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Executive Summary

The Middle St. Croix Watershed Management Organization (MSCWMO) is a Joint Powers Watershed Management Organization composed of ten St. Croix Valley communities that was established under State Statute 103B to cooperatively manage water resources within the watershed. The member municipalities and townships of the MSCWMO appoint members of the MSCWMO Board. The ten member communities of the MSCWMO are: Afton, Bayport, Baytown Township, Lakeland, Lakeland Shores, Lake St. Croix Beach, Oak Park Heights, St. Mary's Point, Stillwater, and West Lakeland Township.

The purpose of the MSCWMO is to conserve natural resources through land use planning, flood control, and other conservation projects to order to ensure continued public health and welfare. The specific purposes of a watershed management organization are:

1. Cooperatively manage water resources in the watershed.
2. Inventory and assess the resources of the watershed.
3. Monitor the water quality of lakes and streams in the watershed.
4. Provide education on water related issues in the watershed.
5. Review development plans for stormwater management, erosion and sediment control, and provide wetland and shoreland protection.
6. Plan and implement capitol improvement projects that enhance the water resources of the watershed.

The State Board of Water and Soil Resources (BWSR) requires an updated Watershed Management Plan for all WMOs. These plans prioritize water related issues within the watershed, such as regulation, protection, and education; and must include a strategy to manage those resources.

The Middle St. Croix watershed is unique when compared to other watersheds in Washington County in that it lacks a major perennial stream channel and has a minimal number of surface water features. Also unique is that it consists of many parallel subwatershed drainages, all flowing individually to the St. Croix River, rather than to one distinct stream.

The list of issues determined by the MSCWMO Board and citizens can be effectively consolidated into four major issues of concern: runoff and stormwater, erosion and sediment control, wetlands, and education and public outreach. The first three of these issues are interconnected as they are all impacted by development in the watershed. Education is a key component to address the other three issues. The identification process for these issues as well as the issue statements are discussed in Section 3. Policies and performance standards relating to these issues are listed in Section 5, and Section 6 discusses the proposed implementation activities, schedule, and estimated costs for implementing this plan.

All existing local ordinances of the ten member communities, Washington County, and the rules of the adjoining watershed districts pertaining to stormwater management, erosion and/or sediment control, and wetlands were reviewed and compiled into a brief summary for Section 4 of this plan. This summary was used to determine whether any gaps exist in the local regulation within the boundaries of the MSCWMO. Of the ten member communities, very few have specific existing stormwater management ordinances, wetland setback regulations or wetland buffer regulations.

The goals and objectives presented in Section 5 provide the conditions that are being sought through the water management planning process. These goals and objectives reflect the issues identified in Section 3 and gaps identified in Section 4; water quality and quantity, erosion and sediment control, wetlands, education, and groundwater. General information and concepts are presented as well as a discussion of the existing regulatory framework. The policies and performance standards in this section provide the extended framework in which local communities will prepare or update their local water management plans to meet the goals of the MSCWMO. Adoption of this plan within each member community will be monitored to ensure that the plan is implemented. The MSCWMO does not intend to amend this plan, but is prepared for minor plan amendments as future inventories and assessments are created and completed (wetland inventory and functional assessment, gully and ditch identification, land cover mapping) if amendments are deemed necessary.

The role of the MSCWMO with local units of government was established with the philosophy that existing local units of government would be the primary regulator of activities of concern, but where issues affected more than one unit of government the MSCWMO maintains a coordination and dispute resolution role. Each member community will be responsible for incorporating the performance standards of this plan into their existing processes, and will refer projects to the MSCWMO for full review when deemed necessary based on the activities listed below.

1. Any project undertaking grading, filling, or other land alteration activities which involve movement of earth or removal of vegetation on greater than 10,000 square feet of land.
2. All major subdivisions. Major subdivisions are defined as subdivisions with 4 or more lots.
3. Any project with wetland impacts and any project with grading within the wetland/public water buffer or within 40-feet of the bluff line.
4. Redevelopment on a site of 5 acres or more, where pervious surface is disturbed and final impervious surface, in aggregate, exceeds 1-acre or 5% of a site, which causes a change in runoff characteristics or removal of vegetation.
5. Development projects that impact 2 or more of the member communities.

Each community will adopt the MSCWMO review comments into the community comments for each project.

The MSCWMO will implement an information and education program, a data collection program for resource inventories and water quality, and a best management practices

technical assistance and cost share program for encouraging water quality improvement and protection. The communities that directly benefit from the project will fund all Capital Improvement Projects.

To achieve implementation of this plan, it is the intention of the MSCWMO to gain levy authority via special legislation during the 2005 legislative session. Until levy authority is granted, the MSCWMO will continue using the current financing approach. The MSCWMO is also prepared to charge review fees directly to individual developers for work performed in reviewing proposed projects beginning with approval of this plan.

The Watershed Management Plan is intended to extend through the year 2014. The MSCWMO Board may initiate plan amendments at any time. Throughout the plan development process, it has been the intent of the MSCWMO to provide a flexible framework for managing the watershed; this plan has been based on current knowledge and the trends and forces shaping the watershed.

Glossary

Acre-feet: Volume of water that would cover an acre of land to a depth of one foot, equal to 43,560 cubic feet.

Aquifer: A saturated permeable geologic unit that can transmit significant quantities of water.

Banks and shorelines: Those areas along streams, lakes, ponds, rivers, wetlands, and estuaries where water meets land. The topography of banks and shorelands can range from very steep to very gradual.

Bedrock: Any solid rock exposed at the earth's surface or covered by unconsolidated materials such as till, gravel, or sand.

Best Management Practices (BMP): An engineered structure or management activity, or a combination of these, that eliminates or reduces adverse environmental effects of pollutants.

Bluff line: A line along the top of a slope connecting the points at which the slope, proceeding away from the adjoining watershed channel, becomes less than twelve percent (12 %) and it only includes slopes greater than twelve percent (12%) visible from the river or any watercourse tributary to the river.

Buffer zone: The area between a water body and upland areas. The area of land that a transition zone occupies varies and is greatly influenced by topography.

Channel: A natural stream that conveys water. A ditch excavated for the flow of water.

Cholorophyll-a: The primary photosynthetic pigment in plants, a measure of the algal biomass in lakes.

cfs: cubic feet per second.

Dissolved oxygen (D.O.): The concentration of molecular oxygen dissolved in water. Fish and other water organisms rely on dissolved oxygen levels to sustain life processes.

Drainage density: Sum of all stream channel lengths divided by the watershed area; also affects the time of concentration or the rapidity by which water can flow to an outlet.

Low: highly permeable soils, flat to moderately flat relief on the terrain, numerous landlocked water features.

Medium: low to medium permeable soils, moderately flat to medium/high relief on the terrain, well-defined drainage systems with few landlocked water features, existing water features dominated by perennial and ephemeral streams.

High: low to very low permeable soils, sometimes non-existent soils with exposed bedrock, high relief on the terrain, very well defined drainage systems with virtually no landlocked water features. Virtually all water features perennial and ephemeral streams and man-made holding ponds/water features.

Drift: A comprehensive term that includes all rock materials that were deposited by glaciers composed of stratified and unstratified materials ranging in size from fine particles to boulders.

Erosion: The wearing away of the land surface by flows of water, wind, ice, or other geological agents.

Eutrophic lake: A nutrient-rich lake usually shallow and green due to excessive algal growth and limited oxygen in the bottom layer of water.

Eutrophication: The process of over-enrichment of lakes with nutrients, particularly phosphorus. The term also refers to the results of nutrient enrichment such as algae blooms and excessive plant growth.

Glacial deposits: Materials deposited as a result of glacial activity.

Gradients: Steepness or angle of slope. Also the rate of change in hydraulic head over distance.

Groundwater: Water contained in, or flowing through, the ground. Amounts and flows of groundwater depend on the permeability, size, and hydraulic gradient of the aquifer.

Groundwater discharge areas: Areas where groundwater exits to the surface. Depending on local topography, these may create continuously saturated area on slopes or in shallow depressions that support unusual plant communities, or may interact with surface water runoff to create ponds and deep-water wetlands.

Groundwater recharge areas: Areas on the earth's surface where surface water can percolate down to the water table.

Gully: A channel or miniature valley cut by concentrated runoff.

High water level (HWL): The highest water elevation obtained during a design storm. Typically design storms are the 100-year storm.

Hydrologic soil groups: The classification of soils by their reference to the intake rate of water, which is influenced by texture, organic matter content, stability of the soil aggregates, and soil horizon development.

Hydrology: The study of water, especially its natural occurrence, characteristics, control, and conservation.

Ice-contact stratified deposits: Sand, loamy sand, and gravel locally stratified with silt and glacial till.

Impervious surface: A surface not permitting penetration or passage of rainwater, snowmelt, etc.

Infiltration rate: Rate at which water percolates into the ground.

Land capability: The suitability of land for use without permanent damage.

Landlocked basins: Basins or depressions that have no surface outlet to a body of water.

Limiting factor: Environmental factor that limits the growth or activities of an organism or that restricts the size of a population or its geographical range.

Loam: Soil composed of sand, silt, clay, and possible organic material.

Lowest Floor Elevation: The lowest floor of the lowest enclosed area (including basement).

Metropolitan Urban Service Area (MUSA): The portion of the seven-county Metropolitan Area where local and regional services are committed and which have urban levels of regional sewer and transportation services.

Non-point source: Polluted runoff; nutrients and pollution sources not discharged from a single point.

Ordinary high water level (OHWL): The highest level reached by a body of water under normal conditions.

Outwash: Sandy or gravelly material deposited by glacial meltwater flowing from an ice sheet.

Peak discharge: The maximum instantaneous flow from a given storm condition at a specific location.

Permeability: The ability of a substance, such as rock or soil, to allow a liquid to pass or soak through it.

Phosphorus: A nutrient essential to plant growth. Phosphorus is the nutrient most commonly limiting plant growth in lakes.

ppb: Parts per billion.

Protected Waters: Also know as "Public Waters". These terms relate to MN Statute 105.37, subdivision 14 of the MN DNR regulations and are identified on the DNR

Protected Waters map of Washington County (Figure 2.12). Any work or alteration in the beds of these waters requires a permit from the DNR.

Recharge: Water added to the saturated zone of the water table. The main source of recharge is precipitation.

Secchi disc: A device used to measure water transparency. Measures the depth of light penetration in water that typically has a nine-inch, black and white, circular plate attached to a rope.

Sediment: Solid materials, both mineral and organic, that are in suspension, being transported, or have been moved from their sites of origin by air, water, wind, gravity, or ice.

Seeps: Groundwater/surface water connections caused by river or stream erosion into a near-surface aquifer.

Stormwater runoff: Water falling as rain during a storm and entering a surface water body by flowing over land. Stormwater runoff picks up heat and pollutants from developed surfaces such as parking lots.

Subwatershed: A smaller geographic section of a larger watershed unit with a drainage area between two and fifteen square miles and whose boundaries include all the land area draining to an outlet where two second order streams combine to form a third order stream.

Till: Un-stratified and unsorted material deposited directly by a glacier. Till consists of clay, sand, gravel, or boulders mixed in any proportion.

Total Phosphorus: A measure of all the different forms of phosphorus in water. Includes phosphorus dissolved in the water, suspended or incorporated in algae or other organisms.

Trophic state: The level of growth or productivity of a lake as measured by the phosphorus content, algae abundance, and/or depth of light penetration.

Wetland: An area that under normal circumstances have hydrophytic vegetation, hydric soils, and wetland hydrology. A standardized methodology has been developed by the federal government determining the criteria by which legally recognized wetland boundaries are defined, typically known as wetland delineation.

Watershed: The area of land draining into a specific body of water.

Water transparency: A measure of the clarity of water; the depth at which an object can be seen in water.

Abbreviations

BCWD	Brown's Creek Watershed District
BMPs	Best Management Practices
BWSR	Minnesota Board of Water and Soil Resources
CAC	Citizen's Advisory Committee
CIP	Capitol Improvement Program
COD	Chemical Oxygen Demand
COE	U.S. Army Corps of Engineers
DNR	Minnesota Department of Natural Resources
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GIS	Geographic Information Systems
HWL	High Water Level
MAC	Metropolitan Airports Commission
MDH	Minnesota Department of Health
MES	Minnesota Extension Service
Met Council	Metropolitan Council
MGS	Minnesota Geological Survey
MNRAM	Minnesota Rapid Assessment Method
MPCA	Minnesota Pollution Control Agency
MSCWMO	Middle St. Croix Watershed Management Organization
MUSA	Metropolitan Urban Service Area
NEMO	Nonpoint source pollution Education for Municipal Officials
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NURP	National Urban Runoff Program
NWI	National Wetlands Inventory
NWL	Normal Water Level
OHWL	Ordinary High Water Level
PCBs	Polychlorinated Biphenyls
SWSRMP	State Wild and Scenic Rivers Management Program
SWPPP	Stormwater Pollution Prevention Plan
TAC	Technical Advisory Committee
TMDL	Total Maximum Daily Load
VOC	Volatile Organic Compounds
VBWD	Valley Branch Watershed District
WCA	Wetlands Conservation Act
WCD	Washington Conservation District
WD	Watershed District
WMO	Watershed Management Organization
WMP	Watershed Management Plan
USDA	United States Department of Agriculture

1.0 Introduction

1.1 Purpose

The Middle St. Croix Watershed Management Organization (MSCWMO) is a Joint Powers Watershed Management Organization composed of ten St. Croix Valley communities that was established under State Statute 103B to cooperatively manage water resources within the watershed. The member municipalities and townships of the MSCWMO appoint members of the MSCWMO Board.

In general, the purpose of a Watershed Management Organization (WMO) is to conserve natural resources through land use planning, flood control, and other conservation projects in order to ensure continued public health and welfare. WMOs are responsible for managing surface water only; groundwater management is optional. Watershed Districts (WD) are responsible for managing both surface and groundwater. The specific purposes of a watershed management organization are:

1. Cooperatively manage water resources in the watershed.
2. Inventory and assess the resources of the watershed.
3. Monitor the water quality of lakes and streams in the watershed.
4. Provide education on water related issues in the watershed.
5. Review development plans for stormwater management, erosion and sediment control, and provide wetland and shoreland protection.
6. Plan and implement capitol improvement projects that enhance the water resources of the watershed.

The Washington County Water Governance Study (Appendix A), recommended that the MSCWMO complete a Second Generation Watershed Management Plan to be deemed an implementing, functional organization. The State Board of Water and Soil Resources (BWSR) requires an approved Watershed Management Plan for WMOs. This plan will prioritize water related issues within the watershed, such as regulation, protection, and education; and include a plan to manage those resources.

1.2 Background

The Middle St. Croix watershed encompasses approximately 19.8 square miles and is located in the east-central part of Washington County. A distinction exists between the Middle St. Croix watershed and the other watersheds of Washington County in that the Middle St. Croix watershed has many small, parallel watersheds that all flow to the St. Croix, whereas the other watersheds in the County generally have one major drainage with a headwaters and outlet. Land use in the watershed is evenly distributed between agricultural uses, rural residential and high-density residential/commercial land uses.

