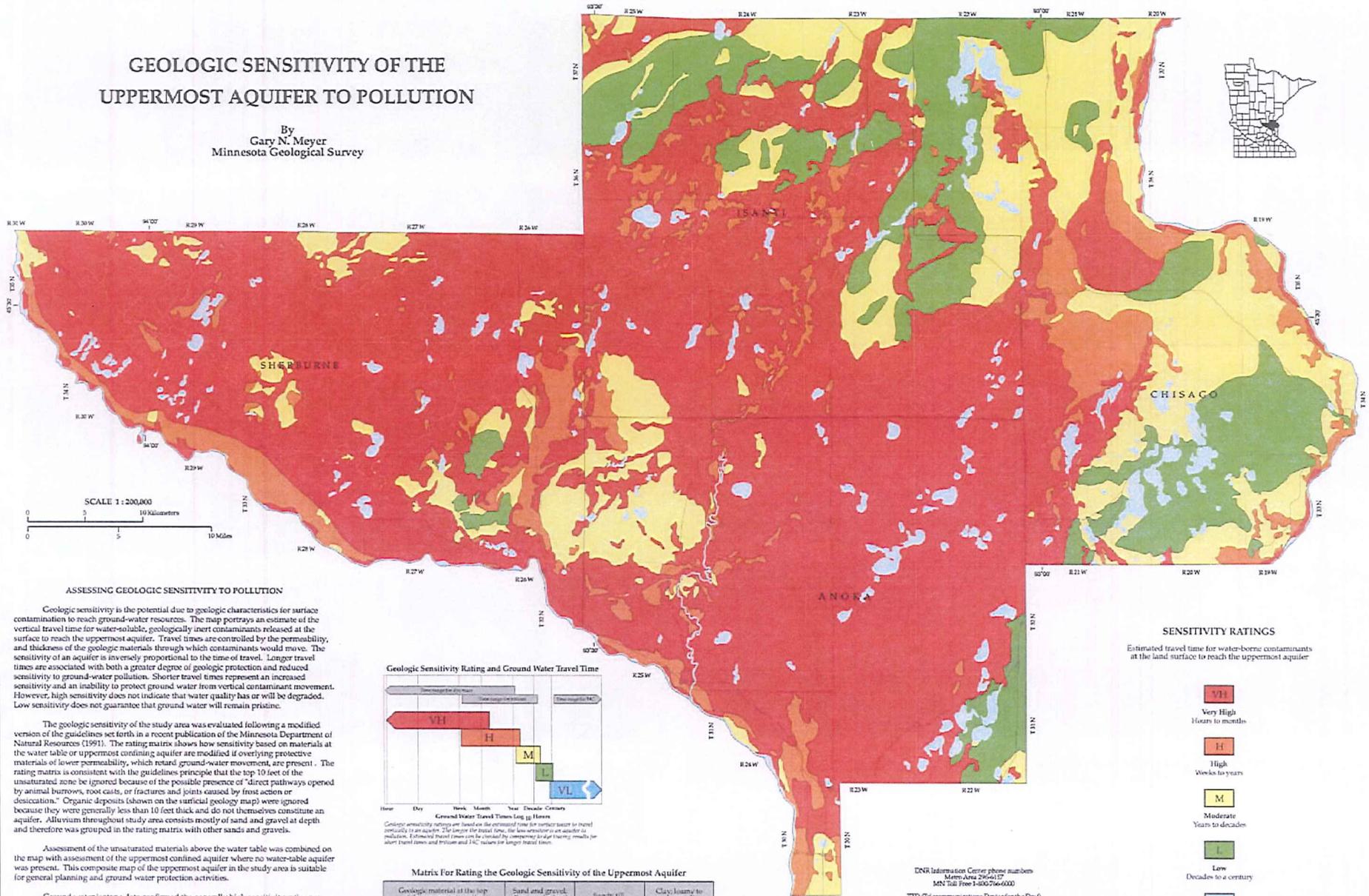
Datum: NGVD 29 (ft)

**Benchmark Location**  
Township: 31 Range: 22 Section: 2

Description: Top left end of right abutment of outlet dam on east side side of lake.

