

SUNRISE RIVER

WATERSHED MANAGEMENT ORGANIZATION



WATERSHED MANAGEMENT PLAN

THIRD GENERATION

February 8, 2010

Adopted by SRWMO Board June 3, 2010

Prepared by the SRWMO Board of Managers
with assistance from the
Anoka Conservation District

EXECUTIVE SUMMARY

The Metropolitan Surface Water Management Act requires a watershed management organization and watershed management plan in all areas of the seven county Twin Cities metropolitan area. The Sunrise River Watershed Management Organization (SRWMO) was originally formed in 1985 when the City of East Bethel, along with Columbus and Linwood Townships, entered into a Joint Powers Agreement to establish a Watershed Management Organization (WMO). The current Joint Powers Agreement includes the City of Ham Lake and was executed by all four communities on, or before, November 1, 2000. The agreement was drafted with the authority of Minnesota Statutes, Section 471.59. The Joint Powers Agreement provides for the preparation of a Watershed Management Plan (hereinafter called Plan) in accordance with Minnesota Statutes, Sections 103B.231.

The portion of the Sunrise River Watershed covered by this plan is located in the northeast corner of Anoka County. This portion of the watershed is approximately 45,300 acres in size, comprised of parts of the cities of East Bethel, Ham Lake, and Columbus, and all of Linwood Township. The area has relatively flat topography and contains extensive lake and wetland areas throughout. Next to wetlands and public recreation space, agriculture has been the major land use in the watershed. Historically, residential development centered around lakes, first as cabins and then converted to year-round homes. In the past 20-25 years areas have been developing as rural residential as owners of larger parcels offer their land for development. Future development to the watershed will be primarily rural residential and limited by the availability of buildable land.

This 3rd Generation Water Resources Management Plan builds upon the work completed under the SRWMO's 2nd Generation Plan, which was implemented from 2000 to 2009. That 2nd Generation Plan focused upon monitoring lakes, streams, rivers, and wetlands. Water quality in lakes and streams was a focus, and several problems were identified. Now that existing conditions are well documented and the most notable problems have been studied in-depth, the focus of this plan shifts toward correcting problems, being protective against new problems, and monitoring for changes.

This plan was developed under the following philosophies:

- Water-related problems are community problems and not individual problems.
- Water resource management is a vital matter that cannot be effectively addressed by individual communities because watersheds cover multiple communities.
- Water resources should be managed on a watershed basis. The WMO is uniquely positioned to address water resource issues across community boundaries.
- Aquatic and terrestrial areas are integrally linked and cannot be effectively managed separately.

The Sunrise River WMO Board of Managers considers its responsibilities to be overseeing the management of water resources in the watershed. The WMO will serve the community by:

1. Providing a forum to consider inter-community water problems.
2. Setting minimum standards for member community ordinances that consider local water resources issues.
3. Educating the public about water resources.

4. Facilitating water quality improvement projects, which often will be cooperative endeavors with others.
5. Collecting data and conducting resource monitoring on a watershed basis.
6. Providing a linkage between natural resources and land use planning decisions.
7. Coordinating water management activities within the WMO among governmental agencies, communities and residents.
8. Maintaining a general awareness of existing water problems and the WMO's responsibilities for water management.
9. Ensuring expenditures result in corresponding benefits to the public.
10. Avoiding duplication among government agencies and communities.

Priority topics for resource management set by the SRWMO Board with public input are, in order of priority:

1. Water quality
2. Septic system compliance
3. Education
4. Aquatic plants, including invasives
5. Funding
6. Sanitary Sewers (same priority as funding)
7. Lakeshore restorations

This plan contains goals, policies, and an action plan for each of these priority topics.

In addition to serving as a guide to the SRWMO, this plan is also a guide for the member communities. Each member community must adopt a Local Water Plan consistent with Minnesota Statutes 130B.235 and this plan. This plan acts as a foundation for local water plans.

This plan directs the SRWMO until January 1, 2020, but it is not a static document. It will be subject to review and update as needs and gains in knowledge dictate.

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CHAPTER 1 INTRODUCTION

SRWMO'S BACKGROUND

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 cities, or as a function of county government. The SRWMO was formed in 1985 through a Joint Powers Agreement ratified by 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. A further amended JPA was fully executed in November 2000. Appendix A contains a copy of the Sunrise River Watershed Management Organization Joint Powers Agreement.

The Sunrise River Watershed has relatively flat topography and contains extensive lake and wetland areas throughout. The abundant lakes, wetlands, and slow-moving streams between them range widely in quality. For example, Fawn Lake is one of the clearest lakes in east-central Minnesota, while Typo Lake is one of the most turbid. Mixed amongst these waterbodies the dominant land uses are public recreation space and rural residential development. Historically, residential development has tended to occur primarily around lakes, first as cabins and then converted to year-round homes. Due to proximity to the Twin Cities Metropolitan Area, future expected growth is moderate but mostly residential. Agriculture has been a major land use in the watershed in the past, but is diminishing as landowners offer their land for development. Future development to the watershed will be primarily rural residential and limited by the availability of buildable land. Water management continues to be important in this water-rich area.

FOCUS OF THIS PLAN

This is a 3rd Generation Water Resource Management Plan for the SRWMO. The 1st Generation Plan was issued in October 1991. Not all of this 1st Generation Plan was implemented, most notably the data collection programs. The 2nd Generation Plan, approved by BWSR in January 2001, focused on resource monitoring, inventories, and investigations that would enable proactive resource management in the future. This 3rd Generation Plan focuses upon correcting problems and protecting against developing problems. It places less emphasis on monitoring and studies.

DEVELOPMENT OF THIS PLAN

A watershed management plan is a comprehensive plan for the organization that sets goals and policies and actions that will take place in order to meet those goals. This plan covers a 10-year period, expiring December 31, 2019. The development and content of the plan follow Minnesota Rules 8410. This plan builds upon the work completed under previous

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plans, and was developed through a process that involved citizens, local public officials, and other agencies involved in water management.

The plan development process began with a concerted effort to gather input from the public and agencies and to meet the requirements of MN Rules 8410.0070 and 8410.0090 and MN Statutes 103B.313. A kickoff meeting was held to solicit comments from the public, lake association representatives, local public officials, and state review agencies. Comments were accepted at the meeting or submitted in writing. Review agencies were asked for their general comments, priority topics they would like to see addressed, and a summary of their relevant water management policies and goals. Promotions for the input meeting and open period for written comments included a notice on local cable access television, a full-length article in the local Anoka Union newspaper, a notice on the SRWMO website, and direct correspondence to those listed in Table 1. The meeting was held October 30, 2008 at the East Bethel City Hall. A summary of input received is provided in Appendix B.

Table 1. Recipients of direct notifications of the plan kickoff input meeting and open period for written comments. Public notification was also made to the public through a newspaper article, local cable TV, and the SRWMO website.

SRWMO Board	Rice Creek Watershed District	Metropolitan Council
Member community city council and town board members	Upper Rum River WMO	MN Dept of Health
Member community city administrators or town clerk	Forest Lake-Comfort Lake Watershed District	MN Dept of Transportation
Oxford Township, Isanti Co. town board	Coon Lake Association	MN Dept of Agriculture
Isanti Co. Water Planner	Coon Lake Improvement District	MN Dept of Transportation
Chisago Co. Water Planner	Linwood Lake Association	Dawn Doering, Friends of the Sunrise River
Isanti Conservation District	Martin Lake Association	Individuals who signed in at Martin and Typo Lakes TMDL public meetings in 2005.
Anoka Conservation District	MN Board of Water and Soil Resources	Miscellaneous other residents
Anoka County Environmental Services	MN Dept of Natural Resources hydrologists (Anoka and Isanti Counties), area wildlife mgr, area fisheries mgr	All recipients were asked to forward the notice to others they felt might be interested.
Coon Creek Watershed District	MN Pollution Control Agency	

To get more input from member communities and review agencies during the plan development, the SRWMO formed a technical advisory committee (TAC; Table 2). TAC members were individuals with technical expertise. The TAC was an advisory body to the

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SRWMO Board and operated by consensus. The wetland and stormwater standards in this plan were drafted by the TAC.

Table 2. Technical Advisory Committee (TAC) members.

Entity	TAC Member
City of Columbus	Elizabeth Mursko, City Administrator
City of East Bethel	Stephanie Hanson, City Planner
City of Ham Lake	Tom Collins, City Engineer
Linwood Township	Philip Osterhus, Town Board member
Anoka Co Environmental Services	Invited, no representative
Anoka Conservation District	Jamie Schurbon, Water Resource Specialist
Metropolitan Council	Jack Frost
MN Board of Water and Soil Resources	Melissa Lewis, Board Conservationist
MN Dept. of Natural Resources	Kate Drewry, Area Hydrologist
MN Pollution Control Agency	Chris Klucas, TMDL Project Manager (St. Croix Basin)

Other development of this plan took place during special work sessions by the SRWMO Board between October 2008 and August 2009. The Anoka Conservation District facilitated these work sessions and drafted the plan. A page within the SRWMO website was established to post work session minutes, draft materials, and provide an avenue for comments at any time. The development of this plan culminated with the 45- and 60-day review periods and public hearing that are required by MN Statutes 103B.231 subparts 7-10. This plan will be in effect once approved by the MN Board of Water and Soil Resources (BWSR) and adopted by the SRWMO Board.

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CHAPTER 2 RESOURCE INVENTORY AND ASSESSMENT

PURPOSE OF THE INVENTORY

The Metropolitan Surface Water Management Act and Minnesota Rules 8410.0060 requires that a Watershed Management Organization (WMO) put together an inventory of the existing and future conditions of its watershed with a detailed inventory of water resources and physical factors affecting water resources. The purpose of this inventory is to provide sufficient information for basic watershed management. To facilitate more advanced watershed management, this inventory refers the reader to more detailed information sources.

LOCATION AND WATERSHED BOUNDARIES

The actual physical watershed boundaries of the Sunrise River (meaning land area with surface water draining to the Sunrise River) includes portions of Anoka, Washington, Isanti and Chisago Counties. For the purpose of this plan, the terms Sunrise River Watershed or watershed shall imply the watershed boundaries of the Sunrise River Watershed Management Organization, as described below:

The Sunrise River Watershed is located in the northeast corner of Anoka County (see Map 1). The watershed is approximately 45,300 acres in size, comprised of parts of the Cities of East Bethel, Ham Lake, and Columbus, along with Linwood Township (Map 2). Linwood Township is entirely within the watershed. The north and east boundaries of the watershed are the Anoka County boundaries with Isanti County (north) and Chisago and Washington Counties (east). The Sunrise River Watershed is bound on the west by the Upper Rum River Watershed, and on the south by Coon Creek and Rice Creek Watersheds. On a national scale, the Sunrise River Watershed is part of the Lower St. Croix River Watershed (USGS Hydrological Code 07030005).

GEOLOGY AND TOPOGRAPHY

The landscape of the Sunrise River Watershed was shaped by several ice advances into east central Minnesota during the last glaciation, which occurred about 10,000 years ago. In the Sunrise River Watershed a large glacial outwash deposit, called the Anoka Sand Plain is the dominant geomorphic feature. It was formed largely by glacial drainage (melt-water) from the receding Grantsburg sub-lobe of the Des Moines glacier. The surface of the Anoka Sand Plain is flat to moderately undulating. Low regions of upland represent areas of till left from previous ice movements that were not buried by the outwash sand. Other features of positive relief are patches of sand dunes, formed by southwesterly winds after the outwash streams left the sand plain. Landscape features of negative relief include numerous lakes and marshes, which formed as ice blocks, originally buried by the outwash sand that melted to create the depressions, and are now filled with water or organic soils. As a result of the above-mentioned glacial actions,

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glacial outwash is the predominant surficial geologic formation in the watershed, about one-third of which is covered by organic soils.

The Anoka Sand Plain is also characterized by a shallow water table. Often the water table is within 6 feet of the surface. The numerous wetlands and lakes in the watershed can be thought of as visible representations of the water table. There are notable connections between the shallow water table and all surface water resources. The area is generally considered a groundwater recharge area, which is of importance given the nearby metropolitan area which draws heavily upon groundwater. More detailed information about hydrogeology of the area is available in the Minnesota Geological Survey's "Anoka Sand Plain Regional Hydrogeologic Assessment" (1993). A more detailed "Anoka County Geologic Atlas" is in production with support from the SRWMO and is anticipated to be completed by 2015.

There are two different general soil associations within the watershed as determined by the "Soil Survey of Anoka County, Minnesota" (1977; see Map 3):

1. Zimmerman-Isanti-Lino Association
The topography of these soils is level to undulating. Drainage is excessive to very poorly drained. These soils are dominated by fine sands throughout.
2. Rifle-Isanti Association
The topography of these soils is nearly level. They are very poorly drained soils formed in organic material and fine sand.

A detailed map showing all the soil types of Anoka County is provided in the United States Department of Agriculture Soil Conservation Service publication entitled *Soil Survey of Anoka County, Minnesota*, published in 1977. This map consists of many sheets made from aerial photographs. On each map sheet, soil areas are outlined and identified by symbols. A complete digital representation of the soils survey data is also available on Anoka Conservation District website (www.AnokaSWCD.org).

Maps in this plan depict soil survey information that is most relevant for watershed managers. These include:

- Map 3 Soil Associations
- Map 4 Hydrologic Soil Group
- Map 5 Soil Drainage Classifications
- Map 6 Soil Slopes
- Map 7 Septic Drainfield Limitations
- Map 8 Basement Limitations

NATURAL LAND COVER

The Sunrise River Watershed contains an unusual variety of natural communities, sites of biodiversity significance, and regionally significant natural areas (see Map 9). Each is defined and described below. In the southeastern portion of the watershed, which is occupied by the Carlos Avery Wildlife Management Area (WMA; discussed later in this section), oak, aspen, sugar maple and elm dominate upland forests surrounded by

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extensive wetlands. In the western section of the watershed, a branch of the northern forest known as the Cedar Creek Forest is characterized by coniferous vegetation. This forest is completely separated from the original evergreen forest, which at one time covered the northeastern third of Minnesota. Additional unique vegetation communities are included and protected in the Boot Lake Scientific and Natural Area in southwestern Linwood. Elsewhere throughout the watershed common land covers are oak forests, other hardwood stands, and commercial and conservation pine groves.

Notable Land Cover Types (also see Map 9)

Natural Communities - 19% (8,642 acres) of the watershed area is high quality natural communities (Table 3). A natural community is a remnant of pre-settlement vegetation. Natural communities have undergone very little human disturbance since pre-settlement times. Many of these areas exist within public natural areas or lie within a matrix of wetlands which made development or farming difficult.

Sites of Biodiversity Significance - The Minnesota County Biological Survey (MCBS) has identified several Sites of Biodiversity Significance within the Sunrise River watershed boundary. Sites of Biodiversity Significance have varying levels of native biodiversity and are ranked based on the relative significance of this biodiversity at a statewide level. Factors taken into account during the ranking process include the number of rare species documented within the site, the quality of the native plant communities in the site, the size of the site, and the context of the site within the landscape (please see http://files.dnr.state.mn.us/eco/mcbs/biodiversity_significance_ranking.pdf). The sites within the watershed boundary contain a wide variety of native plant communities (i.e., shown in Table 3, Natural Communities in the Sunrise River Watershed), and 19% (8,642 acres) of the watershed area consists of high quality native plant communities.

Regionally Significant Ecological Areas (RSEA) - the watershed boundary also contains several Regionally Significant Ecological Areas (RSEA). The DNR's Central Region (in partnership with the Metropolitan Council in the seven-county metropolitan area) identified these ecologically significant terrestrial and wetland areas by conducting a landscape-scale assessment based on the size and shape of the ecological area, land cover within the ecological area, adjacent land cover/use, and connectivity to other ecological areas. The purpose of the data is to inform regional scale land use decisions, especially as it relates to balancing development and natural resource protection.

In addition, more information regarding the MCBS Sites of Biodiversity, the MCBS Native Plant Communities, and Regionally Significant Ecological Areas can be found at the following DNR websites:

http://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html

<http://www.dnr.state.mn.us/npc/index.html>

<http://www.dnr.state.mn.us/rsea/index.html>



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Table 3. Natural Communities in the Sunrise River Watershed. The information was derived from a GIS database (MCBS Native Plant Communities) provided by the Division of Ecological Resources, Minnesota Department of Natural Resources.

TYPE	# OF SITES IN SRW	WETLAND OR UPLAND	ACRES IN SRW
Alder Swamp	10	W	211.81
Aspen Forest	3	U	5.23
Aspen Woodland	4	U	9.94
Black Ash Swamp	1	W	10.52
Cattail Marsh	3	W	337.15
Dry Oak Savanna (Central) Barrens Subtype	2	U	57.99
Emergent Marsh	11	W	348.97
Hardwood Swamp Forest	2	W	12.80
Lowland Hardwood Forest	2	W	317.00
Mixed Emergent marsh (Forest)	35	W	526.73
Mixed hardwood Swamp	62	W	1643.98
Oak Forest (Central)	54	U	991.01
Oak Forest (Central) Dry Subtype	64	U	1541.72
Oak Forest (Central) Mesic Subtype	10	U	299.38
Oak Woodland-Brushland (Central)	2	U	21.64
Poor Fen	20	W	110.41
Rich Fen (Transition)	18	W	179.13
Rich Fen (Transition) Shrub Subtype	1	W	2.80
Shrub Swamp	37	W	411.59
Tamarack Swamp	2	W	35.20
Tamarack Swamp Minerotrophic Subtype	28	W	516.81
Tamarack Swamp Sphagnum Subtype	4	W	30.62
Wet Meadow	43	W	530.41
Wet Meadow Shrub Subtype	1	W	38.01
White Pine-Hardwood Forest (North Central)	5	U	125.38
Willow Swamp	3	W	326.70
Total Natural Communities in SRW	427		8642.93
Wetland Natural Communities in SRW	285		5590.64
Upland Natural Communities in SRW	142		3052.29

The MN DNR Division of Ecological Resources tracks and inventories qualified sightings of rare plant, animal and insect species. The location of the sightings is kept confidential to reduce the likelihood of intentional disturbance. Map 10 shows their general location. Table 4 provides a list of rare species and natural features known to occur in the watershed.

Most of the Sunrise River Watershed is within a DNR-designated Blanding's Turtle Priority Area. These areas are relied upon to maintain the species' security within Minnesota, and the DNR considers these areas to be of the highest priority for Blanding's turtle research and management activities. Appendix D is a fact sheet about Blanding's turtles. Impacts to these rare turtle's habitat should be avoided whenever possible.

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Table 4. Rare Species and natural features in the Sunrise River Watershed.
(source: MN DNR Division of Ecological Resources, current as of 11-10-2009)

Common Name	Scientific Name	Status
Fungi		
Sandy Laccaria	Laccaria trullisata	SPC
Plants		
Cross-leaved Milkwort	Polygala cruciata	END
Tall Nut-rush	Scleria triglomerata	END
Halberd-leaved Tearthumb	Polygonum arifolium	NON
Beach-heather	Hudsonia tomentosa	SPC
Waterwillow	Decodon verticillatus	SPC
Long-bearded Hawkweed	Hieracium longipilum	NON
Sea-beach Needlegrass	Aristida tuberculosa	SPC
Rhombic-petaled Evening Primrose	Oenothera rhombipetala	SPC
Lance-leaved Violet	Viola lanceolata	THR
Tooth-cup	Rotala ramosior	THR
Animals		
Northern Barrens Tiger Beetle	Cicindela patruela patruela	SPC
A Jumping Spider	Tutelina formicaria	SPC
Bog Copper	Lycaena epixanthe michiganensis	NON
Leonard's Skipper	Hesperia leonardus leonardus	SPC
Blanding's Turtle	Emydoidea blandingii	THR
Sandhill Crane	Grus canadensis	NON
Cerulean Warbler	Dendroica cerulea	SPC
American Bittern	Botaurus lentiginosus	NON
Common Moorhen	Gallinula chloropus	SPC
Red-shouldered Hawk	Buteo lineatus	SPC
Bald Eagle	Haliaeetus leucocephalus	SPC
Eastern Hognose Snake	Heterodon platirhinos	NON
Upland Sandpiper	Bartramia longicauda	NON
Wilson's Phalarope	Phalaropus tricolor	THR
Louisiana Waterthrush	Seiurus motacilla	SPC
Gopher Snake	Pituophis catenifer	SPC
Animal Assemblages		
Colonial Waterbird Nesting Site		
Terrestrial Communities		
Native Plant Community, Undetermined Class		
Northern Poor Fen		
Sedge Meadow, Lake Sedge Subtype		
Oak - Aspen Woodland		
Wet Prairie (Southern)		
Tamarack Swamp (Southern)		
Prairie Rich Fen		
Dry Barrens Prairie (Southern)		
Red Oak - Basswood Forest (Noncalcareous Till)		
Dry Barrens Oak Savanna (Southern), Oak Subtype		

SPC = Special Concern, THR = Threatened, END = Endangered, NON = Not Listed But Rare



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Another significant vegetative feature of the watershed is the extensive wetland areas (see Maps 11 and 12). Wetlands or lakes cover 50% of the watershed. There are 9,441 acres of DNR public waters wetlands and 10,342 acres of other wetlands. Additionally, there are 19 lakes, eight of which have a managed fishery. Wild rice is found in several waterbodies, including Boot, Mud, Rice, and Tamarack Lakes.

LAND USE

Development in the watershed is limited by water, wetlands, and an abundance of public lands (Maps 11, 12, 13). Scattered rural residential development is present throughout the watershed. Lot sizes are commonly 2.5 acres or greater, though smaller lots are present in some areas. The most concentrated development is around the lakes. Lakeshore development began as seasonal cabins, but in the last 20-30 years many have been converted to year-round homes. Agriculture is also scattered in the watershed, consisting primarily of sod, corn, soybeans, and some small grains.

Future development in the watershed is expected to be moderate in the next 20 years. Growth forecasts are available for each community from the Metropolitan Council (Table 5). Linwood Township, the only community entirely within the SRWMO, is anticipated to have 2% growth between 2010 and 2020, and 9.8% between 2020 and 2030. Growth within the SRWMO portions of Ham Lake and Columbus will likely be less than in other areas of those cities because of existing development, wetlands, and the lack of major transportation corridors. East Bethel will have the greatest growth of SRWMO communities, but the focal area of this growth will be near the Highway 65 corridor, which is outside of the SRWMO. In the end, modest growth should be expected with a continued focus on large-lot, rural residential. Metropolitan urban sewer area (MUSA) services are not planned to enter the SRWMO during the planning period, though the City of East Bethel may add municipal sanitary sewer and water services to their Highway 65 corridor and Coon Lake areas.

Table 5. Population growth forecasts for SRWMO communities (source: Metropolitan Council, except Ham Lake data are Metropolitan Council approved numbers from the City of Ham Lake Comprehensive Plan).

	Population				% Population Increase	
	2000	2010	2020	2030	2010-2020	2010-2030
East Bethel	10,941	12,600	18,400	23,500	46.0	86.5
Ham Lake	12,710	16,155	18,000	19,600	11.4	21.3
Linwood	4,668	4,920	5,000	5,400	1.6	9.8
Columbus	3,957	4,000	4,240	4,680	6.0	17.0

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CARLOS AVERY WILDLIFE MANAGEMENT AREA

The Carlos Avery Wildlife Management Area (WMA) is the largest WMA in the Twin Cities metro and a notable feature within the SRWMO. It was established in 1933 for wildlife production, public hunting, trapping, and other recreation compatible with wildlife management. About 9,000 acres of the WMA's 22,850 acres are located in the Sunrise River Watershed. The following is taken from a pamphlet created by the Minnesota Department of Natural Resources on Carlos Avery WMA.

Description

“The extensive marshes which form much of the WMA were largely untouched by the settlement of Minnesota until the early 1900s. Then, the Crex Carpet Company began managing the marshes for wiregrass used in manufacturing woven rugs. A system of dikes and ditches allowed water level manipulation, prescribed burning, and mowing. Wiregrass production declined after 1925 due to increased competition from synthetic materials and changes in marsh vegetation caused by lowered water levels, repeated mowing, and heavy equipment use. The carpet company was bankrupt by 1930, and much of the land became tax delinquent.

The Minnesota Conservation Commission recognized the area's potential for wildlife, and land acquisition began in 1933 with the Anoka and Chisago County Commissions' approval. Initially, the WMA was managed by a Federal Emergency Conservation Work Camp, and many buildings and wildlife projects were constructed under the Federal Works Progress Administration during the Great Depression. State resident managers have been assigned to the WMA since 1936.

The WMA has 57 miles of roads and more than 23 miles of trails and firebreaks that provide access to the WMA. In addition, an environmental education area with an interpretive trail has been established. Land acquisition for the management area was completed in 1976, and more than \$100,000 derived from hunting and trapping, license sales and a federal excise tax on sporting arms, ammunition, and archery equipment is spent annually to manage the area.

Carlos Avery has sandy or poorly drained organic soils of low fertility, and most of the area is not suited to agriculture.

Before settlement of the area, the WMA was a mosaic of Oak Savanna, tall grass prairie, marsh, and tamarack bog. Presently, the area is a mixture of forests, marshes, old fields, and agricultural lands. Oaks dominate the forests, but they are associated with other hardwood species. A small tract of Oak Savanna exists on the Sunrise Unit of the WMA. Wetlands have been restored by the construction of dikes. Marshes range from dense stands of cattail growing in wet soils to deep, open-water wetlands with emergent bulrushes and sedges. Numerous old fields, maintained as nesting areas, provide “edges” which are valuable to wildlife. Food plots provide supplemental wildlife foods.

Carlos Avery WMA is managed by manipulating various plant communities to provide an interspersed of productive habitats and by regulating public use. Research provides basic information needed to understand the relationships between the unit's resources and their continued use.

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Uplands are managed for different-aged forests, grassy nesting cover for upland game birds and waterfowl, and food plots. Oak forests are harvested selectively or in small blocks, and large trees that provide wildlife food and den sites are not cut. Cutting is done by either the WMA staff or the public under firewood permits. Oak Savanna and Aspen stands are being established in suitable areas. Grassy nesting areas, established by timber harvest and planting, are maintained by mowing and controlled burning. Food plots operated by unit personnel and by cooperating farmers provide at least 150 acres of winter food for wildlife. Plots are located to help keep wintering deer away from roads.

The marshes are managed for waterfowl, marsh birds, furbearers, and public hunting and trapping. Water levels in many marshes are regulated to favor nutrient release and the growth of desirable aquatic vegetation, and to increase furbearer survival. Other techniques used to increase the value of wetlands to wildlife include prescribed burning and level ditching. Dense cattail stands are thinned by water level control, occasional burning, and summer mowing. These practices increase the amount of water available in the semi-dry portions of the wetlands and reduce woody cover.

Management of the Carlos Avery WMA is directed mainly towards game animals, but the improved habitat benefits a variety of non-game species. Forests are managed primarily to promote an interspersed of different-aged plant communities. Birds such as the flicker, rufous-sided towhee, catbird, and common yellowthroat respond to the temporary openings and edges which clear-cutting produces. In contrast, birds such as the ovenbird, barred owl, pileated woodpecker, and wood thrush require mature forests and benefit from selective cutting. Wetland management and prescribed burning maintain and improve habitat for many shorebirds and marsh birds including the sandhill crane. Agricultural fields benefit the bobolink, meadowlark, several species of sparrows, dark-eyed junco, snow bunting, sandhill crane, and many small mammals.”

Pool Management

Sixteen of the pools maintained by the Carlos Avery Wildlife Management Area (WMA) are located in the Sunrise River Watershed. These pools are surrounded by sand dikes, which also double as roads. The water surface elevations of the pools are regulated to provide habitat for waterfowl. Map 16 and 17 show the pools and control structures. One of the main concerns of the managers of the WMA is receiving enough water from spring runoff to maintain the pools throughout the summer. Another concern is the maintenance of the sand dikes, which are highly susceptible to wind and water erosion. Tables 6 and 7 present information on water surface levels, discharge information, and land cover type within each pool area, based on a the 1987 Water Management Plan for Carlos Avery WMA. Since the Carlos Avery WMA is public land and highly accessible by the public, the entire WMA is considered a Group I water resource by the WMO (see Glossary for definition of Group I).

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Table 6. Pool Information - Carlos Avery WMA. (source: MN DNR)

Pool Area (Acres)						Water Surface Levels (Ft.)	
Pool #	Drainage Basin Ac.	Total	Open Water	Marsh	High Land	Danger Point	Average Operational WSL (Ft.)
P-01	6417.0	200.0	11.0	169.0	22.0	899.32	896.98 to 897.28
P-02	1390.0	871.0	31.0	652.0	120.0	897.88	896.98 to 897.28
P-03	8047.0	240.0	144.0	42.0	54.0	897.14	896.54 to 897.14
P-04	8274.0	227.0	135.0	55.0	36.0	895.61	894.91 to 895.31
P-05	N/A*	95.0	13.0	39.0	43.0	895.36	894.97 to 895.27
P-06	620.0	N/A	200.0	N/A	N/A	N/A	894.00 to 894.50
P-08	4382.0	308.0	160.0	90.0	58.0	889.37	888.50 to 889.20
P-09	8646.0	372.0	210.0	73.0	89.0	891.00	889.92
P-10	4338.0	644.0	153.0	441.0	58.0	892.13	891.53 to 891.93
P-22	3762.0	1506.0	14.0	N/A	N/A	890.43	889.93 to 890.43
P-23	2727.0	N/A	N/A	N/A	N/A	N/A	N/A
P-26	N/A	N/A	200.0	N/A	N/A	890.00	889.00 to 890.00

*N/A – Information Not Available

Source: Carlos Avery Wildlife Management Area 1987 Pool Management Plans.

Table 7. Pool Discharge Information - Carlos Avery WMA. (source: MN DNR)

Pool #	Main Control #1			Aux. Control #2			Aux. Control #3		
	Culv. Dia.	Flow To	Max. Flow To-Date	Culv. Dia.	Flow To	Max. Flow To-Date	Culv. Dia.	Flow To	Max. Flow To-Date
P-01	48"	P-03	45 cfs	None	None	None	None	None	None
P-02	24"	P-03	15 cfs	30"	P-06	None	None	None	None
P-03	36"	P-04	60 cfs	None	None	None	None	None	None
P-04	48"	P-09	60 cfs		P-05	None	None	None	None
P-05	48"	P-06	15 cfs	12"	P-09	None	None	None	None
P-06	2-30"	P-26	30 cfs	72"	P-08	None	None	None	None
P-07	2-24"	P-22	30 cfs	None	None	None	None	None	None
P-08	72" sq.	River	60 cfs	None	None	None	None	None	None
P-09	30"	River	30 cfs	18"	River	10 cfs	30"	River	20 cfs
P-10	48"	River	645 cfs	None	None	None	None	None	None
P-22	36"	P-08	30 cfs	24"	River	None	None	None	None
P-23	Slide Gate	River	7 cfs	Spill-way	River	18 cfs	12"	P-22	20 cfs

Source: Carlos Avery Wildlife Management Area 1987 Pool Management Plans.

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DRAINAGE SYSTEM SUMMARY

The Sunrise River Watershed has little topographic relief, vast areas of wetlands and only a few natural drainage ways (streams or rivers). Numerous man-made ditches have been constructed in the watershed to provide drainage for surface water runoff. The two main drainage ways of the watershed are the West Branch of the Sunrise River and the South Branch of the Sunrise River (Map 16). After leaving the watershed, these two rivers join the Main Branch of the Sunrise River which outlets to the St. Croix River near the town of Sunrise, Minnesota.

The West Branch of the Sunrise River provides drainage for the northern half of the watershed. It begins as Isanti County Ditches 13 and 20, which join to form Data Creek and flow into Typo Lake. Typo Lake straddles the Anoka-Isanti County boundary. From Typo Lake, the West Branch of the Sunrise River flows into Martin Lake. Martin Lake also receives discharge from the following chain of lakes – Rice Lake to Boot Lake to Linwood Lake (discharge controlled by a dam) to Island Lake to Martin Lake. The West Branch of the Sunrise River discharges from Martin Lake via a dam on the east side of the lake. From Martin Lake, the West Branch of the Sunrise River flows east, for approximately three miles, until it exits the watershed through the east boundary.

The South Branch of the Sunrise River starts with Coon Lake located in the southwest corner of the watershed. A v-notch weir on the northeast end of the lake regulates discharge from the lake. From Coon Lake, the South Branch of the Sunrise River flows east into Pool 12 of the Carlos Avery Wildlife Management (WMA). Flow through the WMA is regulated by a series of dikes and control dams, which create pools used for waterfowl habitat. Pools 8, 9, 10 and 26, located along the east boundary of the WMA, discharge into the South Branch of the Sunrise River. The river (also referred to as County Ditch No. 12) then flows east until it exits through the east boundary of the watershed at a point approximately $\frac{3}{4}$ of a mile northwest of the town of Wyoming, Minnesota.

Subwatershed divisions for the Sunrise River Watershed are shown on Map 16. The accuracy of these divisions is limited by the fact that some watershed divides are within wetland complexes, the flat nature of the watershed, and low-resolution available topographic information (United States Geological Survey (USGS) topographic sheets, with scale of 1" = 2,000' and 10-foot contour intervals). Past and present monitoring sites are shown in Map 18.

WETLANDS

The DNR Public Waters (Table 8; Map 11) and National Wetland Inventory (NWI; Map 12) provide inventories of most wetlands in the watershed. These datasets can be readily downloaded from the MN Department of Natural Resources GIS Data Deli website. However these datasets have known limitations, such as limited accuracy of wetland boundaries. More detailed information about individual wetlands will be compiled when projects affecting those wetlands are proposed. Delineation requirements of the Minnesota Wetland Conservation Act provide some assurances that data will be gathered

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on a case-by-case basis. This plan also includes wetland standards that will require wetland functional values assessments on a case-by-case basis as projects are proposed.