The ten member communities of the MSCWMO are: Afton, Bayport, Baytown Township, Lakeland, Lakeland Shores, Lake St. Croix Beach, Oak Park Heights, St.

Mary's Point, Stillwater, and West Lakeland Township (Figure 1.1). The area and percentage of the member communities is included in Table 1.1.

Table 1.1 Area and Percentage of Member Communities

Community	Area (sq mile)	% Area
Afton	0.18	1
Bayport	1.70	9
Baytown Township	3.85	19
Lakeland	2.06	10
Lakeland Shores	0.30	2
Lake St. Croix Beach	0.55	3
Oak Park Heights	2.17	11
St. Mary's Point	0.66	3
Stillwater	3.35	17
West Lakeland Township	4.99	25
Total	**19.81**	**100**

The MSCWMO offices are located at:

C/o Washington Conservation District
1380 West Frontage Road, Highway 36
Stillwater, MN 55082

1.3 MSCWMO Mission Statement

The mission of the Middle St. Croix Watershed Management Organization is to jointly and cooperatively manage the water resources of the watershed. The ten member communities will do so to conserve and protect the water resources in an efficient and effective manner.

2.0 Inventory and Assessment of Resources

2.1 Physical Environment

2.1.1 Climate and Precipitation

The climate of the Middle St. Croix watershed is consistent with the climate for the Seven County Twin Cities Metropolitan Area. The summers are relatively short in duration with a seasonal mean temperature of 70 degrees Fahrenheit (°F). The ground is usually covered with snow from late fall to early spring. Average annual snowfall accumulation is 56 inches. The average winter season temperature is 17 °F. Average annual temperature and precipitation are 45.4 °F and 29.41 inches respectively.

Thirty-year average monthly temperature and precipitation data for Stillwater, Minnesota are summarized in Table 2.1. Data was collected by the National Weather Service Cooperative Program and is available at the State Climatology Working Group [State Climatology (DNR Waters), Extension Climatology (MES) and Academic Climatology (University of Minnesota)] web site: http://www.climate.umn.edu.

Table 2.1 Stillwater, Minnesota (1971-2000, 30-year record) Average Temperature and Precipitation

Month	Temperature (°F)	Precipitation (in)
January	13.1	1.04
February	20.1	0.79
March	32.1	1.86
April	46.6	2.31
May	59.3	3.24
June	68.4	4.34
July	73.2	4.04
August	70.6	4.05
September	61.0	2.69
October	48.7	2.11
November	32.5	1.94
December	18.7	1.00
Annual Mean	**45.4**	**29.41**

Source: National Weather Service

The standard values assumed for the probability of a rainfall event occurring in any given year is illustrated in Table 2.2. The recurrence interval is a measure of the probability of occurrence of a particular storm event. For example, a rainfall event of 5.9 inches has a 1% probability of occurring in a 24-hour period during any given year, which is expressed as once in every 100 years.

Table 2.2: Recurrence Intervals of Storm Events

Recurrence Interval (Years)	**24-Hour Rainfall Amount** (Inches)
1	2.4
2	2.8
5	3.5
10	4.2
25	4.7
50	5.2
100	5.9

Source: United States Weather Bureau TP-40

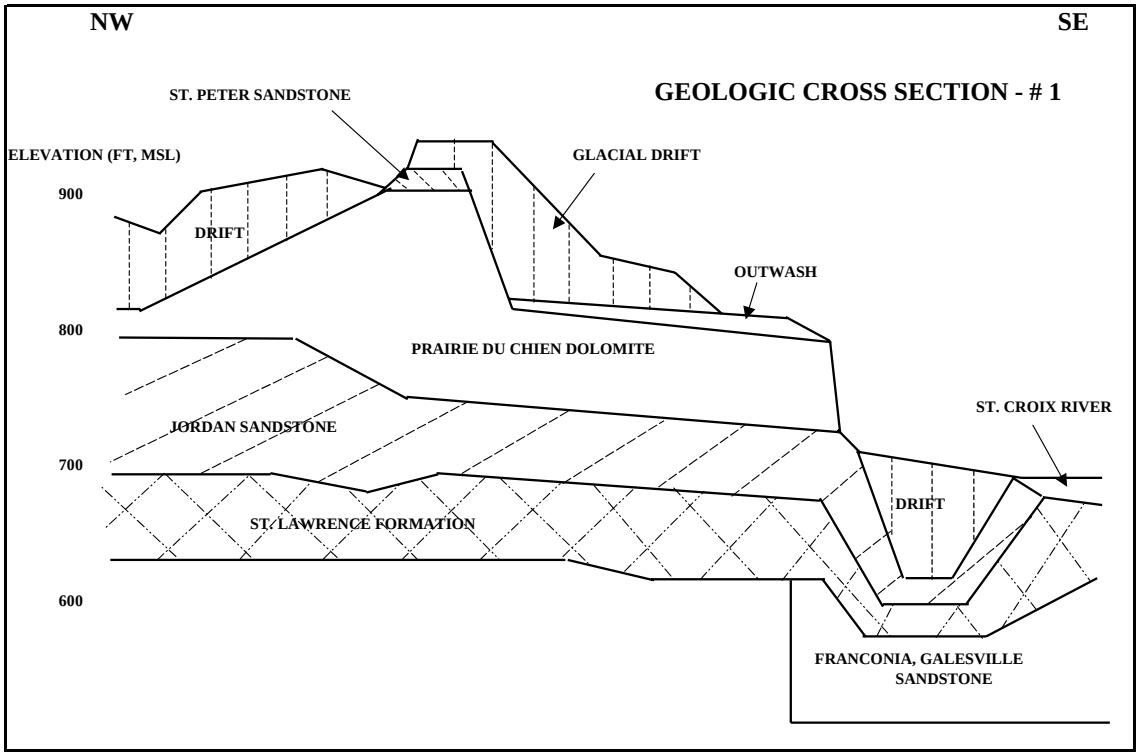
2.1.2 Geology and Groundwater Resource Data

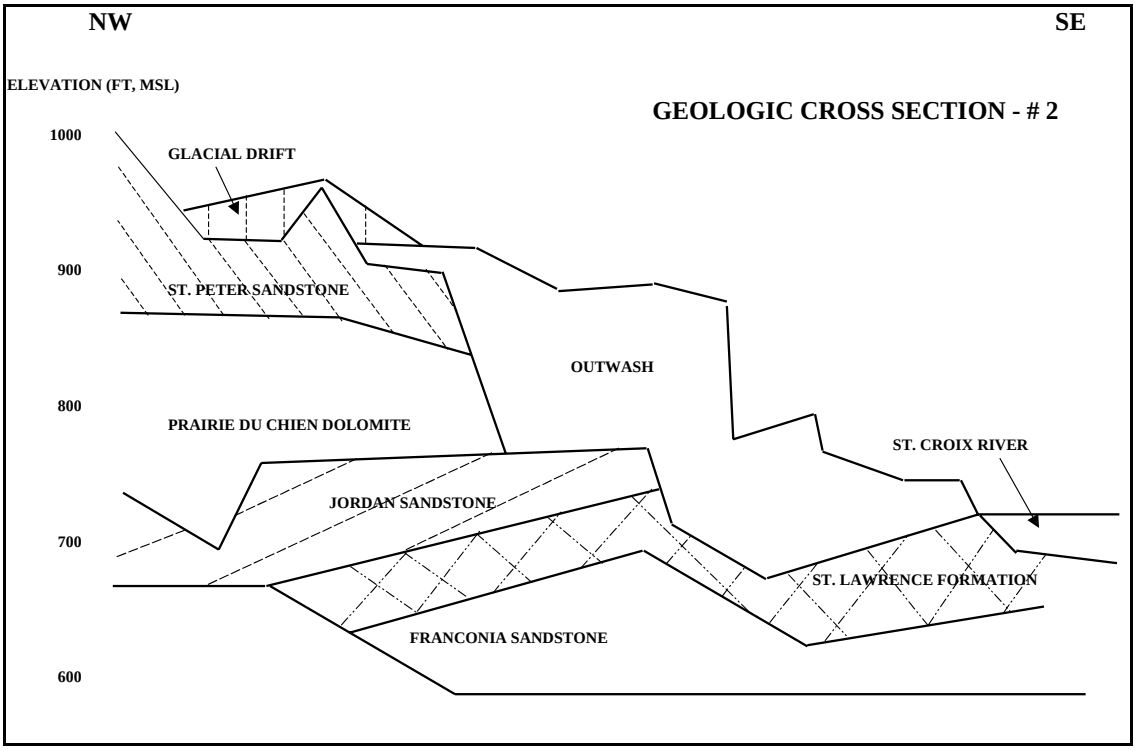
The geology of the Middle St. Croix watershed is typified by layers of glacial outwash and till ranging from 0 to 150 feet thick overlying bedrock. The surface materials are characterized primarily by glacial drift and outwash materials that were deposited by the St. Croix phase of the Superior Ice Lobe, a glacier that advanced from the Lake Superior Basin and receded about 12,000 years ago. These materials are often described as red sandy drift. The outwash and till are underlain by various layers of bedrock. St. Peter sandstone is the uppermost bedrock formation in the Middle St. Croix watershed (Figure 2.2). Beneath the St. Peter sandstone is Prairie du Chien Group, Jordan Sandstone, St. Lawrence Formation, Franconia Formation, Ironton & Galesville Sandstones, Eau Claire Formation, and the Mt. Simon Sandstone respectively. The older geologic deposits (bedrock formations) can be seen in the geologic cross sections shown in Figure 2.1. The locations of these cross sections can be seen in Figure 2.2.

The surface materials in the central and northern parts of the Middle St. Croix watershed are till and ice contact stratified drift. Till is unsorted material deposited by the glacier itself, which has not been subsequently affected by flowing water. Ice contact stratified drift is material left at the edges and bottom of a glacier by melt water as the water leaves the glacier. These materials have a relatively low permeability and may retard recharge through them to bedrock aquifers. The southern portion of the watershed is mapped as outwash or alluvium that was deposited by large streams that carried meltwater away from the retreating glacier. A generalized map of the suficial geology is shown in Figure 2.3.

A generalized map of the surficial soils, based on the Washington County Soil Survey, is shown in Figure 2.4.

Figure 2.1 Profiles of Bedrock Formations





The lakes and depressional wetlands of the Middle St. Croix watershed are largely the result of different types of kettle basins or hummocks. Kettle basins or hummocks form when glaciers retreat, leaving large blocks of ice in the till or outwash. When these ice deposits melt, a depression is left, which eventually form the wetlands that are present today. These features are confined to the quaternary deposits above the bedrock.

Middle St. Croix watershed groundwater located in the bedrock and surficial materials discharges directly to the St. Croix River. Additions to the water table are made mainly through infiltration from rainfall or snowmelt. Withdrawals from the water table occur via discharge to surface water bodies, infiltration into deeper aquifers, and groundwater pumping from wells. The Middle St. Croix watershed surficial groundwater table has experienced both seasonal and long-term fluctuations. The long-term climatic cycles, characterized by several wet years or dry years in succession, have probably contributed most significantly to the fluctuating levels experienced.

The MSCWMO has identified areas with soil types, slopes, and/or water levels that are unsuitable for development of any type or agricultural production involving intensive tilling of the land. Commercial and residential development and inappropriate farming practices in these identified areas increase soil erosion and sedimentation, increase the potential for the introduction of toxic materials into groundwater, encourage pollution, destroy ecological and natural resources, and require expenditures of public funds to correct deficiencies. Figure 2.5 is an inventory of the areas highly susceptible to erosion from land disturbing activities.

Critical Recharge Areas

The majority of recharge in the Middle St. Croix watershed occurs in the western portion of the watershed and discharge occurs predominately in the eastern portion of the watershed. Lakes, wetlands, depressions, and landlocked basins are all characteristic of the western portion of the watershed. Water drains to these vital areas and infiltrates into the groundwater system to later be discharged in the eastern portion of the watershed. Specifically locating and thoroughly analyzing these important groundwater recharge areas will be completed during the South Washington County Groundwater Study, a cooperative effort between Washington County and several southern Washington watershed management organizations. MSCWMO has been an active participant in this study.

2.2 Hydrologic System

The hydrologic system of the Middle St. Croix watershed is distinctive from other watersheds in Washington County in that it is not one contiguous watershed draining to one outlet. The Middle St. Croix watershed drainage system is better described as many parallel drainages generally trending west to east that empty directly into the St. Croix River.

The general drainage system of the watershed can be broken into two different types. The first type is located in the western area of the Middle St. Croix watershed and is characterized by numerous small ponds and lakes, many of which are landlocked. The

drainage density in this area of the watershed is low, indicating the permeable nature of the soils and the relatively flat relief of the terrain.

The second type of drainage system in the Middle St. Croix watershed is located in the northern, eastern and southern portions of the watershed. Well-defined drainage systems and few lakes, ponds and wetlands characterize this area. The drainage density of this portion of the watershed is medium, indicating the permeable nature of the soils and moderate to steep relief of the terrain. This portion of the watershed is also dominated by the St. Croix River bluff, which has many perennial and ephemeral streams that flow parallel to each other and into the St. Croix River. With further urbanization, infiltration basins and stormwater ponds will be necessary to capture excess runoff from increasing amounts of impervious surfaces. These basins will be created based on rates of urbanization and drainage potential of particular areas in Middle St. Croix watershed as they are developed.

2.2.1 Subwatershed Summary

Ninety-seven subwatersheds have been delineated based on Washington County's two-foot topographic mapping, shown in Figure 2.6. Appendix B provides a summary of the area and drainage of the subwatersheds in Middle St. Croix watershed.

2.2.2 Wetlands Inventory

Between 1988 and 1992, a National Wetland Inventory was conducted within the state of Minnesota. The completed inventory delineated areas that are critical wetland resources within the state and more importantly within Washington County. Figure 2.7 shows the National Wetland Inventory for the Middle St. Croix watershed. Additionally, the Washington Soil and Water Conservation District completed a water resource and wetland inventory for MSCWMO in 1986. This inventory can be found in Appendix C. Due to the changes in inventory and assessment protocols, this inventory is considered out-of-date and will be replaced with a new inventory and functional assessment of wetlands that will be incorporated into this plan on the schedule shown in Table 6.2

2.2.3 Storm Sewer and Stormwater Systems

The municipalities of Stillwater, Oak Park Heights, Bayport, and Lakeland have developed and adopted stormwater management plans that include stormwater treatment facilities of various types and designs. The remainder of the Middle St. Croix watershed has been and will likely continue to be served by stormwater ponds and other management facilities.

2.2.4 Flood Level Information

Potential for flooding occurs throughout the Middle St. Croix watershed along the intermittent streams and landlocked basins that exist in the Middle St. Croix watershed and along the St. Croix River. The threat of flooding will increase as development occurs.