# GEOLOGIC SENSITIVITY OF THE UPPERMOST AQUIFER TO POLLUTION

By  
Gary N. Meyer  
Minnesota Geological Survey



### ASSESSING GEOLOGIC SENSITIVITY TO POLLUTION

Geologic sensitivity is the potential due to geologic characteristics for surface contamination to reach ground-water resources. The map portrays an estimate of the vertical travel time for water-soluble, geologically inert contaminants released at the surface to reach the uppermost aquifer. Travel times are controlled by the permeability, and thickness of the geologic materials through which contaminants would move. The sensitivity of an aquifer is inversely proportional to the time of travel. Longer travel times are associated with both a greater degree of geologic protection and reduced sensitivity to ground-water pollution. Shorter travel times represent an increased sensitivity and an inability to protect ground water from vertical contaminant movement. However, high sensitivity does not indicate that water quality has or will be degraded. Low sensitivity does not guarantee that ground water will remain pristine.

The geologic sensitivity of the study area was evaluated following a modified version of the guidelines set forth in a recent publication of the Minnesota Department of Natural Resources (1991). The rating matrix shows how sensitivity based on materials at the water table or uppermost confining aquifer are modified if overlying protective materials of lower permeability, which retard ground-water movement, are present. The rating matrix is consistent with the guidelines principle that the top 10 feet of the unsaturated zone be ignored because of the possible presence of "direct pathways opened by animal burrows, root casts, or fractures and joints caused by frost action or desiccation." Organic deposits (shown on the surficial geology map) were ignored because they were generally less than 10 feet thick and do not themselves constitute an aquifer. Alluvium throughout study area consists mostly of sand and gravel at depth and therefore was grouped in the rating matrix with other sands and gravels.

Assessment of the unsaturated materials above the water table was combined on the map with assessment of the uppermost confined aquifer where no water-table aquifer was present. This composite map of the uppermost aquifer in the study area is suitable for general planning and ground-water protection activities.

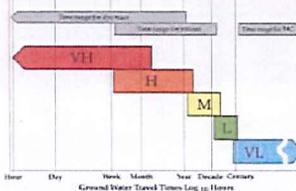
Ground water isotope data confirmed the generally high sensitivity ratings as discussed on Plate 2, Water-Table Hydrogeology. The presence of tritium in all sampled wells less than 131 feet deep confirmed ground-water recharge times of less than a decade or two and sensitivity ratings of High to Very High.

The geologic sensitivity of the uppermost aquifer in the Anoka Sand Plain study area is generally Very High in Anoka, Isanti and Sherburne Counties. Isanti County has significant areas of Moderate to Low sensitivity in the east-central and northern part of the county, reflecting the lower permeability of surficial till deposits. Chicago County has the greatest extent of Moderate and Low sensitivity areas, again reflecting the greater occurrence of lower permeability materials at or near the surface.

### REFERENCE CITED

Geologic Sensitivity Workgroup, 1991. Criteria and guidelines for assessing geologic sensitivity of ground water resources in Minnesota: Minnesota Department of Natural Resources, Division of Waters, St. Paul, 122 p.

### Geologic Sensitivity Rating and Ground Water Travel Time



Geologic sensitivity ratings are based on the estimated time for surface water to travel vertically to an aquifer. The longer the travel time, the less sensitive is an aquifer to pollution. Estimated travel times can be modified by competency to alter travel results for short travel times and tritium and <sup>3</sup>H<sub>2</sub> ratios for longer travel times.

### Matrix For Rating the Geologic Sensitivity of the Uppermost Aquifer

| Geologic material at the top of the uppermost aquifer    | Sand and gravel, alluvium, bedrock |     | Sandy till |     | Clay, loamy to clayey till |     |
|--|------------------------------------|-----|------------|-----|----------------------------|-----|
|  | <20                                | >20 | <20        | >20 | <20                        | >20 |
| No sandy till, clay, or loamy to clayey till             | VH                                 | H   | VH         | H   | VH                         | H   |
| Sandy till, clay, or loamy to clayey till <10 feet thick | VH                                 | H   | VH         | H   | M                          | M   |
| Sandy till >10 feet thick                                | -                                  | M   | M          | M   | M                          | M   |
| Clay or loamy to clayey till >10 feet thick              | -                                  | L   | L          | L   | L                          | L   |

### SENSITIVITY RATINGS

Estimated travel time for water-borne contaminants at the land surface to reach the uppermost aquifer

- VH  
Very High  
Hours to months
- H  
High  
Weeks to years
- M  
Moderate  
Years to decades
- L  
Low  
Decades to a century
- Water  
Unrated

DNR Information Center phone numbers  
Minn. Area 256-6117  
MN Toll Free 1-800-766-6000  
TTD (Telecommunications Device for the Deaf)  
Minn. Area 256-5444  
MN Toll Free 1-800-647-5929

This information is available in an alternative format upon request. Funding for this project approved by the Minnesota Legislature ML 1991, Chapter 254, Art. 1, Sec. 14, Subd. 40, as recommended by the Legislative Commission on Minnesota Resources from the Minnesota Environment and the Natural Resources Trust Fund.