Table 8. DNR Public Waters wetlands and lakes. See Map 11 for locations. (source: MN DNR)

ID	Name	X_UTM	Y_UTM	ACRES	ID	Name	X_UTM	Y_UTM	ACRES
2-63 P	Anderson (2-63 P)	487629	5019284	89.04	2-448 W	Unnamed (2-448 W)	490088	5023631	22.75
2-63 P	Anderson (2-63 P)	487629	5019284	10.40	2-459 W	Unnamed (2-459 W)	485071	5022125	5.07
2-28 P	Boat (2-28 P)	489842	5020872	184.08	2-463 W	Unnamed (2-463 W)	487353	5018855	7.36
2-42 P	Coon (2-42 P)	487113	5017142	2006.40	2-464 W	Unnamed (2-464 W)	487111	5018204	1.98
2-42 P	Coon (2-42 P)	487113	5017142	3.47	2-464 W	Unnamed (2-464 W)	487111	5018204	13.06
2-42 P	Coon (2-42 P)	487113	5017142	0.55	2-465 W	Unnamed (2-465 W)	485616	5018736	117.88
2-58 P	Devil (2-58 P)	486414	5020640	105.66	2-467 W	Unnamed (2-467 W)	484098	5018138	0.24
2-20 P	East Twin (2-20 P)	490983	5015861	4.72	2-467 W	Unnamed (2-467 W)	484098	5018138	0.08
2-20 P	East Twin (2-20 P)	490983	5015861	9.45	2-467 W	Unnamed (2-467 W)	484098	5018138	1.22
2-20 P	East Twin (2-20 P)	490983	5015861	1.69	2-471 W	Unnamed (2-471 W)	483944	5015988	3.55
2-35 W	Fawn (2-35 W)	495847	5028178	58.13	2-476 W	Unnamed (2-476 W)	485800	5014670	3.25
2-65 P	Fish (2-65 P)	486973	5027762	105.36	2-477 W	Unnamed (2-477 W)	486028	5014526	7.11
2-62 P	Goose (2-62 P)	486539	5018704	227.09	2-49 W	Unnamed (2-49 W)	484979	5015022	96.60
2-2 P	Higgins (2-2 P)	498303	5015909	84.54	2-491 W	Unnamed (2-491 W)	490410	5024587	20.29
2-22 P	Island (2-22 P)	492519	5023765	98.63	2-492 W	Unnamed (2-492 W)	496657	5024458	12.23
2-26 P	Linwood (2-26 P)	491399	5022021	595.87	2-492 W	Unnamed (2-492 W)	496657	5024458	102.86
2-32 P	Little Coon (2-32 P)	491392	5017518	564.08	2-493 P	Unnamed (2-493 P)	498336	5023622	627.59
30-2 P	Long (30-2 P)	497935	5029299	7.44	2-493 P	Unnamed (2-493 P)	498336	5023622	138.76
2-50 W	Mallard (2-50 W)	484223	5015828	27.36	2-494 P	Unnamed (2-494 P)	497526	5022591	18.58
2-34 P	Martin (2-34 P)	493425	5025634	15.71	2-495 W	Unnamed (2-495 W)	492712	5021907	44.31
2-34 P	Martin (2-34 P)	493425	5025634	248.58	2-496 P	Unnamed (2-496 P)	495754	5021898	95.05
2-37 W	Mud (2-37 W)	495181	5027401	31.05	2-496 P	Unnamed (2-496 P)	495754	5021898	28.12
2-36 W	Pet (2-36 W)	495465	5027773	19.56	2-496 P	Unnamed (2-496 P)	495754	5021898	59.81
2-145 W	Pool 19 Carlos Avery WMA (2-145 W)	491797	5026832	30.91	2-497 P	Unnamed (2-497 P)	494836	5021518	152.37
2-43 P	Rice (2-43 P)	488957	5020857	255.46	2-497 P	Unnamed (2-497 P)	494836	5021518	7.92
2-40 W	Ryan (2-40 W)	494567	5026801	32.49	2-499 P	Unnamed (2-499 P)	494254	5021082	40.01
2-25 W	Skunk (2-25 W)	489923	5022406	48.40	2-500 P	Unnamed (2-500 P)	497295	5020978	60.48
2-48 W	South Coon (2-48 W)	485404	5014743	55.54	2-502 P	Unnamed (2-502 P)	496261	5018686	363.82
2-21 P	Tamarack (2-21 P)	493666	5024300	120.58	2-504 P	Unnamed (2-504 P)	495108	5018481	75.01
30-9 P	Typo (30-9 P)	493293	5028948	120.15	2-504 P	Unnamed (2-504 P)	495108	5018481	116.98
2-33 P	West Twin (2-33 P)	490565	5016138	22.32	2-504 P	Unnamed (2-504 P)	495108	5018481	234.00
2-148 W	Unnamed (2-148 W)	490896	5025142	48.85	2-505 P	Unnamed (2-505 P)	492774	5017244	660.66
2-150 W	Unnamed (2-150 W)	488325	5028739	19.22	2-505 P	Unnamed (2-505 P)	492774	5017244	220.79
2-155 W	Unnamed (2-155 W)	488751	5027994	20.92	2-505 P	Unnamed (2-505 P)	492774	5017244	100.99
2-156 W	Unnamed (2-156 W)	487944	5027436	27.01	2-505 P	Unnamed (2-505 P)	492774	5017244	180.93
2-157 W	Unnamed (2-157 W)	487913	5027106	7.10	2-505 P	Unnamed (2-505 P)	492774	5017244	289.77
2-159 W	Unnamed (2-159 W)	489853	5026801	21.96	2-506 W	Unnamed (2-506 W)	498145	5018845	6.36
2-161 P	Unnamed (2-161 P)	485972	5026668	21.62	2-506 W	Unnamed (2-506 W)	498145	5018845	29.39
2-163 W	Unnamed (2-163 W)	487725	5026448	13.03	2-507 W	Unnamed (2-507 W)	497515	5018731	68.57
2-167 W	Unnamed (2-167 W)	489520	5025549	11.90	2-508 W	Unnamed (2-508 W)	497265	5018225	78.56
2-23 W	Unnamed (2-23 W)	490735	5022878	37.34	2-510 P	Unnamed (2-510 P)	495807	5017470	137.77
2-24 W	Unnamed (2-24 W)	491853	5024578	27.19	2-511 P	Unnamed (2-511 P)	490173	5015344	20.43
2-27 W	Unnamed (2-27 W)	494386	5022552	29.27	2-511 P	Unnamed (2-511 P)	490173	5015344	5.97
2-280 W	Unnamed (2-280 W)	487825	5026635	2.68	2-515 P	Unnamed (2-515 P)	492853	5016064	189.46
2-29 P	Unnamed (2-29 P)	495568	5020276	67.91	2-515 P	Unnamed (2-515 P)	492853	5016064	10.65
2-29 P	Unnamed (2-29 P)	495568	5020276	313.41	2-515 P	Unnamed (2-515 P)	492853	5016064	0.99
2-29 P	Unnamed (2-29 P)	495568	5020276	520.73	2-515 P	Unnamed (2-515 P)	492853	5016064	4.96
2-29 P	Unnamed (2-29 P)	495568	5020276	134.65	2-515 P	Unnamed (2-515 P)	492853	5016064	23.90
2-30 P	Unnamed (2-30 P)	493963	5018844	220.42	2-517 W	Unnamed (2-517 W)	497924	5017006	20.68
2-31 P	Unnamed (2-31 P)	494181	5017568	615.37	2-518 W	Unnamed (2-518 W)	492885	5015181	44.02
2-39 W	Unnamed (2-39 W)	489559	5026184	20.12	2-520 P	Unnamed (2-520 P)	490708	5012851	1750.00
2-444 W	Unnamed (2-444 W)	487671	5024429	9.50	2-521 W	Unnamed (2-521 W)	493352	5014630	24.57
2-445 W	Unnamed (2-445 W)	487710	5024040	31.77	2-522 W	Unnamed (2-522 W)	493159	5013950	53.65
2-446 W	Unnamed (2-446 W)	489035	5024151	171.04	2-523 W	Unnamed (2-523 W)	492889	5013642	20.26
2-447 W	Unnamed (2-447 W)	489708	5024560	14.39	2-530 P	Unnamed (2-530 P)	492025	5015053	15.35
2-448 W	Unnamed (2-448 W)	490088	5023631	118.03	2-717 W	Unnamed (2-717 W)	493227	5013414	30.89
					2-726 W	Unnamed (2-726 W)	489284	5023284	25.03

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STREAMS

The streams and ditches in the watershed are shown in Map 16. Most of these are small and can go dry or stagnant in drought years. All are slow moving and mucky bottomed. Under the 2nd Generation Watershed Plan, the SRWMO conducted extensive monitoring of streams. Because most streams and ditches are small and of limited recreational value but are connected to lakes, stream monitoring focused upon lake inlets. Monitoring included water quality sampling during base flow and storms, continuous water level recording, and rating curve development at some sites. Table 9 lists monitoring sites. Table 10 lists streams that do not meet state water quality standards. All water quality data has been submitted to the MN Pollution Control Agency's STORET database (<http://www.pca.state.mn.us/data/edaWater/index.cfm>). The Anoka Conservation District also maintains a database of this water quality data, and additionally has the stream hydrology data (www.AnokaSWCD.org). We do not provide the data in this plan, because it is readily accessible through these sources. The "Assessment of Problems" section of this plan discusses concerns found at some of these monitoring sites.

Table 9. Stream monitoring sites in the SRWMO. Data may be downloaded using data access tools on either the MN Pollution Control Agency or Anoka Conservation District website. (source: Anoka Conservation District)

Water Body	SiteID	STORET Station ID	Chemistry	Hydrology	Municipality	Lat UTM	Long UTM
Boot Lake Inlet	BootLakeInlet	S003-215	Yes	Yes	Linwood	5020391.3	489236.7
Data Creek	DataCreek_TypoCreekDr	S003-220	Yes	Yes	Isanti Co	5029427.9	492434
Ditch 13	Ditch13_Hwy20	S003-573	Yes	Yes	Isanti Co	5030260.3	491227.4
Ditch 13	Ditch13_StraightFork	S003-192	Yes	Yes	Isanti Co	5030407.9	490732.1
Ditch 2	Mickelson_TypoCreekDr	S003-223	Yes	Yes	Linwood	5026027.5	492032.3
Ditch 20	Ditch20_Mattsson	S003-210	Yes	Yes	Isanti Co	5029326.1	490986.2
Ditch 56	Ditch56_Hwy22	S003-214	Yes	Yes	East Bethel	5017849.3	487000.2
Trib of Ditch 13	DogFork_Ditch13	S003-190	Yes	Yes	Isanti Co	5030379	491138.8
Hoffman Creek	HoffmanCreek_Hwy20	S003-209	Yes	No	Isanti Co	5030318.3	494396.2
Island Lake Inlet	IslandLakeInlet	S003-221	Yes	No	Linwood	5023411.8	492301.7
Linwood Lake Inlet	LinwoodLakeInlet	S003-216	Yes	No	Linwood	5021291.1	491056.6
Linwood Lake Outlet	LinwoodLakeOutlet	S003-218	Yes	No	Linwood	5022940.2	492196.1
Martin Lake Inlet	TypoCreek_MartinLake	S003-219	Yes	No	Linwood	5026518.3	492632.1
Martin Lake Outlet	SunriseRiver_MartinLakeOutlet	S003-222	Yes	No	Linwood	5025453.3	493791.5
South Branch Sunrise River	SouthBranchSunriseRiver_HornsbySt	S005-640	No	Yes	Linwood	5019935.9	498034.8
South Martin Lake Inlet	SouthMartinLakeInlet	S003-212	Yes	Yes	Linwood	5024758.1	493061.8
Trib of Ditch 13	StraightFork_Ditch13	S003-213	Yes	Yes	Isanti Co	5030456.2	490752.7
W. Branch Sunrise River	SunriseRiver_Hwy77	S001-424	Yes	Yes	Linwood	5026410	498530.2
Typo Creek	TypoCreek_FawnLakeDr	S003-217	Yes	No	Linwood	5028048.6	492632.7
Typo Creek	TypoCreek_TypoCreekDr	S003-188	Yes	Yes	Linwood	5026542.2	491816
Typo Creek	TypoCreek_TypoCreekDrN	S003-225	Yes	No	Linwood	5027370.9	492146.1
Typo Creek Tributary Ditch	TypoCreekTributary_FawnLakeDr	S004-170	Yes	No	Linwood	5028098.6	492089.3
Typo Lake South East Inlet	TypoLakeSouthEastInlet	S003-224	Yes	No	Linwood	5028065.5	492959.4

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Table 10. Impaired streams in the SRWMO. Impaired streams are also shown in Map 20. (source: 2010 draft 303(d) list of impaired waters, MN Pollution Control Agency).

Reach	Assessment Unit ID #	Affected Use	Pollutant/Stressor
Sunrise River, W. Branch (Typo Lake to Martin Lake)	07030005-563	Aquatic Recreation	pH and turbidity
Sunrise River, W. Branch (Martin Lake to Sunrise Pool 1)	07030005-529	Aquatic Life	pH, turbidity, and biota (fish)

STORMWATER SYSTEM

Natural streams and ditches serve as storm water conveyances for most of the SRWMO, however some areas are served by municipal storm sewer and ponds. Highly-detailed maps of these municipal stormwater conveyance systems are available for the cities of East Bethel and Ham Lake. These maps include all collection pipes, ponds, 100-year flood elevations for ponds, sizing and elevations of all control structures. Columbus is in the process of creating a similar inventory. Linwood Township's records are not organized in the same manner, but this plan requires that each community must have maps of their storm water conveyance system for proper maintenance, permitting, flood studies, stormwater management, watershed modeling, and/or road maintenance and reconstruction. These maps should include the location, size, elevation, and condition of all stormwater conveyances, water quality or quantity treatment features, outfalls, and culverts.

Available stormwater system maps are not provided in this plan, with the exception of Map 17, which provides major water control structures. Detailed records should be obtained directly from the community when needed in order to ensure the most updated information is used.

100 YEAR FLOOD BOUNDARY

The National Flood Insurance Program has mapped the Sunrise River Watershed's flood boundaries as part of the Flood Insurance Studies completed in 1979 and 1980. These studies were based on the conditions at that time. Since most of the development in the watershed has been low density residential, the results of the study should still apply. Map 19 delineates the floodway and fringe areas that would be inundated as a result of a 100-year flood. The delineated floodplain is not a set of static elevations but rather a profile that can be adjusted upward or downward as channel restrictions are removed or ponding areas for retention of water are established.

As part of the Flood Insurance Study, detailed water surface profiles for the West Branch of the Sunrise River were computed through the use of the Corps of Engineers HEC-2 step-backwater computer program. Flood boundaries for the rest of the watershed were

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determined in the Flood Insurance Study by approximate methods using engineering judgment, together with field inspection, aerial photographs, and United States Geological Survey (USGS) topographic maps.

Flood Insurance Study maps are useful tools but have considerable limitations. In this relatively flat watershed, the Flood Insurance Study maps, generated from the USGS topographic maps with 10 foot contour intervals, are not very precise. Therefore, it is not uncommon to find non-floodplain areas mapped as flood hazard areas and flood prone areas that are not included on the map.

Map 19 is for general reference. The Minnesota Department of Natural Resources maintains copies of the Flood Insurance Studies (FIS) for the State of Minnesota. Any determination of whether a property is eligible for the National Flood Insurance Program or located within a floodplain should be accomplished using the FIS for that community.

Three flood insurance studies are available that cover the entire area of the Sunrise River Watershed. They are available for review at each member community's municipal office or at the Anoka Conservation District, and are listed as follows:

1. Anoka County FIS, July 1979, Community ID 270005 (includes Columbus and Linwood Townships).
2. City of East Bethel FIS, November 1979 Community ID 270012.
3. City of Ham Lake FIS, January 1980, Community ID 270674.

Flooding along these watercourses is uncommon. The issue was discussed by the SRWMO Board and during public input sessions for developing this plan, and no flooding problems were identified. In fact, low water is a more noteworthy concern in recent years. Most of the flood-prone lands are undeveloped. In order to keep damages from future floods at a minimum, development in flood-prone areas will be discouraged by the Watershed Management Organization.

SHORELAND REGULATION

Regulatory controls exist in the SRWMO for the protection of water resources. This includes shoreland ordinances (other ordinances discussed later in this plan). Minnesota Rules 6120.2500-3900 require that communities adopt shoreland ordinances consistent with the minimum standards provided in state shoreland rules. These rules are closely tied to the MN DNR waterbody classifications, which are discussed below. Currently, all SRWMO communities have approved shoreland ordinances in place. The Cities of Columbus, East Bethel, and Ham Lake have their own ordinances. Linwood Township utilizes the Anoka County Shoreland ordinance.

LAKES

There are 19 lakes all or partially located within the Sunrise River Watershed (Table 11). Three of these lakes do not meet state water quality standards (Table 12). Eight of these

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lakes have actively managed fisheries. These lakes constitute a major resource of the watershed, providing substantial recreational opportunities for residents and visitors. The watershed's centers-of-activity and greatest concentrations of development are around lakes. Five are major recreational lakes (Coon, Fawn, Linwood, Martin, and Typo). Four fall under the 1837 Treaty establishing tribal fishing and hunting rights (Fawn, Island, Martin, and Typo). This treaty allows the designated tribal bands to harvest fish from lakes within the treaty territory. The MN DNR approves tribal harvesting proposals annually. Currently, no tribal harvesting is occurring on these lakes. Most other lakes in the watershed could be described as large open water wetlands.

Water quality and levels in the major recreational lakes have been monitored regularly. Water quality has been approximately every-other-year, every other week from May to September. Lake levels have been monitored every year on these same lakes, with readings taken weekly. Water levels are also monitored on Pet Lake. All water quality data has been submitted to the MN Pollution Control Agency's STORET database (<http://www.pca.state.mn.us/data/edaWater/index.cfm>). The Anoka Conservation District also maintains a database of this water quality data. Lake level data is submitted to the MN DNR for inclusion on their LakeFinder website (<http://www.dnr.state.mn.us/lakefind/index.html>). In this plan, we provide a short summary of the characteristics of each lake. More detailed data is readily accessible through the sources mentioned above.

Lake Classifications

The SRWMO and MN DNR assign classifications to lakes. Classifications differ based upon the characteristics and use of the lakes. The intensity of management and regulation correspond to the classification.

SRWMO Lake Classes

Group I - Protected Water Resource: A water resource having some or all of the following characteristics: a regional recreational resource; adjacent to a regional park; at least partially encircled by bike or pedestrian trails; used extensively for water contact sports (such as swimming, water-skiing, or sail boarding); has a high demand for boating or sailing; a popular fishing resource (summer or winter); regionally perceived as a valuable amenity by the public; a major water resource; has existing or potential erosion problems within a directly tributary watershed; is a known groundwater recharge area; has an existing water quality problem that requires improvement; is highly accessible by the public. The WMO will be involved extensively in managing the water quality of resources in this group.

Group II – Managed Water Resource: A water resource that has some or all of the following characteristics; is adjacent to a local park; is not more than partially encircled by bike or pedestrian trails; lacks a public swimming beach; is a neighborhood pond with some adjacent public property; supports substantial waterfowl; provides general wildlife habitat; is locally perceived as a valuable amenity by the public; could be used to protect downstream water quality; is an intermediate water resource; has existing or potential erosion problems within a directly tributary watershed; is used for stormwater control; is a known groundwater recharge area; is located along, or is part of, a trunk conveyance system; has a



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desirable objective of the maintenance of existing water quality; is moderately accessible by the public; includes ponds, wetlands, regional stormwater detention basins, streams, and ditches; may warrant limited public maintenance.

In general, water quality management for resources in this group will be the responsibility of member communities. The WMO will be involved extensively with selected resources in the group, however.

Group III – Conservation Water Resource: A water resource that has some of the following characteristics: lacks a public swimming beach; lacks adjacent park lands; is a neighborhood pond without adjacent public property; supports substantial waterfowl; provides general or unusual wildlife habitat; is not easily accessible for maintenance or periodic restoration; is a water resource used for stormwater control; has limited public access; merits the least public concern regarding existing or future water quality; includes on-site or local stormwater detention basins, wetlands, streams, or ditches. Water quality management for resources in this group will be primarily the member communities' responsibility.

MN DNR Lake Classes

MN DNR jurisdiction on public waterbodies is all area below the ordinary high water level (OHW). The OHW is the highest water level which has been maintained for a sufficient period of time to leave evidence upon the landscape. It is not the same as the "normal" water level; it is often higher on the landscape. Some of the lakes have not been surveyed for OHW at this time.

The MN DNR has developed a lake classification system so that appropriate development standards could be applied to lakes. This lake classification system was devised into the following classes based on a combination of factors.

Natural Environment Lakes (NE) usually have less than 150 total acres, less than 60 acres per mile of shoreline, and less than three dwellings per mile of shoreline. They may have some winterkill of fish; may have shallow, swampy shoreline; and are less than 15 feet deep.

Recreational Development Lakes (RD) usually have between 60 and 225 acres of water per mile of shoreline, between 3 and 25 dwellings per mile of shoreline, and are more than 15 feet deep.

General Development Lake (GD) usually have more than 225 acres of water per mile of shoreline and 25 dwellings per mile of shoreline, and are more than 15 feet deep.

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Table 11. Lake classifications, management designations, and ordinary high water (OHW) elevations. NA = not available. (source: MN DNR)

Lake	ID #	Size (acres)	Ordinary High Water Level	MN DNR Fisheries Mgmt Classification	MN DNR Ecological Classification	WMO Group	MN DNR Shoreland Lake Class
Anderson	2-63P	84	NA	NA	NA	III	NE
Boot	2-28P	130	NA	Centrarchid	42	II	NE
Coon	2-42P	1498	904.75	Centrarchid (panfish)	41	I	GD
Devil	2-58P	103	NA	Game	NA	III	NE
Fawn	2-35W	57	902.2	Centrarchid	36	I	NE
Goose	2-62P	257	NA	NA	NA	III	NE
Higgins	2-2P	103	NA	NA	NA	II	NE
Island	2-22P	66.7	895.4	Centrarchid	36	I	NE
Linwood	2-26P	559	900	Centrarchid	38	I	RD
Little Coon	2-32P	486	NA	Game	NA	III	NE
Martin	2-34P	234	892.7	Centrarchid	34	I	GD
Mud	2-37W	31	898.7	NA	NA	III	NOTSL
Pet	2-36W	19	901.0	NA	NA	III	NOTSL
Rice	2-43P	255	NA	NA	NA	III	NE
Ryan	2-40W	30	NA	NA	NA	III	NOTSL
South Coon	2-48W	48	NA	NA	NA	I	NE
Tamarack	2-21P	120	NA	Game (animals)	43	III	NE
Typo	30-9P	273	894.5	Roughfish-Game fish	43	I	RD
Unnamed	2-23W	10	NA	NA- spawning area	NA	III	NOTSL

GD = General Development, RD = Recreational Development, NE = Natural Environment, NOTSL = Not regulated by shoreland rules.

Table 12. Impaired lakes in the SRWMO. Impaired lakes are also shown in Map 20. (source: 2008 303(d) list of impaired waters, MN Pollution Control Agency).

Lake	Assessment Unit #	Affected Use	Pollutant/Stressor
Coon	02-0042-00	Aquatic Consumption	Mercury Fish Consumption Advisory
Linwood	02-0026-00	Aquatic Recreation	Excess Nutrients
Martin	02-0034-00	Aquatic Recreation	Excess Nutrients
Typo	30-0009-00	Aquatic Recreation	Excess Nutrients

Parameters and Indices for Evaluating Lake Water Quality

The following are the main parameters are used to evaluate water quality.

Total Phosphorus – Phosphorus is an essential nutrient that stimulates growth of algae. In lakes elevated phosphorus levels result in increased algae populations, which reduce water clarity, deplete dissolved oxygen levels from algae decay which impact fish populations, and degrade aesthetics for recreation. Sources of phosphorus include runoff from agricultural land, runoff from lakeshore and upland properties carrying fertilizer and untreated human waste from failing septic systems, pet wastes, stormwater runoff, and in-lake sources that resuspend phosphorus stored in the lake bed (example - rough fish). In the North Central Hardwood Region, the MN Pollution Control Agency’s water quality standard is a summertime average total phosphorus of <40µg/L, or <60µg/L for shallow lakes. Shallow lakes have a maximum depth of 15 feet or less and/or 80 percent or more of the lake is less than 15 feet (littoral).

Chlorophyll-a – This parameter is used to evaluate the concentration of algae in the water column. Chlorophyll-a is the inorganic portion of all green plants that absorb the light needed for photosynthesis. Like total phosphorus, Cl-a is directly related to the secchi disk measurements; higher concentrations of algal material will result in reduced the water clarity. The MN Pollution Control Agency’s water quality standard is a summertime average chlorophyll-a <15µg/L.

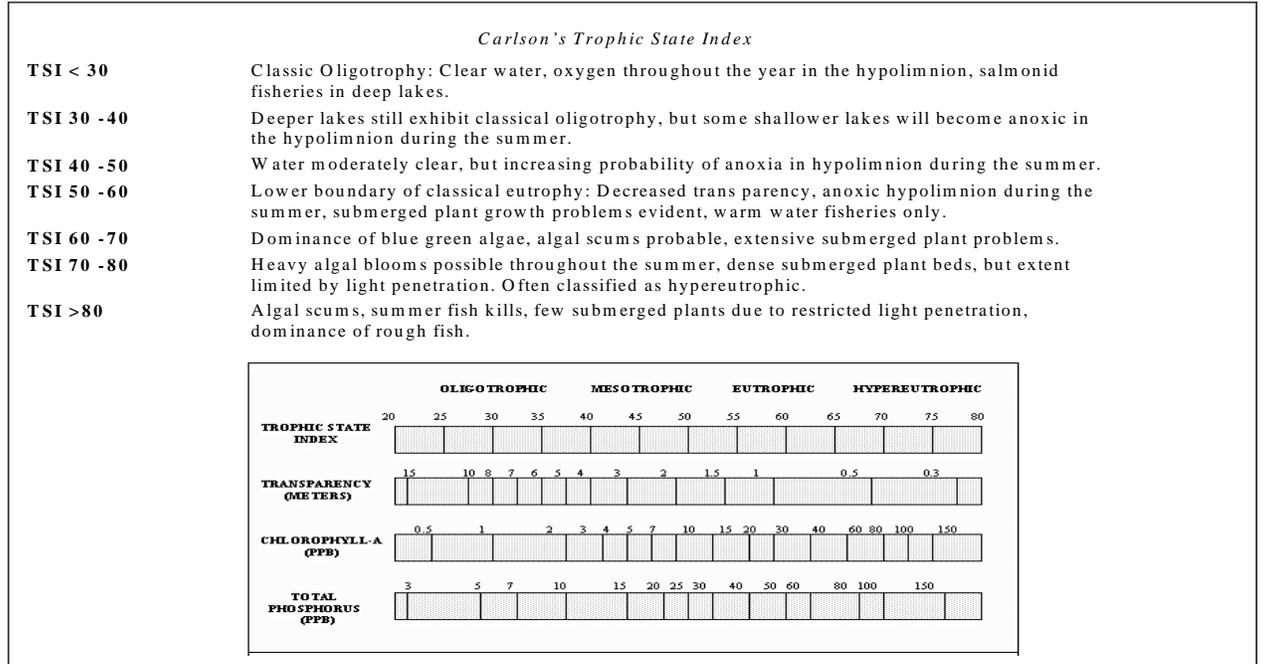
Secchi Transparency – The secchi disk is an instrument that measures the transparency or clarity of the lake. Transparency is directly related to the amount of algae and suspended solids in the water column. Shallow measurements indicate high algae and/or suspended solids concentrations. In the North Central Hardwood Region, the MN Pollution Control Agency’s water quality standard is a summertime average secchi transparency >1.2 meters (3.9 ft).

Trophic State Index (TSI) – Carlson’s Trophic Sate Index is an index to show the stage of eutrophication (nutrient load stage) for a lake (Figure 1). The index ranges from oligotrophic (clear, nutrient poor lakes) to hypereutrophic (green, nutrient

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overloaded lakes). The index values generally range between 0 and 100 with increasing values indicating more eutrophic conditions. The Trophic State Index is based on a total phosphorus, chlorophyll-a, and secchi transparency measurements. In the North Central Hardwood Region, the MN Pollution Control Agency's water quality standard is a summertime TSI <57.

Figure 1 Carlson's Trophic State Index



Lake Descriptions

Summaries of lakes are found below. The summaries include a description of the lake and summary of water quality data. Additional information is available through the MN DNR's LakeFinder website (<http://www.dnr.state.mn.us/lakefind/index.html>). The larger recreational lakes are described first, followed by the smaller waterbodies in alphabetical order.

COON LAKE *Cities of E. Bethel, Ham Lake & Columbus, Lake ID # 02-0042*

General Characteristics

Coon Lake is the county's largest lake. Coon Lake has a surface area of 1498 acres and a maximum depth of 27 feet (9 m). The majority of the lake (80%) is shallower than 15 feet. Public access is available at two locations with boat ramps including one park with a swimming beach. The lake is used extensively by recreational boaters and anglers. Most of the lake is surrounded by private residences. The watershed of 6,616 acres is rural residential. Both curly-leaf pondweed and Eurasian watermilfoil are known to occur in this lake. The MN DNR has classified Coon Lake as a general development lake and it is classified as a Group I lake by the WMO.

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Coon Lake has a long history of water level control issues, both due to high and low water. Beginning in 1934 (dust bowl era) there were low water concerns. In 1948, the MN DNR constructed a dam at the outlet of Coon Lake. This dam consists of a semi-circular weir, with a crest elevation of 903.28 feet to 903.46 feet. Water discharges over the weir and into 30" RCP arch culverts. In 1996 the ditch upstream and downstream of the weir was cleaned. Low water level complaints followed. In 1999 the State Legislature directed the MN DNR to conduct a feasibility study of raising lake water levels (available at http://files.dnr.state.mn.us/waters/surfacewater_section/tech/coonlkfeasrep25.pdf). As a result of that process, in 2001 a steel v-notch weir was added at the top the existing concrete weir. The bottom of the v-notch is at the same elevation as the original weir.

Two recent issues for Coon Lake are the exotic, invasive plant Eurasian Watermilfoil (EWM) and the idea of adding municipal sanitary sewer and water services around the lake. EWM was confirmed in the lake in 2003 and has expanded rapidly. In 2008 a Coon Lake Improvement District was formed, with EWM management as a core of its function. Eradication is not possible. Residents can best prevent the spread of EWM by not disturbing or removing the native plants.

In recent years cities have begun working toward sanitary sewer and water service improvements around the lake. East Bethel is pursuing municipal sanitary sewer and water. Ham Lake is pursuing a community septic system for the Interlachen neighborhood. One reason for adding this service is that there are suspected to be many septic system problems around the lake, especially in the Coon Lake Beach and Interlachen neighborhoods.

While this lake is not listed as "impaired" by the MN Pollution Control Agency, it is close to their criteria of 40 µg/L phosphorus (2006 was 42 and 2008 was 37 µg/L). The primary threats to Coon Lake include EWM, poor lakeshore management by property owners, and failing lakeshore septic systems. Residents should also increase the use of shoreline practices that improve water quality and lake health, such as native vegetation buffers and rain gardens. On a community level, correcting problem septic systems, perhaps by adding municipal sanitary sewer services, would likely be beneficial to the lake.

Fisheries

The most recent DNR fish survey occurred in June 2005. The following is a summary of that survey from the MN DNR:

"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 [and in 2006] 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.

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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."

More recently, the MN DNR has expanded walleye stocking to include 550 pounds of large walleye fingerlings per year.

Most Recent Water Quality Results

In 2008 Coon Lake had average water quality for this region of the state (NCHF Ecoregion), receiving an overall C grade. This was similar to other years, but on the poorer end of this distribution. The lake is slightly eutrophic. In May water was brown or green, but improved to a clearer condition with less algae in June. Algae progressively increased from July to early September, causing a green water color. ACD staff's subjective observations were that "definite" or "high" algae levels occurred at this time, causing some swimming impairment. Conditions were worst in August.

Water Quality Trend Analysis

Thirteen years of water quality data have been collected by the Metropolitan Council (1980, '84, '94, '97), the Minnesota Pollution Control Agency (1989), and the Anoka Conservation District (1998-2002, '04, '06, '08). No water quality trend exists when all of the data are analyzed (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth, $F_{2,10}=1.58$, $p=0.25$). However, it is worth noting that water quality improvements did occur between 1989 and 1994 when no monitoring occurred. Earlier trend analyses detected this improvement. Since 1994, water quality has remained similar among years.

Table 13. Coon Lake historical water quality summary. Numbers shown are summertime averages. (source: Anoka Conservation District)

Coon Lake Historic Summertime Mean Values													
Agency	MC	MC	MPCA	MC	MC	ACD							
Year	80	84	89	94	97	98	99	2000	2001	2002	2004	2006	2008
TP	40.0	50.0	51.0	33.0	34.0	29.8	20.6	25.8	42.3	29.6	33.7	41.7	36.8
Cl-a	28.3	16.2	13.1	15.7	14.5	14.4	9.4	14.6	17.6	14.8	16.6	17.6	19.5
Secchi (m)	1.18	1.50	1.76	1.85	1.39	1.76	2.26	2.04	1.82	1.90	1.81	1.80	1.55
Secchi (ft)	3.9	4.9	5.8	6.1	4.6	5.8	7.4	6.7	6.0	6.2	5.9	5.8	5.1
Carlsons trophic state indices													
TSIP	57	61	61	55	55	53	48	51	58	53	55	58	56
TSIC	63	58	56	58	57	57	53	57	59	57	58	59	60
TSIS	58	54	53	51	55	52	48	50	51	51	51	52	54
TSI	59	58	57	54	56	54	50	53	56	54	55	56	57
Coon Lake Water Quality Report Card													
Year	80	84	89	94	97	98	99	2000	2001	2002	2004	2006	2008
TP	C	C	C	C	C	B	A	B	C	B	C	C	C
Cl-a	C	B	B	B	B	B	A	B	B	B	B	B	B
Secchi	D	C	C	C	C	C	B	C	C	C	C	C	C
Overall	C	C	C	C	C	B	A	B	C	B	C	C	C

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FAWN LAKE

Linwood Township, Lake ID # 02-0035

General Characteristics

Fawn Lake has a surface area of 57 acres and a maximum depth of 30 feet (10 m). There is no public access to this lake and no public boat landing. A neighborhood association has established a small park and swimming beach for the homeowners, and a private boat access. Most of the lake is surrounded by private residences, with the densest housing on the southern and western shores. The watershed for this lake is quite small, consisting mostly of the area within less than ¼ mile of the basin. Curly-leaf pondweed is known to occur in this lake, and is abundant in some areas. The MN DNR has classified Fawn Lake as a natural environment lake and it is classified as a Group I lake by the WMO.