In communities directly along the St. Croix River, flooding takes place both from the river in high water years and from watershed runoff early in the season when water backs

up in the frozen ground of these communities before infiltrating. The MSCWMO will express concern and actively manage areas of its watershed that are adjacent to the St. Croix River, but because it does not have jurisdiction or regulatory control over the river or its floodplain it will defer to those organizations that do. These organizations include the US Army Corps of Engineers, US National Park Service, Minnesota Department of Natural Resources, Washington County, National Flood Insurance Program and the municipalities.

Flooding along Perro Creek in the City of Bayport is a problem currently being addressed. The State of Minnesota Storm Sewer Project completed a design for Perro Pond and Perro Creek in 2003 that will significantly decrease the chance of flooding along the creek and pond. MSCWMO intends to have the final phase of the project completed by 2005, which will allow for the safe, year-around conveyance of water from the Perro Creek watershed to the St. Croix River. 100-year flood elevations along Perro Creek were identified in conjunction with this project.

Lily and McKusick lakes are both located entirely within the Middle St. Croix watershed and have outlet structures that are maintained by the City of Stillwater. Assessment of the flooding potential for the intermittent streams, wetlands, and landlocked basins within the Middle St. Croix watershed will occur as the land is subdivided and developed. With further urbanization and increased storm runoff, future efforts to control flooding problems are of increasing importance to the MSCWMO.

2.2.5 Water Quality Data

Water quality data is collected to provide baseline information for the assessment of trends and impacts on water quality that will lead to proper management of these resources. The MSCWMO has monitored two lakes within the Middle St. Croix watershed to assess water quality. Lily Lake has records pertaining to water quality that date back to 1985. McKusick Lake water quality data dates back to 1994. Additionally, water level has been recorded on the two lakes and Perro Pond. The summarized locations, parameters, and observers are included in Table 2.3. The summarized results of the lake water quality program in watershed are included in Table 2.4. More detailed information can be found in Appendix D.

Table 2.3 Water Quality Monitoring Locations, Parameters, and Observers

Lake Name	Total Phosphorus	Total Kjedahl Nitrogen	Chlorophyll-a	Transparency	Elevation
McKusick Lake	WCD 1994-2004	WCD 1994-2004	WCD 2001-2004	WCD 1994-2004	WCD, Volunteer, 1911-2004
Lily Lake	WCD 1995-2004	WCD 1995-2004	WCD 2001-2004	WCD 1995-2004	WCD, Volunteer, 1922-2004
Perro Pond	NA	NA	NA	NA	WCD, Volunteer, 1993-2004

Existing Monitoring Sites

Three long-term monitoring sites exist within the Middle St. Croix watershed and are presented in Table 2.4. Lily Lake and McKusick Lake are both water quality and water-surface-elevation monitoring sites. Perro Pond is a water-surface-elevation only monitoring site. Lily Lake and McKusick Lake both have surface elevation data records that start in the early 1900's, and Perro Pond has data beginning in 1993. All other monitoring sites are permitted sites monitored by the Minnesota Pollution Control Agency (http://www.pca.state.mn.us). The locations and data associated with these sites can also be accessed at the website above.

Table 2.4 Water Quality Data for Lily Lake, McKusick Lake, and Perro Pond

	Lily Lake			McKusick Lake			Perro Pond
	Total Phosphorus	Transparency	Lake Grade	Total Phosphorus	Transparency	Lake Grade	Elevation
Year	(mg/L)	(ft)		(mg/L)	(ft)		
1985	NA	3.93	C	NA	NA	NA	NA
1990	NA	6.27	C	NA	NA	NA	NA
1991	NA	6.85	C	NA	NA	NA	NA
1994	NA	NA	NA	0.09	3.42	D	NA
1995	0.05	9.61	B-	0.08	3.28	D	NA
1996	0.04	7.07	C	0.10	3.42	D	NA
1997	0.04	5.43	C	0.06	4.10	C	NA
1998	0.05	5.23	C	0.08	3.70	D	746.07
1999	0.05	5.74	C	0.07	3.10	D	744.95
2000	0.06	4.93	C	0.04	8.14	C+	745.20
2001	0.04	9.08	B	0.05	7.37	C+	743.21
2002	0.04	6.57	C+	0.06	4.79	C	745.54
2003	0.03	6.57	C+	0.04	6.92	C+	745.09
2004	0.04	6.14	C+	0.03	9.11	B	745.18

2.2.6 Surface Water Appropriations

The Minnesota Department of Natural Resources regulates surface water appropriations in the Middle St. Croix watershed. Information pertaining to permit appropriations can be obtained by contacting the DNR.

2.2.7 Shoreland Ordinances

Statewide minimum shoreline standards affect nearly all of Minnesota's lakes and rivers. These standards set guidelines for the use and development of shoreland property, including a sanitary code, minimum lot size, minimum water frontage, building setbacks, building heights, and subdivision regulations. Local units of government with priority

shorelands are required to adopt these or stricter standards into their zoning ordinances. For those communities without approved shoreland ordinances, administration of the shoreland ordinance defaults to Washington County. Some communities within the MSCWMO have adopted the State Wild and Scenic Rivers Management Program (SWSRMP), which include special shoreland and bluffland management provisions for the St. Croix River Corridor, which is unrelated to the State Shoreland Program. Table 2.5 indicates the status of shoreland ordinances for the communities with in the Middle St. Croix watershed.

Table 2.5 Status of Shoreland Ordinances Within MSCWMO Member Communities

Community	DNR – Approved Shoreland Ordinance*	Status of Shoreland Ordinance
Afton	No	State Wild and Scenic Rivers Management Program (SWSRMP) adopted.
Bayport	No	SWSRMP adopted.
Baytown Township	Yes	Covered under Washington County's DNR approved shoreland ordinance.
Lakeland	No	SWSRMP adopted.
Lakeland Shores	No	SWSRMP adopted.
Lake St. Croix Beach	No	SWSRMP adopted.
Oak Park Heights	No	SWSRMP adopted.
St. Mary's Point	No	SWSRMP adopted.
Stillwater	Yes	Shoreland ordinance approved by Metro DNR.
West Lakeland Township	Yes	Covered under Washington County's DNR approved shoreland ordinance.

*Those communities that do not have a DNR approved shoreland ordinance have not yet been asked by the DNR to develop an ordinance.

2.3 Human Environment

2.3.1 Transportation

Continued improvement of county and township roads in the Middle St. Croix watershed will most likely occur due to increased development pressure. Improved access to the major arterial transportation systems of State Highway 36 and Interstate 94 will be needed and these improvements have the potential to impact the water resources of the watershed.

Airports

Lake Elmo Airport is the nearest facility to the Middle St. Croix watershed and is located approximately one mile west of the watershed's western boundary. The airport is not expected to have an impact on the plans of the MSCWMO.

2.3.2 Gravel Mining

Four active gravel-mining operations exist in the Middle St. Croix watershed (Figure 2.8) in Baytown and West Lakeland Township. Mining regulation and permitting is a function of Washington County. In addition, gravel-mining operations may be required to obtain a permit from the Minnesota Pollution Control Agency (MPCA). This includes gravel mines that have stormwater not contained directly on-site; wastewater from dewatering of pits and quarries; wash water from sand, gravel, or aggregate washing, water from cooling cutting saws; and/or water from other sources that may carry sediment and solids to Waters of the State. New pits or quarries must obtain a General Construction Stormwater Permit from the MPCA during the construction phase.

2.3.3 Land Use and Land Cover

The Middle St. Croix watershed lies along the eastern fringe of the Twin Cities Metropolitan Area. The current land use is predominantly a mix of agriculture, rural residential and high-density residential, and commercial areas shown in Figure 2.10. Updated information of the land cover in the Middle St. Croix watershed will be available when the Minnesota Land Cover Classification System study is completed (Table 6.2). Each individual community has prepared a future land-use plan that indicates residential development will continue in the central and western portions of the watershed. Projected land use is shown in Figure 2.15.

2.3.4 Public Utility Service

The comprehensive plans of the member communities currently indicate no extension of the Metropolitan Urban Service Area into the Middle St. Croix watershed. With continued growth, municipal sewer lines of the cities of Stillwater, Oak Park Heights, and Bayport will continue to expand within the cities' borders to the west and north. The remainder of the watershed will continue use of individual sewage treatment systems.

2.3.5 Water-based Recreation Areas

The St. Croix River is the major water-based recreation area within the Middle St. Croix watershed and provides a variety of water-based recreation. Lily Lake in Stillwater has a public access and fishing pier and is available for boating, fishing, and swimming. The Minnesota DNR website (http://www.dnr.state.mn.us) provides information, resources, and maps about these specific recreation areas.

2.4 Fish and Wildlife Habitat

The fish and wildlife habitat concerns of the MSCWMO are the natural areas associated with the St. Croix River and the wetlands, streams, and lakes draining to the St. Croix River. The St. Croix River is a body of water of regional importance, which the MSCWMO feels should be studied and addressed either at the regional or State level to adequately plan for future uses that take all interests into account. Impacts of future development in the Middle St. Croix watershed will need to be addressed as to how they may potentially reduce or hinder fish and wildlife habitat. The MSCWMO will focus its current efforts on fish and wildlife habitat protection on the areas that drain directly to the St. Croix River, based on the subwatershed summary in Appendix B.

In addition, four separate natural communities have been identified in the *Natural Communities and Rare Species, Washington County 1987-1989* map (Minnesota County Biological Survey, University of Minnesota Press, 1990). These communities include a dry gravel prairie stretching along St. Croix Trail through most of Lake St. Croix Beach, another area of dry gravel prairie within Lakeland Shores, an area of oak forest within the Bayport Wildlife Management Area (WMA) in the northeast corner of West Lakeland Township, and an area of oak savanna also in the Bayport WMA in the south east corner of Baytown Township. Future priorities and protection efforts will take into account these resources (Table 3.1).

2.4.1 DNR Classifications for Lakes, Streams and Wetlands

The Minnesota DNR has recognized and classified particular lakes, streams, and wetlands as DNR Protected Waters. These water resources are of important concern and typically have monitoring or assessments to evaluate the changes over time that occur to these resources. Figure 2.11 shows the DNR protected waters within Middle St. Croix watershed.

2.4.2 Biological Surveys, Reconnaissance Studies, Unique or Endangered Communities or Species

The Natural Heritage database, maintained by the Natural Heritage and Non-game Research Program within the Minnesota DNR has the most complete list of rare or significant species, natural communities, and other natural features. Because the information in the database is not based on a comprehensive inventory, there may be rare or otherwise significant natural features within the Middle St. Croix watershed that are not found in the list. The most current complete list can be obtained from http://www.dnr.state.mn.us/ecological_services.

Based on a review of the database, one hundred fifty-seven known occurrences of rare plant or animal species or other significant natural features were found within a one-mile radius of the Middle St. Croix watershed. These occurrences include seven separate natural community and fourteen species types within the Middle St. Croix watershed. Table 2.6 lists the upland plant and animal species found within the watershed. Fish and mussel species found in the St. Croix River are not listed here.

Future priorities and protection efforts will take into account these resources. Additional information may be added with the completion of future inventories and assessments.

2.4.3 State Plans for Fish and Wildlife Areas

Fourteen city parks and recreational facilities exist within the Middle St. Croix watershed, but no regional or county parks are located within its boundaries. The State of Minnesota owns and operates approximately six hundred acres within the Middle St. Croix watershed classified as Wildlife Management Areas or Scientific Natural Areas with portions open to the public.

Table 2.6 Natural Heritage Occurrences Within the Middle St. Croix Watershed

Species	**Minnesota Status**
Apalone mutica (Smooth Softshell)	Special Concern
Baptistia alba (Wild White Indigo)	Special Concern
Besseya bullii (Kitten-Tails)	Threatened
Cristatella jamesii (James' Polanisia)	Endangered
Echinochloa walteri (Walter's Barnyard Grass)	No Legal Status
Elaphae vulpine (Fox Snake)	No Legal Status
Emydoidea blandingii (Blandings Turtle)	Threatened
Falco peregrinus (Peregrine Falcon)	Threatened
Haliaeetus Leucocephalus (Bald Eagle)	Special Concern
Hesperia leonardus (Leonard's Skipper)	Special Concern
Lechea tenufolia (Narrow-leaved Pinweed)	Endangered
Linaria Canadensis (Old Field Toadflax)	No Legal Status
Paronychia fastigiata (Forked Chickweed)	Endangered
Seiurus motacilla (Louisiana Waterthrush)	Special Concern
Natural Community Type	
Floodplain silver maple forest	NA
Mixed emergent marsh	NA
Dry prairie, bedrock bluff subtype	NA
Dry prairie, sand-gravel subtype	NA
Maple-basswood forest	NA
Dry oak savanna	NA
Mixed hardwood swamp seepage	NA

2.5 Pollution Sources

Sources of non-point source pollution in the Middle St. Croix watershed are primarily a result of area urban and agricultural activities. Non-point source pollution from urban or urbanizing activities is highly concentrated and often toxic, resulting from such diverse activities as driving an automobile to fertilizing a lawn. Street and parking lot surfaces are perhaps the largest and most significant sources in an urban environment since most of these surfaces drain directly into storm sewers. Pollution loads mainly occur from automobile usage, deicing and anti-skid applications, vegetation and litter, chemical spills, road pavement decomposition, and construction activities. The highest concentrations of pollutants from these sources are usually heavy metals, oils, grease and other associated petrochemicals, chemical oxygen-demanding (COD) substance, silt, sand, and other nutrients. Non-point pollution from agricultural and low density residential areas can generally be characterized as widespread and relatively dilute, but significant in its accumulation. Factors contributing to agricultural non-point pollution are soil erosion, animal feedlots, chemical fertilizers and pesticides, construction site erosion, and gully and stream channel erosion.

Erosion and Sedimentation

Erosion and subsequent sedimentation occur uniformly over the entire Middle St. Croix watershed wherever construction or agricultural crop production is taking place.

Sediment, the largest pollutant by weight, poses two problems. First, detached soil particles settle out in streams and lakes, with coarser particles dropping out of suspension more quickly and finer particles traveling for long distances before precipitating out of solution. As a result, streams and lakes are clouded, channel and lake bottoms become shallower, bottom-dwelling organisms are buried, fish respiratory functions are hindered, and drainage devices are filled.

Second, sediment, especially the silts and clays, has a tendency to hold or adsorb pollutants, particularly nutrients, metals, organics and pesticides. Settling of these fine-grained particles in channel or lake bottoms can lead to accumulations of pollutants that are ready to be re-suspended or remobilized by biologic, physical, and chemical activities.

The extent of erosion and its impacts to the Middle St. Croix watershed need to be assessed. An effective best management practice program may have to be developed to treat current and future problems that occur with time and increased development.

Nutrients
Many nutrients are present in water bodies within the Middle St. Croix watershed as well as all water bodies. Most of these nutrients have little impact on the quality of the water and associated water resources because they are usually not the limiting factor that causes poor or reduced water quality. The nutrients nitrogen and phosphorus are essential to the life functions of aquatic organisms, such as algae, and excessive amounts of these nutrients may result in anoxic lakes, ponds, and slow-moving streams. These nutrients are extremely difficult to remove from lakes because, as the organisms die, portions of the nutrients are readily released. The rest settle to the bottom and are held until oxygen and pH conditions are right for their release.