The map was compiled and generated using geographic information system (GIS) technology. Digital cartography by Jerry Minnis, cartographic design and digital layout by Steve Dabman. Digital data products are available upon request.

Map products were prepared from publicly available information only. The Department of Natural Resources does not warrant the accuracy, completeness, or any implied uses of these data. Users may wish to verify critical information sources include both the references listed here and information on file at the offices of the Minnesota Geological Survey in St. Paul. In addition, every effort has been made to ensure that the interpretation conforms to sound geologic and cartographic practices. This map should not be used to establish legal title, boundaries, or locations of improvements.

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Minnesota  
Pollution  
Control  
Agency

# Hardwood Creek Total Maximum Daily Load

## Impaired Biota (Fish) and Low Dissolved Oxygen

Water Quality/Impaired Water #8.15a • February 2009

**T**he list of impaired waters developed by the Minnesota Pollution Control Agency (MPCA) includes Hardwood Creek, located in the Rice Creek watershed in Washington and Anoka counties. Hardwood Creek is listed as impaired for biota (fish) on the lower portion of the creek (downstream of Highway 61), and low dissolved oxygen (DO) for the full length of the creek. The natural background level of DO is used as the water quality endpoint above Highway 61 due to naturally low oxygen levels occurring in that wetland-dominated part of the watershed.

A Total Maximum Daily Load (TMDL) study began in 2004 and addresses the impairments on Hardwood Creek. The TMDL is a collaborative effort between the MPCA and Rice Creek Watershed District. The technical lead under contract has been Emmons and Olivier Resources, Inc.

### Description of water body

The upper two-thirds of Hardwood Creek is also known as Washington County Judicial Ditch #2 and originates south of Rice Lake. The watershed is predominantly made up of agricultural or undeveloped land.

### Water quality impairments

A stream listed for “impaired biota (fish)” means that the stream is not supporting an appropriate quantity and/or diversity of native fish. Through a stressor identification process, the primary causes of the impairment in the creek were identified. In this case, excess sedimentation and low DO were identified as the primary causes. The TMDL for the biological impairment is based on total suspended solids (TSS) loads, which address sedimentation. Various candidate mechanisms affecting DO were identified and ultimately may all play a role in DO levels to varying degrees. However, the low DO TMDL focuses on biochemical oxygen demand (BOD) loading, which was identified as a significant stressor during 2004. BOD is a measure of oxygen-consuming organic matter additions to the water body (e.g., manure, top soil, leaves, etc.).



This study used a variety of methods to evaluate the current loading, contributions by the various pollutant sources, as well as the allowable pollutant loading capacity of the creek. It is estimated that the average TSS concentration will need to be decreased approximately 14 percent, and the average BOD concentration will need to be decreased approximately 30 percent.

### **Implementation strategies**

Needed loading reductions from regulated urban stormwater runoff sources will be achieved through updating stormwater pollution prevention programs. Implementation of nonpoint source reduction may be achieved through nonregulatory and voluntary incentive programs. A variety of mechanisms, such as stream bank stabilization, enhancement of riparian buffers, livestock management, stormwater management, and cost share best management programs will be evaluated and used

to achieve needed loading reductions. Development of a more specific implementation plan will follow U.S. Environmental Protection Agency approval of the TMDL study.

### **More information**

For more information on this TMDL project contact:

MPCA, St. Paul, 651-296-6300 or 800-657-3864

Matt Kocian, Rice Creek Watershed District,  
763-398-3075

The draft TMDL report will be available on the Web at:  
[www.pca.state.mn.us/water/tmdl/tmdl-draft.html](http://www.pca.state.mn.us/water/tmdl/tmdl-draft.html).

General information on TMDLs can be found on the Web at: [www.pca.state.mn.us/water/tmdl/](http://www.pca.state.mn.us/water/tmdl/) and [www.epa.gov/owow/tmdl/](http://www.epa.gov/owow/tmdl/).