Groundwater probably feeds this lake to a large extent. The lake has no significant incoming or outflowing streams. The groundwater contributions to this lake and its small watershed probably contribute to its exceptionally good water clarity. The highest known water level for the lake is 902.95.

Fisheries

The most recent DNR fish survey occurred in July 1998. The following is a summary of that survey from the MN DNR:

“The fish population of Fawn Lake was dominated by bluegill. One-third of the fish were over 6 inches in length, but none reached 7 inches. Other panfish species present in low numbers included pumpkinseed, hybrid, and green sunfish as well as black crappie and yellow perch. Northern pike were abundant with some larger individuals present. Largemouth bass appeared to be moderately abundant.”

Most Recent Water Quality Results

In 2008 Fawn Lake had excellent water quality for this region of the state (NCHF Ecoregion), receiving an overall A grade. This mesotrophic lake has some of the clearest water in the county. Clarity was best in May at an impressive 19 feet, but decreased 6-8 feet by June, coinciding with a brief increase in algae growth that was too mild to be noticed by most lake users. This algae growth could have been associated with the seasonal die-off and decomposition of curly-leaf pondweed. Clarity was maintained at 10-14 feet for the remainder of summer. ACD staff's subjective observations of the lake's physical characteristics and recreational suitability were that conditions were excellent for swimming and boating throughout the summer.

Water Quality Trend Analysis

Ten years of water quality data have been collected by the Minnesota Pollution Control Agency (1988) and the Anoka Conservation District (1997-2008). Water quality has significantly improved from 1988 to 2008 (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth, $F_{2,7}=5.8$, $p=0.03$). The trend is driven by poorer quality, specifically high chlorophyll-a and low transparency, in 1988. If 1988 data is excluded from the analysis, no changes in water quality have occurred.

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Table 14. Fawn Lake historical water quality summary. Numbers shown are summertime averages. (source: Anoka Conservation District)

Fawn Lake Historic Summertime Mean Values										
Agency	MPCA	ACD								
Year	88	97	98	99	2000	2001	2002	2004	2006	2008
TP	23.0	13.6	41.6	18.0	16.3	21.7	17.4	19.4	30.0	18.0
Cl-a	29.4	5.0	3.4	3.1	7.5	5.2	5.1	2.4	3.5	3.7
Secchi (m)	2.30	4.48	4.05	4.80	4.42	3.76	3.80	4.30	3.80	4.10
Secchi (ft)	7.5	14.7	13.3	15.7	14.5	12.3	12.5	14.1	12.6	13.5
Carlson's Trophic State Indices										
TSIP	49	42	58	46	44	49	45	47	53	46
TSIC	64	46	43	42	50	47	47	39	43	44
TSIS	48	38	40	37	39	41	41	39	41	40
TSI	54	42	47	42	44	45	44	42	46	43
Fawn Lake Water Quality Report Card										
Year	88	97	98	99	2000	2001	2002	2004	2006	2008
TP	B	A	C	A	A	A	A	A	B	A
Cl-a	C	A	A	A	A	A	A	A	A	A
Secchi	A	A	A	A	A	A	A	A	A	A
Overall	B	A	B	A						

ISLAND LAKE

Linwood Township, Lake ID #02-0022

General Characteristics

Located between Linwood and Martin Lake, Island Lake has a lake area of 66.7 acres, maximum depth of 22 feet. The inlet of the lake receives discharge from Linwood Lake through a 64" RCP culvert. Island Lake then discharges through a creek to Martin Lake. The highest known water level for the lake is 896.33. County park properties boarder much of the lake. A small swimming beach is provided to the public on the east shore. A dirt boat launch is on the south shore, but it can only accommodate small boats and canoes. There are no homes an Island Lake. The MN DNR has classified Island Lake as a natural environment lake and it is classified as a Group I lake by the WMO.

Fisheries

The most recent DNR fish survey occurred in July 2000. The following is a summary of that survey from the MN DNR:

“Island Lake is a small (66.7 acres) basin in the middle of a subwatershed of the Sunrise River. Linwood Lake is immediately upstream and Martin Lake is downstream. Fish are known to move between the three lakes.

Bluegill were present in average numbers for this type of lake. Over 40% of the fish were at least 7 inches long and 5.9% were at least 8 inches long. Catch in 1995 and 2000 were similar, much higher than in previous assessments.

Black and white crappie were average in abundance. White crappie had a higher average size, with one-third of the fish over 10 inches long compared to 4.3% of the black crappie.

Northern pike, walleye, and largemouth bass were present in low numbers. A few northern pike were between 25 and 28 inches long. Walleye were between 17 and 21 inches long. Largemouth bass sampled were small, less than 12 inches long.

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Black, brown, and yellow bullhead were present in low numbers with most over 10 inches long. Bowfin, carp, and white sucker were present in average numbers.”

Most Recent Water Quality Results

In 2008 Island Lake had good water quality for this region of the state (NCHF Ecoregion), receiving an overall B grade. Clarity was best in May at 8 feet, and lowest in July at 2.3 feet. Average summertime phosphorus was 27 µg/L, which is better than the state standard of 40 µg/L.

Water Quality Trend Analysis

Seven years of water quality data have been collected by the Anoka County Parks Department through the Metropolitan Council’s Citizen Assisted Monitoring Program (1983, 2003-2008). Water quality has not significantly changed from 1983 to 2008 (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth, $F_{2,3}=1.07$, $p=0.45$).

Table 15. Island Lake historical water quality summary. Numbers shown are summertime averages. (source: Anoka Conservation District)

Island Lake Historic Summertime Mean Values

Agency

Year	83	03	04	05	06	07	08
TP	35.7	31.5	33.8	39.2	39.5	25.9	27.1
Cl-a		9.4	7.6	12.0	10.8	7.6	11.1
Secchi (m)	1.30	1.60	1.80	1.70	1.50	1.60	1.40
Secchi (ft)	4.3	5.2	5.9	5.6	4.9	5.2	4.6

Carlsons trophic state indices

TSIP	56	54	55	57	57	51	52
TSIC		53	51	55	54	51	54
TSIS	56	53	52	52	54	53	55
TSI		53	52	55	55	52	54

Island Lake Water Quality Report Card

Year	83	03	04	05	06	07	08
TP	C	B	C	C	C	B	B
Cl-a	C	B	A	B	B	B	B
Secchi	C	C	C	C	C	C	C
Overall	C	B	B	C	C	B	B

LINWOOD LAKE

Linwood Township, Lake ID # 02-0026

General Characteristics

Linwood Lake has a surface area of 559 acres and maximum depth of 42 feet (12.8 m). Public access is available on the north side of the lake at Martin-Island-Linwood Regional Park, and includes a boat landing and fishing areas. The lake’s shoreline is about 1/3 developed and 2/3 undeveloped. Most of the undeveloped shoreline is on the eastern shore and is part of a regional park. The lake’s watershed is primarily vacant with scattered residential. Curly-leaf pondweed is known to occur in this lake,

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and is abundant in some areas. The MN DNR has classified Linwood Lake as a general development lake and it is classified as a Group I lake by the WMO.

Linwood Lake is on the Minnesota Pollution Control Agency's 303(d) list of impaired waters for excess nutrients. There have been discussions that this designation should be reconsidered because (a) the lake only exceeds the 40 µg/L water quality standard in some years and (b) the lake probably meets the MPCA's definition of a "shallow lake" and does not exceed water quality standards for shallow lakes.

Linwood Lake receives inlet flow from Boot Lake and outlets to Island Lake. A dam controls the outlet from Linwood Lake. The dam, which was built in 1924, is presently owned and operated by Anoka County. Information provided by the MN DNR shows that the Linwood Lake dam has a spillway crest elevation of 898.9 to 899.1. The highest known water level for the lake is 900.27.

It is likely that factors degrading water quality originate from the lake itself, activities within the roughly 1/3 of the shoreline that is developed, or other portions of the lake's direct watershed. The primary inlet to Linwood Lake comes from Boot Lake, a scientific and natural area, and it is likely that this water is of high quality. Threats to this lake may include rough fish, failing shoreland septic systems, poor lakeshore lawn care practices, and natural sources such as nutrient-rich lake sediments. High powered boats may be impacting water quality by disturbing sediments; the lake is mostly shallow but the public access accommodates large boats.

Fisheries

The most recent DNR fish survey occurred in July 2004. The following is a summary of that survey from the MN DNR:

"Linwood Lake is primarily managed for walleye (WAE), but it presently contains an above average population of northern pike (NOP) exhibiting a good size structure. Northern pike were sampled in the 2004 assessment at the highest catch rate observed on this lake since 1979, and more than double the recorded level in 1999. The average size NOP captured was 24.1 inches and 3.2 pounds, and 15% of all sampled fish measured 28.0 inches or larger. Grow rate for NOP is good. Only two WAE were captured during this assessment representing the lowest catch rate for this species since 1985. Both WAE sampled were stocked prior to the year 2000 and averaged 20.0 inches and 2.9 pounds. Yellow perch were sampled above the median level for abundance but small in average size (6.0 inches and 0.1 pounds). Black crappie (BLC) were sampled above the median level for abundance in gill nets, but at a level 2.5 times lower than that observed in 1999. Sampled BLC averaged only 7.1 inches and 0.1 pounds. Bluegill (BLG) were captured in trap nets at the highest catch rate since 1985, but averaged only 5.3 inches and 0.1 pounds each. Approximately 11% of the BLG captured measured 7.0 inches or larger. Growth rates for BLG and BLC are average."

Most Recent Water Quality Results

In 2007 Linwood Lake had average or slightly below average water quality for this region of the state (NCHF Ecoregion), receiving an overall C grade. The lake is slightly eutrophic. In 2007 water quality in late summer was disappointingly worse



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than the other most recent years. At that time of year phosphorus levels were high (maximum 77 µg/L) and a substantial algae bloom developed (maximum chlorophyll-a 51 mg/L). ACD staff's subjective observations of the lake's physical characteristics were that there was a "definite" algae presence until July when algae levels became "high." The lake went from "slightly swimming impaired" to a staff subjective assessment of "no swimming, boating ok." Still, when compared to all data over the last 10 years, it seems that the severity of the 2007 late summer algae bloom is not particularly unusual. Seven of the last 10 years have been monitored, and the maximum total phosphorus and chlorophyll-a has been higher than 2007 in two of those years.

Water Quality Trend Analysis

Thirteen years of water quality data have been collected by the Metropolitan Council (1980, '81, '83, '89, '94, and '97) and the ACD (1998-2001, 2003, 2005, and 2007). Water quality has not significantly changed from 1980 to 2007 (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth; $F_{2,10}=0.78$, $p=0.49$).

Table 16. Linwood Lake historical water quality summary. Numbers shown are summertime averages. (source: Anoka Conservation District)

Linwood Lake Summertime Historic Mean									
	CAMP	MC	MC	MC	CAMP	CAMP	MC	MC	CAMP
Agency	75	80	81	83	85	88	89	94	95
TP		30.0	28.5	40.7			64.8	43.3	
Cl-a		20.0	32.0	37.9			25.1	18.3	
Secchi (m)	0.64	1.30	1.70	1.20	0.82	1.17	1.12	1.45	0.96
Secchi (ft)	2.1	4.3	5.6	3.9	2.7	3.8	3.7	4.8	3.2
Carlson's Tropic State Indices									
TSIP		53	52	58			64	58	
TSIC		60	65	66			62	59	
TSIS	66	56	52	57	63	58	58	55	61
TSI		57	57	60			62	57	
Linwood Lake Water Quality Report Card									
Year	75	80	81	83	85	88	89	94	95
TP		A	B	C			B	A	
Cl-a		A	A	A			A	A	
Secchi	F	A	A	A			A	A	
Overall		B	C	C			C	C	
Linwood Lake Water Quality Report Card									
	CAMP	MC	ACD						
Agency	96	97	98	99	2000	2001	2003	2005	2007
TP		40.6	41.8	31.6	33.4	46.6	34.2	34.0	47.4
Cl-a		34.4	37.8	20.4	22.4	16.1	19.4	15.3	28.3
Secchi (m)	0.82	1.06	0.85	1.62	1.57	1.39	1.32	1.4	1.2
Secchi (ft)	2.7	3.5	3.1	5.3	4.4	4.6	4.3	4.6	3.9
Carlson's Tropic State Indices									
TSIP		58	58	54	54	59	55	55	60
TSIC		65	66	60	61	57	60	57	63
TSIS	63	59	62	53	55	56	56	55	57
TSI		61	62	56	57	57	57	56	60
Linwood Lake Water Quality Report Card									
Year	96	97	98	99	2000	2001	2003	2005	2007
TP		C	C	A	A	C	C	C	C
Cl-a		A	A	A	A	B	B	B	C
Secchi		A	A	A	A	C	C	C	C-
Overall		C	C	C	C	C	C	C	C

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MARTIN LAKE

Linwood Township, Lake ID # 02-0034

General Characteristics

Martin Lake is located in the northeast portion of Anoka County. Martin Lake has a surface area of 223 acres and maximum depth of 20 ft (6.1 m). Public access is available on the southern end of the lake. The lake is used moderately by recreational boaters and fishers, and would likely be used more if water quality were improved. Martin Lake is almost entirely surrounded by private residences. The 5402 acre watershed is 18% developed, with the remainder being vacant, agricultural, or wetlands. Martin is on the Minnesota Pollution Control Agency's (MPCA) list of impaired waters for excess nutrients. Curly-leaf pondweed is known to occur in this lake. The MN DNR has classified Martin Lake as a general development lake and it is classified as a Group I lake by the WMO.

Martin Lake, along with Typo Lake and the section of Typo Creek between the lakes, are the subject of a Total Maximum Daily Load (TMDL) study that is expected to be completed in 2010. The largest nutrient source to Martin Lake is Typo Creek (water from Typo Lake). Phosphorus reductions needed to reach water quality standards are >80%.

Martin Lake is located between Typo and Island Lakes. Martin Lake receives water from Typo Lake through Typo Creek at its north inlet. Water entering the south inlet comes from Island, Linwood, and Boot Lakes (downstream to upstream order of the chain of lakes). Martin Lake discharges from the east side of the lake to the West Branch of the Sunrise River via a concrete dam constructed in 1938. The dam consists of 3 bays each 5 feet wide. The highest known water level for the lake is 894.67.

Fisheries

The most recent DNR fish survey occurred in June 2004. The following is a summary of that survey from the MN DNR:

“Martin Lake is primarily managed for walleye and is currently stocked annually with fry at a rate of 2,000 fish per littoral acre (280,000 fry). Walleye were sampled at median levels for abundance with the average fish being 14.1 inches and 0.9 pounds. The 2001 year class made up 46.7% of all walleye captured in this survey. Northern pike were sampled within the normal range for abundance and at the highest gill net catch rate measured on this lake since 1979. The average northern pike caught was 23.2 inches and 2.6 pounds. Approximately 20.0% of sampled NOP measured 25.0 inches or larger. Yellow perch were sampled within the normal range for abundance with the average individual being approximately 8.0 inches and 0.25 pounds. Both black and white crappie were sampled within the normal range for abundance with White crappies comprised approximately 25% of the total catch. Black crappies averaged 8.9 inches and 0.4 pounds, while white crappies averaged 9.2 inches and 0.4 pounds. Bluegills were sampled in the highest abundance ever recorded for this lake. The average bluegill measured 7.64 inches and 0.4 pounds. Growth rate for all species is average.”

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Most Recent Water Quality Results

In 2007 Martin Lake had poor water quality compared to other lakes in the North Central Hardwood Forest Ecoregion (NCHF), receiving a D letter grade. This eutrophic lake has chronically high total phosphorus and chlorophyll-a, and some of the poorest water quality in the county. 2007 had some of the worst water quality of all years monitored. Average total phosphorus (135 µg/L) was the highest of 9 years that it has been monitored and chlorophyll-a was the third worst. Secchi transparency was the second worst of 27 years that it has been monitored. Water quality was poor until late August, when it worsened. The conditions in Martin Lake were reflective of conditions in upstream Typo Lake, which drains into Martin Lake. Typo Lake has severe water quality problems, and was especially bad in 2007, likely because of internal loading driven by low water conditions caused by drought.

ACD staff's subjective perceptions of the lake's physical characteristics and recreational suitability were that "high" algae made the lake unsuitable for swimming during the entire monitored period from May through September. In some other years, such as 2005, water quality was much better in spring and early summer.

Water Quality Trend Analysis

Nine years of water quality data have been collected by the Minnesota Pollution Control Agency (1983), Metropolitan Council (1998), and ACD (1997, 1999-2001, 2003, 2005, 2007). Citizens monitored Secchi depths 17 other years. Anecdotal notes from DNR fisheries data indicate poor water quality back to at least 1954. A water quality change from 1983 to 2005 is detectable with statistical tests (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth; $F_{2,6}=5.69$, $p=0.04$). However, further examination of the data shows a mixture of changes, some indicating improvement and other indicating deterioration. In the end, it is concluded that no true trend is present. This lake's water quality needs improvement regardless.

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Table 17. Martin Lake historical water quality summary. Numbers shown are summertime averages. (source: Anoka Conservation District)

Martin Lake Summertime Historic Means															
Agency	CLMP	CLMP	CLMP	MPCA	CLMP	CLMP	CLMP								
Year	75	76	77	83	84	85	86	87	88	89	90	91	92	93	94
TP				79.6											
Cl-a				75.4											
Secchi (m)	0.73	0.49	0.85	0.78	0.75	0.90	1.05	0.81	1.11	0.93	1.07	0.89	0.82	1.05	1.00
Secchi (ft)	2.4	1.6	2.8	2.6	2.5	3.0	3.4	2.7	3.6	3.1	3.5	2.9	2.7	3.4	3.3
Carlson's Tropic State Indices															
TSIP				67											
TSIC				73											
TSIS	65	70	62	64	64	62	59	63	58	61	59	62	63	59	60
TSI				68											
Martin Lake Water Quality Report Card															
Year	75	76	77	83	84	85	86	87	88	89	90	91	92	93	94
TP				D											
Cl-a				D											
Secchi	D	F	D	D	D	D	D	D	D	D	D	D	D	D	D
Overall				D											
Martin Lake Water Quality Report Card (continued)															
Agency	CLMP	CLMP	ACD	MC	ACD	ACD	ACD	CLMP	ACD	CLMP	ACD	ACD	ACD		
Year	95	96	97	98	99	2000	2001	2002	2003	2004	2005	2006	2007		
TP			88.0	80.0	61.7	89.4	95.4		81.9		100		135.0		
Cl-a	1.02	0.98	0.61	0.97	1.80	0.88	0.78	0.93	0.90	0.85	1.00	0.97	0.5		
Secchi (m)	3.4	3.22	2.0	3.3	5.3	2.9	2.6	3.1	3.0	2.8	3.3	3.2	1.7		
Secchi (ft)															
Carlson's Tropic State Indices															
TSIP			69	67	64	68	69		68		71		75		
TSIC			73	71	59	67	63		68		68		72		
TSIS	60	60	67	60	52	63	65	65	62	62	60	60	70		
TSI			70	66	58	66	66		66		66		72		
Martin Lake Water Quality Report Card (continued)															
Year	95	96	97	98	99	2000	2001	2002	2003	2004	2005	2006	2007		
TP			D	D	C	D	D		D		D		D		
Cl-a	D	D	F	D	C	D	D	D	D	D	D	D	F		
Secchi			D	D	C	D	D	D	D	D	D	D	D		

TYPO LAKE Linwood Township and Isanti County, Lake ID # 03-0009

General Characteristics

Typo Lake is located in the northeast portion of Anoka County and the southeast portion of Isanti County. It has a surface area of 290 acres and maximum depth of 6 feet (1.82 m), though most of the lake is about 3 feet deep. The lake has a mucky, loose, and unconsolidated bottom in some areas, while other areas have a sandy bottom. Public access is at the south end of the lake along Fawn Lake Drive. The lake is used very little for fishing or recreation because of the shallow depth and extremely poor water quality. The lake's shoreline is mostly undeveloped, with only 21 homes within 300 feet of the lakeshore. The lake's watershed of 11,520 acres is 3% residential, 33% agricultural, 28% wetlands, with the remainder being forested or grassland. Typo Lake is on the Minnesota Pollution Control Agency's (MPCA) list of impaired waters for excess nutrients. The MN DNR has classified Typo Lake as a recreational development lake and it is classified as a Group I lake by the WMO.

Typo Lake, along with Martin Lake and the section of Typo Creek between the lakes, are the subject of a Total Maximum Daily Load (TMDL) study that is expected to be completed in 2009. The largest nutrient sources to Typo Lake are Data Creek and internal loading (carp, wind mixing, etc). Phosphorus reductions needed to reach water quality standards are >80%.

Typo Lake outlets to Typo Creek through a double culvert under Fawn Lake Drive. The lake continuously discharges water, even in dry conditions when inflows are

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minimal, suggesting some groundwater discharges into the lake do occur. Some resident complaints of low water levels have been received, and at times there have been attempts to illegally block the outlet to create higher water levels. The highest known water level for the lake is 896.65.

Fisheries

The most recent DNR fish survey occurred in June 2004. The following is a summary of that survey from the MN DNR:

“Black bullhead continue to be the most abundant species found in Typo Lake but their numbers have dropped since the previous survey. Black crappies were the second most abundant species. Their numbers are also down since the last survey, but are still within the normal range for this type of lake. Crappies up to 15 inches were sampled. Bluegills were sampled in their highest abundance during the survey. The average length sampled was 7.5 inches. Over 80% of the bluegills captured exceeded 7 inches. Northern pike were taken in low numbers and were of average size. Walleyes numbers were low but those sampled were of a size anglers prefer.”

Carp are a dominant feature of Typo Lake’s fishery. Carp are the largest percentage of the fish community by biomass (33%). Carp activity (jumping, splashing, etc) is readily seen on any visit to the lake. Carp, as well as other rough fish, likely have a strong effect on water quality.

Most Recent Water Quality Results

In 2007 Typo Lake had extremely poor water quality compared to other lakes in this region (NCHF Ecoregion), receiving an overall F letter grade. This is the same letter grade as the previous ten years monitored, but 2007 was the worst of all. Average total phosphorus, chlorophyll-a, and Secchi transparency were the worst ever recorded. A bright white Secchi disk could be seen only 3 to 8 inches below the surface. The reason for the especially poor conditions in 2007 seems to be drought-induced low water levels. The lake’s major inlet was monitored in 2007 and found to be similar to previous years or better. During drought it seems that internal loading (wind, rough fish, etc) builds nutrients and algae to very high levels because there is little flushing by storm water. Phosphorus and algae levels dropped by more than half when drought ended and ample rains fell in late August and September.

Water Quality Tend Analysis

Eleven years of water quality monitoring have been conducted by the Minnesota Pollution Control Agency (1993, '94, and '95) and the Anoka Conservation District (1997-2001, 2003, 2005, 2007). Water quality has not significantly changed from 1993 to 2007 (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth, $F_{2,8}=3.74$, $p=0.07$). Minnesota DNR fisheries data has anecdotal notes of severe algae blooms back to the earliest records in 1960. Locals familiar with the lake before 1960 indicate that the lake used to have better water quality, had aquatic plants including abundant wild rice, and was heavily used by waterfowl.

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Table 18. Typo Lake historical water quality summary. Numbers shown are summertime averages. (source: Anoka Conservation District)

Lake Typo Summertime Historic Mean													
Agency	CLMP	CLMP	MPCA	MPCA	MPCA	ACD							
Year	74	75	93	94	95	97	98	99	2000	2001	2003	2005	2007
TP			172.0	233.0	185.6	168.0	225.7	202.1	254.9	256.0	209.8	204	340.5
Cl-a			88.1	172.8	119.6	177.8	134.7	67.5	125.3	136.0	102.5	84.7	200.9
Secchi (m)	0.23	0.27	0.43	0.29	0.38	0.27	0.21	0.25	0.18	0.19	0.3	0.2	0.1
Secchi (ft)	0.2	0.3	1.4	1.0	1.3	0.9	0.7	0.8	0.6	0.6	0.9	0.6	0.4
Carlson's Tropic State Indices													
TSIP			78	83	79	78	82	81	83	82	81	81	88
TSIC			75	81	78	82	79	72	74	77	76	74	83
TSIS	81	79	72	78	74	79	82	80	86	85	77	83	93
TSI			75	81	77	79	81	78	81	81	78	79	88
Lake Typo Water Quality Report Card													
Year	74	75	93	94	95	97	98	99	2000	2001	2003	2005	2007
TP			F	F	F	F	F	F	F	F	F	F	F
Cl-a			F	F	F	F	F	D	F	F	F	F	F
Secchi	F	F	F	F	F	F	F	F	F	F	F	F	F
Overall			F										

ANDERSON LAKE

City of East Bethel, Lake ID #02-0063

Anderson Lake is 84 acres and discharges to Coon Lake through County Ditch 56. The MN DNR has classified Anderson Lake as a natural environment lake and it is classified as a Group III lake by the WMO. No other information regarding water quality conditions or fish populations is available.

BOOT LAKE

Linwood Township, Lake ID #02-0028

Boot Lake is located south of Linwood Lake in the Boot Lake Scientific and Natural Area (SNA). Boot Lake is a flow through lake, which receives discharges from Rice Lake through a 48" culvert then discharges to Linwood Lake. Because it is part of the SNA, no boating or fishing activity is allowed. There is no public access on the lake. Boot Lake is 134 acres with a maximum depth of 19 feet. The MN DNR classified Boot Lake as a natural environment lake and it is classified as a Group II lake by the WMO.

DEVIL LAKE

City of East Bethel, Lake ID #02-0058

Devil Lake is 115 acres with a maximum depth of four feet. Devil Lake discharges to Goose Lake through a County Ditch 56. The MN DNR has classified Devil Lake as a natural environment lake and it is classified as a Group III lake by the WMO. No other information regarding water quality conditions or fish populations is available.

GOOSE LAKE

City of East Bethel, Lake ID#02-0062

Goose Lake is located east of Coon Lake and has a surface area of 257 acres, though much of the basin would more correctly be described as wetland. The lake is affected by County Ditch No. 56, which runs through the lake and outlets to Coon Lake. The MN DNR has classified Goose Lake as a natural environment lake and it is classified as a Group III lake by the WMO. No other information regarding water quality conditions or fish populations is available.

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HIGGINS LAKE City of Columbus, Lake ID #02-0002

Higgins Lake is located on the southeast boundary of the Sunrise River Watershed. The lake has a surface area of 103 acres but only 62 acres are located within the watershed. The MN DNR has classified Higgins Lake as a natural environment lake and it is classified as a Group II lake by the WMO. No other information is available regarding water quality conditions or fish population.

LITTLE COON LAKE City of Columbus, Lake ID #02-0032

Little Coon Lake is located in the Carlos Avery Wildlife Management Area and is part of Pool #12, which outlets to Pool #11, then to Pool #10 and finally flows into the South Branch of the Sunrise River. Little Coon Lake is 107 acres with a maximum depth of four feet. The MN DNR classified Little Coon Lake as a natural environment lake and it is classified as a Group III lake by the WMO. No other information is currently available for Little Coon Lake.

MUD LAKE Linwood Township, Lake ID#02-0037

Mud Lake is located south of Pet and Fawn Lakes. Mud Lake is landlocked except for a wetland on the southeast end of the lake, which is drained by a ditch to the West Branch of the Sunrise River. Wild rice is known to occur in this waterbody. The MN DNR has classified Mud Lake as a natural environment lake and it is classified as a Group III lake by the WMO. No other information or water quality data is currently available for Mud Lake.

PET LAKE Linwood Township, Lake ID#02-0036

Pet Lake is located between Fawn and Mud Lakes. Pet Lake is 19 acres and shallow (< 5 feet). There is no public access to this lake, which is more than 50% surrounded by homes. Despite the fact that Pet Lake is no more than 200 feet from Fawn Lake, the two lakes appear to have somewhat independent hydrology. Fawn Lake's elevation is often over a foot higher than Pet Lake's. Pet Lake does not have a managed fishery. The MN DNR has classified Pet Lake as a natural environment lake and it is classified as a Group III lake by the WMO. No other information or water quality data is currently available for Pet Lake.

RICE LAKE Linwood Township, Lake ID #02-0043

Rice Lake is located east of Boot Lake. The lake is affected by County Ditch No. 16 which inlets to the lake from the northwest. Rice Lake then outlets through a ditch/creek to Boot Lake. Rice Lake has a surface area of 262 acres. The MN DNR has classified Rice Lake as a natural environment lake and it is classified as a Group III lake by the WMO. No other information or water quality data are currently available for Rice Lake.

RYAN LAKE Linwood Township, Lake ID#02-0040

Ryan Lake is a small lake (30 acres, maximum depth < 5 ft.) located northeast of Martin Lake. Ryan Lake is landlocked except for a wetland on the south end of the lake that may provide an outlet to the west branch of the Sunrise River. The MN DNR has classified Ryan Lake as a natural environment lake, primarily for waterfowl, and it is

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classified as a Group III lake by the WMO. No other information or water quality data are available for Ryan Lake.

SOUTH COON City of Ham Lake, Lake ID#02-0048

South Coon Lake is a small lake (48 acres) located immediately south of Coon Lake. This lake has also been known as Little Coon Lake. It is connected to Coon Lake by a culvert that is large enough to accommodate moderately-sized boats. There are a moderate number of lakeshore homes. There is no public access. The MN DNR classified South Coon as a natural environment lake and it is classified as a Group I lake by the WMO. No other information is available regarding water quality conditions or fish population.

TAMARACK LAKE Linwood Township, Lake ID #02-0021

Tamarack Lake is located on the south side of Martin Lake. It discharges to the West Branch of the Sunrise River through a marsh downstream of Martin Lake. The lake is landlocked, other than this discharge. The lake is 86 acres in size with a maximum depth of 3 feet. The MN DNR has classified Tamarack Lake as a natural environment lake and it is classified as a Group III lake by the WMO. No other information regarding water quality or fish population is currently available.

UNNAMED Linwood Township, ID #02-0023

Located on the west side of Linwood Lake, this small (10 acres) lake is managed by the MN DNR as a northern pike spawning area. The pond has a control structure at the outlet with a 4-foot wide weir and stop logs. Discharge flows to Linwood Lake. The MN DNR has classified this unnamed lake as a natural environment lake and it is classified as a Group III lake by the WMO.

GROUNDWATER

The Anoka Conservation District currently monitors groundwater levels in two MN DNR Observation Wells (obwells) in the SRWMO. One well (#2027) is 333 feet deep and penetrates the Franconian-Ironton-Galesville Aquifer. It is located in the Carlos Avery WMA. The other well (#2029) is 221 feet deep and penetrates the same aquifer. Monthly data are available since 1990 through the MN DNR website (http://www.dnr.state.mn.us/waters/groundwater_section/obwell/waterleveldata.html).

The Anoka Conservation District monitors surficial groundwater at the boundaries of three wetlands (reference wetlands) in the SRWMO. Continuous monitoring wells are used to monitor water elevations in the upper 40 inches of the soil profile. Data are available at the Anoka Conservation District website (www.AnokaSWCD.org).

The MN DNR regulates all groundwater withdrawals (appropriations) greater than 10,000 gallons per day or 1 million gallons per year. Table 19 lists active water appropriations permits in the SRWMO. During dry conditions the MN DNR may

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suspend permits to safeguard water availability for natural environments and downstream higher priority users.

Table 19. Active MN DNR water appropriations permits in the SRWMO. (source: MN DNR)

Permit #	Permittee	Type	Volume (mg)	Rate (gpm)	Water Source
1986-6069	Linwood Terrace Co.	Private Waterworks	12.0	430	CFRNCDRE - 451 ft deep well
1986-6069	Linwood Terrace Co.	Private Waterworks	12.0	430	CFRN - 268 ft deep well
1989-6346	Carlos Avery Turf Nursery	Sod Farm Irrigation	62.7	200	Groundwater - 30 ft deep well
1989-6346	Carlos Avery Turf Nursery	Sod Farm Irrigation	62.7	200	County Ditch 12

Groundwater quality is important to residents of the watershed because there are almost no municipally provided sanitary sewer or water supply systems in the watershed. On-site wells and sewage treatment systems provide residential water and sewer. Many of the residential wells are shallow and located in the glacial drift aquifer, which is very susceptible to contamination. A concern of the SRWMO is the pollution of groundwater and lakes by failing on-site sewage treatment systems. This problem is most prevalent around lakes which are the oldest areas of high density residential development. Many of the early drain fields were installed improperly according to today's standards (too deep and too small). Other causes of pollution from on-site sewage treatment systems are overcrowding, inadequate soils to handle the on-site systems and a high water table (or low land elevation relative to lake levels). Each member community is responsible to enforce local ordinances compliant with MN Statute Chapter 7080 regarding individual sewage treatment system installation and maintenance.

In late 2009, Anoka County anticipates completing an update of their a Groundwater Management Report which provides detailed descriptions of the groundwater resources of Anoka County, the regulatory framework, groundwater supply and demand and threats to groundwater quality and quantity. This plan highlights concerns about depressed water tables due to excessive appropriations in the Twin Cities area and contamination of groundwater. The information is available from the Anoka County Health and Environmental Services Department.

An Anoka County Geologic Atlas is also beginning in 2009, with completion anticipated around 2015. The SRWMO financially contributed to this project in 2009 as a first step toward better understanding issues related to groundwater. Little data currently exists. The Geologic Atlas is a map-based report of groundwater and geology to be used for community planning and groundwater management. It provides information about aquifers, sustainability, recharge, sensitivity to pollution, flow directions, connections to

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surface water bodies, chemistry, wellhead protection and others. The MN DNR and MN Geological Survey will be completing the atlas.