Fecal Coliform
Fecal coliform bacteria inhabit the intestinal tracts of warm-blooded animals. These bacteria serve as easily identified indicators of microbial contamination, such as bacteria, viruses, protozoa and fungi. Much of the time, fecal coliform bacteria can be found where large amounts of runoff or non-point source pollution comes from areas containing livestock and livestock involved activities. Another source would be contamination from improperly designed and/or installed individual sewage treatment systems. A high number of fecal coliform bacteria generally indicate that the quality of water being tested is poorly suited for body contact.

Pesticides and Polychlorinated Biphenyls (PCBs)
Pesticides and PCBs fit into a category called toxins. These toxins can be both very toxic at initial strength, and can accumulate in biological organisms in the food chain. PCBs are extremely slow to degrade. Pesticides degrade at varying rates depending upon their chemical composition. Both pesticides and PCBs can be quite mobile because of the strong ability to adsorb to fine-grained sediment and organic matter. Many pesticides are water-soluble and can travel long distances in solution or be adsorbed to fine particles.

2.5.1 Groundwater Pollution

The growing demand for groundwater for irrigation, industrial, commercial, and drinking water supplies, along with the increased detection of groundwater contamination focuses attention on this resource in Washington County and in the Middle St. Croix watershed. Planning, management, and protection of the groundwater supply must be supported by the basic understanding of the occurrence, movement, and composition of the groundwater resource. Groundwater and surface water systems do not necessarily coincide with surface water divides or boundaries; therefore, groundwater protection efforts, to be most effective, should be coordinated at the county or regional level. The MSCWMO cannot successfully plan for or control activities outside its boundaries, which ultimately could have a detrimental impact on the groundwater resource it is dependent upon.

In 1987, Minnesota Department of Health (MDH) issued a Well Advisory for Lakeland and Lakeland Shores (Figure 2.12). Wells in these cities were identified with higher than average levels of volatile organic compounds (VOCs). The advisory prohibits the deepening of existing wells into lower bedrock formations or the drilling of new wells into the lower bedrock formations. Small lots, private septic systems, and many private shallow sand point wells, and coarse textured sandy outwash soils characterize these cities, which makes them more conducive to groundwater contamination problems. At least two sources of plumes are suspect in the area, one with fluorocarbons and petroleum products and the other with solvents. Monitoring of over 360 private wells has indicated the presence of VOCs in 193 wells, 86 of which are at levels considered unsafe to drink. Residents in these homes have been connected to a municipal water system.

The MDH has also identified a Special Well Construction Area (SWCA) located in the Middle St. Croix watershed due to trichloroethylene (TCE) and carbon tetrachloride (CCl_4). These contaminants have been detected in the Prairie du Chien, Franconia, and Jordan groundwater aquifers. Municipalities that are or have portions within the SWCA include the Cities of Oak Park Heights, Lake Elmo, and Bayport; and Baytown and West Lakeland Townships. Municipalities that are or have portions affected by the contaminant plume in the groundwater of the Prairie du Chien and Jordan aquifers are the City of Bayport, Baytown Township, and West Lakeland Township (Figure 2.12). The major source of the TCE has been identified as originating near the City of Lake Elmo with minor sources from the Lake Elmo Airport property. Thus far, CCl_4 doesn't appear to pose any problem due to its low concentrations within tested wells. The CCl_4 source was identified as a former grain storage facility where this pesticide had seeped into the ground.

Well testing, both observation and private well, has been performed to monitor the pollutants' progress through the aquifers. In 2004, 149 wells had been identified as having TCE levels that exceed the exposure limit. All but a few of these wells, and any new homes that were platted for development before April 9th 2002, have been or will be fitted with a granular activated carbon filter by the Metropolitan Airports Commission. In the fall of 2003, Baytown Township passed an ordinance that provides for governmental supervision of privately installed systems, and in 2003, the Minnesota State

Legislature passed a law requiring homeowners within the SWCA who have private wells to notify buyers at the time of sale that the property is within the SWCA.

2.5.2 Surface Water Pollution

Surface water quality monitoring has shown that the water quality in Lily and McKusick Lakes have stayed about the same is recent years (Table 2.4 and Appendix D). Major water quality concerns pertain to impaired summer use due to increased weed growth and algal blooms, and sport fishing deterioration. As urbanization continues within these lakes' drainage areas, risks to the lakes will increase unless steps are taken to understand the extent and character of non-point source pollutant inputs. As these inputs are understood, measures can be taken to preserve and improve the lakes' water quality. Lily Lake was listed as impaired for swimming due to excess nutrients in the 2002 MPCA Clean Water Act Section 303(d) total maximum daily load (TMDL). Additional information on TMDLs can be obtained at the MPCA website: http://www.pca.state.mn.us/water/tmdl.html#tmdl

Active gully erosion along tributaries that outlet directly into the St. Croix River or are located in steeply rolling areas where crop production and construction do not normally take place exist within the MSCWMO. These gullies can be large non-point pollution sources to the St. Croix River. Existing erosion programs and soil erosion regulations implemented by local communities do not always adequately address this problem.

2.5.3 Landfills, Dumps, and Hazardous Waste Sites

One licensed hazardous waste site is present within the Middle St. Croix watershed boundaries (Figure 2.13). The A.S. King Ash disposal site is located at a forty-three acre abandoned sand and gravel quarry in Oak Park Heights near the generating plant. The current disposed waste is made up of fly ash and slag, which originates from the burning of coal to generate power.

2.5.4 Feedlots, Abandoned Wells, Under and Above Ground Storage Tanks

The twenty-one feedlots in the Middle St. Croix watershed is relatively low when compared to other land uses within the Middle St. Croix watershed. As the watershed becomes more developed, feedlots, as well as farmland associated with feedlots, will continue to decrease.

Abandoned wells are difficult to identify as many were created before adequate well drilling and sealing logs and records were kept. According to Figure 2.14, three known wells have been sealed and four have been inactive or abandoned within the Middle St. Croix watershed. It is highly likely many more abandon wells exist and pose a groundwater contamination threat.

Underground Storage Tanks (UST) and Aboveground Storage Tanks (AST) are regulated at both the state and federal levels. A regulated UST system is defined as any one or combination of containers including tanks, vessels, enclosures, or structures and underground appurtenances connected to them that is used to contain or dispense an accumulation of regulated substances, and the volume which, including the volume of

underground pipes connected to them, is ten percent or more beneath the surface of the ground. Tank owners and operators must comply with both state and federal regulations for underground storage tanks, which can be found on the EPA web site at http://www.epa.gov/swerust1/fedlaws/cfr.htm. The state and local fire marshal also regulate USTs. ASTs, which store liquid substances that may pollute the waters of the state, are regulated by Minnesota Rules, Chapter 7151 if site capacity is less than one million gallons. Larger facilities (facilities with a capacity of one million gallons or more) are regulated by permits negotiated with MPCA. Information on the status and location of USTs and ASTs is available in a searchable database at the PCA website: http://www.pca.state.mn.us/programs/tanks_p.html#search.

3.0 Public Involvement and Development of Issues

3.1 Issue Identification Process

A Second Generation Plan is also a requirement of the Board of Water and Soil Resources. The planning process began with a Watershed Management Plan Workshop on February 24, 2003 with the full MSCWMO Board, and continued with a Community Input Meeting on May 29, 2003 at Baytown Community Hall. Summaries of these meetings can be found in Appendix E.

Through input from citizens and board members at these meetings and workshops, the MSCWMO developed a list of issues for the management of the water and natural resources in the watershed. The following issues were identified as important to the MSCWMO (not in any particular order):

Development
Runoff/Stormwater
Erosion and Sediment Control
Pollution
Flooding
Water Quality
Education/Outreach
Habitat/Fish/Wildlife
Regional Coordination
Wetlands
Stream/Rivers
St. Croix Bluffs/Gully
Funding/Costs
Rules/Regulations
Enforcement
Groundwater Plume

3.2 Issue Statements

The list of issues determined by the MSCWMO Board and citizens can be effectively consolidated into four major issues of concern: runoff and stormwater, erosion and sediment control, education and public outreach, and wetlands. Each of these issues stem from development pressure within the watershed. The following descriptions outline these areas of concern.

Runoff and Stormwater
Development within the MSCWMO contributes to imperviousness and increases the amount of stormwater runoff generated. Managing runoff of water is very important, as the lack of any management could be detrimental to property and water resources in the watershed. Runoff contributes to increased nutrient and pollution loading to water bodies and increased potential for flooding. Runoff naturally carries with it nutrients and pollutants, which can have a negative impact on the quality of the water resources and systems of the MSCWMO. The proper management of increased runoff and stormwater, as development pressure increases, will be a major priority for the MSCWMO.

Erosion and Sediment Control
Development and urbanization within the watershed and the associated increase in runoff results in increased opportunities for erosion and sedimentation. During development,

natural land cover is disturbed and the resulting de-vegetation and reduced root structure that normally stabilizes soils creates a prime opportunity for erosion to occur. Sedimentation associated with erosion can have detrimental impacts to the water quality. In addition, the St. Croix River is a very important regional resource that must be afforded special protection from water quality degradation associated with erosion and sedimentation. Active gully erosion along subwatersheds that outlet directly into the St. Croix River are priority concerns of the MSCWMO. Proper methods of controlling erosion and sedimentation are major priorities for the MSCWMO.

Education and Public Outreach
Understanding of watershed issues by the general public, land managers, and decision makers is crucial to improving land use decisions that will, in turn, impact the watershed. Elected officials in the member communities need to be aware of the issues that can impact the water resources of the watershed. Also, the citizens and landowners, stewards of the land in the watershed, need to be informed of the best ways to manage land for the protection of water resources. Timely and effective education of local government officials and watershed citizens will be a major priority for the MSCWMO.

Wetlands
Wetlands provide important functions in terms of water storage, groundwater recharge, and habitat. Wetlands provide areas of storage for stormwater runoff and infiltration to the groundwater aquifers. Wetlands also provide a habitat type that is in short supply in the Middle St. Croix watershed. Proper management of the wetlands of the watershed is a major priority for the MSCWMO.

3.3 Focused Issue Areas

In addition to the issues statements listed above, the MSCWMO also finds the following issues and priority areas listed in Table 3.1 critical to the success of the WMO:

- Fiscal responsibility to each member community.
    - This responsibility will develop and change as the MSCWMO becomes more active with the approval of this plan.
    - Current funding is problematic in that residents of some communities are indirectly taxed for the WMO through the general fund of their community, although they do not reside in the WMO. These landowners also appropriately pay taxes for the watershed district in which they live; thus they are paying twice.
- Maintaining a coordination and dispute resolution role where issues affect more than one unit of government within the MSCWMO.
- Protecting the St. Croix River, so that it remains an environmental and recreational opportunity for the future.
- Coordinating with Washington County to ensure that the goals and objectives of the Water Governance Study are met and that the MSCWMO is seen as an active, implementing agency.

- Coordinating with member communities, surrounding communities, adjacent water management organizations, Washington County, and others to ensure that the existing groundwater pollution plumes do not become greater issues.
- Protecting water resources in a safe, reasonable way to be sustainable to the environment, communities, and citizens of the Middle St. Croix watershed.
    - Work with developed communities to retro-fit BMPs that protect water quality
    - Work with the undeveloped communities to ensure that critical areas are protected as they are developed.
- Monitoring development to ensure compliance with the policies and performance standards of this plan.
- Coordinating with municipal water systems and the Minnesota Department of Health in wellhead protection and ensuring a safe public water supply.

Table 3.1 MSCWMO Priority Areas

Area	Basis for Priority
Groundwater Pollution Plume	MSCWMO will not approve projects that may negatively impact this plume.
Riparian to the St. Croix River	MSCWMO recognizes the importance of protecting areas near the St. Croix River for flood control.
Direct hydrologic connection to the St. Croix River (including ravine corridors)	MSCWMO recognizes the importance of the St. Croix River for water quality and the need to decrease nutrient loading into the St. Croix River.
Land-locked basins	MSCWMO will review closely any plans that are in or adjacent to land-locked basins to decrease potential for future flooding issues.
Percent development of the subwatershed	MSCWMO will support retrofit of Best Management Practices in developed areas that decrease the impacts of these areas on the water resources of the watershed.
Undeveloped subwatersheds	MSCWMO recognizes that improper development can negatively impact valuable resources that will be defined as the land cover classification and wetland inventory and assessment projects are completed.
High quality wetlands	MSCWMO recognizes the value of wetlands and will place greater priority on high quality wetlands identified in the future inventory and assessment.
Lily and McKusick Lakes	MSCWMO places high priority on the lakes of the watershed.
Areas identified as having high or moderate ecological quality ranking	MSCWMO will place greater emphasis on preserving and protecting those areas with high or moderate ecological value that will be defined as the land cover classification is completed.

4.0 Regulatory Framework

4.1 Local Regulatory Framework

Existing local ordinances pertaining to stormwater management, erosion and/or sediment control, and wetlands were complied to determine whether any gaps exist in the local regulation within the MSCWMO. Of the ten member communities, very few have specific existing stormwater management ordinances, wetland setback regulations or wetland buffer regulations. Table 4.1 includes a brief summary of the existing ordinances of the ten member communities, Washington County Ordinances, and the rules of the adjoining watershed districts governing three major categories of management of interest to MSCWMO: stormwater, grading and erosion control, and wetlands.

Nationwide Urban Runoff Program (NURP)
The Environmental Protection Agency (EPA) sampled and studied urban runoff on a large scale throughout the United States. The final report of this study, *Results of the Nationwide Urban Runoff Program: Volume 1 – Final Report*, presented the results and a statistical analysis of those data (EPA, December 1983).

The NURP standards that were developed allowed for the treatment of runoff from pervious areas for water quality concerns. Specific standards vary over the country but all of them are in place to achieve treatment of stormwater runoff to remove particulates and other contaminants. For example, the City of Stillwater requirements regarding NURP are that drainage plans "must include water quality treatment provisions, at a minimum, meeting NURP pond standards (phosphorous removal efficiency of at least sixty-five percent, capacity of 2.5 inches, 24-hour storm, with twenty-five percent increase for sediment.)" Stormwater detention facilities constructed in the city must be designed according to the NURP Wet Basin Design Criteria and the Urban Best Management Practices as reflected in the MPCA publication "Protecting Water Quality in Urban Areas," (http://www.pca.state.mn.us/water/pubs/swm-coverpg.pdf).

4.2 State and Federal Regulatory Framework

Environmental Protection Agency and Minnesota Pollution Control Agency
The National Pollutant Discharge Elimination System (NPDES) Phase II is a federal program developed by the Environmental Protection Agency (EPA) that is administered in Minnesota by the Minnesota Pollution Control Agency (MPCA). The goal of the program is to prevent or minimize negative impacts from construction activity both during active construction and after construction is complete. The program requires a NPDES II permit on any project disturbing one acre or more of land. An application and temporary and permanent erosion and sediment control plans must be submitted and approved. The permit also requires that a stormwater management plan that provides for no negative impacts to water quality of the receiving water body be submitted to and approved by the MPCA. A permittee is held to the permit until the site has undergone

final stabilization, all maintenance activities have been completed, and a notice of termination has been submitted.