# Minnesota Pollution Control Agency

# Draft Statewide Mercury TMDL Study

Impaired Waters fact sheet 4-01a, August 2006

## Contents

- Minnesota's impaired waters..... 1
- Why is mercury a problem? ..... 1
- Minnesota's regional approach to the mercury TMDL ..... 1
- Water quality standards for mercury ..... 2
- Source assessment and reduction allocation ... 2
- MPCA is responding to comments and making the TMDL final..... 2

## Minnesota's impaired waters

The federal Clean Water Act requires the states to develop water-quality standards to protect the designated uses of their waters, and to monitor their waters to ensure they meet the standards.

Surface waters not meeting the standards are "impaired" for the pollutants and are listed by the states as impaired waters. For each impairment, the act requires a pollutant-loading study called a Total Maximum Daily Load, or TMDL.

The 2006 Impaired Waters list of the Minnesota Pollution Control Agency (MPCA) shows 1,312 mercury impairments, including 442 impairments on rivers and 870 impairments on lakes.

The state is responsible for the development of TMDLs, and this fact sheet describes Minnesota's approach to TMDLs for mercury.

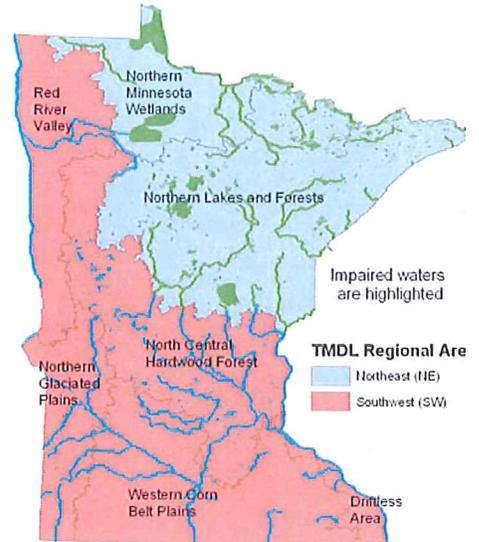
The MPCA has prepared a draft statewide TMDL study for mercury for review and approval by the U.S. Environmental Protection Agency (EPA). The document describes the impairment, its sources, and a pollution-reduction goal that will enable the impaired water bodies covered by the TMDL to meet standards.

## Why is mercury a problem?

Excess mercury in fish can cause serious human health problems. According to the Minnesota Department of Health's Fish Consumption Advisory program, "Young children, developing fetuses and breast-fed babies are at most risk, because small amounts of mercury can damage a brain that is just starting to form or grow. Too much mercury may affect a child's

behavior and lead to learning problems later in life."

2006 Minnesota Regional Mercury TMDLs



## Minnesota's regional approach to the mercury TMDL

The mercury in Minnesota's fish comes almost entirely from atmospheric deposition, with approximately 90 percent originating outside the state. Sources are both anthropogenic (from human activities) and natural, with the former about double the latter.

Mercury moves from the air into fish in complex ways. Northern wetland-dominated aquatic systems tend to have fish-tissue values averaging about 50 percent higher than the rest of the state. As a result, the MPCA has divided the state into two regions, based on ecoregions. The northeast (NE) region comprises the Northern Lakes and Forests ecoregion and the Northern Minnesota Wetlands ecoregion. The rest of the state, called the southwest (SW) region for this project,

comprises the North Central Hardwood Forest ecoregion, the Red River Valley ecoregion, the Western Corn Belt Plains ecoregion, and the Driftless area.

Because so much of the excess mercury comes from outside the state and because atmospheric deposition is relatively uniform across the state, the MPCA has chosen a regional approach to developing the required pollution-reduction goals for mercury.

### **Water-quality standards for mercury**

Three water-quality standards are involved:

- the statewide fish-tissue criterion of 0.2 milligrams mercury per kilogram (mg/kg),
- the Lake Superior Basin water-column standard of 1.3 nanograms per liter (ng/l), and
- the non-Lake Superior Basin water-column standard of 6.9 ng/l.

Because mercury accumulates as it moves up the biological food web, when the mercury content of top predator fish such as northern pike and walleye meets the standard, so will the rest of the food web and the water column.

Using 1990 as the baseline, the 90<sup>th</sup> percentile mercury concentration in a standard-length walleye was 0.57 mg/kg in the NE region and 0.41 mg/kg in the SW region. To achieve the numeric target, 0.2 mg/kg, mercury levels must drop 65 percent in the NE region and 51 percent in the SW region.