To assess groundwater quality, Anoka County Community Health and Environmental Services Department conducted a study of rural drinking water quality in 1994. They found the following to be generally true of rural well water quality throughout Anoka County.

- ❖ Nitrate is the most common groundwater contaminant of health concern in the study area. Approximately 10% of the rural wells have elevated levels of nitrate (>1mg/l).
- ❖ Coliform bacteria were found within 17% of the samples.
- ❖ Coliform bacteria found in the tap water appear to be almost entirely entering at points in the plumbing system rather than from groundwater.
- ❖ After a water supply system has been disinfected with chlorine, most water retests show no Coliform present.
- ❖ Lead was detected in 64% of the 50 sites sampled. Most of these were below 15 μ /l, but 6% were substantially higher.
- ❖ The fluoride levels across Anoka County are low. For the 50 wells sampled, the results range from <.10 to .33 mg/l. These results agree with previously determined values for the county.
- ❖ Fluoride was generally found to slowly increase in concentration with deeper wells. As the water migrates downward, it comes in contact with fluoride minerals, dissolving them and adding fluoride to the water.

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SPECIAL STUDIES

Several watershed-level special studies exist or are in-progress that serve as a resource for the SRWMO and are directly related to the goals of this plan. These are described in Table 20.

Table 20. Special studies in the SRWMO area.

Study	Completion	Description	Contact
TMDL Study for Martin and Typo Lakes and the segment of the W. Branch of the Sunrise River between the Lakes	2010	A study of excess phosphorus sources in Martin and Typo Lakes, and high pH and turbidity in the segment of the W. Branch of the Sunrise River inbetween. Includes pollutant source analysis, reductions needed to meet water quality standards, and an implementation plan.	Jamie Schurbon, Anoka Conservation District 763-434-2030
Lake St. Croix TMDL Study	2011	A study of excess phosphorus sources to Lake St. Croix. Includes pollutant source analysis, reductions needed to meet water quality standards, and an implementation plan.	Chris Klucas, MN Pollution Control Agency 651-296-7072
Sunrise River Watershed Study	2010	Part of the creation of a TMDL study for the entire Sunrise River watershed, this study includes fish and invertebrate inventories, geomorphic assessment, creation of a Soil and Water Assessment Tool (SWAT) model, and develops a wetland mitigation procedure for water quality.	Jerry Spetzman, Chisago County 651-213-8383 SWAT modeler – Jim Almendinger, St. Croix Watershed Research Station 651-433-5953
Anoka County Geologic Atlas	2014-15	A map-based report of geology and hydrogeology. It includes analysis of groundwater capacity, susceptibility to pollution, movements, recharge areas, connections to surface waters, chemistry, and others.	Jamie Schurbon, Anoka Conservation District 763-434-2030
Anoka County Groundwater Management Report	2009	This is Anoka County’s alternative to a groundwater plan. It includes county-wide information about groundwater issues. It also discusses the protection and management of surface water resources. It will be updated every 5 years.	Bart Biernat, Anoka Co Env. Services (763) 422-6985

CHAPTER 3 ASSESSMENT OF PROBLEMS

PROBLEMS ASSESSMENT BY OTHER AGENCIES AND RESIDENTS

As discussed in Chapter 1, development of this plan began with an effort to solicit comments from the public, elected officials, and other agencies. The October 30, 2008 comment meeting and corresponding opportunities for written comments provided the SRWMO with substantial input. At the meeting issues were identified and prioritized through voting. After an exhaustive list of issues was compiled, each attendee was asked to vote for their four highest priority issues. Below is a summary of issues in order of priority, and comments related to each (see Appendix B for more detail).

Prioritized issues from by other agencies and residents:

1. Water Quality
 - a. The connected nature of lakes and streams in the watershed demands watershed-wide approaches.
 - b. Impaired waters area priority.
 - c. Typo Lake water quality is especially poor. Data Creek is an important pollutant source.
 - d. SRWMO streams contribute to water quality problems downstream.
 - e. The Sunrise River is the worst polluter of the St. Croix River. Other organizations and agencies within the Sunrise River watershed have adopted a 20% phosphorus reduction goal.
 - f. Ongoing work is needed to ensure good quality waterbodies stay that way.
 - g. Many ditches are not well maintained, but ditch cleaning is not necessarily desirable because of water quality impacts downstream.
 - h. Lawn fertilization affects lake water quality. Lakeshore soil testing in the SRWMO has found that local soils are naturally high in phosphorus and do not benefit from phosphorus fertilization.
 - i. Groundwater protection through wellhead protection and unused well sealing is important.
2. Sanitary Sewer
 - a. East Bethel and Ham Lake's efforts to expand municipal sanitary sewer services or community septic systems to Coon Lakeshore neighborhoods would be beneficial to lake water quality and should be supported.
3. Invasive Plants
 - a. Invasive plants in lakes are a problem. Eurasian watermilfoil was discovered in Coon Lake in 2003 and is expanding rapidly. A Lake Improvement District, formed in 2008, is taking the lead on addressing this issue. Prevention of invasive species in other lakes is important.
4. Aquatic Plant Management
 - a. Increasing costs of DNR permits could result in more people doing chemical applications on their own, with water quality consequences. Improved lakeshore homeowner education is needed.
5. Education



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- a. Cost effective education is needed. City newsletters may be an effective, low cost outlet.
- b. Education outreach has traditionally been focused on lakeshore homeowners, but given the expansive wetlands and streams in the watershed, more widespread education is appropriate.
6. Resident Frustration
 - a. Residents want to be more involved and aware of watershed management.
7. Construction Site Management
 - a. Poor construction site management is too common and can result in erosion and other water quality impacts. Better education is needed for both private contractors and municipal workers.
8. Funding
 - a. The SRWMO has tremendous amounts of water resources, and some with notable problems, but local funding resources are limited. Outside grants should be sought.
9. Fisheries
 - a. Typo Lake fishery is in decline.
 - b. Coon Lake walleye habitat improvement is being discussed.
10. Mercury Contamination
 - a. This issue is widespread but poorly understood.

PROBLEMS ASSESSMENT BY THE SRWMO BOARD

The SRWMO Board used the prioritized list of issues from residents, local officials, and agencies as a foundation for development of their own priorities. The Board first considered if any other issues should be added to the list. Septic system compliance was added. Then the Board prioritized these issues. Below is the SRWMO Board's list of prioritized issues/problems.

Priorities

Prioritized issues as determined by the SRWMO Board, along with specific comments about each topic:

1. Water quality

- Water quality affects recreation and property values on impaired lakes in the watershed (Map 20). Algae blooms limit swimming, fishing, and other contact recreation.
- Impaired waters (Map 20) are a high priority. Impaired lakes include Typo, Martin, and Linwood. All have a stable water quality trend. Our jurisdictional area also contributes to downstream impairments of the Sunrise River and St. Croix River.
- Maintaining good conditions in non-impaired waterbodies is important. Coon Lake and Island Lakes are of good quality, while Fawn Lake is of exceptional quality. These lakes have stable water quality trends though some have shown periods of improvement (see Chapter 2 for more info).

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- Executing projects in the Martin and Typo Lakes TMDL Implementation Plan is a high priority.
- Linwood Lake should be the subject of the next TMDL study, however there are some questions about whether it should be classified as a shallow lake (it meets shallow lake water quality standards).
- Several streams on the MPCA's 303(d) list of impaired waters should probably be removed from the list, and are low priorities for the SRWMO. The stream between Island and Martin Lake, the tributary to Typo Creek, and Boot Lake inlet have low dissolved oxygen, but this is likely due to natural conditions, not an impaired condition. (*Note: as of Dec. 11, 2009 these streams were removed from the 303(d) impaired waters list by the MPCA*).
- The watershed includes areas outside of the SRWMO, most notably in Isanti and Chisago Counties. The SRWMO should be active in regional discussions, such as through the St. Croix Basin Team, a multi-agency group working cooperatively to address water quality issues in the St. Croix River and its tributaries.
- Untreated storm water discharges to some lakes are also a problem. In particular, neighborhoods around Martin Lake and Coon Lake Beach have untreated discharges to lakes.
- Favored stormwater management techniques are evolving and updates to local ordinances and procedures are warranted in some communities. Better site design and infiltration are favored techniques for managing rate, volume, and water quality. Infiltration is especially well-suited for the Anoka Sand Plain.
- Abundant wetlands are an important water quality and quantity management feature in the watershed, and additionally provide ecological benefits. Given the abundance of wetlands in the watershed, most future development will be in close proximity to wetlands. While the MN Wetland Conservation Act and MN DNR Public Waters rules provide some protections, some additional provisions tailored to the watershed are needed to ensure future development does not have adverse effects. This plan includes wetland standards.
- Groundwater is highly susceptible to contamination in the Anoka Sand Plain.

2. Septic system compliance

Poor septic system compliance can pose both environmental and human health threats. Existing data from surveys and permit reviews, in addition to anecdotal evidence, indicates that septic system compliance levels are undesirably low. Estimates in community SSTS reports to the MPCA suggest better compliance, but are community-wide estimates that do not highlight problem hotspots. Three communities track individual septic system maintenance through a database and send individual maintenance reminders. Linwood has paper records and sends community-wide maintenance reminders, but without a database does not actively track compliance. Enforcement of related ordinances is variable among

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communities. There are no existing local programs that provide residents with technical or financial assistance for correcting failing systems.

3. Education

Education is an important tool for achieving behavioral and societal change that will benefit water quality. Public knowledge of the WMO also needs to be improved.

4. Resident frustrations (similar to education)

Frustrations are often due to confusion, misinformation, or lack of information being communicated. Better communication with the public is needed.

5. Aquatic plants, including invasives.

This includes both the prevention and management of invasive species as well as encouraging healthy native plant communities.

6. Funding

The amount of water resources and problems in the watershed are not commensurate with local funding. 50% of the watershed is wetland, lake, or stream and development (tax base) is relatively light. Partnerships and grant funding will be necessary to achieve the work laid out in this plan.

7. Sanitary Sewers (same priority level as funding)

East Bethel installation of municipal sanitary sewer around Coon Lake would be beneficial for water quality and should be supported. Ham Lake is pursuing installation of a community septic in the Interlachen neighborhood. This topic has been grouped with septic system compliance throughout the remainder of this plan.

8. Lakeshore restorations

Private property management, especially at the lakeshore, is important to water quality. Negative impacts can be from erosion or lack of natural habitats.

Other topics mentioned:

- Low water in Sunrise River
- New shoreland ordinances
- Construction site management
- Fisheries

Administrative Issues

An overarching problem for the SRWMO is that communication between the WMO and member community has been inadequate in the past. Several ways to improve were discussed, including:

- Annual WMO reporting of accomplishments to the member communities. This might be through written and/or oral communications.
- Offering a tour of WMO projects for public officials on a periodic basis.
- Annual reporting of the member communities to the WMO, as a way for the WMO to ensure that local water plans are being implemented.
- Ensuring municipal officials directly receive copies of SRWMO agendas and minutes.
- Involving the member communities directly in the SRWMO 3rd Generation Plan development, such as by including them on the Technical Advisory Committee.

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- Updating the Joint Powers Agreement.

Non-Priorities

Several issues that are not priorities for the SRWMO, but deserve mention include:

- **Flooding** problems are not known to occur in the WMO. No stormwater rate control issues are known within or between communities. While these issues are not active problems in the watershed, this plan does include stormwater management standards to ensure they do not become problems.
- **Erosion** is not a significant problem in the watershed because of the flat topography and low gradient streams. Construction erosion is managed through municipal and state controls. Lakeshore erosion, while minor, is addressed in this plan through lakeshore restoration education and financial assistance programs.
- **Water level control structures** in the watershed are managed by the MN DNR.
- **Mercury contamination** of lakes is a regional issue that cannot be addressed on a local scale, therefore it is not an issue the SRWMO will act upon.

SRWMO Philosophical Approach

The philosophy of the WMO Managers is based foremost on their acknowledgement of the responsibilities imposed by the Metropolitan Surface Water Management Act Chapter 103B and MN Rules 8410. Philosophical beliefs include:

- Water-related problems are community problems and not individual problems.
- Water resource management is a vital matter that cannot be left solely to individual communities.
- Water resources should be managed on a watershed basis. The WMO is uniquely positioned to address water resource issues across municipal boundaries.
- Aquatic and terrestrial areas are integrally linked and cannot be effectively managed separately.

The Managers intend to seek the cooperation and assistance of governmental agencies, municipalities, and citizens within the WMO in order to conserve the watershed's natural resources. It is a primary goal of the Managers to develop the active and affirmative support of these groups. The Managers will initiate communications. The Managers will form citizen and technical advisory committees on a program- and project-specific basis.

While the WMO places a high importance on partnerships and coordination, avoiding duplication is equally important. Water resources in Minnesota are managed through a complex network of agencies (Table 21). This plan is intentionally focused upon those issues that are not already handled by other entities, are best handled by a local entity or through a partnership that includes the local entity, and are most directly in the WMO's jurisdiction.

The WMO has neither intention nor desire to take over any of the regulatory responsibilities of the other agencies. It is the Managers' intention that any regulations required by the WMO will be in addition to those required by other agencies at the local, county, state, and federal levels. The SRWMO's standards will be reflected in each member community's ordinances and control measures, but the SRWMO will not have a permitting or regulatory role.

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Table 21. Water Management in the Twin Cities Metropolitan Area.

AGENCIES	PRINCIPAL ACTIVITIES
LOCAL – REGIONAL	
Counties	Manage county water resource with focus on unincorporated areas.
Municipalities	Provide water supply and manage local resources.
Townships	Manage local resources, often with help of county.
Watershed Management Organizations	Plan and carry out programs of quantity and quality at watershed level for groundwater and surface water.
Soil and Water Conservation Districts	Provide technical assistance for countywide soil and water programs.
Lake Improvement Districts	Manage surface activities on lakes where established.
Metropolitan Council	Plan for regional development and provision of urban services: co-authority over solid waste facilities.
Metropolitan Waste Control Commission	Provide sewer service for most urbanized areas.
Metropolitan Parks and Open Space Commission (advises Metropolitan Council)	Provide for recreational opportunities associated with water bodies.
Park Districts and County Parks Departments	Provide for recreational opportunities and manage water resources within park boundaries.
STATE	
Department of Natural Resources (26 programs)	Regulates use and alteration of water and related resources.
Pollution Control Agency (16 programs)	Regulates water quality.
State Planning Agency/ Environmental Quality Board (11 programs)	Plan for use and protection of water: assess environmental impacts.
Department of Health (10 programs)	Provide soil and water conservation technical service: regulate pesticides and use of water for agricultural processing.
University of Minnesota (5 programs)	Research in geology (MN Geological Survey) and hydraulics (St. Anthony Falls Hydraulics Lab); education in water resources.
Department of Transportation (4 programs)	Research and planning for control of water in connection with highways.
Board of Water and Soil Resources	Watershed organization administration: watershed plan approval.
Waste Management Board (2 programs)	Management of hazardous wastes.
Department of Public Safety (2 programs)	Emergency assistance for flooding and water supply.
FEDERAL	
Environmental Protection Agency	Planning and regulation for water quality, solid and hazardous wastes, drinking water.
Geological Survey (Department of Interior)	Research in all facets of water occurrence and use.
Fish and Wildlife Service (Dept. of Interior)	Protection of water-related resources (wetlands, wildlife, etc.).
Army Corps of Engineers (Dept. of Defense)	Regulation of waterways, wetland: flood control; research in water topics; recreation; water management.
Natural Resources Conservation Service (Department of Agriculture)	Technical assistance in soil and water conservation.
Farm Service Agency (Dept. of Agriculture)	Administration of erosion control funds and farm subsidies.
National Park Service	Management of national parks.
Federal Emergency Management Agency	Floodplain management.
US Coast Guard	Regulatory enforcement in waters of the US.

CHAPTER 4 GOALS, POLICIES, AND ACTIONS

The SRWMO has prioritized issues and problems, then set goals for each priority issue and developed policies and an action plan to reach those goals. The goals, policies, and actions are categorized by the priority topics (determined in previous chapter), except that #3 (education) and #4 (resident frustrations) are combined. Several non-priority topics also have policies. The order of topics addressed on the following pages is:

Priority topics

1. Water quality
2. Septic system compliance
3. Education
4. Aquatic plants, including invasives
5. Funding
6. Lakeshore restorations

Non-priority topics

7. Groundwater
8. Wetlands
9. Upland Natural Areas
10. SRWMO Administration

The following definitions are useful to consider when reading the following section:

- Vision - A broad-level statement of preferred future conditions or accomplishments.
- Goals - A desired end toward which water management efforts are directed. Goals might be achieved through policies, actions, and/or standards.
- Policies - A governing principle that guides decision-making to achieve goals in the plan.
- Actions - A program, procedure, or task that achieves goals in the plan.
- Standards - Extensions of policies that provide specific, detailed guidance regarding water management practices. Standards are included as appendices in this plan.

PRIORITY TOPIC #1 - Water Quality

Vision:

- Monitor, maintain or improve water quality, depending upon water body.
- No further deterioration of water quality.

Goals:

1. Work toward 20% phosphorus reduction within the SRWMO to help meet the multi-agency St. Croix Basin Team 20% reduction goal for the entire Sunrise River watershed. We recognize that this will likely be only a step toward the goals of TMDLs in the area, and we therefore consider this a shorter term goal.
2. Make progress toward the Lake St. Croix TMDL goals.
3. Make progress toward the Sunrise River TMDL goals.



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4. Make progress toward the Martin and Typo Lakes TMDL goals.
5. Water quality will be maintained where good conditions exist.
6. Manage rough fish populations that are affecting water quality.
7. Citizen monitoring of all recreational lakes in order to get residents involved and ensure continuous low cost data collection.
8. Partner with lake associations and lakeshore residents.

Policies:

1. The member communities shall maintain or improve overall water quality in all Group I waters and wetlands within the watershed.
2. The member communities shall maintain the general water quality of Group II water and wetlands to ensure their viability for wildlife habitat, aesthetic values and natural water treatment. Appropriate actions for any problems will be determined by the member communities.
3. Water quality data shall be submitted annually to the MPCA's STORET database to ensure consistency and comparability of data.
4. Planned Unit Developments (PUD's) and conservation development designs are encouraged for parcels containing or adjacent to waterbodies, high quality wetlands, and natural communities.
5. Treatment of storm water to NURP (Nationwide Urban Runoff Program) guidelines is required prior to storm water discharge to a lake, stream, or wetland and prior to discharge from the site as part of development.
6. Erosion from construction projects shall be managed through the MPCA NPDES (National Pollutant Discharge Elimination System) rules, especially the MPCA construction stormwater permit for projects >1 acre.
7. Discharge of waters from dewatering projects should be through some form of treatment that removes solids and other pollutants, and in a manner that maximizes groundwater recharge without causing damage to public or private properties.
8. The WMO will actively seek enforcement of applicable water quality standards through the appropriate governmental agencies when violations are suspected.
9. The SRWMO aims to work cooperatively with lake associations, the Coon Lake Improvement District, and other agencies that have goals consistent with SRWMO goals.
10. The SRWMO will actively communicate with upstream and downstream agencies regarding water quality or quantity issues.

SRWMO Actions:

1. Join and work with the St. Croix Basin Team, a multi-agency group working cooperatively to address water quality issues in the St. Croix River and its tributaries.
2. The SRWMO will apply a FLUX model to existing monitoring data for the W. Branch of the Sunrise River at County Road 70 (WMO boundary) to

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- calculate phosphorus export from our jurisdictional area and thereby quantify our 20% phosphorus reduction goal.
3. Estimate pollutant load reductions from each water quality improvement project completed to track progress toward the 20% phosphorus reduction goal and TMDL goals. Such calculations will only be necessary for projects affecting waterways that drain to Group I waters, as these are the focus of the goals. Calculators from the BWSR Elink online database, or similar, should be used.
 4. Implement projects and practices recommended in the Typo and Martin Lakes TMDL, Sunrise River TMDL, and Lake St. Croix TMDL. Projects for Martin and Typo Lakes are the WMO's first priority because they also benefit the Sunrise River and Lake St. Croix. Efforts to manage rough fish are expected to be one part of this work.
 5. Evaluate and potentially revise goals, policies, and/or actions related to water quality based on the results of the Lake St. Croix TMDL and Implementation Plan, and any other TMDLs.
 6. Conduct TMDL studies of impaired waters when such projects are a partnership with other agencies and substantial outside funding is secured.
 7. Continue professional monitoring of lake and stream water quality as scheduled in the Implementation Plan portion of this document in order to detect water quality changes and determine if state water quality standards (MN Rules 7050) are being met.
 8. Recruit volunteers, where none already exist, to monitor lake level and Secchi transparency on each recreational lake, including Coon, Linwood, Island, Martin, Typo, and Fawn.
 9. Perform storm water retrofit reconnaissance in selected locations to identify opportunities to better treat stormwater draining directly to Group I waters. This shall include identifying opportunities to improve stormwater treatment, sketch designs for cost effective projects, and promoting these projects to landowners or municipal officials. The WMO's cost share grant program shall be used as a way to encourage project installation.
 10. Maintain a cost share grant program to encourage shoreland restorations and other water quality improvement projects on private property, and promote it annually. Grants shall assist with design and installation of projects that will have public benefits.
 11. Advise the design of any new storm water systems that would drain directly to Group I lakes. WMO Board members will bring any applicable projects the WMO's attention. Applicable projects may include municipal sanitary sewer or community septic systems added in lakeshore neighborhoods in East Bethel and Ham Lake because this will likely involve installing curb-and-gutter systems for storm water where none currently exist. WMO input will relate to water quality goals, but not necessarily technical advice. We rely on engineering staff from the member community to incorporate our input into designs in the way and to the extent they feel is practical.

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12. Review member community ordinances and standards for consistency with this plan.

Member Community Actions:

1. Estimate pollutant load reductions from each water quality improvement project completed to track progress toward the 20% phosphorus reduction goal and TMDL goals. The form for member community annual reporting to the WMO will include space to report this information. Such calculations will only be necessary for projects affecting waterways that drain to Group I waters, as these are the focus of the goals. Calculators from the BWSR Elink online database, or similar, should be used.
2. Create and maintain maps of the member community storm water conveyance system. These maps should include the location, size, elevation, and condition of all stormwater conveyances, water quality or quantity treatment features, outfalls, and culverts. This should be completed before or during treatment basin inspections (see below) required by 2014.
3. Inspect storm water treatment basins by 2014 and again at least 5 year intervals. Sump catch basins/manholes shall be inspected every year. Maintenance shall be conducted as necessary. Maintenance activities undertaken by member communities shall be included in the annual report to the SRWMO.
4. Sweep streets with curb and gutter once annually in all areas, and twice annually in priority areas. Priority areas shall be areas that drain directly to water bodies and/or natural wetlands without pretreatment of storm water runoff. Roadside ditches in rural areas will constitute treatment.
5. Each member community will adopt, implement, and enforce ordinances that meet or exceed the standards in this plan. These include:
 - Erosion and sediment control ordinance
 - Shoreland ordinance
 - Floodplain ordinance
 - Septic system ordinance
 - Stormwater ordinance
 - Wetland ordinance

PRIORITY TOPIC #2 – Septic System Compliance

Vision:

- All septic systems compliant.

Goals:

1. Locate non-functioning septic systems and provide residents with means to correct the problems including financial or technical assistance. Financial assistance dependent upon outside funding.
2. Work in coordination with local units of government toward achieving septic system compliance.

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3. Cities will accomplish their goals toward installing or updating municipal sanitary sewer in a way that is beneficial to water quality.

Policies:

1. The SRWMO supports municipal efforts to replace septic systems in shoreland areas with municipal sanitary sewer, community septic systems, or new or retrofitted individual septic systems. Neighborhoods of concern include Coon Lake Beach Community, the Interlachen neighborhood in the City of Ham Lake on the south shore of Coon Lake, and the neighborhoods immediately west of Martin Lake.
2. The design, installation and inspection of individual sewage treatment systems (ISTS) shall be in conformance with MN Rules Chapter 7080.
3. Member communities must adopt and enforce a septic system ordinance consistent MN Rules 7080-7082 and Statutes 115.55-56. This includes measures to ensure :
 - all septic systems are pumped every three years unless an inspection finds pumping is not necessary at that time,
 - failing systems are identified through the pumping and/or inspections process that is required every three years, and these systems are corrected,
 - in cases where owners are not providing proper maintenance or correcting non-compliant systems, the member communities perform the necessary actions and assess the costs to the owner,
 - non-compliant systems are repaired or replaced swiftly, especially in shoreland areas and in cases where the system is an imminent threat to public health.
 - septic system options available to landowners include non-traditional or performance systems, particularly in difficult situations such as properties without space for a replacement drainfield.
 - the above measures may be waived or changed at the community's discretion in areas where municipal sanitary sewer is being planned for the next 10 years. Owners of these systems must still maintain and operate them to minimize impact on the environment and public health until the connection is made.
4. Pumping and inspections must be done by individuals licensed by the State of Minnesota.

SRWMO Actions:

1. Pursue a low interest loan programs or cost share grants and technical assistance to assist residents with replacing or repairing non-compliant septic systems in shoreland areas. The first step will be a scoping study of programs already existing or available, similar programs in other counties, options for administering such a program, funding opportunities, and interested partners. The Anoka County Housing and Redevelopment Authority's Community Development Block Grant and the MN Dept. of Agriculture's Ag BMP Loan Program are two possible funding sources. Ham Lake is the only SRWMO community with its own low interest loan program, but it is rarely utilized.



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2. Implement a program to educate homeowners about proper septic system maintenance and assistance available to those with problems. Homes in shoreland areas shall be target audiences. Possible approaches include widespread distribution of Septic System Owner's Guides (Univ. of MN Extension Service publication), workshops, and others.
3. Upon request, write letters of support for member municipality sanitary sewer projects that benefit water quality, as requested by the communities.
4. Upon request, assist in member municipality educational efforts for sanitary sewer projects that will benefit water quality.
5. Review member community ordinances and standards for consistency with this plan.

Member Community Actions:

1. Member communities will accomplish a septic system inventory, maintenance tracking, and a system for maintenance reminders and corrective action by adopting and enforcing a septic system ordinance consistent MN Rules 7080-7082 (updated in 2008) and Statutes 115.55-56.

PRIORITY TOPIC #3 – Education

Vision:

- Everyone in the SRWMO (everyone is near water), will receive an educational message about watershed management each year.
- Residents will understand what the WMO is and does, and how to contact.

Goals:

1. Improved communications between the SRWMO and municipal staff and officials.
2. Residents will easily be able to contact the SRWMO to provide input.
3. Reach a broad audience by using multiple formats, including city newsletters, websites, newspapers, local cable, informational meetings, and workshops.

Policies:

1. Public participation opportunities with the SRWMO include:
 - “Open mike” during each SRWMO meeting to take public comments.
 - Citizen or technical advisory committees to advise the SRWMO. Such committees will be formed as deemed appropriate by the SRWMO Board, and often will be specific to a particular issue.
 - Inviting lake associations to participate in projects or efforts that affect their lake, such TMDL's or promoting lakeshore restorations.

SRWMO Actions:

1. At least once per year provide articles, press releases, and other educational materials to regularly circulated newsletters of the members, newspapers, and/or local cable.
2. Maintain the SRWMO website.

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3. Organize or host workshops on topics of interest, such as septic system maintenance, aquatic plant management, best management practices (BMP's) or others. At least four such efforts shall take place during the 10-year term of this plan.

Member Community Actions:

1. Provide a link on member community websites to the SRWMO website.

PRIORITY TOPIC #4 – Aquatic Plants, Including Invasives

Vision:

- No new infestations of invasive plants in SRWMO lakes.
- Existing infestations will be controlled.
- Aquatic native plants will be viewed as a beneficial part of lakes.

Goals:

1. Educate homeowners about differentiating between problem plants and healthy native plants. Target audience not limited to lakeshore, but also includes wetlands and streams.
2. Educate lakeshore homeowners on management of native and invasive plants.
3. Keep invasive species at a level that minimally affects water recreation and lake ecology.

Policies:

1. MN DNR rules and permitting govern aquatic plant management in public waterbodies.
2. Invasive species should be managed in a manner that is protective of native plants, water quality, and ecological health.
3. The SRWMO supports lake improvement district efforts to manage invasive species, and recognizes it as important to reaching the WMO's goals.
4. The SRWMO supports the Minnesota DNR's Stop Aquatic Hitchhikers campaign, and recognizes it as important to reaching the WMO's goals.

SRWMO Actions:

1. Educate lakeshore homeowners about the benefits of native aquatic plants, threat of invasive species, and ecologically-sound and legal lakeshore management. This will be accomplished every third year through newspaper articles, city newsletters, direct mailings, local cable TV, informational booths at local events, presentations at lake association meetings, and/or other methods.
2. Maintain existing SRWMO signage at all public boat landings in the watershed. These signs provide a message consistent with DNR signage, but show WMO endorsement. They also show a running tally of infested lakes.
3. Review proposed state rule changes, as they occur, and comment as appropriate.

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PRIORITY TOPIC #5 – Funding

Vision:

- Funding will be adequate to support the priorities in this plan.

Goals:

1. Acquire grants to supplement funding of projects in this plan.
2. Ensure local officials understand the benefits of SRWMO projects and support them.

Policies:

1. The SRWMO member communities are committed to providing a base level of funding to implement this plan.
2. The SRWMO will seek out donations, grants, and in kind contributions of public and private organizations for plan implementation.
3. The following considerations, from most to least important, shall guide the WMO in selecting how to apply limited resources:
 - 1) Projects related to priority topics, in the order specified in this chapter
 - 2) Projects done with partners for greater accomplishment or cost sharing
 - 3) Projects benefiting impaired waters, or those where water quality is declining or immediately threatened
 - 4) Protection of good or stable water quality
 - 5) Non-priority topics

SRWMO Actions:

1. Apply for grants to assist funding projects.
2. Annual communication to city councils about SRWMO accomplishments.

PRIORITY TOPIC #6 – Lakeshore Restorations

Vision:

- Intensive shoreline management that is harmful to the lake will not be commonplace on SRWMO lakes.
- Runoff from most lakeshore properties will be filtered before entering the lake.

Goals:

1. 3 shoreland restorations annually.

Policies:

1. Buffer zones of unmowed, preferably native, vegetation are encouraged around waterbodies for wildlife and water quality.

SRWMO Actions:

1. Join the Blue Thumb consortium in 2011 and continue in subsequent years. Blue Thumb consists of WMOs, natural resources organizations, landscapers, and nurseries who create a unified public education message about rain gardens and lakeshore restorations. The WMO can then purchase promotional materials and “how to” manuals co-developed by field professionals, and more effectively collaborate with agencies and organizations with shared education goals.

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2. Maintain a cost share grant program to encourage shoreland restorations and other water quality improvement projects on private property, and promote it annually. Grants shall assist with design and installation of projects that will have public benefits.
3. Educate property owners about the benefits of lakeshore buffers through mailings, workshops, articles in local publications, or other marketing each year. Additional work in 2013 will include a workshop, demonstrations and promotions.

Water Quantity

Goals:

1. Avoid future flooding problems. None currently exist.

Policies:

1. The WMO encourages maintaining natural water storage areas and preserving all natural basins within the floodplain and prohibits encroachment into the floodways.
2. The WMO requires member communities to adopt and enforce a floodplain ordinance that is at least as protective as the Anoka County Floodplain Ordinance and Minnesota Rules Chapter 6120.5000 to 6120.6200.
3. If FIRM maps for a member community are not available or are claimed to be inaccurate, the SRWMO shall require the regional (100-year) flood elevations for the area to be established by the member community or the proposer of land use alterations.
4. All member communities within the SRWMO shall adopt a shoreland ordinance in compliance with Minnesota Rules, Chapter 6120.2500 through 6120.3900. Shoreland rules for Linwood Township may continue to be administered by Anoka County, as allowed in MN Rules 6120.3900 subpart 4a.
5. Where practical, stormwater conveyors shall not discharge directly into streams or lakes without at least primary sedimentation in natural or man-made basins.
6. The SRWMO requires infiltration of treated storm water whenever a development or redevelopment project increases storm water volume runoff, provided that past and existing land use practices do not have a significant potential to contaminate the storm water runoff and the soil characteristics are suitable for infiltration. For specific criteria see the Performance Standards section of this plan (Appendix C).
7. The SRWMO requires stormwater discharge rates in new developments and redevelopment will not to exceed existing rates. This requirement is not site specific, and volume control within a larger common plan or region is acceptable. For specific criteria see the Performance Standards section of this plan (Appendix C).
8. The SRWMO requires stormwater discharge volume control in new developments and redevelopment to be protective against future flooding problems. For specific criteria see the Performance Standards section of this plan (Appendix C).



Sunrise River WMO Watershed Management Plan

9. Review member community ordinances and standards for consistency with this plan.

Member Community Actions:

1. Adopt and enforce floodplain, shoreland, and stormwater ordinances consistent with this plan.
2. Perform maintenance measures to assure proper function of public drainage system, with the exception of County ditches which are managed by the Anoka County Highway Department.

Groundwater

Vision:

- Sustainable amounts of groundwater free of contamination.

Goals:

1. Complete studies that allow informed decision-making toward sustainable groundwater use.
2. No significant groundwater contamination issues.

Policies:

1. The SRWMO supports long-term efforts to protect groundwater quality and quantity. This includes support for more robust regional groundwater monitoring to inform decision-making.
2. Development projects and stormwater management plans should incorporate techniques that maximize infiltration of precipitation.
3. Stormwater infiltration practices shall not infiltrate water from potential stormwater hotspots. Potential stormwater hotspots are defined as a land use or activity that produces higher concentrations of trace metals, hydrocarbons, or pollutants than normally found in stormwater. Examples include fueling stations, vehicle service or washing areas, vehicle fleet storage areas, auto recycling or salvage, stockpiled snow from salted roadways, construction site inputs, manufacturing sites, public works storage areas, facilities that generate or store hazardous waste materials, and others as determined by the community or watershed management organization.