Minnesota Department of Natural Resources
The Minnesota Department of Natural Resources (DNR) is responsible for managing and regulating activities within the ordinary high water levels of Protected Wetlands and Waterbodies of the state. Within this jurisdiction, the DNR manages activities that affect the course, current, or cross-section of the water bodies. The DNR also manages lake fisheries and provides guidelines for shoreland impacts adjacent to protected waters. The DNR regulates water appropriations from surface and groundwater.

National Park Service
The Lower St. Croix National Scenic Riverway, which extends fifty-two miles from St. Croix Falls/Taylor's Falls to the confluence with the Mississippi River at Prescott/Point Douglas, is jointly managed by the National Park Service (NPS), Minnesota DNR, and Wisconsin Department of Natural Resources. Additional information regarding the regulatory authority of the NPS can be found at:
http://www.nps.gov/sacn/pdfs/Final_St_Croix_CMP_EIS.pdf or
http://www.nps.gov/sacn/management/planning_docs.html

Table 4.1 MSCWMO Member Community Ordinances

	Stormwater			Erosion Control			Wetlands		
	Water Quality	**Rate Control**	**Volume Control**	**Erosion and Sediment Control Plan required when**	**Setbacks**	**Steep Slope Prohibition**	**Direct Stormwater Prohibited**	**Filling**	**Wetland Buffers**
Afton	No standard	100-year event	No ordinance	All grading requiring building permit	Lower St. Croix Overlay District OHW 100-200' Bluff 40-100'	12-18% conditional, >18% prohibited	No ordinance	WCA	No ordinance
Bayport	No standard	2-, 10-, 100-year event	No ordinance	If runoff leaves site	No ordinance	>18% prohibited	Prohibited	WCA	16.5' buffer
Baytown Township	No standard	No ordinance	No ordinance	>50 cu yards fill in floodplain	MLF 3' above OHW	No ordinance	Prohibited	WCA	No ordinance
Lake St. Croix Beach	No standard	No ordinance	No ordinance	>10,000 sq. ft. disturbance	No ordinance	>18% prohibited	No ordinance	WCA	No ordinance
Lakeland	No standard	Professional Judgment	No ordinance	Slopes >13%-25%, >1 acre or > 50 cu yards	No ordinance	>25% prohibited	No ordinance	WCA	No ordinance
Lakeland Shores	No standard	10- year event	No ordinance	Slopes >13% by discretion, Slopes >18%, >50 cu yards or > 1,000 sq. ft.	River OHW 100' Bluff 40'	>13% conditional, >25% prohibited	No ordinance	WCA	No ordinance
Oak Park Heights	NURP	10-, 100-year event	Only if runoff > Stormwater Management Plan	>10,000 sq. ft.	MLF 2' above 100 yr flood elev.	>25% prohibited	Prohibited	WCA	15-35' buffer 20' setback

Continued on next page.

Table 4.1 continued

	Stormwater			Erosion Control			Wetlands		
	Water Quality	**Rate Control**	**Volume Control**	**Erosion and Sediment Control Plan required when**	**Setbacks**	**Steep Slope Prohibition**	**Direct Stormwater Prohibited**	**Filling**	**Wetland Buffers**
St. Mary's Point	No standard	No ordinance	No ordinance	Residential Construction in Flood Plain District	OHW 100', Bluff 40'	No prohibition	No ordinance	WCA	No ordinance
Stillwater	NURP	2-, 10-, 100- year event	Required for new developments	> 50 cu yards	MLF 3' above OHW Bluff 40'	12-24% conditional, > 25% prohibited	Prohibited	WCA	25' buffer 50' setback
West Lakeland Township	Sediment basins and traps required	No ordinance	No ordinance	> 200 cu yds or > 1,000 sq. ft by professional judgment	No ordinance	13-25% conditional > 25% prohibited	No ordinance	WCA	No ordinance
Washington County	Yes	2-, 10-, 100- year event	No ordinance	> 1,000 sq. ft or >50 cu yards	Lakes 50/75' SW ponds 16.5' Streams 150 Bluff 30 MLF 2' above 100 yr flood	Conditional 10-25% Prohibited >25%	Prohibited	WCA	16.5' buffer 50' setback
BCWD	Yes	1.5-, 10-, 100- year event	1.5 year, 24 event with exceptions	> 5,000 sq. ft or >50 cu yards	MLF 2' above 100 yr flood	No prohibition	Prohibited	WCA	25-150 buffer
VBWD	Yes	2-, 10-, 100- year event, 10 day snow	No ordinance	> 1 acre	MLF 2' above 100 yr, septic not in drainage easements	No prohibition	Prohibited	WCA	16.5' buffer
Lower St. Croix National Scenic Riverway	No standard	No standard	No standard	No standard	River 100-200' Bluff 40-200'	>12% prohibited, 40' setback	No standard	No standard	No standard

5.0 District-Wide Goals, Policies, and Standards

Watershed management plans provide a means for communities to develop and implement programs and regulations to ensure that future development and land use activities will occur within an overall design for the watershed. This section of the plan presents goals and policies that pertain to either the entire MSCWMO or to large portions of the MSCWMO. General information is presented, including water quality concepts. The goals and objectives in this section provide the conditions that are being sought through the water management planning process. The policies and performance standards will provide the framework in which local communities will prepare or update their local water management plans, or accept this plan by reference. MSCWMO will monitor the adoption of the plan within each member community to ensure that the plan is implemented.

As future inventories and assessments are created and completed (wetland inventory and functional assessment, gully and ditch identification, land cover mapping) these performance standards may be amended.

5.1 Water Quantity and Quality

5.1.1 Key Water Quantity and Quality Concepts

Stormwater runoff presents significant concern with respect to water quantity and quality. This runoff collects pollutant-laden sediments that drain into the lakes, wetlands, and streams of the watershed, rather than filtering through the ground. This non-point source of pollution is considered the leading source of water pollution in the United States. Control of runoff quantity is important in preventing downstream flooding, limiting sedimentation, and protecting the physical and ecological integrity of downstream watercourses.

Stormwater runoff contains a variety of elements that can negatively impact the quality of receiving waters. Phosphorus and nitrogen accelerate eutrophication of surface waters and increase surface algal scum, algal blooms, water discoloration, and depressed oxygen levels. Stormwater carries heavy metals, oils and grease from roads and parking lots and toxic organic compounds from herbicides, pesticides and wood preservatives as well as fecal coliform bacteria and sediments that degrade aquatic habitats. These pollutants may impair recreational and harvesting uses of receiving waters.

Increased stormwater runoff from land development projects also presents significant concerns. Land development alters the hydrology of a watershed. As ditches, sidewalks, roads, parking lots, rooftops, and other hard surfaces that inhibit water from infiltrating into the ground are constructed, more water runs off the land and less water is incorporated into groundwater. During storms, the rainwater flows off impervious areas very quickly and often discharge directly into natural streams, wetlands, and lakes. Decreased flow during dry weather periods and increased flow during storms have a serious adverse impact on local surface waters.

Not only does more impervious surfaces mean more runoff volume, it also means there is more surface area (e.g. roads, parking lots) available to collect pollutants which then wash off into receiving streams when it rains. Most stormwater runoff receives no treatment before it is discharged to streams. More runoff volume also means there will be more in-stream erosion and more frequent turbidity (or dirty water). Another measure of changes in hydrology is the level of total suspended solids (TSS) in a creek system. TSS comprises the direct wash-off from impervious surfaces, plus sediment that erodes from stream bottoms and sides. TSS acts as a carrier of other pollutants such as organics, hydrocarbons and metals.

5.1.2 Water Quality and Quantity Goals

The water quality goal of the MSCWMO is to protect or improve water quality in the Middle St. Croix watershed through the treatment and control of stormwater runoff. Best Management Practices (BMPs) will be used to mitigate the negative impacts from stormwater runoff generated on development sites and agricultural lands. BMPs will be applied to achieve the following in preferential order: (1) prevent runoff from occurring, (2) retain water and infiltrate it on-site to largest extent possible, and (3) hold water in a detention pond to reduce the amount of nutrients leaving the site. BMPs including but not limited to grassed waterways; infiltration trenches; bioretention ponds; restoration of stream, lakes, wetlands, and upland plant communities; and other BMPs will be endorsed.

While mimicking natural hydrologic systems is the ultimate goal, controlling peak runoff will also help with protecting water quality. Excessive flow and flooding is the responsibility of each unit of government to correct. Peak runoff control will reduce the likelihood of flooding. Promoting infiltration where the precipitation falls, appropriately designing detention facilities to attenuate the peak flows, and providing localized infiltration will reduce peak runoff.

The MSCWMO also recognizes the goal of the St. Croix River Basin Planning Team to reduce phosphorus loading to the St. Croix River by twenty percent and is willing to consider incorporating strategies and standards to meet this goal when the strategies are available (Table 6.2).

5.1.3 Existing Water Quality and Quantity Regulatory Framework

A number of units of government in addition to the MSCWMO have a role in managing the water quality and quantity of the watershed. Local city and county ordinances are summarized in Table 4.1. Additionally, the MPCA is charged with implementing the National Pollution Discharge Elimination System (NPDES) Phase II program that impacts water quality and quantity. Additional information about NPDES Phase II can be found in Section 4.2.

5.1.4 Policies and Performance Standards Regarding Water Quantity and Quality

Policies

1. Direct discharge of stormwater to wetlands and all other water bodies without water quality treatment is prohibited.
2. Sources of water pollution shall be identified through the MSCWMO data collection program and corrected through the application of BMPs.
3. All hydrologic studies shall analyze the 24-hour two- (2.75 inch), ten- (4.15 inch) and one hundred-year (5.9 inch) critical rainfall event, with the critical duration defined as that event causing either the highest water surface elevation or the largest peak discharge in an area or both. Any study must use consistent methodology for the pre-development and post-development land use conditions. The methodology must be approved by MSCWMO.
4. Newly developed or redeveloped areas will be limited to the predevelopment or existing rate of runoff or to a rate within the capacity of downstream conveyance systems, whichever is less, and no increase in the volume or rate of runoff from newly developed areas will occur in areas where natural outlets do not exist. In sub-areas of a landlocked watershed, development shall not increase the predevelopment volume or rate of discharge from the sub-area for the 10-year return period event.
5. Runoff will be minimized through on-site infiltration or prevented through reduction in impervious surfaces to the largest extent possible before detention ponds are used.
6. Site design practices that may have only a minor negative impact on peak flow and volume, such as the use of buffer strips along receiving waters and drainage swales, will be promoted to achieve compliance with the water quality performance standard.
7. Applicants must secure any flowage easements that would be required to accommodate the stormwater management facilities. These easements will be granted up to the 100-yr flood level.
8. Applicants will provide the MSCWMO with 100-year flood levels on the ponds, lakes, and streams as parcels are developed.
9. The MSCWMO has adopted the Washington County Floodplain Regulations. (Appendix H).
10. Retention is defined as the permanent or temporary storage of stormwater to prevent it from leaving the development site.
11. Detention is defined as the storage of stormwater in a pond or settling basin, where the rate of stormwater released is controlled.
    a. Detention Time: The theoretical calculated time that a small amount of water is held in a settling basin.

Performance Standards

1. See the State of Minnesota Stormwater Manual, November 2005 or the most recent edition at www.pca.state.mn.us/water/stormwater/stormwater-manual.html for Design Standards for Structural Stormwater Management Measures.

1. Enhanced volume runoff controls will be designed to retain on-site the first ½ inch of runoff for all impervious areas plus ¼ inch of runoff for areas with compacted soils,

a. Impervious areas or surfaces are defined as a surface in the landscape that impedes the infiltration of rainfall and results in an increased volume of surface runoff.
b. Compacted soils are defined as surfaces in the landscape where the underlying soils are compacted by construction or other activity that impedes the infiltration of rainfall and results in an increased volume of surface runoff.
c. In redevelopment scenarios, volume control standards apply only to areas of new construction, where soils are compacted, runoff characteristics are changed, or vegetation is removed.

2. No increase in rate of runoff leaving the site from pre-development to post-development conditions generated by the 24-hour two- (2.75 inch), ten- (4.15 inch) and one hundred-year (5.9 inch) critical rainfall events.
3. A Stormwater Pollution Prevention Plan (SWPPP) that meets the National Pollutant Discharge Elimination System (NPDES) requirements must be submitted to and approved by the MSCWMO for all projects undertaking grading, filling, or other land alteration activities which involve movement of earth or removal of vegetation on greater than 10,000 square feet of land (See Appendix J for NPDES requirements).
4. Direct discharge of stormwater to wetlands and all other water bodies without water quality treatment is prohibited.
5. Predevelopment conditions shall assume "good hydrologic conditions" for appropriate land covers as identified in TR−55 or an equivalent methodology. The meanings of "hydrologic soil group" and "runoff curve number" are as determined in TR−55. However, when predevelopment land cover is cropland, rather than using TR−55 values for cropland, the following runoff curve numbers shall be used. These curve numbers represent midrange values for soils under a good hydrologic condition where conservation practices are used and are selected to be protective of the resource waters.

Hydrologic Soil Group	Runoff Curve Number
A	56
B	70
C	79
D	83

6. Conversion of high-permeability soils shall be avoided and these soils shall be targeted for infiltration.
7. Lowest floor elevations of structures built adjacent to stormwater management features and other water bodies must be a minimum of two feet above the 100-year flood elevation and a minimum of two feet above the natural overflow of landlocked basins. The landowner or developer is required to provide MSCWMO with the location of the 100-year flood elevation, natural overflow elevation, and lowest floor elevations.
8. Buffer zones of unmowed natural vegetation shall be maintained or created upslope of delineated wetland edges, ordinary high water elevation, or floodplain of all water bodies (wetlands, streams, lakes) in accordance with the Performance Standards relating to wetlands, Section 5.3.4.
9. Detention facilities will be designed to attenuate peak flows and provide on-site infiltration in high-permeability soils, natural depressions, and swales.

5.2 Erosion and Sediment Control

5.2.1 Key Erosion and Sediment Concepts

Erosion and subsequent sedimentation down-slope causes several unintended negative effects on downstream uses. Sediment smothers fish larvae and eggs by covering the coarser substrate that fish typically use to spawn. Sediment induced turbidity reduces light penetration of water, hinders sight-feeding fish and can increase the cost of providing drinking water. Sedimentation reduces water quality for recreational uses, lowers the value of adjoining lands, and increases public costs to maintain waterways and stormwater conveyances. Soil particles carry nutrients, trace metals and hydrocarbons into receiving waters and foster algae and weed growth. Runoff from construction sites is the largest source of sediments in areas undergoing development. Uncontrolled runoff from agricultural crop production can also contribute greatly to sedimentation problems.

A vegetative buffer adjacent to a stream, lake or wetland serves a number of purposes critical to the protection of that water resource and is considered an integral part of that protection. Buffers moderate flow rates of stormwater runoff into receiving waters, stabilize banks and shorelines, filter nutrients and sediments from runoff, provide habitat, and visually screen aesthetically unappealing uses. Buffer width is the most important determinant of buffer effectiveness; soils, slope, and the types and condition of plant communities within the buffer also are relevant to buffer function.