### **Source assessment and reduction allocation**

About 30 percent of the mercury deposited by air in Minnesota originates from natural sources, such as volcanoes. About 60 percent comes from human activities outside the state, such as coal-fired power plants and mining. The remaining 10 percent originates in the state.

Since natural sources are not controllable, the 65 percent reduction must come from the 70 percent of mercury deposition that is from anthropogenic sources, which translates to a 93 percent reduction goal for anthropogenic sources from 1990 levels. This mercury emissions goal is driven by the greater reduction needed in the NE region because air deposition is relatively uniform across the state.

Given Minnesota sources contribute only 10 percent of the mercury deposition, the state's share of the allocated

reduction is also relatively small. Taking that a 10 percent share of the 70 percent that is controllable (10 percent divided by 70 percent of the total) means the state share is 14 percent of emissions; and the non-state share is 86 percent of emissions. Thus, the federal government and international sources will have an 86 percent share of the mercury-reduction goal.

Since 1990, Minnesota has substantially reduced mercury releases to the environment, especially from manufactured products. As of 2005, the MPCA estimates that air emissions in the state have declined by 70 percent, to about 3,341 pounds (lb.) per year. To reach the 93 percent reduction goal established in the draft TMDL, sources in the state will need to reduce annual emissions by an additional 2,552 lb. When the goal is met, Minnesota sources will have reduced annual emissions to 789 lb.

Because wastewater point sources of mercury are less than one-half of 1 percent (0.5%) of total mercury deposition in the state, there is a small reserve capacity for water dischargers, but not air sources of mercury.

### **MPCA is responding to comments and making the TMDL final.**

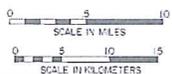
The MPCA requested comments on its Draft Mercury TMDL during a formal, 90-day comment period that ended in October 2005. The MPCA responded to the 973 comments it received, and prepared a final draft TMDL. With the MPCA Citizens' Board's approval of the final draft TMDL in July 2006, the MPCA will continue the process of developing an implementation plan for meeting the reduction goal established by the TMDL.

To be covered in the Mercury TMDL, water bodies must meet water-quality standards after the mercury-reduction goals are achieved. Of the impairments on the 2006 list, 334 lake impairments and 178 river impairments meet the requirement and are included in the final draft TMDL.