SRWMO Actions:

1. Support, financially or otherwise, a multi-agency effort to create an Anoka County Geologic Atlas that will gather new detailed information that will improve protection of groundwater quality and quantity. The SRWMO made a \$4,310 contribution to this project in 2009. Future requests for assistance are not anticipated.
2. Review member community ordinances and standards for consistency with this plan.

Member Community Actions:

1. Adopt and enforce an ordinance at least as protective as the stormwater standards in this plan, which emphasize infiltration.

Sunrise River WMO Watershed Management Plan

Wetlands

Goals:

1. Identify and protect the highest quality wetlands. The wetland functions and values of greatest importance to the SRWMO are water quality treatment, wildlife, and groundwater recharge.

Policies:

1. The Wetland Conservation Act of 1991 and the MN DNR Public Waters and Public Wetlands program are the overriding regulatory programs that address the WMO's goals pertaining to wetlands.
2. The SRWMO does not act as the Local Governmental Unit (LGU) for the MN Wetland Conservation Act or 1991. Each of the member communities is charged with the LGU responsibility and has the authority to delegate that responsibility to another entity. The entity must agree to accept the LGU designation.
3. Member communities should consider wetland biotic communities when evaluating water level fluctuation (bounce) in wetlands.
4. High priority wetland areas should be protected both in terms of quantity and quality.
5. Wetland restoration is encouraged.
6. The SRWMO prefers that mitigation for wetland impact under the MN Wetland Conservation Act occur within the Sunrise River watershed, though not necessarily within the WMO. Mitigation projects that help address water quality problems are preferred.

SRWMO Actions:

1. Review member community ordinances and standards for consistency with this plan.

Member Community Actions:

1. Adopt and enforce wetland ordinances consistent with the Performance Standards in this plan (Appendix C)

Upland Natural Areas

Vision:

- High quality natural areas will be protected and have public access.

Policies:

1. The WMO strongly encourages the protection of MN DNR classified Natural Communities and other high quality natural areas from future development and public access to these areas.
2. The WMO encourages management of MN DNR classified Natural Communities and other high quality natural areas in order to maintain their ecological integrity.

Sunrise River WMO Watershed Management Plan

SRWMO Administration

Goals:

1. Efficient and regular communication between the SRWMO and member communities.
2. Minimize costs while maximizing public benefits.
3. Avoid duplication of efforts.

Policies:

1. The SRWMO will seek to implement projects that provide the greatest benefit to the community for the lowest cost.
2. The SRWMO will not have a permitting program. Permitting shall be done by member communities with ordinances and standards consistent with this plan. This plan serves to coordinate consistency among communities.
3. The WMO will retain authority over water resource management issues that transcend community boundaries, or in cases where the community is found to not be in compliance with this plan.
4. Budget, staffing, and environmental constraints may necessitate altering the schedule of work in this plan.
5. The WMO shall establish an equitable cost allocation formula when project implementation affects more than one unit of government. The communities shall agree on equitable financing or refer to the Joint Powers Agreement.
6. The SRWMO desires multi-agency discussion regarding restructuring the WMO to cover all of the Sunrise River watershed or complete subwatersheds of the west and south branches of the river. Currently the SRWMO's jurisdictional area stops at the 7-county metropolitan area boundary (Anoka County boundary). Watershed management would be more effective if WMO boundaries followed watershed boundaries.

SRWMO Actions:

1. Review local water management plans and ordinances, and evaluate their consistency with this Watershed Management Plan. All local water management plans shall be consistent with the SRWMO Watershed Management Plan. Member communities shall have two years from the date of the SRWMO's approval of this plan to adopt their local water management plans.
2. Submit an annual report to the MN Board of Water and Soil Resources in accordance with Minnesota Rules 8410.0150. The report is due 120 days after the end of the SRWMO's fiscal year (fiscal year ends Dec. 31, deadline is April 30 or April 29 in leap years).
3. Annually review member communities' actions to ensure compliance with the WMO plan. The annual review will include an annual report by each member community to the WMO.
4. Hire an on-call administrator beginning in 2011 who will handle miscellaneous administration such as preparing budgets, seeking bids on work plans every other year, administering our cost share grants, correspondence, fielding questions or requests from agencies or residents, and others specified in a contract for services.

Sunrise River WMO Watershed Management Plan

Member Community Actions:

1. Update local water plans and ordinances to be compliant with the SRWMO Plan.
2. Submit an annual report to the SRWMO using a reporting template provided by the SRWMO.

CHAPTER 5 IMPLEMENTATION PLAN

This portion of the plan details tasks that will be completed to achieve the WMO's goals. It includes work done by the SRWMO, as well as work being done by other entities. Implementation will occur through an action plan, regulatory controls and performance standards, and maintenance.

ACTION PLAN

Table 22 on the following pages lists the SRWMO planned tasks and describes each. Table 23 outlines the timing and estimated costs of each task. The SRWMO will make every effort to adhere to this plan, though it may be necessary to deviate due to environmental, staffing, financial, or logistical reasons, or because new information leads the SRWMO Board to believe that a change is appropriate. These tables list only those tasks that will be completed by the SRWMO.

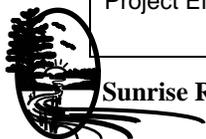
The WMO is committed to providing the funding specified in this plan, but some tasks will require additional grants or partners. As mentioned earlier in this plan, the SRWMO area is approximately 50% water and wetlands with substantial public lands, and development is scattered rural residential. The tax base is therefore relatively small, while the need for water resource management is significant. Table 22 identifies potential partners.

Some action items of importance to the SRWMO are being completed by other agencies (Table 24). The SRWMO recognizes that implementing all of the aspects of proactive water resource management is not the sole responsibility of the SRWMO or its members. Many other agencies and organizations are involved in different aspects of water resource management. Table 24 is not a comprehensive list of all work done by all agencies, but rather are those tasks most closely related to meeting SRWMO goals. By identifying the efforts and funding opportunities of all involved agencies and organizations in the implementation plan, the SRWMO Board believes a more complete picture of natural resource management is drawn that will lead the reader to the proper source of information depending on their needs. This approach will also reduce the likelihood of duplication of effort and jurisdiction.

Table 22. Action plan task descriptions. Timing and estimated costs of each task are in Table 23.

Task	Task Summary	Possible Funding	Possible Partners
Operating Expenses (per the SRWMO Joint Powers Agreement costs split equally among member cities)			
Secretarial or other administrative	Recording secretary hired to produce meeting agendas, minutes, and assist with minor administrative tasks. The estimated need is for 6 meetings per year.	SRWMO	
Administrator (On-call, limited)	On-call administrator for tasks outlined by contract. Tasks may include preparing budgets, seeking bids on work plans every other year, administering our cost share grants, correspondence, fielding questions or requests from agencies or residents, and others.	SRWMO	
Liability Insurance	Liability insurance, purchased through League of Minnesota Cities Insurance Trust in the past.	SRWMO	
Admin assistance - City of East Bethel	The City of East Bethel provides miscellaneous administrative services, such as serving as the SRWMO mailing address, keeping the SRWMO checkbook in their safe, and serving as a check signatory.	SRWMO	City of East Bethel
Non-Operating Administrative Expenses			
Financial Audit	Annual financial audit by an independent accountant.	SRWMO	
Legal	Legal counsel for miscellaneous issues is infrequently used but included in this projection.	SRWMO	
Annual Report to BWSR and member municipalities	Annual reporting to the MN Board of Water and Soil Resources required by MN Rules 8410.0150. The SRWMO enhances this report to also serve as an annual report to the member municipalities.	SRWMO	
Review municipal local water plans	Member municipalities must update their Local Surface Water Management Plans to be consistent with this plan within 2 years of SRWMO adoption and update ordinances within 180 days thereafter (MN Statutes 103B.235 subd. 4). The WMO will review and approve these plans (MN Statutes 103B.235 subd. 3) and ordinances required by the SRWMO Plan.	SRWMO	
Develop member community annual report template	The SRWMO depends upon the municipalities to fill some water protection and management roles, such as regulatory controls and maintenance. In order to facilitate communication and ensure tasks are being completed the SRWMO requires municipalities to submit an annual report to the SRWMO . The SRWMO will create a reporting form to simplify this task.	SRWMO	
Seek bids for services	"A WMO shall at least every two years solicit interest proposals for legal, professional, or technical consultant services before retaining the services of an attorney or consultant or extending an annual services agreement" (MN Statutes 103B.227, subd. 5).	SRWMO	
Grant search and applications	Several tasks in this plan will require outside funding. The SRWMO will annually review grant opportunities and prepare applications. Important grant sources include the MN DNR, MPCA, and BWSR (see their websites).	SRWMO	
Reevaluate this plan based on new TMDLs	Evaluate and potentially revise goals, policies, and/or actions in this plan related to water quality based on the results of the Lake St. Croix TMDL and Implementation Plan, and any other TMDLs.	SRWMO	
Update Watershed Plan (due Dec. 31, 2019)	Approximately 1-2 years before the expiration of this plan, the WMO will begin the plan update process.	SRWMO	

Task	Task Summary	Possible Funding	Possible Partners
Water Condition Monitoring			
Lake Level Monitoring (volunteer)	Lake elevations will be monitored with volunteer assistance on major recreational lakes. Professional staff will facilitate by installing and surveying lake gauges, coordinating volunteers such as by providing equipment and datasheets, troubleshooting problems, and receiving the data, checking its quality, and submitting it to state databases. Volunteers will take weekly readings. All data collected will be made publicly available through the Lakefinder portion of the MN DNR website. Lakes: Coon, Fawn, Linwood, Martin, and Typo.	SRWMO	ACD, DNR, volunteers
Lake Water Quality Monitoring (volunteer)	Transparency on major recreational lakes will be measured throughout the open water season with a secchi disk by volunteers. The SRWMO will recruit volunteers for Linwood, Typo, and Fawn Lakes, where none currently exist. Coon and Martin Lakes have volunteers. Once recruited, volunteers will be facilitated through the MPCA citizen lake monitoring program.	SRWMO	ACD, MPCA, volunteers
Lake Water Quality Monitoring (professional)	Past lake water quality will be continued, but on reduced frequency. Fawn, Linwood, Typo, and Martin will be monitored every third year starting in 2012. The east and west bays of Coon Lake will be monitored every other year starting 2010 (Fawn Lake also included in 2010). The schedule may be altered so monitoring occurs after water quality improvement projects. MPCA provides lake monitoring methods at http://www.pca.state.mn.us/publications/wq-s1-16.pdf provides methods. Minimum measurements will include total phosphorus, chlorophyll-a, and secchi transparency every other week May-September. A trend analysis consistent with those in Chapter 2 will be completed after each year of monitoring. All data will be submitted to MPCA's STORET database.	SRWMO	ACD
Stream Water Quality Monitoring	Stream monitoring will occur following water quality improvement projects at streams affected by that work, and the outlets from the watershed (West and South Branches of Sunrise River) will be monitored every third year (to keep our watershed models up to date). At a minimum, measurements will include stage, total phosphorus, total suspended solids, chlorides, pH, and turbidity. Eight to ten samples per year will be taken, half during baseflow and half following storms. All data will be submitted to the MPCA's STORET database.	SRWMO	ACD
Stream Hydrology Monitoring	Water levels will be recorded every two hours at the outlets of the watershed (West and South Branches of Sunrise River) every year to keep our watershed models up to date and to allow pollutant load calculations from water quality monitoring.	SRWMO	ACD
Reference Wetland Monitoring	Reference wetlands are an ACD program where hydrology is monitored in ~18 wetlands county-wide. Data are used by wetland regulators to understand local wetland hydrologies, ultimately resulting in more accurate regulatory decisions. The SRWMO will support continued monitoring of three reference wetlands in the watershed.	SRWMO	ACD
Monitoring of Water Quality Improvement Project Effectiveness	Streams or lakes that are the target of water quality improvement projects will be monitored to document the effectiveness of that work. The cost estimates in Table 20 are for monitoring one lake or stream site each year, however the timing, locations, and number of sites will be dependent upon the water quality improvement work done.	SRWMO, BWSR or MPCA grants, Martin Lake Assoc.	ACD



Task	Task Summary	Possible Funding	Possible Partners
Studies and Investigations			
Impaired Water TMDL Studies - Linwood Lake^	Several lakes and streams are on the state 303(d) list of impaired waters. The highest priority for a TMDL study is Linwood Lake. The study will involve extensive monitoring of the lake and inlets, study of possible phosphorus sources, modeling, calculation of phosphorus reductions needed to meet water quality standards, and strategies to reach this goal. The TMDL will be done only with funding partners, including the MN Pollution Control Agency.	SRWMO, MPCA grant (14),	MPCA, Linwood Lake Assoc.
Fawn Lake curly-leaf pondweed mapping and assessment of control needs	Curly-leaf pondweed, an exotic invasive plant was first noticed in Fawn Lake in 2007. The extent of the plant within the lake will be mapped. The purpose is to provide a baseline so in the future we can determine if the plant is expanding, as well as to determine if and when treatment is warranted.	SRWMO	Fawn Lake Residents
Water Quality Improvement Projects			
Cost Share Grant Fund	Competitive grants are awarded to landowners as an incentive to do projects that improve water quality. Cost share grants are 50-70% of materials and are currently administered by the Anoka Conservation District, along with other similar grants.	SRWMO	ACD
Martin and Typo Lakes carp barriers project	The purpose of the project is to improve water quality and habitat by reducing carp. Four carp barriers at strategic locations will reduce carp spawning success and overwintering survival by preventing seasonal migrations between favorable overwintering habitat (Martin Lake) and spawning areas (Typo Lake and creek). Commercial carp harvests will also be used.	SRWMO, Martin Lakers Assoc, DNR Grant (secured)	DNR, MPCA, ACD, Martin Lakers Assoc., Linwood Twp, Isanti Co.
Discretionary water quality projects	Projects that will be defined through stormwater assessments, TMDL studies, and similar work will be accomplished in the first five years of this Watershed Management Plan's effective life. Martin, Typo, and Coon Lakes are likely focus areas, where there are know problems and diagnostic work is planned or underway.	SRWMO, grants	ACD, DNR, MPCA, lake assoc.
Stormwater Retrofit - reconnaissance and design phase	Storm water draining directly and untreated to waterbodies contributes pollutants. These types of drainages are most prevalent in older neighborhoods that were built before modern stormwater construction standards. This project includes locating untreated stormwater discharges to waterbodies and designing solutions. These solutions need to fit into the existing neighborhood design, and are therefore best described as retrofits. Projects may include rain gardens, stormwater conveyance modifications, new stormwater treatment facilities, and others. The work product will be a list of projects prioritized by cost per unit of pollutant reduction. Sketch designs of all projects will be produced, along with cost estimates. Phase 2 of this work is installation of the projects.	SRWMO, City of East Bethel, Linwood Township, BWSR and MPCA grants, Lake Associations, Coon Lake Improvement District	ACD Landscape Restoration Program, City of E. Bethel, Linwood Twp, Lake Assocs, Coon Lake Improvement District

Task	Task Summary	Possible Funding	Possible Partners
	<p>Target neighborhoods include the west side of Martin Lake, Coon Lake Beach neighborhood, and other smaller areas. In the Coon Lake Beach neighborhood it is desirable to combine this work with planned installation of municipal sewer services for cost savings and increased options. In the Martin Lake neighborhoods, this work should build from a stormwater retrofit assessment already done (in the 1980s?). Retrofits already done there include construction of a ditch and holding pond at 227th Avenue and W Martin Lake Dr; construction of a holding pond, catch basins and dry sump at 227th Ave and Elbe St; excavation of a roadside ditch along W Martin Lake Dr to retain runoff; excavation of a roadside ditch and removal of a curb along Martin Lake Rd to improve retention of runoff; excavation of water holding areas on 228th Ln; and construction of a holding pond of Feather St tied to catch basins on Martin Lake Rd.</p>		
<p>Stormwater Retrofit - installation phase^{^^}</p>	<p>Installation of projects identified during the stormwater retrofit reconnaissance and design. Staff with expertise in stormwater treatment will be needed to coordinate this process, and engineering assistance will be required in some instances. The process will include creating final construction designs, coordinating with the municipality, securing permits, promoting private property projects, obtaining landowner permissions, constructing the projects, and ensuring proper maintenance.</p>	<p>SRWMO, City of East Bethel, Linwood Township, BWSR and MPCA grants</p>	<p>ACD Landscape Restoration Program, City of East Bethel, Linwood Township</p>
<p>Estimate WMO phosphorus export</p>	<p>Apply a FLUX model to existing monitoring data for the W. Branch of the Sunrise River at County Road 70 (WMO boundary) to calculate phosphorus export from our jurisdictional area and thereby quantify our 20% phosphorus reduction goal.</p>	<p>SRWMO</p>	<p>US Army Corps of Engineers, Chisago Co</p>
<p>Join St. Croix Basin Team</p>	<p>The SRWMO will formally join this multi-agency group working cooperatively to address water quality issues in the St. Croix River and its tributaries. Contact person is Randy Ferrin (rsferrin@frontiernet.net 651-433-4929)</p>	<p>SRWMO</p>	
<p>Pursue financial and technical assistance program for septic system repair and replacement</p>	<p>Low interest loans or grants and technical assistance to assist residents with replacing or repairing non-compliant septic systems in shoreland areas. Clean Water Partnership Loans, Anoka Co. Housing and Redevelopment Authority's (HRA) Community Development Block Grant and the MN Dept. of Ag's Ag BMP Loan Program are possible funding sources. HRA funding could be zero interest loans or grants through the WMO. Zero interest loans would sit on the property with a repayment when sold or refinanced. Contracts would be between the county and the WMO and between the homeowner and septic professional. SRWMO will plan expenditures for the grant application preparation, soliciting interested homeowners, and minor administration. Most administration, such as evaluating residents' income eligibility, is done by the county. Applications are due in January. Contracts are 18 months.</p>	<p>SRWMO, Anoka Co HRA, MN Dept of Ag - AG BMP Loan Program, BWSR, MPCA</p>	<p>Municipalities, Anoka Co Housing and Redevelopment Authority, MN Dept of Ag, MPCA, BWSR, Lake Associations</p>



Task	Task Summary	Possible Funding	Possible Partners
Education and Public Outreach			
SRWMO website	The existing SRWMO website will be continued (www.AnokaNaturalResources.com/SRWMO). Information posted will include board members, contact information, meeting dates, agendas, minutes, project descriptions, annual reports, and information about services provided.	SRWMO	ACD
Public officials tour	A tour for municipal officials focusing on recent projects and problems, as well as ecologically unique areas in the WMO.	SRWMO	
Septic system maintenance education campaign	Efforts to educate residents in shoreland areas about septic system maintenance will include: (a) mailing the U of M Extension's Septic System Owner's Manual to ~950 lakeshore homes that exist on our 5 largest recreational lakes - \$9000 and (b) at least one locally-held workshop, perhaps with U of M Extension as a partner - \$1,500.	SRWMO	U of M Extension, Lake Associations
Aquatic plant education campaign	Mailings, workshops, signage, and articles to educate lakeshore homeowners about the benefits of native aquatic plants, threat of invasive species, and ecologically-sound and legal lakeshore management. Also education about aquatic hitchhikers, for which MN DNR is a educational materials source. Target neighborhoods are those surrounding Coon, Fawn, Linwood, and Martin Lakes. Existing SRWMO signage at boat landings will be maintained.	SRWMO	ACD, DNR, Lake Associations
Lakeshore landscaping marketing	A marketing campaign will promote water quality projects such as lakeshore restorations, rain gardens, and others applicable to lakeshore properties. Efforts will include mailings, articles in local publications, workshops, presentations (such as at lake association meetings), and others. In 2013 the most work will occur including a workshop (\$2,000), demonstrations (\$1,000), and promotions (\$1,000). All years will have active work. To facilitate this effort the SRWMO will join the Blue Thumb consortium in 2011 and continue membership in subsequent years. We will use already-prepared educational materials available through this consortium. Membership requires an annual contribution of \$1500 cash or 30 hours in-kind (strongly preferred). We will meet this 30 hour obligation by incorporating Blue Thumb into several of our work plan tasks, including lakeshore landscaping marketing campaign, aquatic plant education campaign, public officials tour, the SRWMO website, our annual education publication, stormwater retrofits, some Martin and Typo Lakes water quality projects, and similar work by member communities.	SRWMO	ACD, DNR, Lake Associations
Annual educational publication	An article about the SRWMO submitted to each member city for inclusion in city newsletters, including information required in MN Rules 8410.010 subpart 4. Topics may include water quality or unique ecological features.	SRWMO	Member municipalities

^ Project dependent upon securing additional funds from grants.

^^Project dependent upon additional funds from the member community where project occurs.

Table 23. Action plan timeline and estimated costs. All costs listed are an estimate of SRWMO expenditures.

	Target Date/Estimated Cost										
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Operating Expenses* (per the SRWMO Joint Powers Agreement costs split equally among member cities)											
Secretarial or other administrative	\$880	\$1,200	\$1,200	\$1,200	\$1,200	\$1,500	\$1,500	\$1,500	\$1,500	\$1,500	\$13,180
Administrator (On-call, limited)		\$1,500	\$1,500	\$1,500	\$1,500	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$14,500
Liability Insurance	\$2,500	\$2,300	\$2,300	\$2,300	\$2,300	\$2,600	\$2,600	\$2,600	\$2,600	\$2,600	\$24,700
Admin assistance- City of E. Bethel		\$300	\$300	\$300	\$300	\$300	\$300	\$300	\$300	\$300	\$2,700
Non-Operating Administrative Expenses*											
Financial Audit		\$300	\$300	\$300	\$300	\$350	\$350	\$350	\$350	\$350	\$2,950
Legal		\$1,000	\$1,000	\$1,000	\$1,000	\$1,200	\$1,200	\$1,200	\$1,200	\$1,200	\$10,000
Annual Report to BWSR and member municipalities	\$675	\$675	\$675	\$675	\$675	\$800	\$800	\$800	\$800	\$800	\$7,375
Review municipal local water plans for consistency with SRWMO Plan	\$2,000	\$1,000									\$3,000
Develop member community annual report template	\$560										\$560
Seek bids for services		\$100		\$100		\$100		\$100		\$100	\$500
Grant search and applications		\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$9,000
Reevaluate this plan based on new TMDLs			\$2,000								\$2,000
Update Watershed Plan (due Dec. 31, 2019)									\$10,000	\$30,000	\$40,000
Water Condition Monitoring**											
Lake levels (volunteer)	\$750	\$710	\$720	\$730	\$740	\$750	\$760	\$770	\$780	\$790	\$7,500
Lake water quality (volunteer)		\$400									\$400
Lake water quality (professional)****	\$2,850		\$6,061		\$1,917	\$4,300	\$1,953		\$6,409		\$23,490
Stream water quality			\$2,040	\$1,030	\$1,040	\$2,100	\$1,060	\$1,070	\$2,160	\$1,090	\$11,590
Stream hydrology	\$1,070	\$1,055	\$1,060	\$1,065	\$1,070	\$1,075	\$1,080	\$1,085	\$1,090	\$1,095	\$10,745
Reference wetland	\$1,605	\$1,650	\$1,665	\$1,680	\$1,695	\$1,710	\$1,725	\$1,740	\$1,755	\$1,770	\$16,995
Monitoring of water quality improvement project effectiveness			\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$8,000
Studies and Investigations											
Impaired water TMDL studies - Linwood Lake is top priority^					\$20,000						\$20,000
Fawn Lake curly-leaf pondweed mapping and assess control needs		\$3,300				\$3,300				\$3,300	\$9,900

	Target Date/Estimated Cost										
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Water Quality Improvement Projects											
Cost share grant fund	\$1,840	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$19,840
Martin and Typo Lakes carp barriers project			\$20,000	\$15,000							\$35,000
Discretionary water quality projects						\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$50,000
Martin Lake area stormwater retrofit - reconnaissance and design phase	\$5,000										\$5,000
Coon Lake area stormwater retrofit - reconnaissance and design phase				\$18,000							\$18,000
Martin Lake area stormwater retrofits - installation phase^^		\$10,000	\$10,000								\$20,000
Coon Lake area stormwater retrofits - installation phase^^					\$20,000	\$20,000					\$40,000
Estimate WMO phosphorus export		\$1,200									\$1,200
Join St. Croix Basin Team	\$0										\$0
Pursue financial and technical assistance program for septic system repair and replacement			\$3,000	\$1,500							\$4,500
Education and Public Outreach											
SRWMO website	\$270	\$400	\$400	\$400	\$400	\$400	\$400	\$400	\$400	\$400	\$3,870
Tour of water quality projects for public officials					\$1,500				\$1,500		\$3,000
Septic system maintenance education campaign				\$10,500							\$10,500
Aquatic plant education campaign		\$1,000			\$1,000			\$1,000			\$3,000
Lakeshore landscaping marketing		\$500	\$700	\$4,000	\$700	\$700	\$700	\$700	\$700	\$700	\$9,400
Annual educational publication		\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$4,500
ANNUAL ESTIMATED EXPENDITURES	\$20,000	\$42,090	\$59,421	\$65,780	\$61,837	\$57,385	\$30,628	\$29,815	\$47,744	\$62,195	\$466,895

* All administrative costs estimated to be constant for 1st 5 yrs, then increased 10-20% for 2nd 10 yrs.

** All monitoring costs estimated with an increase of up to 4% per year.

^ Project dependent upon securing additional funds from grants. SRWMO is committed to providing the funds listed as match toward a grant.

^^Project dependent upon additional funds from the member community where project occurs. SRWMO is committed to providing the funds listed. Limited funding will be applied to projects yielding the greatest pollutant removal per dollar.

Table 24. Water resource management work that is being completed by others and is closely related to SRWMO goals.

Task	Description	Agency
SRWMO website promotion	Links to SRWMO website will be posted on community websites.	Member communities
Lake water quality monitoring	Island Lake is monitored through the Met Council Citizen Assisted Monitoring Program (CAMP)	Anoka County Parks
Stream biota monitoring	Stream biota (invertebrates and fisheries) periodically monitored.	MPCA
Precipitation monitoring	Four volunteers record daily precipitation totals. Volunteers are coordinated by the ACD and the Office of State Climatology is the data repository.	Volunteers, ACD, State Climatology
Eurasian water milfoil treatment	Eurasian watermilfoil is monitored and treated. Other water quality improvement projects are also done.	Coon Lake Improvement District, Coon Lake Improvement Association
Aquatic invasive species control	“Stop Aquatic Hitchhikers” education campaign. Grants for invasive species control.	MN DNR
Sunrise River watershed-wide TMDL	A study of the entire Sunrise River Watershed which will take the form of a TMDL. Completion is expected in 2010.	Chisago County and US Army Corps of Engineers
Storm water management	Maintenance and management of the storm sewer system. Ham Lake and East Bethel are MS4 communities under the Federal Clean Water Act and therefore have additional duties to manage storm water quality, which are detailed in their Storm Water Pollution Prevention Plans.	Member communities
Ordinance enforcement	Enforcement of community-level ordinances including erosion and sediment control, shoreland, septic system, stormwater, and wetland ordinances. It also includes state-level laws such as public waters laws and some erosion and sediment control rules.	Member communities, state agencies.
Landscaping for water quality program	Work with willing landowners to install practices that will result in water quality improvement. Cost share grants are available. Work is mostly done in conjunction with watershed organizations.	Anoka Conservation District
Lake aeration	A wintertime aeration system is in place on Martin Lake to prevent fish kills.	Anoka County Parks

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REGULATORY CONTROLS AND PERFORMANCE STANDARDS

Regulatory Controls

The SRWMO does not have a permitting or regulatory program, but does require that each member community have certain regulatory controls and performance standards in place (Table 25). The SRWMO has chosen this approach because these and other regulatory controls are already administered by the communities, because this allows communities the opportunity to customize their approaches to their individual circumstances provided they are consistent with the WMO approach, and in order to minimize SRWMO operating expenses. The local water plans must be updated within two years of SRWMO approval of this plan and ordinances must be updated within 180 days thereafter (MN Statutes 103B.235 subd. 4).

Table 25. Regulatory controls and performance standards required in each SRWMO community.

Regulatory Control	Required Content
Erosion and sediment control ordinance	Consistent with, or relying upon, the MPCA Construction General Permit. Member communities may find the model ordinance at www.pca.state.mn.us/publications/wq-strm2-16b.pdf helpful.
Shoreland ordinance	In compliance with Minnesota Rules, Chapter 6120.2500 through 6120.3900. Shoreland rules for Linwood Township may continue to be administered by Anoka County, as allowed in MN Rules 6120.3900 subpart 4a.
Septic system ordinance	Consistent with Minnesota Rules 7080-7082 and Statutes 115.55-56
Stormwater ordinance	Consistent with SRWMO storm water standards (Appendix C)
Wetland ordinance	Consistent with SRWMO wetland standards (Appendix C). Additionally, the community shall serve as the local governmental unit administering the state Wetland Conservation Act.
Floodplain ordinance	At least as protective as the Anoka County Floodplain Ordinance and Minnesota Rules Chapter 6120.5000 to 6120.6200.

SRWMO Performance Standards

The SRWMO developed performance standards for stormwater and wetlands as part of this plan in a cooperative effort with the communities. A technical advisory committee was formed that included staff from member communities, oversight agencies (BWSR, DNR, MPCA, Metropolitan Council), and the Anoka Conservation District. While the

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primary goal was to develop minimum protective standards watershed-wide, the TAC found it was appropriate to also strive to remain consistent with, if not identical to, the neighboring Upper Rum River WMO standards because the cities of Ham Lake and East Bethel are in both watersheds. The TAC also worked to make the standards consistent with similar state-level standards, thereby reducing confusion and complexity. This approach resulted in standards with consensus support.

It is notable that, although septic systems are a high priority for the SRWMO, the WMO did not develop its own septic system rules. The TAC and SRWMO Board reviewed this issue and found that 2008 updates to state rules 7080-7082 (septic system rules communities must adopt and enforce) were rigorous. The updates to these state rules closely paralleled the approaches that the SRWMO Board favored. The SRWMO Board feels that enforcement of these rules at the local level should be a priority, particularly in shoreland areas.

VariANCES

The members may grant variances from WMO standards only if extraordinary or unnecessary hardship will result from strict compliance. However, these variances should not subvert the intent and purpose of the standards or the WMO's management plan, and should not grant special convenience or rights to any person or group. In accordance with these provisions, variances may be granted only if all of the following circumstances exist:

1. The purpose of the variance is to alleviate unique non-economic conditions or circumstances that are not the result of any action by the applicant.
2. The exceptional or unusual circumstances for which the variance is requested do not apply generally to other properties adjacent to the same water resource and are the result of topography or other natural circumstances over which the property owners have no control.
3. Granting the variance will not confer special privileges to the applicant that are otherwise denied to the owners of other lands adjacent to the water resources or to public users of the resource.
4. The variance will not result in conditions that do not meet standards set by state law or by regulations of other governmental bodies, and it will not permit a lower degree of flood protection than that provided to other lands adjacent to the water resource.
5. The variance is the minimum variance that will alleviate the hardship.
6. The variance will not violate the spirit and intent of the WMO's management plan.
7. The variance will not adversely affect the use of other properties not controlled by the applicant and will not unduly limit the way in which other properties not under the applicant's control may be used or developed.
8. Hardship means the proposed use of the property and associated structures in question cannot be established under the conditions allowed by the ordinance or its



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amendments and no other reasonable alternate use exists; however, the plight of the landowner must be due to physical conditions unique to the land, structure or building involved and are not applicable to other lands, structures or buildings in the same zoning district. These unique conditions of the site cannot be caused or accepted by the landowner after the effective date of the ordinance, its amendments or previous like ordinances.

9. Economic considerations alone shall not constitute a hardship.

WMO Oversight

The WMO will retain the right to monitor the local governments' permitting activity with regard to enforcement and consistency with the approved management plan. In this way, the WMO can identify any policies, standards, or criteria that warrant updating, modification, or improvement, in order to maintain water resource planning and implementation at the intended level. While the WMO does not intend to exercise regulatory authority by issuing permits, the WMO does reserve the authority to become an active component of the regulatory process as necessary to ensure compliance with this plan. The SRWMO requires the communities annually report to the SRWMO, providing an opportunity to review ongoing enforcement.

If the SRWMO finds that a member community fails to implement its enforcement duties the SRWMO shall take actions necessary to ensure SRWMO standards are implemented. The WMO's first step will be to communicate concerns to the community, first via the WMO Board member from that community, second through a letter, and third by meeting with the city council or town board. If inadequacies cannot be remedied by other means, the SRWMO Joint Powers Agreement and Minnesota Statutes, Section 103B.211 provides that the WMO has:

“the authority of a watershed district under chapter 103D to regulate the use and development of land in the watershed when one or more of the following conditions exists:

- (i) the local government unit exercising planning and zoning authority over the land under sections 366.10 to 366.19, 394.21 to 394.37, or 462.351 to 462.364, does not have a local water management plan approved and adopted in accordance with the requirements of section 103B.235 or has not adopted the implementation program described in the plan;
- (ii) an application to the local government unit for a permit for the use and development of land requires an amendment to or variance from the adopted local water management plan or implementation program of the local unit;
- (iii) the local government unit has authorized the organization to require permits for the use and development of land;”

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MAINTENANCE

Maintenance to water conveyance systems is the responsibility of member communities or other agencies. The Anoka County Highway Department has jurisdiction over county ditches. Most structures within public waters, such as lake outlets, are under MN DNR jurisdiction. Storm water conveyance systems are the responsibility of the respective community (see Table 26). Storm water conveyance system management and maintenance for the cities of East Bethel and Ham Lake are in their Storm Water Pollution Prevention Plans (SWPPP).

Table 26. Maintenance of the storm water conveyance system to be carried out by communities.