5.2.2 Erosion and Sediment Goals

The erosion and sediment goal of the MSCWMO is to prevent erosion and subsequent sedimentation from surface runoff within the watershed on construction sites; agricultural lands; and along stream banks, lakeshores, and roadsides. To achieve this, MSCWMO will: (1) promote methods that prevent erosion, (2) intercept eroded material before it leaves the site, and (3) require sedimentation basins or other areas for sediment to be safely controlled.

5.2.3 Existing Erosion and Sediment Control Regulatory Framework

Many units of government in addition to the MSCWMO have a role in managing erosion and sediment control of the watershed. Local city and county ordinances are listed in Table 4.1. Additionally, MPCA is charged with implementing the National Pollution Discharge Elimination System (NPDES) Phase II program which requires erosion and sediment control for all construction sites of one acre or greater. Additional information about NPDES can be found in Section 4.2.

5.2.4 Policies and Performance Standards Regarding Erosion and Sediment Control

Policies

1. The MSCWMO shall require proper erosion and sediment control throughout the watershed to prevent siltation and sedimentation of streams, lakes, wetlands, and other areas of the watershed.
2. Both temporary (during construction) and permanent (long-term) erosion control will be required on newly developed or redeveloped land in MSCWMO undertaking

grading, filling, or other land alteration activities which involve movement of over 100 cubic yards of earth or removal of vegetation on greater than 10,000 square feet of land.

3. Existing agricultural activities will be exempt from the performance standards listed below. MSCWMO will require buffers from waterbodies and support agricultural BMPs. New agricultural activities must conform to the performance standards listed below.

Performance Standards

1. See the State of Minnesota Stormwater Manual, November 2005 or the most recent edition at www.pca.state.mn.us/water/stormwater/stormwater-manual.html for Design Standards for Structural Stormwater Management Measures.
2. No increase in rate of runoff leaving the site from pre-development to post-development conditions generated by the 24-hour two- (2.75 inch), ten- (4.15 inch) and one hundred-year (5.9 inch) critical rainfall events.
3. A Stormwater Pollution Prevention Plan (SWPPP) that meets the National Pollutant Discharge Elimination System (NPDES) requirements must be submitted to and approved by the MSCWMO for all projects undertaking grading, filling, or other land alteration activities which involve movement of earth or removal of vegetation on greater than 10,000 square feet of land (See Appendix J for NPDES requirements).
4. Construction is prohibited on slopes greater than twelve percent (12%).
    a. Twelve percent (12%) slopes are defined as lands having average slopes 12% or greater over horizontal distances of fifty feet (50) or more.
5. Construction is prohibited within 40 feet of the top of blufflines in urban areas and 100 feet in rural areas.
    a. Blufflines are defined as a line along the top of a slope connecting points at which the slope, proceeding away from the waterbody or adjoining watershed channel, becomes less than twelve percent (12%). The location of the bluffline shall be certified by a registered land surveyor or the Zoning Administrator.
6. Land alteration activities are prohibited within twenty (20) feet of the top of the bluff.
    a. Top of bluff is defined as the highest point of a bluff with an average slope exceeding 12%.
7. Buffer zones of unmowed natural vegetation shall be maintained or created upslope of delineated wetland edges, ordinary high water elevation, or floodplain of all water bodies (wetlands, streams, lakes) in accordance with the Performance Standards relating to wetlands,

5.3 Section 5.3.4.Wetlands

5.3.1 Key Wetland Concepts

Wetlands provide many important benefits, a fact that becomes only more apparent as wetland numbers have dwindled. These benefits include: storage area for excess water during times of flooding; filtering of sediments and nutrients before they enter lakes, rivers, streams, and groundwater; fish and wildlife habitat; public recreation; and commercial uses. Wetlands are divided into eight types depending on their

characteristics, primarily the amount and frequency of water retention and the typical vegetation. These wetland types are defined in Appendix C: Water Resources Inventory. This inventory will be replaced upon completion of a new inventory and functional assessment and determination of policies based on local values.

A vegetative buffer adjacent to a stream, lake, or wetland serves a number of purposes critical to the protection of that water resource and is considered an integral part of that protection. Buffers moderate flow rates of stormwater runoff into receiving waters, stabilize banks and shorelines, filter nutrients and sediments from runoff, provide habitat and visually screen aesthetically unappealing uses. Buffer width is the most important determinant of buffer effectiveness. Soils, slope and the types and condition of plant communities within the buffer also are relevant to buffer function.

5.3.2 Wetland Goals

Wetlands are valuable natural resources and will be protected in a manner consistent with the Wetland Conservation Act.

5.3.3 Existing Regulatory Controls

The Wetland Conservation Act (WCA), enacted by the Minnesota Legislature in 1991, aims for a no net loss of wetlands. The law regulates draining and filling wetlands and, if wetland loss is unavoidable, requires replacement. Although the WCA is the most comprehensive law regulating wetlands, there are additional regulations and regulators listed below. Local city ordinances regarding wetlands are listed in Table 4.1.

Local Government Units

Local government units (LGUs) are charged with enforcing the WCA. As of the writing of this plan, the MSCWMO does not want to take over the LGU status for the member communities; however the MSCWMO will solicit the opportunity to comment on WCA applications. In addition, the MSCWMO wetland performance standards in this plan may parallel and/or exceed the WCA performance standards.

Board of Water and Soil Resources

The Board of Water and Soil Resources (BWSR) provides technical assistance and oversight in administering the Wetland Conservation Act as well as input in wetland determinations, banking, and violations.

Minnesota Department of Natural Resources

Minnesota DNR Conservation Officers enforce the WCA. They have the authority to issue cease and desist orders to stop work on a project, replacement orders to require replacement of lost wetland area, and restoration orders requiring that the disturbed wetland be restored. Violation of an order is a misdemeanor. In addition, a permit from the Minnesota DNR is necessary for work in most type three, four, or five wetlands that are at least ten acres in size in unincorporated areas and two and one-half acres in incorporated areas.

U.S. Army Corps of Engineers
The Corps of Engineers (COE) is responsible for regulating impacts to wetlands and navigable water at a federal level. The COE must issue a permit or a letter of non-jurisdiction for all wetland filling or excavating, under Section 404 of the Clean Water Act. If a Section 404 permit is required, an applicant must also obtain a Section 401 permit from the MPCA; this is to ensure that no activity conducted under a section 404 permit degrades water quality. The MPCA is presently waiving Section 401 certification applications; however, the MPCA reserves the authority to proceed differently if extreme or unique circumstances merit a different approach. The waiver of 401 certification means that the MPCA has not reviewed the proposed federal permit application for conformance with state water quality standards, nor has the MPCA made a determination of the proposal's compliance with water quality standards. The waiver action does not exempt the applicant from the responsibility of complying with all applicable state rules regarding water quality. In the event of water quality violations caused by the applicant's project, enforcement action may be taken by the MPCA.

Washington Conservation District
While the Washington Conservation District (WCD) does not have regulatory control over wetlands, the WCD is the designated resource agency for additional wetland information and wetland evaluation and serves on the Technical Evaluation Panel. Many communities within the MSCWMO rely on the WCD for technical assistance regarding wetlands.

5.3.4 Policies and Performance Standards Regarding Wetlands

All wetlands shall be afforded the maximum protection consistent with the policies of the MSCWMO.

Policies
1. Permits shall be obtained from appropriate regulatory authorities before any work is started that impacts a wetland or its required buffer.
2. All alternatives shall be thoroughly considered and documented in order to justify wetland impacts; all projects shall be designed with minimal wetland impact. The pre-existing wetland functions will be taken into account as alternatives are considered. Applicants are responsible for providing MSCWMO with identification of wetland type and a wetland delineation, using a methodology approved by BWSR (see also Table 5.1); any inventories or ranking assessments completed by the MSCWMO are for preliminary planning purposes. The MSCWMO may require a functional assessment.
3. The effect of bounce from treated stormwater input will be evaluated as per State of Minnesota Stormwater Advisory Group's guidelines for wetland susceptibility in the publication *Stormwater and Wetlands: Planning and Evaluation for Addressing Potential Impacts of Urban Storm-Water and Snow-Melt runoff on Wetlands* available from the MPCA.

4. Any potential changes to the hydrology of the wetland (i.e. changes to the outlet elevation or contributing drainage area) must be reviewed to evaluate the impact of both the existing and proposed wetland conditions and approved by the MSCWMO.
5. Wetland are classified into the following categories (see also Table 5.1)

Management Class	A Preserve	B Maintain	C Manage
Definition	The wetlands in this category are rated high in those functions that protect downstream water quality, groundwater quality, and/or provide flood and stormwater attenuation or rated exceptional vegetation.	The wetlands in this category are rated high in those functions related to wildlife habitat, vegetation quality, and in-wetland water quality; and/or rated moderate for protecting downstream water quality, groundwater quality, and/or providing flood and stormwater attenuation.	All other wetlands are included in this category.
Minimum Buffer Width	≥ 60 feet Require monument to mark edges.	≥ 30 feet	No buffer
WCA Sequencing	Higher emphasis on avoidance. Replacement emphasizes lost functions, otherwise per WCA.	Per WCA	Per WCA
Excavation or Wetland Type Alteration	Considered an adverse impact.	Proposed alteration will be assessed for improvements based on MNRAM. Will not be allowed for mitigation credit and must still conform to WCA and other applicable regulations.	Restoration and enhancement encouraged

   The functional assessment and inventory was completed in 2005 and a summary can be found in Appendix H. This functional assessment will be used to further define the distribution of the MSCWMO's wetlands within these classification categories.
6. The MSCWMO will establish a Wetland Enhancement and Replacement fund. Payment into this fund will be at rates set by formal MSCWMO resolution after review and comment by the Technical Evaluation Panel. The MSCWMO may use a portion of this fund to cover technical and administrative costs of implementing a wetland enhancement or restoration project; administrative costs cannot exceed 20 percent of the cost estimated for a specific project. Voluntary restoration activities in degraded wetlands may be considered in lieu of cash payment. Payment into this fund is required under the following conditions.
    a. Variances granted from these policies and performance standards.
    b. Activities permitted under the Wetland Conservation Act but exempt from replacement (e.g. agricultural, incidental, de minimus exemptions).
    c. Temporary impacts to wetlands including utility repair.
    d. Wetland impacts replaced outside of the MSCWMO jurisdictional boundary including road impacts replaced through the BWSR Bank.
    e. Variances from the buffer requirements of this plan.

7. MSCWMO and member community staff time to manage violations of these policies and performance standards will be charged back to the violator at the current hourly rate of the staff. A portion of the dollars collected may be deposited into the Wetland Enhancement and Replacement Funds.

Performance Standards

1. Lowest floor elevations of structures built adjacent to wetlands and other water bodies must be a minimum of two feet above the 100-year flood elevation and a minimum of two feet above the overflow of landlocked basins.
2. Direct discharge of stormwater to wetlands and all other water bodies without water quality treatment as outlined in Sections 5.1.4 and 5.2.4 is prohibited.
3. Land-altering activities shall not increase the bounce in water level or duration of inundation from a 2.0-inch 24-hour storm for any downstream wetland beyond the limit specified in Table 5.1 for the individual wetland susceptibility class.
4. Buffer zones of unmowed natural vegetation shall be maintained or created upslope of delineated wetland edges, ordinary high water elevation, or floodplain of all water bodies (wetlands, streams, lakes). Buffer width requirements can be found in Section 5.3.4 Policies and Performance Standards Regarding Wetlands, Policy 5. Buffer width averaging is not allowed.
5. All buildings (principle and accessory) must be set back at least 20 feet from the upslope edge of the wetland buffer.
6. Buffer and setback requirements shall apply only to sites that have been (a) subdivided or split or (b) subject to a new primary use for which a necessary rezoning, special use permit or variance has been approved. These requirements will apply on or after May 11, 2006. The applicant is required to provide MSCWMO with a delineation of the wetland edge.

Table 5.1 MSCWMO Wetland Susceptibility Class*

Susceptibility	Highly Susceptible	Moderately or Slightly Susceptible	Least Susceptible
Wetland Type	Sedge Meadow, Open Bog, Coniferous Bog, Calcareous Fen, Low Prairies, Coniferous Swamp, Lowland Hardwood Swamp, Seasonally Flooded Basins, Mitigation Areas	Shrub-carrs[a], Alder Thickets[b], Fresh (Wet) Meadows[c, e], Shallow Marshes[d, e], Deep Marshes[d, e] Floodplain Forests[f], Shallow Marshes [g], Deep Marshes[h]	Gravel Pits, Cultivated Hydric Soils, Degraded Material/Fill Material Disposal Sites
Inundation Period for 1 and 2 year precipitation event	Existing. Special consideration must be given to avoid altering these wetland types. Inundation must be avoided. Water chemistry changes due to alteration by stormwater can also have adverse impacts.	Existing plus 1-2 days, depending on site conditions. **a, b,** and **c** can tolerate inundation from 6-12 inches for ≤ 1 day. **d** can tolerate 12+ inches, but adversely impacted by sediment and/or nutrient loading and prolonged high water levels. **e** fresh meadows dominated by reed canary grass ≤ 2 days. **f** can tolerate annual inundation of 1 to 6 feet or more, possibly more than once/year ≤ 2 days. **g** shallow marshes dominated by reed canary grass, cattail, giant reed, or purple loosestrife ≤ 2 days.	Existing plus 7 days. These wetlands are usually so degraded that input of urban storm water may not have adverse impacts.
Bounce	Existing	Existing plus 0.5 to 1.0 feet, depending on site conditions	No limit

*Adapted from: State of Minnesota Stormwater Advisory Group "Stormwater and Wetlands Planning and Evaluation Guidelines for Addressing Potential Impacts of Urban Storm-water and Snow-melt Runoff on Wetlands" (June 1997)

5.4 Education

5.4.1 Current Education and Outreach Program

Developing an education program will increase the public's knowledge of the MSCWMO, increase public understanding of natural resources and water resource management, and will lead to better natural resource decisions and protection. Improved communication and outreach with the landowners of the MSCWMO will decrease potential for misunderstandings of management decisions.

5.4.2 Education Goals

The education goals of the MSCWMO are broad based, but with the understanding that meeting these goals will result in better individual land use decisions and greater natural resource protection. The MSCWMO believes that awareness of resource issues, understanding of those issues, and skills to protect those resources can lead to positive changes in land use management. The MSCWMO education and outreach goals include:

1. Increase communities' (stakeholders') understanding and awareness of the MSCWMO and its Mission.
2. Increase stakeholders' knowledge and understanding of the MSCWMO functions and the rationale behind them.
3. Keep stakeholders informed of the MSCWMO activities.
4. Increase stakeholders' knowledge and understanding of:
    a. Water quality
    b. Water quantity
    c. Wetlands
    d. Natural resource protection
5. Foster pride in the resources of the MSCWMO.

The target audiences for the MSCWMO education program include: watershed residents, government officials and staff, consultants, and developers.