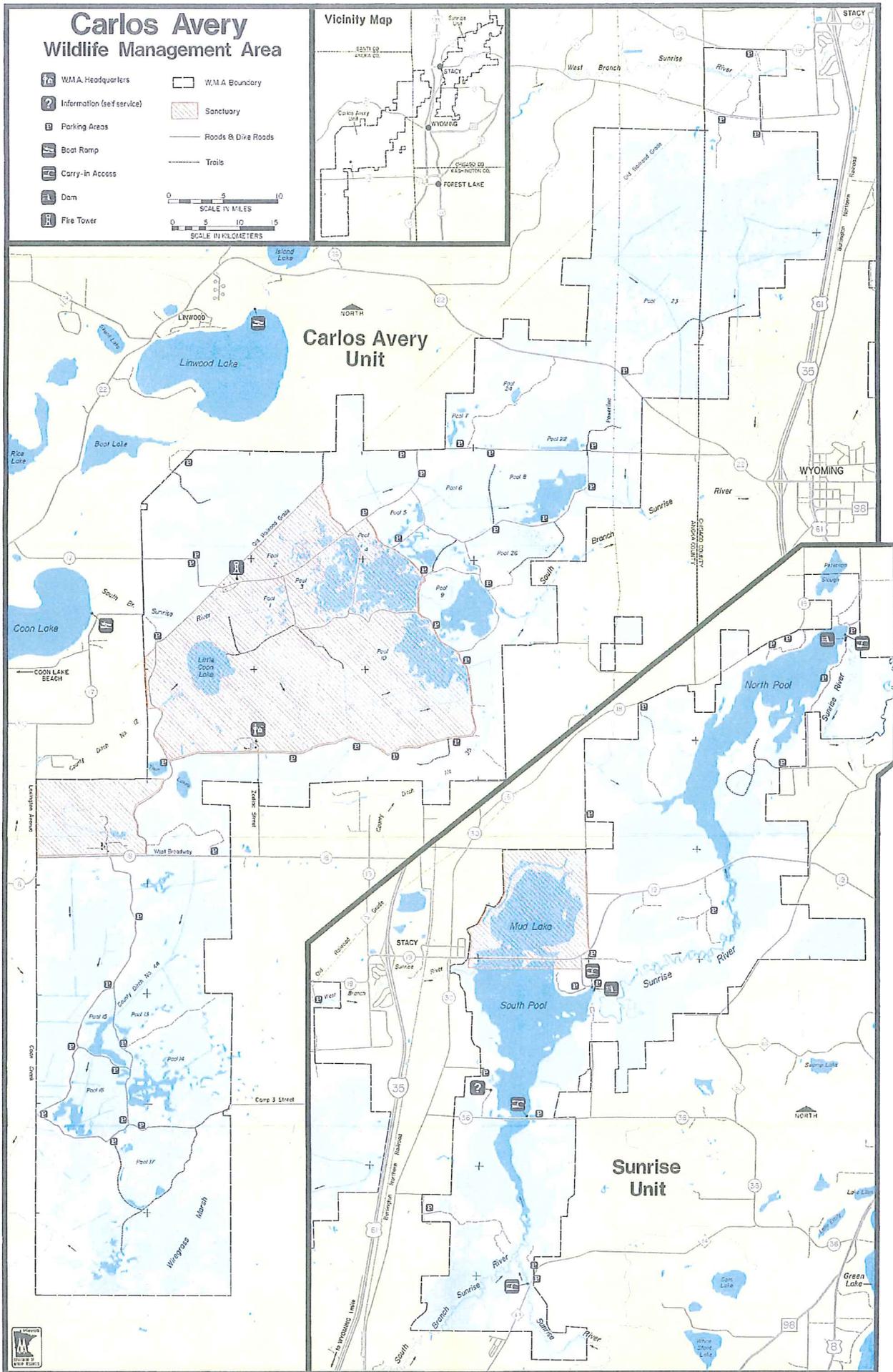
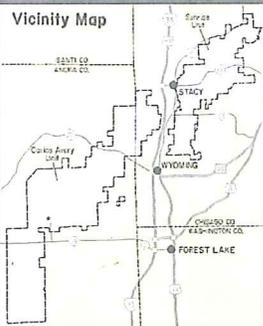
**For more information** about the statewide mercury TMDL study, call Howard Markus at (651) 296-7295 or (800) 657-3864. The draft mercury TMDL may be seen on the MPCA's Web site at [www.pca.state.mn.us/water/tmdl/index.html#drafttmdl](http://www.pca.state.mn.us/water/tmdl/index.html#drafttmdl).

# Carlos Avery Wildlife Management Area

- WMA Headquarters
- Information (self service)
- Parking Areas
- Boat Ramp
- Carry-in Access
- Dam
- Fire Tower
- W.M.A. Boundary
- Sanctuary
- Roads & Dike Roads
- Trails



## Vicinity Map



# CARLOS AVERY

## Wildlife Management Area

Minnesota Department  
of Natural Resources

This information is available in  
alternative format upon request.



Printed on recycled paper with a minimum  
of 50% post-consumer material.



The 23,000 acre Carlos Avery Wildlife Management Area is located 30 miles north of the Twin Cities near Forest Lake. The W.M.A. headquarters is 7 miles west of Forest Lake and one mile north of Anoka County Road 18 on Zodiac Street.

### GENERAL DESCRIPTION

The Carlos Avery W.M.A., with its extensive marshes, was purchased by the Minnesota Conservation Commission in 1933 after the Crex Carpet Company allowed the land to become tax forfeited.

The Carlos Avery lies on the Anoka Sand Plain, an area of poorly drained sandy soil with low fertility. Most of the area is not suited for agriculture. The area is about one-third upland and two-thirds wetland. Uplands consist of forests, grasslands and fields. Wetlands are about half shallow marsh and half open water.

Forty-six miles of roads and more than 23 miles of trails and firebreaks provide access to the unit. More than 6,000 wetland acres are impounded by 21 miles of dike.

### WILDLIFE MANAGEMENT

The Carlos Avery W.M.A. was established for wildlife production, public hunting, and trapping, and other uses compatible with wildlife management.

On the W.M.A. various plant communities are managed to provide an interspersion of critical habitat components and by regulating public use.

Forests are managed primarily to promote a diversity of different aged plant communities. Selective cutting is done by the public with wood cutting permits. Oak savanna, aspen and conifer stands are maintained in suitable locations. Grass nesting cover is maintained by mowing and burning under controlled conditions. At least 150 acres of food plots are planted each year to provide a reliable winter food source for resident wildlife.