Maintenance	Specifications
Map stormwater system	Each community must have maps of their storm water conveyance system for proper maintenance, permitting, flood studies, stormwater management, watershed modeling, and/or road maintenance and reconstruction. These maps should include the location, size, elevation, and condition of all stormwater conveyances, water quality or quantity treatment features, outfalls, and culverts. This should be completed before or during treatment basin inspections (see below) required by 2014.
Street sweeping	The SRWMO requires sweeping of streets with curb and gutter once annually in all areas, and twice annually in priority areas. Priority areas shall be areas that drain directly to water bodies and/or natural wetlands without pretreatment of storm water runoff. Roadside ditches in rural areas will constitute treatment.
Inspections	The SRWMO requires that member communities inspect storm water treatment basins by 2014 and again at least 5 year intervals. Sump catch basins/manholes shall be inspected every year. Maintenance shall be conducted as necessary. Maintenance activities undertaken by member communities shall be included in the annual report to the SRWMO.
Spill containment and cleanup	Each community will assess the need for spill containment and cleanup plans in their community.

ANNUAL REPORTING

Annual reporting, both by the WMO and member communities, is part of this implementation plan. This reporting is designed to ensure proper oversight, transparency, and to facilitate communication.

SRWMO Annual Report - The SRWMO will submit an annual report to the Board of Water and Soil Resources per Minnesota Rules 8410.0150, but this

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report will also be submitted to SRWMO member communities. This report is due 120 days after the end of the WMO's fiscal year (April 30 or April 29 in leap years).

Member Community Annual Reports - Each year each community will submit an annual report to the WMO. The WMO will create a reporting template. This template will list tasks required of communities in this plan. As such, it will serve as a "to do" list for the communities and a way for the WMO to ensure that this work is being completed. The WMO will set the due date for these annual reports. The member community reports should be due before the WMO's annual report to BWSR so community accomplishments can be included in the report to BWSR.

CHAPTER 6 IMPACT ON LOCAL GOVERNMENT

LOCAL CONTROLS

The impact of local controls and programs varies from community to community. The status of local controls and programs is listed in Table 27.

Table 27. Status of required regulatory controls in SRWMO communities (July 2009). Table 25 summarizes the required content for each regulatory control.

Regulatory Control	Columbus	East Bethel***	Ham Lake***	Linwood
Erosion and sediment control ordinance	Ok	Ok	Ok	Ok
Shoreland ordinance	Ok	Ok	Ok	Ok
Septic system ordinance*	Update	Update	Update	Update
Stormwater ordinance	Update	Update	Update	Update
Wetland ordinance	Update	Update	Update	Update
Floodplain ordinance	Ok	Ok	Ok	Ok
Local Water Plan	Update	Update	Update	Update**

Ok Community has existing regulation which is adequate.

Update Community has existing regulation, but updates are needed for consistency with this plan. In many cases the needed updates are minor, except in Linwood Township.

No Community lacks this element but is required to adopt one.

* All communities need to update septic system ordinances due to revisions of MN Rules 7080-7082 in 2008.

** Linwood Township adopted the SRWMO Plan by reference to satisfy local water planning requirements, and will be allowed to do so with this 3rd Generation Plan if they desire.

*** The SRWMO is aware that East Bethel and Ham Lake are, as of the writing of this plan, undertaking revisions to their local water plans and ordinances in order to be compliant with the Upper Rum River WMO Plan. Once those revisions are complete, Table 27 may be inaccurate for those communities. The SRWMO Plan contains provisions that are similar to, if not identical to, provisions in the Upper Rum River WMO Plan.

The Cities of Ham Lake and East Bethel already have regulatory controls and local water plans that are similar to SRWMO requirements. Updates needed for compliance are minor. Some needed updates will be addressed by the time this plan is approved because these communities are actively updating local controls in 2009 for consistency with the

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Upper Rum River WMO standards, which are similar to, if not identical to, SRWMO standards.

In the City of Columbus moderate updates are needed to some control measures. Their control measures largely capture the spirit of SRWMO standards, but some updates are needed in the details. This community has concerns that additional wetland standards can create difficulties in their communities because of the high abundance of wetlands.

Linwood Township needs extensive updates of local controls. This is the community with the most limited staff and financial capacity. Linwood has, in the past, adopted the SRWMO Plan as their local water plan by reference and may do so again by resolution. Their stormwater and wetland ordinances need major updates. Enforcement of their septic system ordinance has been substandard and updates required by recent revisions of MN Rules 7080-7082 will likely be somewhat controversial in this community. Yet these regulatory controls may be of greater importance in Linwood than in the other communities because of existing water quality problems and documented septic system problems.

Despite the fact that communities need updates, the fact that staff or elected officials from all four member communities participated in the formulation of SRWMO standards gives assurances that the standards will be successfully implemented. The technical advisory committee that formulated the performance standards did so with a consensus-minded approach. All of the performance standards have been examined and accepted by staff or elected officials from each member community before inclusion in this plan.

FINANCIAL IMPACT

The SRWMO is financed by the member communities, and additional financial capacity is achieved through partnerships and grants. The joint powers agreement states that operating expenses of the WMO shall be borne by each member equally (i.e. 25% each). Annual project expenses will be funded by member communities based upon percentages established in the joint powers agreement.

Different community contribution percentages are used for budgeting and financial impact estimates in 2010 and subsequent years because the joint powers agreement was revised in early 2010 (see Table 28). Percentages used through year 2010 are the proportion of the assessed property valuation of each community within the SRWMO. For all years after 2010 community contribution percentages are calculated as 50% of WMO's TMV in the community plus 50% of the WMO's taxable land acreage in that community. Table 28 contains annual estimates of the financial impact on member communities.

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Table 28. Estimated financial contributions from each member community each year.

	2010**	2011	2012	2013	2014	2015	2016	2017	2018	2019	TOTAL
Operating Expenses*	\$3,380	\$5,300	\$5,300	\$5,300	\$5,300	\$6,100	\$6,100	\$6,100	\$6,100	\$6,100	\$55,080
Non-Operating Admin. and SRWMO Projects***	\$16,620	\$26,790	\$54,121	\$60,480	\$56,537	\$51,285	\$24,528	\$23,715	\$41,644	\$56,095	\$411,815
Linwood 25% Admin. & 46.40% Projects	\$7,958	\$13,756	\$26,437	\$29,388	\$27,558	\$25,321	\$12,906	\$12,529	\$20,848	\$27,553	\$204,254
E. Bethel 25% Admin. & 32.93% Projects	\$6,812	\$10,147	\$19,147	\$21,241	\$19,943	\$18,413	\$9,602	\$9,334	\$15,238	\$19,997	\$149,874
Columbus 25% Admin. & 16.72% Projects	\$3,780	\$5,804	\$10,374	\$11,437	\$10,778	\$10,100	\$5,626	\$5,490	\$8,488	\$10,904	\$82,782
Ham Lake 25% Admin. & 3.95% Projects	\$1,450	\$2,383	\$3,463	\$3,714	\$3,558	\$3,551	\$2,494	\$2,462	\$3,170	\$3,741	\$29,985

*Operating expenses are split evenly among the member communities, per the joint powers agreement.

** 2010 contributions from each community for projects uses these percentages - Linwood 42.8%, E. Bethel 35.9%, Columbus 17.66%, Ham Lake 3.64%. The percentages used for all other years and shown in the first column of the table were calculated in December 2009 by Anoka County GIS Department and Anoka Conservation District following methods prescribed by the 2010 SRWMO Joint Powers Agreement.

Additional costs include work conducted by the individual members that improve or protect water quality such as administering the Wetland Conservation Act, street sweeping, regulating shorelands and septic systems, and enforcing erosion control standards. This work has been ongoing for many years, is included in this plan, and illustrates the high commitment of resources by the members to maintaining and improving water resources. These do not represent additional costs of operating the WMO, but rather those already incurred on an annual basis.

There are many options available at the local level for funding the implementation plan. This plan does not prescribe the means by which to fund the plan, rather, that is left to the discretion of the member communities. Table 29 is a brief summary of funding alternatives and their pros and cons.

The Metropolitan Surface Water Management Act gives local governments within the WMO the authority to levy taxes (without regard to existing levy limitations) to pay for water resource planning and management activities required under the Act. Thus, local government planning required to prepare or amend any plans and regulations to comply with the WMO's management plan can be funded by new local tax levies without regard to existing limitations on regular property tax levies within the local government. A local government can also apply a local levy over part of its jurisdiction by creating a local drainage district for tax and planning purposes.

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Table 29. Financing Options

Funding Option	Pros	Cons
Special Assessments	Use only if project would permit establishment of special benefit to individual parcels	Need to prove benefit to each parcel. Deemed least feasible for projects that serve a broad area. Anticipated to be used for isolated projects.
Ad Valorem Taxes	Simplest method. Simply spreads the cost out equally based on the tax classification and value of the property. Least expensive to administer.	Based solely on the tax classification and value and the tax paid is not related to the runoff generated.
Storm Water Utility Fee	Fee based on runoff generated. Provides greatest flexibility for funding methods related to runoff.	More administration to create a storm water utility and for collection of funds.
Subwatershed (special taxing district identified by WMO in plan)	Costs are borne by generators of runoff. Can be used with ad valorem taxes. Adds flexibility.	More administrative time to create the subwatershed or special taxing districts. Question of how the district will be defined.
Connection Fees Area Charges	Reasonable charge would be collected from new development that would reduce charges to existing properties.	Watersheds do not have authority to collect. Presently requires joint powers agreement. Possible challenge to fees by residents.
New Water Management Fee (Flat Fee)	Setting a flat fee for all residents and properties (similar to Solid Waste Fee). Easy to administer. Recognizes that water is everyone's responsibility.	
Tax Increment Financing (TIF)	Minimizes tax impact on existing properties.	Very complex. Loss of tax revenue on schools and municipalities.

Source: Water Governance Study, Washington County, Minnesota. 1999.

Isanti County is an anticipated financial partner for some projects. Portions of southeast Isanti County drain to Typo Lake and the lake is half in Isanti County. Some projects to improve Typo Lake water quality will need to occur in Isanti County. The SRWMO will approach Isanti County regarding a partnership on these projects. The Isanti County Local Water Management Plan (2006) indicates they plan to assist with the TMDL study for Typo Lake and need to be involved in the implementation phase. The expenditures they planned were less than \$600, and much greater sums will need to be contributed, along with staff technical support.

Chisago County's work within the Sunrise River watershed is also important to the SRWMO's goals. Chisago County, along with the US Army Corps of Engineers, is leading an intensive study of the entire Sunrise River watershed. Chisago County's goals are well-aligned with the SRWMO goals.

CHAPTER 7 PLAN AMENDMENTS & LOCAL WATER PLANS

AMENDMENTS TO THIS PLAN

This plan is intended to extend through December 31, 2019. Updates to the plan before that date may be done through the amendment process. Amendments may include re-direction of this plan based upon the completion of new TMDL studies, changes to the state list of impaired waters, or for other reasons. The amendment process differs for major and minor amendments, as set forth in Minnesota Rules 8410.0140 and described below.

Minor Amendments

Minor amendments shall be defined as recodification of the plan, revision of a procedure meant to streamline administration of the plan, clarification of the intent of a policy, the inclusion of additional data not requiring interpretation, or any other action that will not adversely affect the member communities or diminish the SRWMO's ability to achieve the plan goals or implementation program. Adjustments to subwatershed boundaries will be considered minor changes, provided that the change will not have significant impact in the rate or quality in which storm water runoff is discharged from the WMO boundaries. The WMO may also deem other changes to be minor amendments. BWSR may decide that a proposed amendment is not a minor amendment and must undergo the process listed below for major amendments.

Proposed minor amendments shall be sent to all counties, soil and water conservation districts, towns, and statutory and home rule charter cities having territory within the watershed, and to the Metropolitan Council, MN DNR, MPCA, MDH, and the Minnesota Board of Water and Soil Resources (BWSR). These entities shall have 45 days from receipt to provide comments. During this period, the WMO shall hold a public hearing to explain the amendments. Legal notice of the meeting must be posted twice, at least seven and 14 days before the meeting date. All amendments must be approved by the BWSR. If BWSR fails to act within 45 days the proposed amendments shall be deemed approved.

Upon approval, adopted amendments must be provided to member communities and all others who have received a copy of the plan within 30 days of adoption. These shall be in the form of replacement pages and include the effective date of the amendment.

Major Amendments

Major amendments are all those not meeting the definition of a minor amendment. Major amendments must follow a procedure defined in Minnesota Statutes Section 103B.231, Subdivisions 7, 8 and 9, which prescribes 60 and 45 day formal review periods. Proposed amendments shall be sent to counties, the Metropolitan Council, the state review agencies, the Board of Water and Soil Resources, soil and water conservation districts, towns, and statutory and home rule charter cities having territory within the watershed. A 60 day comment period shall

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ensue. The watershed management organization must respond in writing to any concerns expressed by the review agencies within 30 days of receipt thereof. The watershed management organization must hold a public hearing on the draft plan no sooner than 30 days and no later than 45 days after the 60-day review period of the draft plan. Legal notice of the meeting must be posted twice, at least seven and 14 days before the meeting date. The amendments (revised in response to comments received, as determined necessary by the WMO), all written comments received on the plan, a record of the public hearing, and a summary of changes incorporated as a result of the review process shall be submitted to the Metropolitan Council, the state review agencies, and the Board of Water and Soil Resources for final review. This review period will last 45 days. All amendments must be approved by the BWSR. If BWSR fails to act within 45 days the proposed plan amendments shall be deemed approved.

Upon approval, adopted amendments must be provided to member communities and all others who have received a copy of the plan within 30 days of adoption. These shall be in the form of replacement pages and include the effective date of the amendment.

LOCAL WATER PLANS

In order to satisfy the intent of Minnesota Rules Chapter 8410 Metropolitan Area Local Water Management, each member communities shall prepare a local water management plan in conformance with the goals, policies, and standards of this plan. Member communities must update their Local Surface Water Management Plans to be consistent with this plan within 2 years of SRWMO adoption and update ordinances within 180 days thereafter (MN Statutes 103B.235 subd. 4). The WMO will review and approve these plans (MN Statutes 103B.235 subd. 3) and ordinances required by the SRWMO Plan.

Columbus, Ham Lake, and East Bethel updated their local water plans during the development of this plan. They took into consideration the portions of this plan that were in draft form at that time. As such, little or no revision to their local water plans may be needed. If, after comparing their local water plan to this plan, the community feels no updates are necessary they must communicate this to the WMO within 18 months from the time of SRWMO adoption of this plan, and provide a copy for the WMO to review and approve. The review process detailed on the following page shall be followed, except that submittal of the plan to the Metropolitan Council is not required provided it has not been changed since last Metropolitan Council approval.

Content Requirements

Each local government's water resource management plan shall include those elements specified in Minnesota Rules 8410.0170. It must include goals, policies, actions, and standards that are consistent with, and at least as protective as, this plan. It must address all requirements of communities that are contained within this plan.

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Adoption by Reference

Member communities may adopt the WMO plan or portion of it by reference, through a resolution, to satisfy the intent of local water management planning. The WMO feels that this is reasonable because most of the actions demanded of communities in this plan must be formalized in other ways, such as through ordinances. For other tasks, such as storm water system maintenance, this plan contains a required schedule for completion. The SRWMO will ensure tasks are completed on schedule by requiring annual reporting from all communities. The SRWMO will create a reporting template that includes all tasks required of communities in this plan.

Review Process

After consideration but before adoption by the governing body, each local unit shall submit its water management plan to the watershed management organization for review for consistency with the WMO Plan (Minnesota Statutes 103B.235). Once a plan is received, the WMO shall have 60 days to review the document and to approve or reject it (in whole or in part) based on its compliance with the WMO's management plan. If the WMO fails to complete its review within 60 days, and if the local government has not agreed to an extension, the plan will be deemed approved. The plan must also be submitted to the Metropolitan Council, who has a 45 day review period that runs concurrent with the WMO review. Local governments are encouraged to solicit informal WMO Board input and review before they submit their plans for formal review.

After the WMO approves a local water resource management plan, the local government shall adopt and implement the plan within 120 days and shall amend its official controls accordingly within 180 days. If a local government should later wish to amend its plan, it must submit the proposed amendment to the SRWMO Board of Managers for review of consistency with the WMO's management plan. The WMO must approve or disapprove of the amendment (in whole or in part) within 60 days of its submittal.

GLOSSARY

100 Year Rain Storm – Rainstorms of varying duration (e.g., 2, 6, 24 hour) and intensities (inches per hour) expected to recur on the average of once every one hundred years (1% frequency probability).

Algae - Simple rootless plants that grow in bodies of water in relative proportions to the amount of nutrients available. Algal blooms, or sudden growth spurts, can affect water quality adversely.

Aquifer – Saturated permeable geologic unit(s) that can transmit significant quantities of water under ordinary hydraulic gradients.

Bedrock Aquifer – One or more saturated geologic units composed of sedimentary, metamorphic, or igneous rock that can transmit significant quantities of water under ordinary hydraulic gradients.

Best Management Practices (BMPs) – Practices that can be used to control nonpoint source pollution.

Bounce – The vertical elevation difference between the peak flood elevation and the wetland elevation.

County Ditch - County Ditch means an open channel to conduct the flow of water. (Minnesota Statutes, Section 103E.005, subd8). County ditch includes only those ditches which are part of the public drainage system as identified in the Anoka County Public Ditch Inventory dated January 1992.

Ditch – An open channel to conduct the flow of water.

Design Storm - The storm, which creates the runoff, is unusually characterized as having a “frequency” or “return-interval” as well as duration. For example, a 100-year, 24-hour rainstorm is the maximum depth of rain, which could be expected to fall in a 24-hour period once every 100 years on average. This type of storm would have a 1% chance of occurring in a given year. Similarly, a 5-year storm would have a 20% chance of occurring.

Detention – The temporary storage of storm runoff used to control the peak discharge rates, and which provide gravity settling of pollutants.

Detention Pond – An impoundment that is normally dry but is used to store water runoff until it is released from the structure. Used to reduce the peak discharge from stormwater runoff.

Detention Area - A lake, pond, stormwater storage area or wetland where surface water runoff is temporarily held to reduce peak discharges or for water quality improvement.

Detention Time – The amount of time a parcel of water actually is present. Theoretical detention time for a runoff event is the average time parcels of water reside in the basin over the period of release.

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Ditch Repair - Ditch repair means to restore all or part of a drainage system, as nearly as practicable, to the same condition as when originally constructed and subsequently improved.

- Re-sloping of ditches, leveling and reseeding of waste banks, if necessary, to prevent further deterioration;
- Realignment of original construction, if necessary, and to restore the effectiveness of the system or prevent the drainage of a wetland;
- Routine operations that may be required to remove obstructions and maintain the efficiency of the drainage system;
- Restoration or enhancement of wetlands; and
- Wetland replacement under Minnesota Statutes 103G.222

Discharge – The total volume of water moving past a point in the stream (Q) measured in m^3s^{-1} . This is calculated by width of the stream (W) multiplied by the mean depth of the stream (D) multiplied by the velocity of the water (U): $Q=WDU$.

Erosion – Wearing away of lands or structures by running waters, glaciers, winds, and waves.

Eutrophication - The natural or artificial process in a water body of nutrient enrichment causing abundant algae or aquatic plant growth.

Floodway – The channel of a watercourse and those portions of the adjoining floodplain, which are reasonably required to carry and discharge the 100-year flood.

Floodplain – Lowland area adjoining waterbodies, which are susceptible to inundation of water during a flood.

Flood Fringe - The portion of the floodplain outside of the floodway.

Freeboard – A factor of safety above a certain flood level. This typically is defined as the vertical separation between the design flood level (e.g., 1 percent chance flood elevation) and the lowest floor of a structure or the top of an embankment. Freeboard compensates for the many unknown factors (e.g., waves, ice, debris, etc.) that may increase flood levels beyond the calculated level.

Geology – The science, which treats the origin, history, and structure of the earth, as recorded in the rocks; together with the forces and processes now operating to modify rocks.

Glacial Drift – Material that was deposited by glaciers.

Greenways – Corridors of protected open space managed for conservation and/or recreation purposes. They often follow natural land or water features, and link natural areas, parks, cultural features.

Groundwater – Water underneath the ground surface.

Hydrograph – A graph showing the variation in the water depth or discharge in a stream or channel, over time, at a specified point of interest.

Hydrology – The applied science concerned with the waters of the earth in all its states – their occurrences, distribution, and circulation through the unending hydrologic cycle of:

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precipitation; consequent runoff, stream flow, infiltration, and storage; eventual evaporation; and re-precipitation.

Impervious Surface – Impermeable surfaces, such as pavement or rooftops, which prevent the infiltration of water into the soil.

Infiltration – The entrance of water into the soil or other porous material through the interstices or pores of a soil or other porous mediums.

Landlocked Lake or Subwatershed – Area which has an outlet that is significantly higher than the normal water level of the lake, pond or wetland.

Lateral Ditch – Any open channel or storm sewer drainage construction by branch or extension, or a system of branches and extensions, or a drain that connects or provides an outlet to property with an established drainage system (Minnesota Statutes, section 103E.005, subdivision 15). Lateral includes only those facilities, which are connected to the Anoka County Ditch system as identified in the Anoka County Public Ditch Inventory dated January 1992.

Level of Protection - This is the design storm for which detention areas are sized. A pond designed for a 100-year rainstorm will have sufficient volume to contain the resulting runoff without flooding.

Level of Service - This is the design storm for which culverts or conveyors can be expected to flow at full capacity without flooding. This typically is a 5-, 10-, or 25-year design. The level of service is selected to be a combination of flood protection and economic cost.

Natural Communities – An assemblage, that tend to recur over space and time, of native plants and animals that interact with each other and their abiotic habitats in ways little modified by humans or non-native species. Natural communities are classified and described by considering vegetation, succession status, topography, hydrology, landforms, substrates, soils and natural disturbance regimes (such as wild fires, wind storms, normal flood cycles, and normal infestation by native insects and microorganisms).

Nonpoint Source Pollution – Pollution from any source other than any discernible, confined and discrete conveyances, including but not limited to surface runoff from agricultural, silvicultural, mining, construction, subsurface disposal and urban activities.

Nutrients –Substances, particularly phosphorous and nitrogen in aquatic environments, which promote plant growth.

Ordinary High Water (OHW) Level – The boundary of public waters and wetlands, and shall be an elevation delineating the highest water level which has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the ordinary high water level is the elevation of the top of the bank of the channel. For reservoirs, and flowages, the ordinary high water level is the operating elevation of the normal summer pool.

Policies: A governing principle that provides the means for achieving established goals.



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Outflow Conveyors - These are the ditches, streams, channels or pipe systems that carry water between detention areas.

Overland Flow or Runoff - Water that flows over the soil surface and occurs from areas that are impervious, locally saturated, or areas where the rainfall rate exceeds the infiltration capacity of the soil.

Peak Runoff – The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event.

Precipitation – The total measurable supply of water of all forms of falling moisture, including dew, rain, mist, snow, hail, and sleet; usually expressed as depth of liquid water on a horizontal surface in a day, month or year, and designated as daily, monthly, or annual precipitation.

Public Waters – Any waters defined in Minnesota Statutes, section 105.37, subdivision 14 and 15.

Reach – Longitudinal segments of a stream defined by natural or manmade restrictions. In an urban area the segments of the stream between two consecutive road crossings could typically constitute a reach.

Recharge – Replenishment of the groundwater system by natural or artificial means.

Regional Detention Basin – A natural period or wetland area, often modified by man, in which a minimum and permanent water level is maintained. During periods of stormwater runoff of various durations, the basin receives additional water, stores it temporarily, and releases it at a controlled rate. In addition to runoff flow equalization in reducing existing flooding problems; the basin serves pollutants from existing as well as planned development.

Retention – The holding of runoff in a basin without release except by means of evaporation, infiltration, or emergency bypass.

Roughfish – A broad category of non-game fish species that include carp, buffalo, redhorse, freshwater drum (sheepshead), bowfin (dogfish) burbot (eelpout), cisco (tullibee), gar, mooneye, and bullhead.

Runoff – That portion of the precipitation which is not absorbed by the deep strata but finds its way into the surface water system.

Secchi Disk – A circular plate, used to measure the transparency or clarity of water by noting the greatest depth at which it can be seen. Its primary use is in the study of lakes.

Sediment – Solid matter carried by water, sewage, or other liquids.

Sedimentation Area - A basin similar to a detention basin except that it has been designed to capture and retain sediment in the runoff water.

Shoreland – Land located within the following distances from public water: 1,000 feet from the ordinary high water level of a lake, pond, or flowage; and 300 feet from a river or stream, or the landward extent of a floodplain designated by ordinances on a river or stream, whichever is greater.

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Stormwater Runoff – The flow on the surface or the ground, resulting from precipitation in the form of rainfall or snowmelt. The magnitude of discharge is a function of land use, precipitation depth and intensity, and the time required to reach a conveyer.

Standards - Extensions of the policies which provide specific, detailed guidance regarding water management practices.

TMDL (Total Maximum Daily Load) - A study of required by the Federal Clean Water Act for waterbodies not meeting water quality standards. The study determines pollutant sources and the amount of pollutant reduction needed to meet water quality standards.

Universal Soil Loss Equation – A method developed by the Agricultural Research Service, USDA, and used by Soil and Water Conservation Districts to estimate the average annual soil erosion based on rainfall, soil erodibility, slope of the land, length of slope, vegetative cover, and erosion control practices.

Water Control Structures - These can be dams, culverts or flow regulating devices, which are at the outlet of a basin or in a conveyance.

Waterbodies – Natural or man-made depression and stormwater conveyance and storage facilities including wetlands, lakes, ponds, streams, and rivers.

Water Resource Groups -

Group 1 - Protected Water Resource: A water resource having some or all of the following characteristics: a regional recreational resource; adjacent to a regional park; at least partially encircled by bike or pedestrian trails; used extensively for water contact sports (such as swimming, water-skiing, or sail boarding); has a high demand for boating or sailing; a popular fishing resource (summer or winter); regionally perceived as a valuable amenity by the public; a major water resource; has existing or potential erosion problems within a directly tributary watershed; is a known groundwater recharge area; has an existing water quality problem that requires improvement; is highly accessible by the public.

Group II – Managed Water Resource: A water resource that has some or all of the following characteristics; is adjacent to a local park; is not more than partially encircled by bike or pedestrian trails; lacks a public swimming beach; is a neighborhood pond with some adjacent public property; supports substantial waterfowl; provides general wildlife habitat; is locally perceived as a valuable amenity by the public; could be used to protect downstream water quality; is an intermediate water resource; has existing or potential erosion problems within a directly tributary watershed; is used for stormwater control; is a known groundwater recharge area; is located along, or is part of, a trunk conveyance system; has a desirable objective the maintenance of existing water quality; is moderately accessible by the public; includes ponds, wetlands, regional stormwater detention basins, streams, and ditches; may warrant limited public maintenance.

Group III – Conservation Water Resources: A water resource that has some of the following characteristics: lacks a public swimming beach; lacks adjacent park lands; is



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a neighborhood pond without adjacent public property; supports substantial waterfowl; provides general or unusual wildlife habitat; is not easily accessible for maintenance or periodic restoration; is a water resource used for stormwater control; has limited public access; merits the least public concern regarding existing or future water quality; includes on-site or local stormwater detention basins, wetlands, streams, or ditches.

Watershed – A geographical area which collects precipitation and provides runoff to a particular collector such as a stream, lake, or marsh.

Wetlands – Lands in transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands must have predominance of hydric soils; be inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; under normal circumstances, support a prevalence of hydrophytic vegetation.

ACRONYMS

ACD	Anoka Conservation District
BMP	Best Management Practice
BWSR	Board of Water and Soil Resources
MN DNR	Minnesota Department of Natural Resources
FEMA	Federal Emergency Management Agency
FIS	Flood Insurance Study
GIS	Geographical Information System
GPS	Global Positioning System
LGU	Local Government Unit
MPCA	Minnesota Pollution Control Agency
MDH	Minnesota Department of Health
MC	Metropolitan Council
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
OHW	Ordinary High Water Mark
WCA	Wetland Conservation Act
WMA	Wildlife Management Area
WMO	Watershed Management Organization
WPA	Wetland Preservation Areas

MAPS

APPENDIX A:
JOINT POWERS AGREEMENT

AMENDED
SUNRISE RIVER WATERSHED MANAGEMENT ORGANIZATION
JOINT POWERS AGREEMENT

THIS AMENDED JOINT POWERS AGREEMENT made and entered into as of the date of execution by and between the Local Government Units of the City of Columbus, City of East Bethel, City of Ham Lake and Linwood Township. The purpose of this Joint Powers Agreement is to establish a Water Management Organization to assist the member local units of government with surface water, ground water, water quality and water usage issues.

WHEREAS, the parties to this Agreement have authority pursuant to Minnesota Statutes, Chapter 471.59, to jointly or cooperatively, by agreement, exercise any power common to the contracting parties. Pursuant to Minnesota Statutes, Chapters 103B.201 to 103B.255, these local units of government have authority to jointly or cooperatively manage or plan for the management of surface water within a defined watershed; and

WHEREAS the parties to this Agreement desire to prepare a surface water management plan for the purpose of management and implementation of the programs identified by Minnesota Statutes, Chapters 103B.201 through 103B.255.

NOW, THEREFORE, the parties to this Agreement do mutually agree as follows:

SECTION I

General Purpose

1.1 It is the general purpose of the parties to this Agreement to establish a Water Management Organization to jointly and cooperatively develop a Watershed Management Plan for the purposes of (a) protecting, preserving, and using natural surface and groundwater storage and retention systems in the Sunrise River Watershed; (b) minimizing public capital expenditures needed to correct flooding and water quality problems; (c) identifying and planning for means to effectively protect and improve surface and groundwater quality; (d) assist with establishing more uniform local policies and official controls for surface and ground water management; (e) preventing erosion of soil into surface water systems; (f) promoting groundwater recharge; (g) protecting and enhancing fish and wildlife habitat and water recreational facilities; and (h) securing other benefits associated with the proper management of surface and groundwater. The plan and programs shall operate within the boundaries of the Sunrise River Watershed as set forth in Appendix 1 and 2, attached hereto (hereinafter "Area").

SECTION II

Sunrise River Watershed Management Organization

Sunrise River WMO Watershed Management Plan

2.1 Establishment: There is hereby established the "Sunrise River Watershed Management Organization" whose membership shall be appointed in accordance with the provisions of this section and whose duties shall be to carry out the purposes contained herein. The Sunrise River Watershed Management Organization (hereinafter "Organization") shall be constituted as described in Section 2.2.

2.2 Membership Appointment: Each party to this Agreement shall appoint two (2) representatives to serve as members of the Organization board. Each representative of a party to this agreement who is current in the payment of operating costs shall have one (1) vote. Representatives appointed to the Organization board shall be evidenced by a resolution or certified copy of official meeting minutes of the governing body of each party and filed with the Organization.

2.3 Alternate Members: One alternate member of the Organization board may be appointed by appropriate resolution or certified copy of official meeting minutes of the governing body of each party to this Agreement filed with the Organization. The alternate member may attend any meeting of the Organization board when a regular member representing that party is absent and vote on behalf of the party the member represents. If an Organization board member is also an officer of the Organization, the alternate member shall not be entitled to serve as such officer.

2.4 Term: The members of the Organization board shall be filled by the governing body of the party whose membership position on the board is vacant. Removal of a board member or alternate board member shall be at the sole discretion of the appointing authority. The term of appointment is at the sole discretion of the appointing authority.

2.5 Vacancies: The Organization shall notify the Board of Water and Soil Resources of member appointments and vacancies in member positions within 30 days. A vacancy on the Organization board shall be filled by 90 days after the vacancy occurs by the governing body of the party whose membership position on the board is vacant.

Vacancies resulting from expiration of members' terms or other reasons shall be filled only after published notice of the vacancy once a week for two (2) successive weeks in a newspaper of general circulation in the watershed management organization area. The notices must state that the party is considering applications for appointment of a member to the Organization board and that persons interested in being appointed to serve on the board may submit their names to the appointing authority for consideration. A vacancy shall not be filled until at least 15 days have elapsed after the last published notice.

2.6 Compensation and Expenses: The Organization members shall not be entitled to compensation or reimbursement for expenses incurred in attending meetings, except to the extent that the governing body of a party may determine to compensate or reimburse the expenses of the member(s) it appoints, in which case the obligation to make such payments shall be that of the party and not that of the Organization.

2.7 Officers: The Organization board shall elect from its membership a chair, a vice-chair, a secretary, and a treasurer. All such officers shall hold office for a term of one (1) year and until their successors have been qualified and duly elected by the board. An officer may serve only while a member of the Organization. A vacancy in an office shall be filled from the membership of the board by election for the remainder of the unexpired term of such office.

Sunrise River WMO Watershed Management Plan

2.8 Duties of Officers: The duties of the officers of the Organization shall be as outlined in Parts 40 and 41, Article VII, Robert's Rules of Order, as the board deems necessary.

2.9 Quorum: Voting members of the Organization board representing a majority of the parties to this Agreement shall constitute a quorum. Less than a quorum may adjourn a scheduled meeting.

2.10 Meetings:

A. Meetings of the Organization board will be scheduled as needed, with the annual meeting held in February at the East Bethel City Hall, 2241 221st Avenue NE, East Bethel, MN 55011. Notice of all regular meetings shall be provided with a minimum of thirty (30) days advance notice of the meeting by the secretary of the Board to all parties to this Agreement. Such meeting notice shall be posted on the official notification board for each party to this agreement.

At the annual meeting the board, at a minimum, shall:

1. Elect officers for the next fiscal year;
2. Establish the annual budget and work plan;
3. Hear recommendations on amendments to this agreement and the watershed management plan;
4. Biennially renew or decide on contracts for professional, legal, and administrative services; and
5. Decide on meeting dates.

B. Special meetings may be held at the call of the chair or by any three (3) members of the board giving not less than 72 hours written notice of the time, place, and purpose of such meeting delivered by mailed or email to the residence of each Organization member and delivered to the City or Town Hall of each party to this Agreement.

C. All meetings of the board are subject to Minnesota Statutes, Section 13D and the notice provisions contained therein. Posted notice, when required, shall be given separately to each party to this Agreement.