5.4.3 Education Policies

Recognizing the limited budget of the MSCWMO, the education and outreach strategy will focus on a limited number of achievable objectives. The three key objectives of this plan are:

Communicate and educate through local newspapers and member communities' newsletters.

- Community newspapers include: Stillwater Gazette, St. Croix Valley Press, and the South Washington County Bulletin.
- Focus articles on MSCWMO activities and natural resource stewardship will be sent to these publications when applicable.
- MSCWMO will work with these publications on developing a recurring natural resource/water resource column (similar to Outdoors column).

- Provide MSCWMO communities with information about MSCWMO activities, meetings and natural resource stewardship articles for their newsletters.

Technical fact sheets – BMPs for a single lot.

- Create and provide fact sheets for: infiltration, habitat, runoff, erosion control, construction BMPs, retrofitting existing developments, etc.

Website.

- Create and provide a website with MSCWMO meeting agendas, minutes, Water Management Plan, and focus articles on MSCWMO activities.

In addition to the strategies mentioned above, the MSCWMO recognizes many other education strategies are available and that these programs may be managed more efficiently and effectively through coordination with other water management organizations, and state and local water resource agencies. The MSCWMO may develop the following programs, either independently or in collaboration with other organizations, when funding becomes available:

- Workshop and/or seminar program for developers, consultants, local officials and staff, potentially in coordination with NEMO (Nonpoint source pollution Education for Municipal Officials)
- Have regular communication with each community's planning advisory board
- Watershed/WMO newsletter
- Presentations and/or presence at regularly held LGU meetings
- Demonstration sites of BMPs
- Volunteer water quality monitoring programs

5.5 Groundwater

The growing demand for groundwater for drinking water supplies, irrigation, industrial, and commercial uses, along with the increased detection of groundwater contamination, focuses attention on this resource in Washington County and in the Middle St. Croix watershed. Groundwater and surface water systems do not necessarily coincide with surface water divides or boundaries; therefore, groundwater protection efforts, to be most effective, should be coordinated at the county or regional level. MSCWMO will work to further the goals, objectives, and implementation actions of the 2003-2013 Washington County Ground Water Plan as adopted by the Washington County Board of Commissioners on December 16, 2003. The following implementation actions were listed as lead activities for Watershed Districts and Watershed Management Organizations:

1. Develop and adopt policies on the quantity of water used in areas where existing wells and/or groundwater dependent natural resources could be negatively impacted by overuse of groundwater. Negative impacts include reduced flow to surface water bodies, lowering of lake or wetland levels, or interference with other wells.
2. Provide education to citizens and public officials on the inter-relation of surface and groundwater quality and quantity; the value of and need to protect

groundwater recharge areas and wetlands; and implementation of best management practices and low-impact development and redevelopment strategies to protect groundwater resources.

3. For all new developments and redevelopments, adopt rules controlling stormwater runoff volume and establish performance standards based on issues identified in water resource plans, inventories or studies, and on available scientific literature.

In addition, the MSCWMO will have an involved and active role as a team member in the nineteen additional implementation actions of the 2003-2013 Washington County Ground Water Plan and will work towards implementation of the yearly work plans.

6.0 Implementation

The four most important issues for the MSCWMO identified by the Board and citizens of the watershed are runoff and stormwater, erosion and sediment control, wetlands, and education. The first three of these issues are interconnected as they are all impacted by development in the watershed. Education is a key component to address the other three issues. A table of the proposed implementation plans, schedule, and estimated costs is listed in Table 6.2 at the end of this section.

6.1 Management Programs

6.1.1 Joint Powers Agreement

The current Joint Powers Agreement is included in Appendix F. The role of the MSCWMO with local units of government was established with the philosophy that existing local units of government would be the primary regulator of activities of concern, but where issues affected more than one unit of government the MSCWMO maintains a coordination and dispute resolution role. To achieve and maintain compliance with the water management system and land use controls, local units of government will refer projects to the MSCWMO for investigation, comments, and recommendations regarding the proposed activity based on the criteria listed in Section 6.3 Implementation of Performance Standards. The MSCWMO will review the performance of the local units of government; and monitor the status of the local plan, current water problems, and the need for local plan amendments. Local plans shall include adoption of ordinances sufficient to comply with the MSCWMO standards.

6.1.2 Local Government Management Plans

Following final approval of the MSCWMO Second Generation Watershed Management Plan (WMP) by BWSR, each local government in the MSCWMO will be required to prepare a new local government water resources management plan, adopt this WMP, or amend any existing plan to comply with this WMP. After the MSCWMO approves each local government plan, the local government will incorporate the performance standards set forth in Section 5 of this plan into their review processes.

Local government units in the MSCWMO must submit their local water resources management plans to the MSCWMO within one year after the BWSR approval and MSCWMO adoption of the WMP. Once the local plan is received, the MSCWMO 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 MSCWMO's WMP.

After MSCWMO approves a local government's 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 unit later wished to amend its plan, it must submit the proposed amendment to the MSCWMO Board of Managers for review of consistency with the WMP. The MSCWMO must approve or disapprove of the amendment (in

whole or in part) within 60 days of its submittal. Interim approval may be granted if the amendment does not conflict with provisions of the MSCWMO Plan.

6.1.3 Administration

At this time, MSCWMO does not anticipate hiring staff. Administration of this Watershed Management Plan and its policies will be performed through a service contract. Supervision of the administrative services will be through the MSCWMO Board. Administrative services will include review of activities for performance standards, Board meetings, Board meeting minutes, educational programs, and other activities as requested by the Board. Legal, accounting, and engineering services will also be contracted for on a biennial basis.

6.1.4 Washington County Water Governance

The MSCWMO recognizes Washington County's overall goals, listed below, to improve the Water Governance of the County.

- To create a water management structure that will provide long-term protection for surface and ground water resources.
- To create local water management units with the fiscal capacity and authority to govern efficiently and effectively.
- To identify financing mechanisms that are fair and adequate to meet the needs of the county.
- To coordinate surface water, ground water, land-use and natural resources management to provide for a more comprehensive approach to resource management.
- To adopt a proactive rather than a reactive approach to countywide water governance.
- To increase the accountability of the water management structure.

The MSCWMO also recognizes the water governance recommendations of Washington County specific to the MSCWMO. These recommendations are listed in Table 6.1.

6.2 Implementation of Performance Standards

Performance Standards in Section 5 of this Watershed Plan will apply to development within the Middle St. Croix watershed and focus on stormwater management, erosion and sediment control, and wetland protection. These Performance Standards will apply to all projects that trigger the MSCWMO review process listed in section 6.2.1. In addition, whenever a project requires a building permit that add five hundred (500) square feet of additional impervious surface or a project requires a variance from the current local impervious surface zoning requirements for the property, these Performance Standards will apply. Building permits for new construction in an approved major subdivision that meets the requirements of the Performance Standards are exempt from the water quantity and quality standards as long as the individual property does not exceed impervious surface percentage approved for the given parcel in that subdivision." All projects regardless of whether public or private can be reviewed. The MSCWMO requires an

annual report from each member community summarizing the projects within the community and the application of the performance standards.

For parcels on the borders of the MSCWMO that are within the jurisdictional MSCWMO boundaries, but are hydrologically outside of the MSCWMO or vice versa, the MSCWMO plans to work cooperatively with the adjacent watershed districts. The MSCWMO recognizes that the authority will remain with the watershed organizations where the project is legally located, but will provide or obtain review comments from the watershed organization where the runoff flows.

Table 6.1 Washington County Water Governance Criteria for MSCMWO

Criteria	How MSCWMO is Meeting Criteria
1. The organization has a current Joint Powers Agreement (JPA) that meets the standards established by the BWSR.	The JPA will be updated as needed.
2. The organization has a current management plan that meets the content requirements and schedule established by the BWSR.	This management plan was approved by BWSR on April 26, 2006.
3. The organization is actively implementing the water resources management plan.	Implementation of the activities listed will occur on the schedule listed in Table 6.2.
4. The organization is actively implementing the recommended actions defined for the watershed districts and water management organizations in the Washington County Ground Water Management Plan.	The MSCWMO will have an involved and active role as a team member in the implementation actions of the 2003-2013 Washington County Groundwater Plan and will work towards implementation of the yearly work plans (See Section 5.6).
5. The organization has mechanisms in place for citizens to advise the organization on planning, budgeting, and projects that may benefit the area.	The MSCWMO will ensure that MN Statute requirements for obtaining citizens' advise are met.
6. The organization has a clear point of contact for customers. The point of contact is able to answer questions about the organization and is able to assist local governments and citizens in resolving their concerns.	Point of contact is: MSCWMO Administrator C/o Washington Conservation District 1380 West Frontage Road, Highway 36 Stillwater, MN 55082 651-275-1136 extension 22
7. The organization is using the Washington County Standardized Chart of Accounts for Water Management Organizations to track its revenues and expenditures.	The MSCWMO will use the Washington County Standardized Chart of Accounts.
8. The organization submits, to the County, an annual report that includes a financial statement, work accomplishments, and how the organization is implementing the goals of the Water Governance Project.	Annual reports will be submitted to Washington County (see Table 6.2)

6.2.1 Review Process

Each community will refer projects to the MSCWMO for full review when deemed necessary based on the activities listed below. Each community will adopt the MSCWMO review comments into the community comments for each project.

1. Any project undertaking grading, filling, or other land alteration activities which involve movement of earth or removal of vegetation on greater than 10,000 square feet of land.
2. All major subdivisions. Major subdivisions are defined as subdivisions with 4 or more lots.
3. Any project with wetland impacts and any project with grading within public waters, the wetland buffer as identified in the plan, or within 40-feet of the bluff line.
4. Redevelopment on a site of 5 acres or more, where pervious surface is disturbed and final impervious surface, in aggregate, exceeds 1-acre or 5% of a site, which causes a change in runoff characteristics or removal of vegetation.
5. Development projects that impact 2 or more of the member communities.

In addition, as a prerequisite for construction stormwater permitting, development projects fifty acres or more in size and within two thousand feet of impaired water or a special water (i.e., trout stream or outstanding resource value) must submit stormwater management plans to the MPCA for a thirty-day review.

6.2.2 Time For Submittal

Projects qualifying for full review shall be submitted to the MSCWMO administrator by the member community at least 21 days prior to the scheduled meeting date of the MSCWMO Board. Late submittals or submittals with incomplete exhibits will be scheduled to a subsequent meeting date. Comments will be returned to the member community within 60 days of receipt. Member communities may require applicants to submit projects directly to the MSCWMO.

6.2.3 Submittal Items

A project submittal form will be provided to each member community for dispersal to applicants. Submittals will include the following items.

1. Grading plan showing grading limits, existing and proposed contours, profiles, wetland setbacks, and quantities.
2. Delineation of existing wetland, shoreland, ordinary high water levels, drain tiling, and floodplain areas.
3. Erosion/sediment control plan showing temporary and permanent Best Management Practice locations, specifications, and details.
4. Schedule of construction staging, construction entrances, and truck routing.
5. Drainage plan showing all proposed drainage features and a drainage report containing calculations for all drainage features (pond sizing, runoff calculations, etc.) for the 2-, 10-, and 100-year critical events.
6. Soils map for the area and soil boring information.
7. Professional wetland delineation and report or written statement (by a wetland professional) indicating no wetlands are present.

6.2.4 Fee Schedule

The MSCWMO will submit an invoice to the appropriate member community as each full review is completed. The member community is responsible for reimbursing the MSCWMO and collecting the fee from the applicant. The current review fee on approval of this plan is $250.00. This fee will be reviewed and set by the MSCWMO on an annual basis. Applicants of major subdivisions (subdivisions with four or more lots) will be charged an additional fee equal to the actual costs of field inspection of the work, including investigation of the area affected by the work, analysis of the work, services of a consultant including engineering and legal consultants, and any subsequent monitoring of the work.

6.2.5 Variances from Performance Standards

The MSCWMO Board may grant variances from the literal provisions of these performance standards. A variance shall only be granted when in harmony with the general purpose and intent of the Performance Standards, in cases where strict enforcement of the performance standards will cause practical difficulties or particular hardship, and when terms of the variance are consistent with the MSCWMO Watershed Management Plan. "Hardship" as used in connection with the granting of a variance means the land in question cannot be put to a reasonable use if used under the conditions allowed by these performance standards; the plight of the applicant is due to circumstances unique to the land and not created by the applicant; and the variance, if granted, will not adversely affect the essential character of the locality and other adjacent land. Economic considerations alone shall not constitute a hardship if a reasonable use for the land exists under the terms of these performance standards. Conditions may be imposed in the granting of a variance to insure compliance and to protect adjacent land and the public health and general welfare of the MSCWMO. An application for a variance shall describe the practical difficulty or particular hardship claimed as the basis for the variance. The application shall be accompanied with such surveys, plans, data and other information as may be required by the MSCWMO to consider an application. A violation of any condition imposed in the granting of a variance shall be a violation of these performance standards and shall automatically terminate the variance.

Projects requesting variances shall be submitted to the MSCWMO administrator by the member community at least 21 days prior to the scheduled meeting date of the MSCWMO Board. Late submittals or submittals with incomplete exhibits will be scheduled to a subsequent meeting date. Comments will be returned to the member community within 60 days of receipt. Member communities may require variance applicants to submit projects directly to the MSCWMO.

6.3 Information and Education Program

The MSCWMO will submit an annual report that includes a financial statement, work accomplishments, and goal implementation to Washington County and BWSR. This document will also be provided to each of the member communities, and residents of the MSCWMO by request. The MSCWMO will meet the education goals listed in Section 5 on the schedule in Table 6.2.

6.4 Data Collection Program

The MSCWMO proposes the following projects be implemented as a part of a data collection program. See Table 6.2 for estimated timeline and expenses.

Integrated Water Quality Monitoring Program
A comprehensive summary of the monitoring efforts in the Middle St. Croix watershed has been completed for this plan (Table 2.3) and these resources will be used to develop an overall water-quality monitoring program for the future. This program will include baseline monitoring; coordinating, collecting and compiling data; acquiring equipment; and database management and maintenance. The MSCWMO anticipates continuing to support the existing monitoring efforts within the watershed, as well as to add outlet monitoring to Perro Creek and McKusick Lake.

Volunteer monitoring will be incorporated into the MSCWMO Data Collection Program whenever feasible. The MSCWMO recognizes that volunteers can collect reliable, meaningful data that can be used in watershed planning and decision-making. Additionally, volunteer monitoring programs promote watershed stewardship by engaging, involving, and educating volunteers in natural resource management.

Monitoring procedures and protocols will be implemented so that collected data can be better utilized in future decision making processes. The practices used in data collection need to encompass dataset requirements set by the MPCA to be used for identifying, listing, and restoring impaired waters.

Contour Mapping Data
Contour mapping of the Middle St. Croix watershed was acquired for this plan, and digital two-foot topographic data will be purchased from Washington County for use in watershed, subwatershed, and drainage delineation. This high-resolution topographic data will be valuable for the evaluation of future developments and projects in the watershed.