Water levels in many of the wetlands are regulated via a system of dikes and control structures to produce the types of vegetation favored by many species of furbearers and waterfowl. Other techniques used to increase the value of wetlands include prescribed burning and level ditching. Cattail stands are managed by water level control and mechanical treatment.

### RECREATIONAL OPPORTUNITIES

Public hunting is the primary outdoor recreational use of the Carlos Avery W.M.A. with waterfowl, deer, and squirrel the most sought after species. Trappers harvest from good populations of mink, muskrat, racoon, and beaver. The variety of habitats attract almost 272 species of birds, so the area is very popular for bird watching.

### OTHER FACILITIES

Also located at the Carlos Avery W.M.A. are:

- North Metro Area Wildlife Office for Anoka, Washington, and Ramsey County.
- Forestry, Metro Fire Base.  
Phone: 651-982-9720



### WILDLIFE MANAGEMENT AREA RULES

Activities permitted on the Carlos Avery Wildlife Management Area:

- Hunting in accordance with state regulations.
- Hiking both on and off designated trails.
- Picking fruit and mushrooms.
- Bird watching and nature study.

Activities requiring a permit:

- Trapping on the W.M.A.
- Cutting fuelwood for home use.
- Activities between 10:00 p.m. and 4:00 a.m.

It is unlawful while in a designated W.M.A. to:

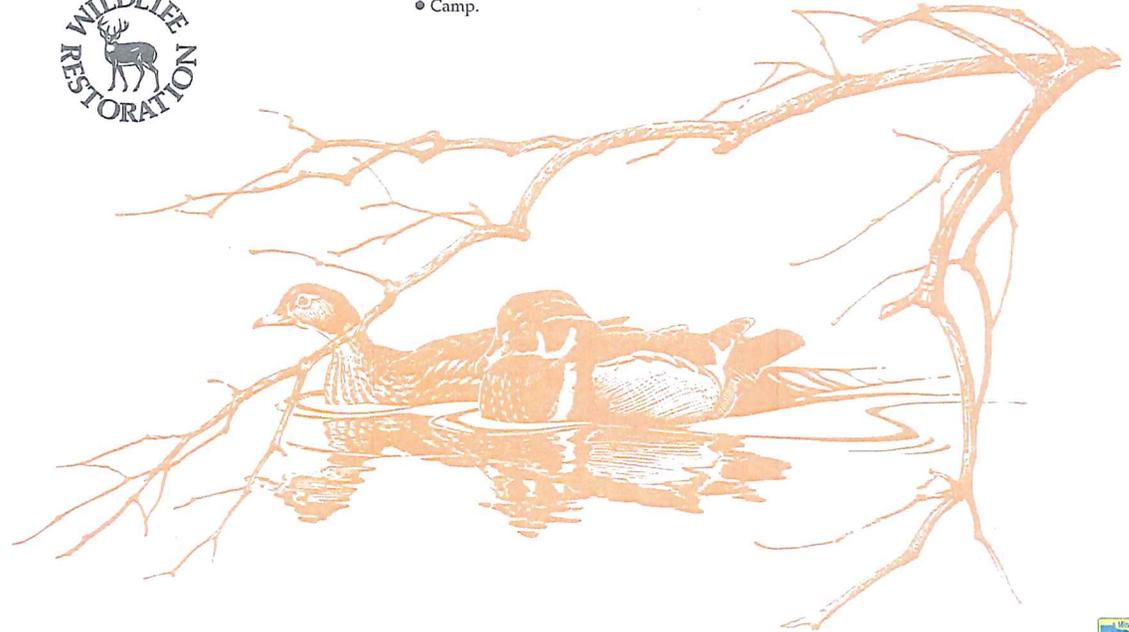
- Target shoot.
- Operate snowmobiles or all-terrain vehicles.
- Ride horses.
- Camp.

### FOR MORE INFORMATION

Carlos Avery W.M.A. Office  
18310 Zodiac Street  
Forest Lake, MN 55025  
Phone: (651) 296-5290

North Metro Area Wildlife Office  
5463 West Broadway  
Forest Lake, MN 55025  
Phone: (651) 296-5200

Department of Natural Resources  
Section of Wildlife  
500 Lafayette Road  
St. Paul, MN 55155-4007  
Phone: (651) 296-3344



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