2.11 Conduct of Meetings: The Organization board shall adopt rules of order and procedure for the conduct of its meetings; the board may adopt any such rules as a majority of all voting members shall agree. Decisions by the board may not require more than a majority vote, except a decision on a capital improvement project may require a unanimous vote by all parties.

2.12 Organization Office: The office of the Organization shall be the East Bethel City Hall, 2241 221st Avenue NE, East Bethel, MN 55011. All notices to the Organization shall be delivered or served at said office.

SECTION III

Organization Powers and Duties

3.1 Authority: Upon execution of the Agreement by all parties, the Organization shall have authority provided for in Minnesota Statutes, Chapter 103B.211 through 103B.255, unless otherwise limited by this Agreement that provides for, in part:

Sunrise River WMO Watershed Management Plan

A. The authority to prepare, adopt and implement a plan for the Sunrise River Watershed meeting the requirements of Minnesota Statutes, Chapter 103B.231.

B. The authority to review and approve local water management plans as provided in Minnesota Statutes, Chapter 103B.235, Subd. 3, Review.

C. Other powers necessary to exercise the authority under clauses A and B, including the power to enter into contracts for the performance of functions with governmental units or persons.

3.2 Watershed Management Plan: The Organization shall prepare a Watershed Management Plan for the Sunrise River Watershed. The plan shall be in compliance with Minnesota Statutes, chapter 103B.231, Subd. 4 as from time to time amended. This Chapter describes plan contents to include but not limited to the following:

A. Description of the existing physical environment, land use and development in the Sunrise River Watershed. It shall further describe the environment, land use and development proposed in existing local and metropolitan comprehensive plans; and

B. Present information on the hydrologic system in the Sunrise River Watershed and its components, including any drainage systems previously constructed under Minnesota Statutes, Chapter 103E, and existing and potential problems relating thereof; and

C. State objectives and policies, including management principles, alternatives and modifications, water quality, and protection of natural characteristics; and

D. Set forth a management plan, including the hydrologic and water quality conditions that will be sought and significant opportunities for improvement; and

E. Describe the effect of the Watershed Management Plan on existing drainage systems; and

F. Describe conflicts between the Watershed Management Plan and existing plans of local government units; and

G. Set forth an Implementation Program consistent with the Watershed Management Plan, which may include a Capital Improvement Program; and

H. Set out a procedure for amending the Watershed Management Plan. The plan shall be amended as required from time to time.

3.3 Employment: The Organization may contract for services, may contract services from parties to this Agreement, or may employ such other persons as it deems necessary. Where staff services of a party are contracted, such services shall not reduce the financial commitment of such party to the operating fund of the Organization unless the Organization so authorizes.

3.4 Committees: The Organization may appoint such committees and subcommittees as it deems necessary. The Organization shall establish a citizen advisory committee and technical advisory committee and promote other means of public participation.

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Citizen and/or technical advisory committees will be formed from time-to-time as deemed appropriate by the Organization board and shall be issue-specific. Committees may be formed that include both citizens and technical experts. Committees shall operate by seeking consensus, while noting any dissenting opinions. Committee findings shall be reduced to writing and submitted to the Organization board. In all cases, committees shall be advisory in nature and their findings shall be referred to the Organization board. Issues that may warrant formation of advisory committees include but are not limited to amendments or updates to the Organization's Watershed Management Plan; lake level or water quality issues; a total maximum daily load (TMDL) impaired waters study or implementation of the study; capital improvement projects; major hydrological changes in the watershed and others as deemed appropriate by the Organization board.

Technical advisory committees shall include technical experts in areas relating to land use, natural resources, pollution control, and soil and water resources.

Citizen advisory committees shall include residents and elected officials from the affected area including but not limited to homeowners; business owners; lake association or lake improvement district representatives; and, others, as deemed appropriate by the Organization Board.

All advisory committees shall include at least one Organization board member.

3.5 Rules and Regulations: The Organization may prescribe and promulgate such rules and regulations as it deems necessary or expedient to carry out its powers and duties and the purpose of the Agreement.

3.6 Review and Recommendations: Where the Organization is authorized or requested to review and make recommendations on any matter relating to the Watershed Management Plan, the Organization shall act on such matter within 60 days of receipt of the matter referred. Failure of the Organization to act within 60 days shall constitute approval of the matter referred, unless the Organization requests and receives from the referring unit of government an extension of time to act on the matter referred. Such extension shall be in writing and acknowledged by both parties.

The Board shall adopt an appeal procedure for any party aggrieved by a decision of the Board or an alleged failure to implement the Plan pursuant to Minnesota Statutes, Chapter 103B.231, Subd. 13.

3.7 Ratification: The Organization may, and where required by this Agreement shall, refer matters to the governing bodies of the parties for review, comment or action

3.8 Financial Matters:

A. Method of Operation: The Organization may collect and receive money and contract for services subject to the provision of the Agreement from the parties and from any other sources approved by the Organization. The organization may incur expenses and make disbursements necessary and incidental to the effectuation of the purposes of this Agreement. Funds may be expended by the Organization in accordance with procedures established herein. Checks shall be signed by the chair or treasurer. Other legal instruments shall be executed on behalf of the Organization by the chair or vice-chair and an appointed Board member.

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B. Operating Funds. On or before June 1st of each year, the Organization shall prepare a work plan and operating budget for the following year. The annual budget shall provide details to support the proposed revenues and expenditures for the Organization. This detail shall be sufficient to meet standard budget and/or accounting principles generally recognized for governmental organizations. Expenditures may include administrative expenses, plan development costs, review expenses, capital improvement costs authorized in Section 3.12, and insurance costs as authorized in Section 3.14. Upon the approval of a majority of the partners of this agreement, the budget shall be recommended to the parties for ratification along with a statement showing each party's proposed share of the budget. The budget shall be implemented only after ratification by all parties to this Agreement. Failure to ratify or pay its share of the budget by any party to this Agreement shall be subject to the procedures in Section 3.6. Each party's share of the operating cost is based on 50% of their portion of the watershed's Total Market Value (TMV) and 50% of their portion of the Total Taxable Watershed Acreage (TWA).

Work Plan - $((PA / WA) + (PV / WV)) / 2$ = the party's percentage share of the organization's operating budget.

PA = Party's area within the watershed organization area

WA = watershed organization area

PV = party's market valuation within the watershed organization area

WV = market valuation of the watershed organization area

Operating Costs - Total amount to be divided equally between members of the Joint Powers Agreement. Operating costs per the operating budget are defined as copies, postage, recording secretary fees, insurance, and administrative fee charged to each member community.

After ratification by the organization, the Organization Chair or Vice Chair shall certify the recommended budget to each party on or before June 1 of each year together with a statement showing the budgeted amounts applicable to each party. Each party shall pay over to the Organization the amount owing in two (2) equal installments, the first on or before January 15 and the second on or before July 15 in accordance with the tax year for which the amount due is being paid.

C. Review Services: When the Organization is authorized or requested to undertake a review and submit recommendations to a party as provided in this Agreement, the Organization shall conduct such review, without charge, except as provided below. Where the project size and complexity of review are deemed by the Organization to be extraordinary and substantial, the Organization may charge a fee for such review services, the amount to be based upon direct and indirect costs attributable to that portion of review services determined by the Organization to be extraordinary and substantial. Where the Organization determines that a fee will be charged for extraordinary and substantial review services, or where the flowage enters the Sunrise River, but the party is not a member of the Sunrise River Watershed Management Organization, the party to be charged shall receive written notice from the Organization of the services to be performed and the fee therefore, prior to undertaking such review services. Unless the party to be charged objects within fifteen (15) days of receipt of such written notice to the amount of the fee to be charged, such review services shall be performed and the party shall be responsible for the cost

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thereof. If the party to be charged objects to the proposed fee for such services with fifteen (15) days and the party and the Organization are unable to agree on a reasonable alternative amount for review services, such extraordinary and substantial review services shall not be undertaken by the Organization. Payment for such services shall be in advance of any work performed.

3.9 Annual Audit. The Organization shall annually prepare a comprehensive financial report on operations and activities. An annual audit, by an independent accounting firm or the State Auditor, shall be provided for that includes a full and complete audit of all books and accounts the Organization is charged with maintaining. Such audit shall be conducted in accordance with generally accepted auditing principles and guidelines. A copy of the annual financial report and auditor's statement shall be provided to all parties to this agreement and to the Board of Water and Soil Resources no later than June 30th of each year. The report to the Board of Water and Soil Resources shall include an annual activity report. All of its books, reports and records shall be available for and open to examination by any party at all reasonable times.

3.10 Gifts, Grants, Loans. The Organization may, within the scope of this Agreement, accept gifts, may apply for and use grants of money or other property from the United States, the State of Minnesota, a local government unit or other governmental unit or organization or any person or entity for the purpose described herein. The Organization may enter into any reasonable agreement required in connection therewith. The Organization shall comply with any laws or regulations applicable to grants, donations and agreements. The Organization may hold, use, and dispose of such money or property in accordance with the terms of the gift, grant, or agreement relating thereto.

3.11 Contracts. The Organization may make such contracts and enter into any such agreements as it deems necessary to make effective any power granted to it by this Agreement. Every contract for the purchase or sale of merchandise, materials, or equipment by the Organization shall be let in accordance with the Uniform Municipal Contracting Law, Minnesota Statutes, Section 471.345 and the Joint Exercise of Powers Statute, Minnesota Statutes, Section 471.59. No member or employee of the Organization or officer or employee of any of the parties shall be directly or indirectly have an interest in any contract made by the Organization.

3.12 Works of Improvement: Works of improvement for protection and management of the natural resources of the Area, including, but not limited to, improvements to property, land acquisition, easements, or right-of-way, may be initiated by:

- A. Recommendation of the Organization to a party or parties; or
- B. Petition to the Organization by the governing body of a party or parties.

Where works of improvement are recommended by the Organization, the Organization shall first determine whether such improvement will result in a local or regional benefit to the area. Where the Organization determines that the benefits from the improvement will be local or not realized beyond the boundaries of the party in which the improvement is to be established, the Organization may recommend such improvement to the governing body of the unit of government which the Organization determines will be benefited. The recommendation shall include the total estimated cost of the improvement and a detailed description of the benefits to be realized.

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Where the Organization determines that the benefits from the improvement will be beyond the local unit or beyond the boundaries of the party in which the improvement is to be established, the Organization may recommend such improvement to each party to this Agreement which the Organization determines will be benefited thereby. The recommendation of the Organization shall include the total estimated cost of the improvement, a description of the extent of the benefits to be realized by each party to this Agreement and the portion of the cost to be borne by each party benefited in accordance with the benefit of party to this Agreement.

Each party to whom the Organization submits such recommendation shall respond within 60 days from receipt of such recommendation. Where the Organization determines that the benefits of such improvement will be local, the unit of government to whom such recommendation is made may decline to ratify and undertake said improvement. Where the Organization determines that the benefits of such improvement will be regional, all Parties to this Agreement must ratify the project proposal before any project is moved forward by the Organization. Should the project not be ratified by all Parties to this Agreement, the Organization shall continue to review and recommend alternative methods of cooperation and implementation among those parties ratifying the recommendation of the Organization, unless and until the Organization determines that said improvement is no longer feasible.

When works of improvement are initiated by a Party to this Agreement, a copy of the proposed project shall be submitted to the Organization for review and comment. The Organization shall review and make recommendations on the proposed improvement and its compliance with the Organization's management plan in accordance with the provisions of Section 3.5 of this Agreement.

When a proposed improvement may be eligible for federal or state funds as a cost-share project, the Organization shall receive the approval of all Parties to this Agreement prior to submission of any grant request. No member Party shall unreasonably withhold approval for a grant application. All improvements that are considered for state or federal grant funding that have a local or member share (matching funds) must be submitted for approval in advance of the proposed grant award. All improvements that are considered for state or federal grant funding shall be presented to each Party to the Agreement for review, comment and approval and shall provide details to include projects scope, estimated cost, estimated matching share, benefits to be derived and project timing.

3.13 Claims. The Organization or its agents may enter upon lands within or without the Sunrise River Watershed to make surveys and investigations to accomplish the purpose of the Organization. The Organization shall be liable for actual damages resulting there from. But every person who claims damages shall serve the Chairperson or Secretary of the Organization with a notice of claim as required by Minnesota Statutes, Section 466.05. The Organization shall obtain court orders authorizing and directing such entries when necessary due to refusals of landowners to allow the same.

3.14 Indemnification and Insurance. Any and all claims that arise or may arise against the Organization, its agents or employees as a consequence of any act or omission on the part of the Organization or its agents or employees while engaged in the performance of this Agreement shall in no way be the obligation or responsibility of the parties. The Organization shall indemnify, hold harmless and defend the parties, their officers and employees against any and all

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liability, loss, costs, damages, expenses, claims, or actions, including attorney's fees which the parties, their officers, or employees may hereafter sustain, incur, or be required to pay, arising out of or by reason of any act or omission of the Organization, its agents or employees in the execution, performance, or failure to adequately perform the Organization's obligations and understandings pursuant to the Agreement.

The Organization agrees that in order to protect itself as well as the parties under the indemnity provision set forth above, it will at all times during the term of this Agreement keep in force the following insurance policies in the limits specified.

A. Commercial General Liability/Professional Liability: \$1,250,000 per incident and shall include the following endorsements:

B. Automobile Coverage (\$0)

C. Worker's Compensation Coverage (statutory minimum)

The minimum liability limits shall be increased to the statutory limits provided for member local units of government in Minnesota Statutes.

Any policy obtained and maintained under this clause shall provide that it shall not be cancelled, materially changed or not renewed without a minimum of thirty (30) days prior notice thereof to each of the parties.

Prior to the effective date of this Agreement, and as a condition precedent to this Agreement, the Organization will furnish the parties with certificates of insurance listing each party to the Agreement as an additional insured.

3.15 General: The Organization may take all such other actions as are reasonably necessary and convenient to carry out the purpose of this Agreement.

SECTION IV

Mediation

4.1 The parties agree that any controversy that cannot be resolved between parties shall be submitted to for mediation. Mediation shall be conducted by a mutually agreeable process by all parties.

SECTION V

Termination of Agreement

5.1 This Agreement may be terminated by approval of two-thirds vote of the governing bodies of each party hereto, provided that all such approvals occur within a ninety (90) day period. Withdrawal of any party may be accomplished by filing written notice with the Organization and the other parties sixty (60) days prior to the effective date of termination. No party may withdraw from this Agreement until the withdrawing party has met its full financial obligations through the effective date of such withdrawal.

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SECTION VI

Dissolution of Organization

6.1 The Organization shall be dissolved under any of the following conditions:

A. Upon termination of this Agreement;

B. Upon unanimous agreement of all parties; or

C. Upon the membership of the Organization being reduced to fewer than three (3) parties.

D. Process. At least 90 days notice of the intent to dissolve shall be given to affected counties and the Board of Water and Soil Resources. Upon dissolution, all personal property of the Organization shall be sold, and the proceeds thereof, together with monies on hand after payment of all obligations, shall be distributed to the parties. Such distribution of Organization assets shall be made in proportion to the total contributions to the Organization for such costs made by each party. All payments due and owing for operating costs under Section 3.8, B, or other unfilled financial obligations, shall continue to be the lawful obligation of the parties.

SECTION VII

Amendment

7.1 The Organization may recommend changes and amendments to this Agreement to the governing bodies of the parties. Amendments shall be adopted by all governing bodies of the parties. Adopted amendments shall be evidenced by appropriate resolutions or certified copies of meeting minutes of the governing bodies of each party filed with the Organization and shall, if no effective date is contained in the amendment, become effective as of the date all such filings have been completed.

SECTION VIII

Counterparts

8.1 This Agreement shall be executed in several counterparts and all so executed shall constitute one Agreement, binding on all of the parties hereto. Each party to the agreement shall receive a fully executed copy of the entire document following adoption by all parties.

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SRWMO JPA Appendix 1

SUNRISE RIVER WATERSHED MANAGEMENT ORGANIZATION LEGAL DESCRIPTION OF SUBJECT PROPERTY

All of Linwood Township, Anoka County.

That part of East Bethel Township, Anoka County lying Easterly of the following described line:

Beginning on the Anoka and Isanti County Line at the Northwest corner of East Half of East Half of Section 25, Township 34 North, Range 23 West, Anoka County, Minnesota; thence South along the West line of East Half of East Half of Section 25 and East Half of East Half of Section 36 to the Southeast corner of Northwest Quarter of Northeast Quarter of Section 36; thence Southwesterly in a straight line to the intersection of Durant Street and 231st Lane NE on the East line of Section 35, Township 34 North, Range 23 West, thence South along Durant Street to 229^h Avenue at the Northeast corner of Section 2, Township 33 North, Range 23 West; thence West along 229^h Avenue and North line of Section 2 to East Bethel Boulevard at the Northwest corner of Section 2; thence Southerly along East Bethel Boulevard to 221st Avenue and the North line of Section 11, Township 33 North Range 23 West; thence in a straight line to East Bethel Boulevard at the Northwest corner of the Southwest Quarter of Section 11; thence Southerly along East Bethel Boulevard to the center of Section 22, Township 33 North Range 23 West; thence in a straight line to the Northwest corner of the Southeast quarter of the Southwest Quarter of Section 22. Thence South along the West line of East Half of Southwest Quarter of Section 22 and the East Half of Northwest Quarter of Section 27 to the Southwest corner of East Half of Northwest Quarter Section 27;

Thence West along the North line of Southwest Quarter Section 27 to the West line of Section 27; thence South along the West line of Sections 27 and 34 to the Northeast corner of the Southeast Quarter of Section 33, Township 33 North, Range 23 West:

Thence West along the North line of the Southeast Quarter of Section 33 to the centerline of County Road No. 68 (Greenbrook Drive); thence Southerly along the centerline of County Road No. 68 to the South line of Section 33, which is also the South line of East Bethel, and the North line of Ham Lake; and there terminating.

That part of Columbus Township, Anoka County lying Northerly of the following described line:

Beginning at the West line of Section 6, Township 32 North, Range 22 West, at the Northwest corner of the South Half of Section 6, which is the Northerly line of Coon Creek Watershed District; thence Easterly along the Northerly line of the South Half of Section 6 to the Southwest corner of East Half of Northeast Quarter of Section 6; thence North along the West line of East Half of Northeast Quarter to the Northwest

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corner of the East Half of Northeast Quarter; thence East along the North line of Section 6 to the Southwest corner of Section 32, Township 33 North, Range 22 West;

Thence North along the West line of Section 32 to the Northwest corner of the South Half of the South Half of Section 32, thence Easterly along the North line of South Half of South Half to the East line of Section 32; thence Southerly along the Easterly line of Section 32 and Section 5, Township 32 North, Range 22 West, to the Southwest corner of Northwest Quarter of Section 4; thence Easterly along the South line of the Northwest Quarter to Northwest corner of East Half of Southwest Quarter; thence Southerly along the West line of East Half of Southwest Quarter to South line of Section 4; thence Easterly along the South line of Section 4 to the Northeast corner of Northwest Quarter of Section 9;

Thence Southerly along the East line of Northwest Quarter to Northeast corner of Southwest Quarter, of Section 9; thence, departing from the boundary of Coon Creek Watershed District to follow the Northerly line of Rice Creek Watershed District, Southerly on the East line of the Southwest Quarter to the Southeast corner of the Northeast Quarter of the Southwest Quarter; thence Easterly on the North line of the South Half of the Southeast Quarter to the Northeast corner of the South Half of the Southeast Quarter of Section 9; thence Northerly on the West line of Section 10 to the Northwest corner of the South Half of the Northwest Quarter of Section 10;

Thence Easterly on the North line of the South Half of the North Half of Section 10 and South Half of the Northwest Quarter of Section 11 to the Northeast corner of the South Half of the Northwest Quarter of Section 11; thence Northerly on the West line of the East Halves of Sections 11 and 2 to the Northwest corner of South Half of Southeast Quarter of Section 2; thence Easterly on the South line of North half of Southeast Quarter of Section 2 to a point of intersection with the Southerly extension of the East line of Lot 1, Block 2, (Hansen Farms); thence North on said line to the Northeast corner of Lot 1, Block 2, (Hansen Farms); thence Northeasterly to the Southeast corner of Lot 8, Block 1, (Hansen Fan's); thence North along the East line of Lot 8, Block 1, (Hansen Farms) to the Northeast corner of Lot 8, Block 1, (Hansen Farms) at the North line of South Half of Section 2; thence Easterly on the North line of the South Halves of Section 2 and 1 to the Northeast corner of the Southwest Quarter of Section 1; thence Southerly on the East line of the Southwest Quarter to the Southeast corner of the Southwest Quarter; thence Easterly on the North line of Section 12 to the Northeast corner of the West Half of the Northeast Quarter of Section 12;

Thence Southerly on the East line of the West Half of the Northeast Quarter to the Southeast corner of the West Half of the Northeast Quarter; thence Easterly on the North line of the Southeast Quarter to the Northeast corner of the Southeast Quarter; this point being on the East boundary of Columbus Township, and the East boundary of Anoka County; and there terminating.

That part of Ham Lake, Anoka County described as follows:

Government Lot 1 and Government Lot 2 Section 1, the Northeast Quarter of Section 1, the Northwest Quarter of the Southeast Quarter of Section 1, the Southeast Quarter of the Northwest

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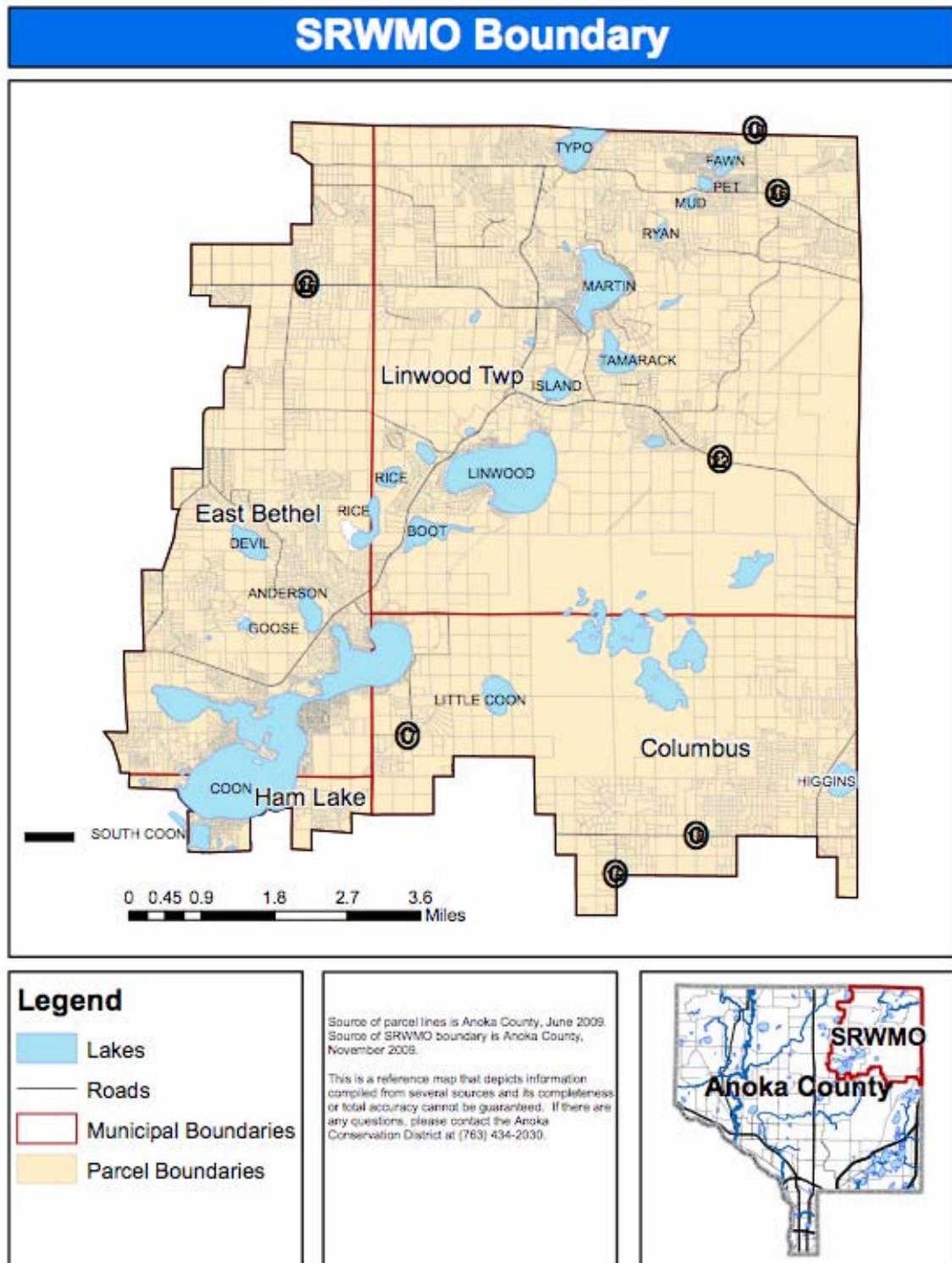
Quarter of Section 1, the North Half of the Southwest Quarter of Section 1, the Southwest Quarter of the Southwest Quarter of Section 1 and that part of Government Lot 1 of Section 2 lying North of the Southeast Quarter, Government Lot 3 and Government Lot 4, Section 2 and Government Lot one and Government Lot 3 in Section 3, the Southeast Quarter of the Southeast Quarter of Section 3, that part of Government Lot 2 in Section 3 lying East of the West Half of the Northeast Quarter, all in Township 32 North, Range 23 West.

That part of Forest Lake Township, Washington County lying Westerly of the following described line:

The center line of Elmcrest Ave N within the Northeast Quarter of Section 6, Township 32 North, Range 21 West.

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SRWMO JPA Appendix 2



APPENDIX B:

**INPUT RECEIVED DURING
PLAN DEVELOPMENT**

PUBLIC INPUT SUMMARY

3RD GENERATION WATERSHED PLANNING

This document includes comments received during an input meeting and in writing by October 30, 2008.

Input Meeting

October 30, 2008 6:30pm

East Bethel City Hall Senior Center

A meeting was held to solicit input on watershed planning. Invitations were sent to member communities, state agencies, other government entities, neighboring communities, lake association representatives, and others. Public attendance and input was encouraged through press releases to the Anoka Union, Forest Lake Times, The Peach, local cable access TV, and the SRWMO website. The meeting included a short presentation about WMO's given by Jamie Schurbon, an open forum to provide input, and voting upon the top issues for the SRWMO. Several written comments were also received outside of the meeting.

In Attendance:

- Jamie Schurbon, Anoka Conservation District
- Kathy Berkness, Anoka Conservation District
- Denny Peterson, SRWMO Columbus Rep
- Mark Walsh, SRWMO Columbus Rep
- Marie Holm, SRWMO Linwood Rep
- Chris Klucas, MN Pollution Control Agency
- Bill Boyer, City of East Bethel Council
- Thomas Betz, Typo Lake resident
- Goldie Johnson, Coon Lake resident
- Jack Frost, Metropolitan Council
- Phillip Osterhus, Linwood Township supervisor
- Doug Tierney, Coon Lake resident
- Steve Olsen, Coon Lake Improvement Association

Agenda:

1. Introductions
2. Presentation by J. Schurbon – “What is a WMO”
3. Open forum for comments
4. Voting on priority issues among all of those voiced

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Oct. 30, 2008 Input Meeting Summary				
Issue, Opportunity or Challenge	Possible Actions	Comments	Votes for this issue as priority 1 or 2	Votes for this issue as priority 3 or 4
Water Quality	<ul style="list-style-type: none"> • Stock predatory fish. • Control rough fish. • Educate residents about fertilization and too much weed control. • Monitor water quality, including by using volunteers. • Improve road runoff <ul style="list-style-type: none"> ○ Stormwater system improvements, notably roadsides that drain straight into the lake ○ Rain gardens targeting road runoff. ○ Move all mailboxes to roadside to end off-road driving by postal personnel which results in erosion. • Discourage ditch cleaning near lake inlets. • Add holding ponds where ditches enter lakes as a way to capture pollutants. • Work with Isanti County on upstream water quality. • Better manage construction sites (enforcement, education). 	<ul style="list-style-type: none"> • Typo Lake water quality is especially bad. Past agricultural activities are to blame, and have washed many feet of nutrient-rich soil into the lake. It will take many years to improve and may never improve. • Data Creek water quality is poor. • Rather than worry about water quality on each waterbody, the entire system should get attention because most lakes and streams are connected. • There should be concern about downstream waterbodies outside of the SRWMO. • Keep good quality lakes and streams good. • Adopt a goal of 20% phosphorus reduction for the Sunrise River. This goal has been adopted by Chisago County. Multi-agency work groups have also established this goal for the St. Croix River, which would get the river back to pre-1950 levels. The Sunrise River is the worst polluter of the St. Croix River. • Ditch cleaning near lake inlets can result in sediment and muck 	11	4

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Oct. 30, 2008 Input Meeting Summary				
Issue, Opportunity or Challenge	Possible Actions	Comments	Votes for this issue as priority 1 or 2	Votes for this issue as priority 3 or 4
		<p>getting washed into lake.</p> <ul style="list-style-type: none"> Lawn fertilization is a problem for lake water quality. 		
Sanitary sewer	<ul style="list-style-type: none"> Support East Bethel's grant applications for sewer around Coon Lake 		3	4
Invasive Plants (only Eurasian watermilfoil in Coon Lake was discussed)	<ul style="list-style-type: none"> Contribute to City and Lake Improvement District efforts? 	<ul style="list-style-type: none"> The City of East Bethel and lake association have worked on surveys and treatment of milfoil. 	3	3
Aquatic Plant Management	<ul style="list-style-type: none"> Comment on proposed DNR rule changes. Educate residents about proper application rates. Educate residents that too much aquatic plant removal can be bad. 	<ul style="list-style-type: none"> Increasing costs of DNR permits could result in more people doing chemical applications on their own, with water quality consequences. 	3	1
Education	<ul style="list-style-type: none"> Utilize East Bethel's city newsletters and meetings (offered by Councilmember Boyer) Educate residents on living next to wetlands, not just living next to lakes 	<ul style="list-style-type: none"> Councilmember Boyer stated that the city's newsletter would be a good place to put educational articles at low cost. 	2	3
Resident Frustration	<ul style="list-style-type: none"> Involve residents Team with lake associations Incorporate existing Coon Lake Improvement Association and Coon Lake Improvement District plans into the SRWMO Plan 	<ul style="list-style-type: none"> Enforcement of various regulations pertaining to water quality and weeds are a frustration, particularly with regards to the MN DNR. 	0	2
Construction Site Management	<ul style="list-style-type: none"> Educate municipal workers Educate construction workers 	<ul style="list-style-type: none"> Instances of poor construction site management were discussed, both by private construction 	0	1

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Oct. 30, 2008 Input Meeting Summary				
Issue, Opportunity or Challenge	Possible Actions	Comments	Votes for this issue as priority 1 or 2	Votes for this issue as priority 3 or 4
	<ul style="list-style-type: none"> Enforce 	<ul style="list-style-type: none"> firms and city or county maintenance staff. 		
Funding	<ul style="list-style-type: none"> Pursue grants 	<ul style="list-style-type: none"> Once the TMDL and implementation plan for Typo and Martin Lakes are done, that will open the door to new MPCA grants. Other grants also exist. 	0	0
Fisheries	<ul style="list-style-type: none"> Improve walleye habitat in Coon Lake. See other comments in water quality section. 	<ul style="list-style-type: none"> Declining fishery in Typo Lake, particularly for walleye. Overfishing during winter noted as a cause. 	0	0
Mercury Contamination	<ul style="list-style-type: none"> Test lake sediments to understand the problem. 	<ul style="list-style-type: none"> This is a regional issue, not much the SRWMO can do. 	0	0

All of the issues discussed were written on poster boards at the meeting. At the end of the meeting, attendees were asked to place pink colored stickers next to their two top priority issues and yellow stickers next to their 3rd and 4th priority issues. They were allowed to place more than one sticker on a single issue. The result of this voting was a prioritized list of issues.