Gully Inventory
The MSCWMO will inventory and map both the active and stable gullies of the watershed using methods developed by the Washington Conservation District. Active gully erosion along tributaries that outlet directly into the St. Croix River or are located in steeply rolling areas where crop production and construction do not normally take place contribute to surface water pollution. These gullies can be large non-point pollution sources to the St. Croix River. This inventory will document the location and the quantity of material that is being eroded and the amount that is ultimately transported to the St. Croix River.

Wetlands Inventory

Wetlands greater than one acre were inventoried and classified in the 1986 MSCWMO Water Resources Inventory (Appendix C). This inventory is outdated and will be replaced with a new inventory, including functional assessment and following contemporary protocols, on the schedule listed in Table 6.2. Priority goals of the MSCWMO will be used to determine values utilized during this assessment (Table 3.1).

Lily and McKusick Lakes TMDL Studies
Total Maximum Daily Load (TMDL) is a determination of the amount of nutrient or contaminant loading a given water body can sustain and still meet the Clean Water Act Standards for that body of water. The MPCA has placed Lily Lake on the impaired water list. The TMDL study will allow nutrient management and budgeting analysis for the surrounding subwatershed and will assist in future land use conservation projects to be performed to improve the water quality of this impaired body of water. The target start date for the project will be 2007. It is intended that the City of Stillwater will undertake this study as the lake, and most of the drainage area, is within Stillwater.

Currently, data gathered from other waterbodies within the Middle St. Croix watershed are under review at the MPCA to generate an updated list of impaired waters. McKusick Lake is a candidate for inclusion in the revised TMDL list to be available in 2006.

6.5 Studies and Capital Improvement Projects

All Capital Improvement Projects (CIP) will be funded by the communities that directly benefit from the project. MSCWMO will not submit to the county a certification for payment of the costs of capital projects unless first approved by the county. Washington County will not approve funding for any CIP without the project first being submitted to the county for project review and funding approval on a case-by-case basis. The MSCWMO must review and approve Washington County CIPs within the MSCWMO boundaries.

State of Minnesota Storm Sewer Project
A portion of the State of Minnesota Storm Sewer Project was completed in 2004 and the remainder will potentially be completed in 2005. The project will provide a safe outlet for Perro Pond and the Perro Pond watershed to the St. Croix River. The project will be the final stage in a piping system through the city of Bayport. Upon completion of the project, regular flooding that occurred in Bayport and in Oak Park Heights will be alleviated. This project was sponsored by the MSCWMO and funding was provided by the State of Minnesota through the 2002 bonding bill.

Other Capital Improvement Projects
The CIPs listed below are occurring or are scheduled to occur within the MSCWMO boundaries. The community in which they are occurring initiates these projects and the MSCWMO has no control over their completion.

- City of Stillwater Levy Wall
- Lakeland Storm Sewer Project

- Lake St. Croix Beach Shoreland Erosion Control Project

6.6 Best Management Practices Program

The goal of this program is to encourage the use of innovative best management practices (BMPs) to reduce and prevent nonpoint source pollution and the negative impacts of existing and future land use. The program will also increase public awareness on the relation between land use and water quality through the demonstration of common stewardship practices. The initial phase of the program will apply cost share funding to assist in demonstrating innovative BMPs, and will target projects with multiple partners. The second phase of the program will increase the education component and include demonstration workshops, site tours, and other public awareness activities. The secondary goal of this program is to use the designated funding to leverage local, state, and federal grants for further implementation activities.

6.7 Financing Approaches

6.7.1 Current Approach

Through the current Joint Powers Agreement the MSCWMO funding comes from fees paid by the member communities. All communities fund administration of the MSCWMO; large expenditures are funded by those communities receiving a direct benefit. The MSCWMO would prefer an ad valorem taxation process, as it is fairer to the member communities in the MSCWMO and other watersheds.

The MSCWMO Joint Powers Agreement states that the portion paid by each community is determined in the following way:

1. 40% is determined by amount of land area of a community as a percentage of the land area of the entire watershed.
2. 20% is determined by the tax capacity of a community's area in the watershed as a percentage of the tax capacity of the entire watershed.
3. 40% is determined by the population of a community's area in the watershed as a percentage of the population of the entire watershed.

In summary, the amount paid is based forty percent on land area, forty percent on population, and twenty percent on tax base for the area of the community within the watershed. The MSCWMO will use the Washington County Standardized Chart of Accounts for WMOs to track its revenues and expenditures.

6.7.2 Future Approach

Inherent inequalities exist in the current funding approach of each member community supporting the MSCWMO through their general fund. Residents of areas within some of the member communities reside outside the jurisdictional boundary of the MSCWMO, but within the boundary of another WMO or Watershed District. These residents are first indirectly paying for the MSCWMO that they are not residents of through their

community's taxes, and a second time paying for their Watershed District through that organization's general levy. In addition, as the MSCWMO begins to implement this plan, the operating costs of the WMO will increase, therefore increasing the burden to these residents.

The communities impacted by these inequalities include the Cities of Stillwater, Oak Park Heights, Afton, and St. Mary's Point as well as Baytown and West Lakeland Townships. The MSCWMO will rectify these inequalities in one of two ways: either through special legislation granting the MSCWMO taxing authority, or through the member cities and townships creating special taxing districts for the areas within both the city or township borders and the borders of the MSCWMO.

The main difficulties with either taxing authority or taxing districts are that both approaches add another layer of taxes to the community and that questions arise regarding accountability when an appointed board is granted taxing authority. Despite these difficulties, the MSCWMO believes taxing authority or taxing districts are a more equitable way to fund the WMO than through general funds. Additionally, the MSCWMO Board, although appointed, is appointed by the member communities and exists though a Joint Powers Agreement. These factors mitigate the difficulties discussed here.

It is the intention of the MSCWMO to gain levy authority via special legislation during the 2005 legislative session. Until levy authority is granted or rejected, the MSCWMO will continue using the current financing approach. In addition to the overall change in financing, the MSCWMO is also prepared to charge review fees directly to individual applicants for work performed in reviewing proposed projects upon approval of this plan.

Table 6.2 Proposed Implementation Plans, Estimated Completion Dates, and Estimated Costs

#	Plan Reference	Description	Involvement	Estimated Cost*	Funding Source	Expected Implementation Date
1	2.2.2	Inventory and assessment of wetland resources (MNRAM)	MSCWMO, Contract	$20,000.00	Watershed Plan Implementation Fund	2005
2	2.3.4	Development of a land cover/land classification for the Middle St. Croix watershed using MLCCS.	LCMR funding, WCD, MSCWMO	$8,000.00	Watershed Plan Implementation Fund	2005-2006
3	6.6	Best Management Practices Program	MSCWMO, grants	$10,000.00	General Fund, Grants	Annually, starting 2006
4	2.5.2, 6.5	Integrated Water Monitoring	Volunteers, WCD	$10,000.00	General Fund	Annually
5	2.5.2, 6.5	Lily Lake TMDL Study	City of Stillwater	Unknown	Not applicable	2007
6	2.5.2, 6.5	McKusick Lake TMDL Study	City of Stillwater	Unknown	Not applicable	2008
7	4.1	Working with communities to bring WQ standards up to WMP goals	MSCWMO and Member Communities	$0	Not applicable	2005
8	5.1	Incorporation of St. Croix River Basin Planning Team (SCBPT) nutrient reduction strategies into MSCWMO goals	SCBPT for strategies, MSCWMO plan amendment	$0	Not applicable	Dependent on SCBPT
9	5.2.4	Establishment of floodplain elevations	Applicants	$0	Applicants	As development occurs
10	5.3.4, policy 1 & 2	Establishment of an erosion and sediment monitoring program	MSCWMO, member communities	$2,000.00	General fund	Annually, starting 2006
11	5.5	Communication in local newspapers and newsletters	MSCWMO Board	$1,200.00	General fund	Annually
12	5.5	Technical Fact Sheets for BMPs	MSCWMO, Contract	$2,000.00	General fund, Grants	2006, 2010

*Not adjusted for inflation

13	5.5	Workshops and seminars for developers, consultants, local officials, member communities, staff	MSCWMO, Member Communities	$1500.00	General fund, Grants	Annually, starting 2007
14	5.5	Regular attendance at member communities' city or town meetings, and planning advisory boards	MSCWMO Board	$0	Not applicable	Multiple times per year
15	5.5	Presentations to member communities regarding water issues	MSCWMO	$1500.00	General fund	Annually, rotating through communities, 2007
16	5.5	Demonstration sites of innovative BMPs for local communities, elected officials, staff, landowners and developers.	MSCWMO, cooperating parties, grants	$10,000.00	General fund, grants	Annually, starting in 2007
17	5.5	Website	MSCWMO	$2,000.00	General Fund	Annually, starting in 2005
18	6.2.1	Update Joint Powers Agreement	MSCWMO, Member Communities	$1,000.00	General fund	As needed
19	6.2.3	Review process will be incorporated into existing city and township review processes	MSCWMO Board, Administration, Member Communities	$2500.00	General fund	2006
20	6.2.4	Annual Report	MSCWMO	$500.00	General fund	Annually
21	6.3	Development Plan Reviews, Inspection, and Enforcement	MSCWMO, Developers	$0	Fee to Developer	As development occurs
22	6.5	Gully Inventory	MSCWMO	$9,000.00	General fund, grants	2006
23	6.7.2	Taxing Authority	MSCWMO Board, Legislature	$0	Not applicable	2005
24	7.1	Next Generation Water Management Plan	MSCWMO, Contract	$100,000.00	General Fund	2015 (start saving funds in 2006)
25	7.3	Amendments to Plan	MSCWMO	$10,000.00	Watershed Plan Implementation Fund	As needed

*Not adjusted for inflation

Table 6.3 Projected Costs to Member Communities

Member Community	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Afton	$ 156.80	$ 390.33	$ 418.25	$ 418.25	$ 404.81	$ 458.57	$ 449.61	$ 449.61	$ 449.61	$ 449.61	$ 449.61
Bayport	$ 4,243.19	$10,562.88	$11,318.41	$11,318.41	$10,954.70	$ 12,409.51	$ 12,167.04	$ 12,167.04	$ 12,167.04	$ 12,167.04	$ 12,167.04
Baytown	$ 3,565.66	$ 8,876.25	$ 9,511.14	$ 9,511.14	$ 9,205.52	$ 10,428.03	$ 10,224.28	$ 10,224.28	$ 10,224.28	$ 10,224.28	$ 10,224.28
Lakeland	$ 3,480.75	$ 8,664.88	$ 9,284.65	$ 9,284.65	$ 8,986.30	$ 10,179.70	$ 9,980.80	$ 9,980.80	$ 9,980.80	$ 9,980.80	$ 9,980.80
Lakeland Shores	$ 411.60	$ 1,024.63	$ 1,097.91	$ 1,097.91	$ 1,062.63	$ 1,203.75	$ 1,180.23	$ 1,180.23	$ 1,180.23	$ 1,180.23	$ 1,180.23
Oak Park Heights	$ 5,590.59	$13,917.04	$14,912.49	$14,912.49	$14,433.29	$ 16,350.07	$ 16,030.60	$ 16,030.60	$ 16,030.60	$ 16,030.60	$ 16,030.60
Stillwater	$ 10,803.49	$26,893.89	$28,817.52	$28,817.52	$27,891.51	$ 31,595.56	$ 30,978.22	$ 30,978.22	$ 30,978.22	$ 30,978.22	$ 30,978.22
Lake St. Croix Beach	$ 1,366.19	$ 3,400.95	$ 3,644.21	$ 3,644.21	$ 3,527.11	$ 3,995.52	$ 3,917.45	$ 3,917.45	$ 3,917.45	$ 3,917.45	$ 3,917.45
St. Mary's Point	$ 281.16	$ 699.90	$ 749.96	$ 749.96	$ 725.86	$ 822.26	$ 806.19	$ 806.19	$ 806.19	$ 806.19	$ 806.19
West Lakeland	$ 5,100.59	$12,697.25	$13,605.45	$13,605.45	$13,168.25	$ 14,917.03	$ 14,625.56	$ 14,625.56	$ 14,625.56	$ 14,625.56	$ 14,625.56
Total	**$ 35,000**	**$ 87,128**	**$ 93,360**	**$ 93,360**	**$ 90,360**	**$ 102,360**	**$ 100,360**	**$ 100,360**	**$ 100,360**	**$ 100,360**	**$ 100,360**

7.0 Amendments to Plan

7.1 Term of Plan

The Watershed Management Plan is intended to extend through the year 2014. The MSCWMO Board may initiate plan amendments at any time. Throughout the plan development process, it has been the intent of the MSCWMO to provide a flexible framework for managing the watershed; this plan has been based on current knowledge and the trends and forces shaping the watershed.

7.2 Amendment Procedures

The MSCWMO recognizes the need to amend this plan to reflect changes in proposed land use, changes to capital improvement projects, updating of technical data as more accurate data becomes available, and modifications to the goals, policies, standards and implementation which may be required as a result of future legislation or as problems become evident.

All amendments to the plan, except minor amendments, shall adhere to the full review and process set forth in MN Statute 103B.231, Subdivisions 7, 8, and 9 as they now exist or as subsequently amended. The MSCWMO Board of Managers shall adopt the proposed plan amendments upon their approval by BWSR in accordance with MN Statute 103B.231, Subdivision 9, as amended.

The amendment procedure for minor plan amendments, as defined in Minnesota Rules 8410.0020, Subpart 10, and 8410.0140, Subpart 3, shall be in accordance with MN Rules 8410.0140, Subpart 2 (A, B, and C), as such rules now exist or are subsequently amended. For minor plan amendments, the MSCWMO will hold a public meeting to explain the proposed amendment and publish a legal notice of the meeting twice, at least seven and fourteen days before the date of the meeting. Copies of the proposed amendment will be sent to the affected communities, the state review agencies, and the Metropolitan Council for review and comment. The proposed amendment will be considered minor if the Board of Water and Soil Resources has agreed or failed to act within forty-five days of receipt of the proposed amendment.

7.3 Anticipated Amendments

A number of amendments are anticipated for this plan. A brief description of these potential amendments is provided in Table 7.1. This list does not provide a comprehensive summary of mandated revisions or amendments that might be contemplated by the MCWMO.

Table 7.1 Anticipated Amendments

Potential Amendment	Plan Reference	Anticipated Date for Amendment
Land Cover Mapping	2.3.4	December 2006
SCBPT Strategies for reducing phosphorus to St. Croix River	5.1	Dependent on SCBPT
Gully and Ravine Inventory	6.5	December 2008

Appendices

Appendix A. Washington County Water Governance Study

Appendix B. Subwatershed Summary

Appendix C. Water Quality Data

Appendix D. Planning Meeting Minutes

Appendix E. Website References

Appendix F. Joint Powers Agreement

Appendix G. Washington County Floodplain Regulations

Appendix H. MNRAM and Functional Assessment Results

Appendix I. Design Standards for Structural Stormwater Management Measures

Appendix J. NPDES Permit

Appendix K. St. Croix River Basin Planning Team Fact Sheet

Appendix L. Amendments