Prioritization of issues:

1. Water Quality
2. Sanitary Sewer
3. Invasive Plants
4. Aquatic Plant Management
5. Education
6. Resident Frustration
7. Construction Site Management
8. Funding
9. Fisheries
10. Mercury Contamination

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Written Comments Received		
Topic	Comment	Comments by
Water Quality – Sunrise River and St. Croix River	<p>“Find ways, where appropriate, to combine the goals and objectives of the Sunrise River Watershed Study and the St. Croix Basin with the goals and objectives of the SRWMO Plan.”</p> <p>Attached is the most current (today) draft of the Sunrise River Watershed Study Project Management Plan. This is the agreement between Chisago County and the Army Corps of Engineers on what we are planning on accomplishing through the Study. I expect the process to take several years to complete, resulting in a set of further recommendations.</p> <p>Page 17 shows the goals and objectives of the Study that were developed by the stakeholders groups. My request to you is that you consider partnering with us in adopting Water Quality Goals 1 & 2 into the Sunrise WMO plan.</p> <p>Goal 1, "Reduce phosphorus loading from the Sunrise River to the St. Croix River to help meet 20% basin wide goal"</p> <p>This Goal is consistent with the water quality goal set for the St. Croix River. In 2004, the St. Croix Basin Water Resources Planning Team made the following recommendation in the document St. Croix Basin Phosphorus-Based Water-Quality Goals: http://www.pca.state.mn.us/publications/reports/stcroixbasin-phosreport04.pdf (page 1).</p> <p>"Rapid population growth and accompanying land-use changes have affected the water resources of the St. Croix River Basin, which forms most of the northern half of the border between the states of Minnesota and Wisconsin. Based on the 39-percent projected population growth in the St. Croix Basin by the year 2020, the water resources will continue to degrade within the current regulatory path.</p> <p>The St. Croix Basin Water Resources Planning Team (St. Croix Basin Team), citing recently completed nutrient and sediment research, has recommended a 20-percent reduction in total phosphorus loading within the St. Croix Basin. A 20-percent reduction in total phosphorus loading will approximate the ecological conditions of Lake St. Croix prior to 1950, before the major ecological changes currently experienced."</p> <p>Chisago County has adopted the 20% phosphorus reduction goal into the 2006-2011 Local Water Management Plan. http://www.co.chisago.mn.us/file.aspx?id=c322f0bf-1210-4306-9035-1cd63771c7b2</p> <p>This goal has been adopted the water regulatory agencies of Minnesota and Wisconsin (Minnesota Pollution Control Agency and Wisconsin Department of Natural Resources).</p> <p>Goal 2, "Attain applicable aquatic standards, criteria, and longer term locally driven goals appropriate to specific lakes, rivers,</p>	<p>Jerry Spetzman, Chisago Co Water Planner</p> <p>Email 10-10-08</p>

Sunrise River WMO Watershed Management Plan

Written Comments Received		
Topic	Comment	Comments by
	<p>streams, wetlands, and ground water"</p> <p>This Goal relates to Impaired Waters and the TMDL process. As you are well aware, multiple water bodies in the Sunrise River Watershed are in the process of assessment, TMDL study, and development of implementation plans. Lake St. Croix is now on the 2008 Impaired Waters List. More water bodies will be included in the 2010 list. This emphasis is also included in the Chisago County 2006-20110 Local Water Management Plan.</p> <p>We would welcome the Sunrise WMO partnering with us to achieve these goals in ways that are appropriate to your organization.</p>	
Groundwater	<p>1) Please recognize existing public water suppliers in the WMO area. Visit http://mdh-agua.health.state.mn.us/swa/pdwgetpws.cfm to identify them.</p> <p>2) Approved wellhead protection areas in the WMO area of authority should be recognized in the plan. To identify them go to http://www.health.state.mn.us/divs/eh/water/swp/maps/index.htm .</p> <p>3) Source water protection for surface intake protection for Mpls. & St. Paul can be impacted by activities in the WMO area. To identify the protection area and items of concern, please visit http://www.umrswpp.com/ .</p> <p>4) The MDH guidance for addressing impact of storm water infiltration basins can be found at http://www.health.state.mn.us/divs/eh/water/fs.htm</p> <p>5) Last but not least, it is suggested that the WMO plan recognize the importance of sealing unused/unsealed wells and work to establish a well-sealing cost share program if none exists.</p>	<p>Mike Howe, MN Dept. of Health</p> <p>Email 10-23-08</p>
Water Quality	<p>First, feel free to list our group as a stakeholder in the watershed. We have done river cleanups, fecal coliform monitoring, annual river festivals, and educational forums. Membership is open to anyone interested in the health of the Sunrise River.</p> <p>Second, as many sections of the main stem of the Sunrise River are now also considered Impaired by the MN Pollution Control Agency along with the north branch, we would like to see continued work to bring Typo & Martin lakes up to the water quality standards of the Clean Water Act. For example, Chisago County has made a resolution to reduce phosphorus loads 20% by 2020 within the watershed, a goal recommended by the St. Croix Basin Team. We ask that you also consider adopting this goal.</p>	<p>Dawn Doering, Friends of the Sunrise River</p> <p>Email 10-30-08</p>

Compiled by Jamie Schurbon, Anoka Conservation District

APPENDIX C:
SRWMO PERFORMANCE STANDARDS

Sunrise River WMO Watershed Management Plan



Sunrise River Watershed Management Organization

Stormwater Standards

Background

Stormwater is an all-inclusive term that refers to any of the water running off the land's surface after a rainfall or snowmelt event. Prior to development, stormwater is a small component of the annual water balance. However, as development increases, the paving of pervious surfaces (surfaces able to soak water into the ground) increases stormwater runoff. It is important to manage this water because of the impacts it can have on water quality, flooding, and groundwater recharge. The SRMWO has goals of improving or maintaining water quality, preventing future flooding problems, and encouraging groundwater recharge. Therefore, the Sunrise River WMO has minimum stormwater standards. These standards were developed by a Technical Advisory Committee including representation from each SRWMO community, MN Department of Natural Resources, MN Pollution Control Agency, MN Board of Water and Soil Resources, Metropolitan Council, and the Anoka Conservation District.

* consistent with requirements of the MN Pollution Control Agency's Construction General Permit.

**consistent with recommendations of the MN Stormwater Manual.

Administration

These stormwater standards will be administered by the member communities of the SRWMO. Each community must adopt standards at least as protective as the SRWMO standards in their local water plan or ordinances, and implement them.

Applicability

SRWMO Stormwater Standards apply to the following:

- Development and redevelopment disturbing one or more acres, including,*:
 - Disturbance to the land that results in a change in the topography, existing soil cover (both vegetative and non-vegetative), or the existing soil topography that may result in accelerated storm water runoff, leading to soil erosion and movement of sediment into surface waters or drainage systems. Examples of construction activity may include clearing, grading, filling and excavating.
 - Smaller projects that are part of a larger common plan, even though multiple separate and distinct land development activities may take place at different times.*
 - In the case of redevelopment, replacement of an existing feature (building, pavement, etc) with a new one is new construction, and therefore must comply with the standards.
- Projects in the shoreland zone that meet the following conditions (except that peak flow rate control requirements are not applicable for shoreland zone projects):

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- Projects requiring a building permit and a variance from the local maximum impervious surface percentage.
- Any project requiring a building permit that increases or replaces impervious surface by >1,000 sq ft.
- Road projects creating new impervious surfaces.

The following activities are exempt:

- Road mill and overlay.
- Maintenance and paving of existing gravel roads.
- Agricultural crop production activities not creating additional impervious surfaces.
- Emergency activities necessary for protection of life, property, or natural resources.

Permit Application Materials

Any project to which these standards are applicable must submit, at a minimum, the following as part of their permit application to the community:

- Calculations showing volume, peak discharge rate, and period of inundation requirements are met.*
- Maintenance plan.*
- Soil borings logs, as required below.
- Documentation describing how Better Site Design techniques were considered, and where they will be implemented.

Preferred Stormwater Management Techniques

The following order preference for stormwater management techniques must be followed:

- 1st - Better Site Design (as defined in the Minnesota Stormwater Manual Chapter 4)
- 2nd - Infiltration
- 3rd - Biofiltration, filtration, wetland treatment systems, extended detention basins, or NURP ponds (in no particular order of preference)

It is expected that a combination of techniques, used in series, will often be necessary.

Project proposers must show how Better Site Design techniques were considered, where they will be implemented, and if they will not be implemented, why.

Peak Flow Rate Control

Post-development peak flow rates shall not exceed existing rates, in aggregate, within the project boundary for the 2-, 10-, and 100-year 24 hour storm events.

The project proposer shall provide calculations or modeling showing requirements will be met. These calculations or models shall use methodologies and runoff curve numbers consistent with the US Department of Agriculture Natural Resource Conservation Service (NRCS) Technical Releases 55 and 20, the Minnesota Stormwater Manual, and subsequent updates (see Table 1 below). In determining curve numbers used to model the post-construction condition, Hydrologic Soil Group must be shifted down 1 classification (1/2 for A because compaction is minimal in sand) to account for grading impacts to soil structure, unless soil amended or deep ripped.

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TABLE 1. Selected Runoff Curve Numbers for Antecedent Moisture Conditions II (normal conditions). Source: USDA-NRCS Technical Release 55 (TR-55), and also presented in the MN Stormwater Manual.

Land Use Description	Hydrologic Soil Group			
	A	B	C	D
Meadow (continuous grass, protected from grazing and generally mowed for hay)				
Good condition (>75% ground cover and lightly or only occasionally grazed)	30	58	71	78
Forest				
Poor (litter, small trees and brush destroyed by heavy grazing or regular burning)	45	66	77	83
Fair (grazed but not burned and with some forest litter coving soil)	36	60	73	79
Good (protected from grazing with litter and brush adequately covering soil)	30	55	70	77
Open Space (lawns, parks, golf courses, cemeteries, etc)				
Poor (grass cover <50%)	68	79	86	89
Fair (grass cover 50-75%)	49	69	79	84
Good (grass cover >75%)	39	61	74	80
Commercial				
85% impervious	89	92	94	95
Industrial				
72% impervious	81	88	91	93
Residential				
1/8 ac lots (65% impervious)	77	85	90	92
1/4 ac lots (38% impervious)	61	75	83	87
1/2 ac lots (25% impervious)	54	70	80	85
1 ac lots (20% impervious)	51	68	79	84
2 ac lots (12% impervious)	46	65	77	82
Impervious areas	98	98	98	98
Roads (including right of way)				
Paved	83	89	92	93
Gravel	76	85	89	91
Dirt	72	82	87	89
Row Crops				
Straight row – Good	67	78	85	89
Contoured row – Good	65	75	82	86
Pasture				
Poor (<50% ground cover or heavily grazed with no mulch)	68	79	86	80
Fair (50-75% ground cover and not heavily grazed)	49	69	79	84
Good (>75% ground cover, lightly or only occasionally grazed)	39	61	74	80
Open water	99	99	99	99

Volume Control

Stormwater volume management practices shall be the equivalent of infiltrating the first half-inch of precipitation from new impervious surfaces. This requirement may be met off-site for government projects if not practical on site, but preferably within the same subwatershed.

Infiltration Facility Design and Construction

Infiltration basin construction must follow MN Stormwater Manual Chapter 12-INF, vol. 2 or future updates. Additionally:

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- Projects within a Drinking Water Supply Management Area (DWSMA) should refer to MN Department of Health guidance entitled “Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas” (<http://www.health.state.mn.us/divs/eh/water/fs.htm>) to determine if infiltration techniques are appropriate.
- Storm water discharges from potential stormwater hotspots may require the use of specific structural stormwater treatment practices and pollution prevention practices.* Certain practices, such as infiltration, may not be allowed. Potential stormwater hotspots are defined as a land use or activity that produces higher concentrations of trace metals, hydrocarbons, or pollutants than normally found in stormwater. Examples include fueling stations, vehicle service or washing areas, vehicle fleet storage areas, auto recycling or salvage, stockpiled snow from salted roadways, construction site inputs, manufacturing sites, public works storage areas, facilities that generate or store hazardous waste materials, and others as determined by the community or watershed management organization.
- During the planning and design phase of a project, either soil borings** or double-ring infiltrometer tests must be used to verify that the practice will perform appropriately.
 - If soil borings are used, the MN Stormwater Manual recommends at least 3 borings to a depth of 5 feet below the proposed practice bottom. Soil borings shall determine soil type, infiltration rate, groundwater level, seasonally high water table, bedrock, and impeding layers.
 - If infiltration rates are not measured directly with an infiltrometer, soil infiltration rates used for design purposes shall be those found in Table 2 below, which are conservative estimates of long term, sustainable infiltration rates.

TABLE 2. Infiltration Rates for Hydrologic Soil Groups

Hydrologic Soil Group	Soil Textures	Corresponding Unified Soil Classification	Infiltration Rate (in/hr)
A	Gravel, sand, sandy gravel, silty gravel, loamy sand, sandy loam	GW – Well-graded gravel or well-graded gravel with sand GP – Poorly graded gravel or poorly graded gravel with sand	1.6
		GM – Silty gravel or silty gravel with sand SW – Will-graded sand or well-graded sand with gravel SP – Poorly graded sand or poorly graded sand with gravel	0.8
B	Loam, silt loam	SM – Silty sand or silty sand with gravel	0.6
		ML – Silt OL – Organic silt or organic silt with sand or gravel or gravelly organic silt	0.3
C	Sandy clay loam	GC – Clayey gravel or clayey gravel with sand SC – Clayey sand or clayey sand with gravel	0.2
D	Clay, clay loam, silty clay loam, sandy clay, silty clay	CL – Lean clay or lean clay with sand or gravel or gravelly lean clay CH – Fat clay or fat clay with sand or gravel or gravelly fat clay OH – Organic clay or organic clay with sand or gravel or gravelly organic clay MH – Elastic silt or elastic silt with sand or gravel	<0.2

Source: Minnesota Stormwater Manual. Thirty guidance manuals and many other stormwater references were reviewed by the MPCA when it compiled the recommended infiltration rates.

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- Every storm water treatment practice shall have an acceptable form of pre-treatment.* The community's engineer shall decide how much pre-treatment is needed to ensure long term performance.
- Protections of infiltrations areas during the construction process that are discussed in the MN Stormwater Manual are of great importance.** Ensuring these measures are taken should be a high priority for reviewers of development proposals and municipal construction site inspectors.
- A legally binding and enforceable maintenance plan clarifying responsible parties is required for all infiltration practices.* The maintenance plan must specify:
 1. Parts or components of a stormwater management facility that need to be maintained
 2. Methods (detailed maintenance and repair procedures to ensure continued function of the stormwater feature)
 3. Schedule
 4. Responsible parties for maintenance
 5. Equipment and skills or training necessary
 6. Provisions for the periodic review and evaluation of the effectiveness of the maintenance program
 7. Need for revisions or additional maintenance procedures
- An easement is required over the area inundated by a 100-year storm and adequate to provide maintenance access.

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Sunrise River Watershed Management Organization

Wetland Standards

Background

The SRWMO finds that wetlands serve a variety of beneficial functions. Wetlands within the SRWMO maintain water quality, reduce flooding and erosion, are groundwater recharge areas, provide food and habitat for wildlife, provide open space, and contribute to the area's rural "feel." Therefore, wetlands are important to the health, safety, economy, and general welfare of the communities. Regulating wetlands and the land uses around them is therefore in the public interest.

The state Wetland Conservation Act (WCA) provides many protections of the public benefits of wetlands, but does not address all areas of concern. These areas are left to local control. Topics not addressed by state law but considered by the SRWMO include those addressed in these wetland standards. These standards were developed by a Technical Advisory Committee including representation from each SRWMO community, MN Department of Natural Resources, MN Pollution Control Agency, MN Board of Water and Soil Resources, Metropolitan Council, and the Anoka Conservation District.

Goal

The goal of the SRWMO wetland standards is to avoid direct or indirect impacts from activities that destroy or diminish the quantity, quality, and biological diversity of wetlands.

Administration

These wetland standards will be administered by the member communities of the SRWMO. Each community must adopt standards at least as protective as the SRWMO standards in their local water plan or ordinances, and implement them.

Applicability

The following standards apply to all parcels where any of the following activities are proposed:

- Subdivision creating three or more lots and creating impervious surfaces or structures.
- Any project with wetland impacts as defined by the Wetland Conservation Act (WCA, Minnesota Rules 8420) that do not qualify for a WCA exemption.
- Wetland excavations >0.5 acres will be subject to the excavation provisions.

Wetland Definition

For the purpose of these standards, wetlands:

- are defined in MN Statutes section 103G.005, subdivision 19
- include public waters wetlands defined in MN Statutes section 103G.005, subdivision 15a.

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Wetland Delineation and Classification

All wetlands do not have equal value. Some are healthier and provide more benefits to the community than others. The SRWMO seeks to identify these highly-valued wetlands and give them greater protections, and allow more flexibility in and around lower-valued wetlands. The SRWMO most highly values wetlands that provide (in order of preference):

1. Water quality treatment
2. Wildlife habitat
3. Groundwater recharge

The SRWMO allows more flexibility for wetlands that poorly provide these functions. Wetlands will be delineated and classified on a case-by-case basis for applicable project proposals.

Delineation and Classification Methodology

Proposers of applicable projects must perform a wetland delineation and wetland functional values assessment. The delineation shall follow methods allowed by WCA. The functional values assessment shall use MnRAM (the Minnesota Routine Assessment Method for Evaluating Wetland Functions) version 3.1 or newer, which is the method allowed by WCA. The results should be reported to the permitting authority, which will assign an appropriate wetland classification.

MnRAM scores 15 wetland functions. The SRWMO will use scores from five of these functions to classify wetlands, including:

Water Quality Treatment

1. Downstream water quality protection
2. Maintenance of wetland water quality

Wildlife Habitat

3. Vegetative diversity/integrity
4. Maintenance of characteristic wildlife habitat structure
5. Maintenance of characteristic amphibian habitat

Groundwater recharge functions will not be used in classifying wetlands because almost all SRWMO wetlands provide groundwater recharge functions and therefore the SRWMO will be protective of this function in all wetlands.

Classifications

Four wetland classes will be utilized:

1. High Priority Wetlands
2. Moderate Priority Wetlands
3. Low Priority Wetlands
4. Use Wetlands

The defining characteristics of each wetland class are summarized in Table 1.

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TABLE 1. Wetland Classifications

	High Priority Wetlands	Moderate Priority Wetlands	Minor Priority Wetlands	Use Wetlands
Description →	High quality natural basins that serve both target wetland functions of water quality treatment and wildlife habitat.	Wetlands that highly perform one of the two target wetland functions (water quality treatment or wildlife habitat).	Wetlands that do not highly perform either of the two target wetland functions (water quality treatment or wildlife habitat).	Wetlands created for stormwater management. These wetlands usually need periodic maintenance.

Targeted Wetland Functions	MnRAM Category				
Water Quality Treatment	Downstream water quality protection	MnRAM Score is “high” for at least one of these two MnRAM categories	MnRAM Score is “high” for at least one of these two MnRAM categories	Does not score “exceptional” or “high” for any of these MnRAM categories	Wetlands created for stormwater management. MnRAM scores are irrelevant.
	Maintenance of wetland water quality				
		AND	OR		
Wildlife Habitat	Vegetative diversity/integrity	MnRAM Score is “exceptional” or “high” for one or more of these three MnRAM Categories	MnRAM Score is “exceptional” or “high” for one or more of these MnRAM Categories		
	Maintenance of characteristic wildlife habitat structure				
	Maintenance of characteristic amphibian habitat				

Almost all wetlands in the SRWMO serve a groundwater recharge function, so wetland standards were designed to be protective of this function in all wetlands.

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Appeals of Wetland Classification

If an applicant disagrees with a wetland classification, s/he bears the burden of supplying detailed information supporting their assertion. This may include historical aerial photography, topographic, hydrologic, floristic, or soils data deemed necessary by the permitting authority. The municipality or other permitting authority will review the appeal.

Standards for Wetland Classes

Wetlands standards vary by wetland class. These standards are summarized in Table 2, and described in detail on the following pages.

TABLE 2. Summary of Wetland Standards

Wetland Class	Minimum Buffer (communities set buffer width equal or greater)	Structure Setbacks	Excavation	Stormwater Discharge to Wetlands
High Priority Wetlands	15 ft	At each community's discretion, but a minimum 20 ft setback is highly recommended	Excavations >0.5 acres must be denied for portions of wetlands that score high on the MnRAM vegetative diversity criteria.	Stormwater discharges to all wetlands must comply with the text
Moderate Priority Wetlands	15 ft			
Minor Priority Wetlands	15 ft		Only Wetland Conservation Act restrictions apply	
Use Wetlands	At each community's discretion			

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Wetland Buffers

Wetland buffers are unmowed areas adjacent to wetlands that contain non-invasive vegetation, preferably dense native vegetation. Buffers filter pollutants before they can enter the wetland, reduce erosion, protect vegetation diversity and wildlife habitat, and minimize human impacts to the wetland. The SRWMO requires buffers on wetlands, with the width dependent upon wetland classification. The buffer widths were selected based upon research literature, experiences in other communities, practical limitations, and city staff input.

Buffer Widths

The SRWMO allows minimum buffer widths such that each community can choose a buffer width equal or greater that is most appropriate for their community based upon soil types, slopes, development rules, and other factors. Allowed minimum buffer widths are shown in Table 2.

Buffer Averaging

Buffers are encouraged to have a meandering shape for a more natural appearance and in order to make reasonable accommodations for nearby features of the development or landscape. The buffer width may vary around the wetland such that:

- it may be 10 feet less than the minimum allowable (see Table 2), but not less than 5 feet.
- the total acreage of buffer cannot be reduced.
- in areas of concentrated inflow to the wetland the buffer cannot be less than the minimum allowable buffer width in Table 2 or the minimum allowed by the community, whichever is greater.

Buffer Variances

Variances of buffer width may, at the community's discretion, be granted for the following reasons:

- Small wetlands where the entire wetland area is less than or equal to the area of wetland impact allowed without replacement as *de minimis* under WCA. It is acceptable to have no buffers in these cases.
- Part of the required buffer is outside of the wetland's watershed. Due to topography near the wetland, runoff flows away from and never enters the wetland through surface flows. Variances should only be for that portion of the buffer that would be outside of the wetland's watershed.
- If drainage is redirected to an area where a buffer is feasible.
- If the site is not generating stormwater or is using storm water minimizing techniques that also provide habitat value such as rain gardens, vegetated swales, and other Best Management Practices (BMP's) replace the functions of buffers.
- If the applicant is protecting additional upland, beyond that required by other ordinances or control measures, to connect existing wildlife habitat.
- Undue hardship, as defined in MN Statutes 462.357, subd. 6, subpart 2.
- Others as determined by the permitting authority.
- Roads and other linear projects, except those created as part of new residential or commercial developments.

Activities Prohibited within Buffers

Activities that disturb the roots or influence the growth of vegetation are prohibited, including:

- Mowing (except as part of municipality-approved wetland buffer management or for pedestrian trails)
- Structures
- Paving (except as allowed below in the "Activities Allowed within Buffers" section)

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- Retaining walls
- Clearing and removal of vegetation (except selective clearing and pruning of individual trees and shrubs which are dead, diseased, hazards, or removal of noxious or invasive weeds)
- Introduction of non-native vegetation
- Filling, dumping, or yard waste disposal
- Fertilization
- Removal of buffer monuments
- Septic systems

Activities Allowed within Buffers

- Management needed to establish the buffer, such as mowing or burning.
- Activities consistent with municipal park management plans.
- Plantings that enhance the natural vegetation
- Selective clearing and pruning of individual trees and shrubs which are dead, diseased, or hazards
- Noxious or invasive vegetation removal
- Use and maintenance of an unimproved access strip not more than 10 ft wide for recreational access and the exercise of riparian rights
- Pedestrian trails, provided that at least 10 feet of buffer remains between the trail and wetland
- Placement, maintenance, or repair of utility and drainage systems that exist on creation of the buffer strip or are required by a permitting agency, as long as any adverse impacts have been avoided or minimized.
- Construction, maintenance, repair, or reconstruction of existing and future public roads as long as any adverse impacts have been avoided or minimized
- Others as approved by the municipality

Buffer Easements

Municipalities shall place a conservation easement (preferred), or functional equivalent such as a drainage and utility easement or outlot, on the wetland and buffer. If the project manager creates GPS files of buffer and easement locations, it is recommended that these be provided to the municipality.

Use of Existing Vegetation as the Buffer

The existing vegetation is acceptable for a buffer and must not be disturbed if:

- It is continuous, dense, deep-rooted perennials (can be trees and shrubs with 60% canopy cover), and
- <30% invasive plant species, and
- Topography does not channelize runoff

Buffer Establishment and Seed

All buffers (natural or created) must be protected during construction with erosion control.

When existing vegetation is not acceptable for use as the buffer, then a buffer must be established by planting. Planting must meet these criteria:

- Planting must be identified on the wetland replacement plan or grading plan.
- Planting must be done by a qualified contractor.
- Install in accordance most current BWSR guidance.
- Replant vegetation that is unsuccessful during the first two growing seasons.
- No fertilizer may be used unless prescribed by accredited soil testing lab.
- The seed planted must be:
 - i. a 100% native BWSR seed mix or equivalent approved by permitting authorities, with the exception of a 1-time annual nurse or cover crop such as oats or rye.

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- ii. of local ecotype originating within 300 miles.
- Native trees/shrubs may substitute forbs at 60 per acre.

Buffer Monuments

Buffers shall be adequately marked with signage at a maximum 200 ft spacing or every other lot corner. Signs should be erected before occupation of new developments and before the completion of work for all other projects. Monument requirements can be waived where the permitting authority deems they would serve no practical purpose.

Buffer Maintenance

First two full growing seasons –

During first two full growing seasons the applicant must replant any vegetation that does not survive.

Municipalities are encouraged to consider buffer establishment and management in escrows.

After the first two full growing seasons-

After the first two full growing seasons the buffer must be reseeded if the buffer changes at any time through human intervention or activities.

Structure Setbacks

Each municipality may, at its own discretion, choose to establish structure setbacks from the wetland buffer, however a minimum of 20 feet is highly recommended by the SRWMO.

Excavations

Excavations >0.5 acres must be denied for portions of wetlands that score high on the MnRAM vegetative diversity criteria.

Stormwater Discharge to Wetlands

- Treatment of storm water to NURP (Nationwide Urban Runoff Program) guidelines is required prior to storm water discharge to a lake, stream, or wetland and prior to discharge from the site as part of development.
- The allowable bounce of wetland water levels and inundation period due to stormwater discharges shall follow “Stormwater and Wetlands: Planning and Evaluation Guidelines for Addressing Potential Impacts of Urban Stormwater and Snowmelt Runoff on Wetlands,” Minnesota Pollution Control Agency 1997, or subsequent updates.

Letter of Credit

Municipalities are encouraged to require a letter of credit from applicants to ensure compliance with these standards (for example, buffer establishment and maintenance).

Disposition of Wetland Classification Records

State Rules 8410 require the SRWMO inventory the functions and values of wetlands. All member communities must maintain a file containing the functions and values and assigned classifications of wetlands inventoried as part of these standards.

APPENDIX D:

BLANDING'S TURTLE FACT SHEET

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Environmental Review Fact Sheet Series

Endangered, Threatened, and Special Concern Species of Minnesota

Blanding's Turtle (*Emydoidea blandingii*)

Minnesota Status: Threatened
Federal Status: none

State Rank¹: S2
Global Rank¹: G4

HABITAT USE

Blanding's turtles need both wetland and upland habitats to complete their life cycle. The types of wetlands used include ponds, marshes, shrub swamps, bogs, and ditches and streams with slow-moving water. In Minnesota, Blanding's turtles are primarily marsh and pond inhabitants. Calm, shallow water bodies (Type 1-3 wetlands) with mud bottoms and abundant aquatic vegetation (e.g., cattails, water lilies) are preferred, and extensive marshes bordering rivers provide excellent habitat. Small temporary wetlands (those that dry up in the late summer or fall) are frequently used in spring and summer -- these fishless pools are amphibian and invertebrate breeding habitat, which provides an important food source for Blanding's turtles. Also, the warmer water of these shallower areas probably aids in the development of eggs within the female turtle. Nesting occurs in open (grassy or brushy) sandy uplands, often some distance from water bodies. Frequently, nesting occurs in traditional nesting grounds on undeveloped land. Blanding's turtles have also been known to nest successfully on residential property (especially in low density housing situations), and to utilize disturbed areas such as farm fields, gardens, under power lines, and road shoulders (especially of dirt roads). Although Blanding's turtles may travel through woodlots during their seasonal movements, shady areas (including forests and lawns with shade trees) are not used for nesting. Wetlands with deeper water are needed in times of drought, and during the winter. Blanding's turtles overwinter in the muddy bottoms of deeper marshes and ponds, or other water bodies where they are protected from freezing.

LIFE HISTORY

Individuals emerge from overwintering and begin basking in late March or early April on warm, sunny days. The increase in body temperature which occurs during basking is necessary for egg development within the female turtle. Nesting in Minnesota typically occurs during June, and females are most active in late afternoon and at dusk. Nesting can occur as much as a mile from wetlands. The nest is dug by the female in an open sandy area and 6-15 eggs are laid. The female turtle returns to the marsh within 24 hours of laying eggs. After a development period of approximately two months, hatchlings leave the nest from mid-August through early-October. Nesting females and hatchlings are often at risk of being killed while crossing roads between wetlands and nesting areas. In addition to movements associated with nesting, all ages and both sexes move between wetlands from April through November. These movements peak in June and July and again in September and October as turtles move to and from overwintering sites. In late autumn (typically November), Blanding's turtles bury themselves in the substrate (the mud at the bottom) of deeper wetlands to overwinter.

IMPACTS / THREATS / CAUSES OF DECLINE

- loss of wetland habitat through drainage or flooding (converting wetlands into ponds or lakes)
- loss of upland habitat through development or conversion to agriculture
- human disturbance, including collection for the pet trade* and road kills during seasonal movements
- increase in predator populations (skunks, raccoons, etc.) which prey on nests and young

*It is illegal to possess this threatened species.

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RECOMMENDATIONS FOR AVOIDING AND MINIMIZING IMPACTS

These recommendations apply to typical construction projects and general land use within Blanding's turtle habitat, and are provided to help local governments, developers, contractors, and homeowners minimize or avoid detrimental impacts to Blanding's turtle populations. **List 1** describes minimum measures which we recommend to prevent harm to Blanding's turtles during construction or other work within Blanding's turtle habitat. **List 2** contains recommendations which offer even greater protection for Blanding's turtles populations; this list should be used *in addition to the first list* in areas which are known to be of state-wide importance to Blanding's turtles (contact the DNR's Natural Heritage and Nongame Research Program if you wish to determine if your project or home is in one of these areas), or in any other area where greater protection for Blanding's turtles is desired.

List 1. Recommendations for all areas inhabited by Blanding's turtles.	List 2. Additional recommendations for areas known to be of state-wide importance to Blanding's turtles.
GENERAL	
A flyer with an illustration of a Blanding's turtle should be given to all contractors working in the area. Homeowners should also be informed of the presence of Blanding's turtles in the area.	Turtle crossing signs can be installed adjacent to road-crossing areas used by Blanding's turtles to increase public awareness and reduce road kills.
Turtles which are in imminent danger should be moved, by hand, out of harms way. Turtles which are not in imminent danger should be left undisturbed.	Workers in the area should be aware that Blanding's turtles nest in June, generally after 4pm, and should be advised to minimize disturbance if turtles are seen.
If a Blanding's turtle nests in your yard, do not disturb the nest.	If you would like to provide more protection for a Blanding's turtle nest on your property, see "Protecting Blanding's Turtle Nests" on page 3 of this fact sheet.
Silt fencing should be set up to keep turtles out of construction areas. It is <u>critical</u> that silt fencing be removed after the area has been revegetated.	Construction in potential nesting areas should be limited to the period between September 15 and June 1 (this is the time when activity of adults and hatchlings in upland areas is at a minimum).
WETLANDS	
Small, vegetated temporary wetlands (Types 2 & 3) should not be dredged, deepened, filled, or converted to storm water retention basins (these wetlands provide important habitat during spring and summer).	Shallow portions of wetlands should not be disturbed during prime basking time (mid morning to mid- afternoon in May and June). A wide buffer should be left along the shore to minimize human activity near wetlands (basking Blanding's turtles are more easily disturbed than other turtle species).
Wetlands should be protected from pollution; use of fertilizers and pesticides should be avoided, and run-off from lawns and streets should be controlled. Erosion should be prevented to keep sediment from reaching wetlands and lakes.	Wetlands should be protected from road, lawn, and other chemical run-off by a vegetated buffer strip at least 50' wide. This area should be left unmowed and in a natural condition.
ROADS	
Roads should be kept to minimum standards on widths and lanes (this reduces road kills by slowing traffic and reducing the distance turtles need to cross).	Tunnels should be considered in areas with concentrations of turtle crossings (more than 10 turtles per year per 100 meters of road), and in areas of lower density if the level of road use would make a safe crossing impossible for turtles. Contact your DNR Regional Nongame Specialist for further information on wildlife tunnels.
Roads should be ditched, not curbed or below grade. If curbs must be used, 4 inch high curbs at a 3:1 slope are preferred (Blanding's turtles have great difficulty climbing traditional curbs; curbs and below grade roads trap turtles on the road and can cause road kills).	Roads should be ditched, not curbed or below grade.

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ROADS cont.	
Culverts between wetland areas, or between wetland areas and nesting areas, should be 36 inches or greater in diameter, and elliptical or flat-bottomed.	Road placement should avoid separating wetlands from adjacent upland nesting sites, or these roads should be fenced to prevent turtles from attempting to cross them (contact your DNR Nongame Specialist for details).
Wetland crossings should be bridged, or include raised roadways with culverts which are 36 in or greater in diameter and flat-bottomed or elliptical (raised roadways discourage turtles from leaving the wetland to bask on roads).	Road placement should avoid bisecting wetlands, or these roads should be fenced to prevent turtles from attempting to cross them (contact your DNR Nongame Specialist for details). This is especially important for roads with more than 2 lanes.
Culverts under roads crossing streams should be oversized (at least twice as wide as the normal width of open water) and flat-bottomed or elliptical.	Roads crossing streams should be bridged.
UTILITIES	
Utility access and maintenance roads should be kept to a minimum (this reduces road-kill potential).	
Because trenches can trap turtles, trenches should be checked for turtles prior to being backfilled and the sites should be returned to original grade.	
LANDSCAPING AND VEGETATION MANAGEMENT	
Terrain should be left with as much natural contour as possible.	As much natural landscape as possible should be preserved (installation of sod or wood chips, paving, and planting of trees within nesting habitat can make that habitat unusable to nesting Blanding's turtles).
Graded areas should be revegetated with native grasses and forbs (some non-natives form dense patches through which it is difficult for turtles to travel).	Open space should include some areas at higher elevations for nesting. These areas should be retained in native vegetation, and should be connected to wetlands by a wide corridor of native vegetation.
Vegetation management in infrequently mowed areas -- such as in ditches, along utility access roads, and under power lines -- should be done mechanically (chemicals should not be used). Work should occur fall through spring (after October 1 st and before June 1 st).	Ditches and utility access roads should not be mowed or managed through use of chemicals. If vegetation management is required, it should be done mechanically, as infrequently as possible, and fall through spring (mowing can kill turtles present during mowing, and makes it easier for predators to locate turtles crossing roads).

Protecting Blanding's Turtle Nests: Most predation on turtle nests occurs within 48 hours after the eggs are laid. After this time, the scent is gone from the nest and it is more difficult for predators to locate the nest. Nests more than a week old probably do not need additional protection, unless they are in a particularly vulnerable spot, such as a yard where pets may disturb the nest. Turtle nests can be protected from predators and other disturbance by covering them with a piece of wire fencing (such as chicken wire), secured to the ground with stakes or rocks. The piece of fencing should measure at least 2 ft. x 2 ft., and should be of medium sized mesh (openings should be about 2 in. x 2 in.). It is *very important* that the fencing be **removed before August 1st** so the young turtles can escape from the nest when they hatch!

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