Source Water Protection Plan

Minneapolis Water Works

Part II

Potential Contaminant Source Inventory And Management Strategy

September 2008

TABLE OF CONTENTS

Page Number

APPENDICES:

LIST OF FIGURES

LIST OF TABLES

PUBLIC WATER SUPPLY PROFILE

PUBLIC WATER SUPPLY

NAME	Minneapolis Water Works
ADDRESS	4300 Marshall St. NE Fridley, MN 55421
TELEPHONE	612-661-4924
E-MAIL	lucian.osuji@ci.minneapolis.mn.us
FAX NUMBER	612-661-4914

SOURCE WATER PROTECTION MANAGER

NAME	Lucian Osuji	Rick Malmberg
ADDRESS	4300 Marshall St. NE Fridley, MN 55421	4300 Marshall St. NE Fridley, MN 55421
TELEPHONE	612-661-4924	612-661-4923
E-MAIL	lucian.osuji@ci.minneapolis.mn.us	richard.malmberg@ci.minneapolis.mn.us
FAX NUMBER	612-661-4914	612-661-4914

CONSULTANT

NAME	David L. Brostrom	Bayerl Water Resources
ADDRESS	2159 Berkeley Avenue St. Paul, MN 55105	9083 State Hwy 114 SW Alexandria, MN 56308
TELEPHONE	651-690-0690	320-283-6127
E-MAIL	brost004@umn.edu	bayerl@runestone.net

TECHNICAL ADVISORS

NAME	Mike Howe, MDH	Art Persons, MDH	Chris Elvrum, Metropolitan Council
ADDRESS	3400 North First Street St. Cloud, MN 56303	18 Woodlake Drive SE Rochester, MN 55904	390 N Robert St St. Paul, MN 55101
TELEPHONE	320-650-1076	507-292-5138	651-602-1066
E-MAIL	mike.howe@health.state.mn.us	art.persons@health.state.mn.us	christopher.elvrum@metc.state.mn.us
FAX NUMBER	320-255-4264	507-285-7745	651-602-1130

NAME	Dave Neiman, MRWA	Charles Regan, MPCA	Douglas Hansen, MPCA
ADDRESS	217 12th Avenue Southeast Elbow Lake MN 56531	520 Lafayette Rd N St. Paul, MN 55155	520 Lafayette Rd N St. Paul, MN 55155
TELEPHONE	218-820-0595	651-296-7363	651-296-9192
E-MAIL	dave.neiman@mrwa.com	charles.regan@pca.state.mn.us	douglas.hansen@pca.state.mn.us
FAX NUMBER	218-825-7411	612-297-7178	651-297-7708

GENERAL INFORMATION

NAME OF SOURCE WATER:	Mississippi River
SIZE OF POPULATION SERVED:	Minneapolis Water Works: 446,000
VOLUME OF WATER USED:	65 MGD

The following table serves to document the process of the development of this plan, following the guidelines of the Minnesota Department of Health.

STEP	DATE PERFORMED
Scoping Meeting 2 Held (SWP Surface Intake Guidance (SIG) Chapter 6)	July 14, 2005
Scoping 2 meeting results letter received (SWP SIG Chapter 6)	August 11, 2005
Part 2 SWP Plan Submitted to Local Units of Government (LGUs) (SWP SIG Chapter 7)	June 2008
Response to Comments From Local Units of Government (SWP SIG Chapter 7)	August 2008
Public Hearing Conducted (SWP SIG Chapter 7)	September 2008
Part 2 SWP Plan Submitted (SWP SIG Chapter 7)	September 2008
Final Part 2 SWP Plan Review Received (SWP SIG Chapter 7)	December 2008
Final State Approved Part 2 SWP Plan Submitted to LGUs (SWP SIG Chapter 7)	December 2008

ABBREVIATIONS

ACOE	Army Corps of Engineers
BMP	Best Management Practices
BN	Burlington Northern Railway
BWC	St. Paul Board of Water Commissioners
BWSR	Board of Water and Soil Resources
CERCLIS	Comprehensive Environmental Response, Compensation & Liability System
CP	Canadian Pacific Railway
CROW	Crow River Organization of Water
CRP	Conservation Reserve Program
DNR	MN Department of Natural Resources
DWSMA	Drinking Water Supply Management Area
EQIP	Environmental Quality Incentive Program
ISTS	Individual Sewage Treatment Systems
IBI	Index of Biological Integrity
LGU	Local Units of Government
LUST	Leaking Underground Storage Tanks
LWMP	Local Water Management Plan
MDA	MN Department of Agriculture
MDH	MN Department of Health
MDPS	MN Department of Public Safety
MGD	Million Gallons per Day
Mg/L	Milligrams per Liter
MGS	MN Geologic Survey
MN	Minnesota
MNDOT	MN Department of Transportation
MPCA	MN Pollution Control Agency
MRWA	MN Rural Water Association
MSP	Minneapolis / St. Paul
MWW	Minneapolis Water Works
NFRAP	No Further Remedial Action Planned
NPDES	Non-point Drainage
NRCS	Natural Resources Conservation Services
OHW	Ordinary High Water Mark
OPS	Office of Pipeline Safety
PCB	Polychlorinated Biphenyl
PCSI	Potential Contaminant Source Inventory
RDN	Mississippi River Defense Network
SWCD	Soil & Water Conservation District
SPRWS	St. Paul Regional Water Services
SRWD	Sauk River Watershed District
SWP	Source Water Protection
SWPA	Source Water Protection Area
SWPP	Source Water Protection Plan
SWUDS	State Water Use Data System
TMDL	Total Maximum Daily Load
UMRSWPP	Upper Mississippi River SWP Project
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Survey
WD	Watershed District
WCA	Wetland Conservation Act
WHP	Wellhead Protection
WMO	Water Management Organization

EXECUTIVE SUMMARY

The Source Water Protection Plan (SWPP) for the City of Minneapolis, Minnesota, is a result of the 1996 Amendments to the Federal Safe Drinking Water Act, which requires the Minnesota Department of Health (MDH) to complete source water assessments for public water systems in Minnesota. Although this plan is not mandatory by the 1996 Amendments or State Law, Minneapolis Water Works (MWW) has decided to proactively protect their drinking water supply. This utility draws all of their drinking water from the Mississippi River. Part Two of the plan addresses data elements and their assessments; impacts of changes on the public water supply; issues, problems and opportunities; source water protection goals, objectives and action plans; program evaluation; and alternative water supply/contingency strategy.

In Part One of the Plan, approved in 2005, the delineation of the Source Water Protection Area (SWPA), the Drinking Water Supply Management Area (DWSMA), the Surface Water Intake Susceptibility and Groundwater Susceptibility were completed. These important protection area boundaries are shown in **Figure One** and were utilized in the completion of this document. The Scoping Document, prepared by the MDH and found in **Appendix I**, lists the required data elements to be addressed in Part Two of the Plan. Available data were utilized and where these data were inadequate, strategies to verify or supplement existing information are addressed.

The susceptibility of any surface water source is determined to be high because there is no practical means of preventing all potential contaminant releases into surface waters. The Federal Safe Drinking Water Act recognizes the susceptibility of surface waters and requires filtration to remove pathogens and particulate contaminants. Therefore, the susceptibility of the Minneapolis surface water intake is considered to be high for a surface based public water supply system.

While it has been determined that this public water supply system is highly susceptible to contaminants found in the River, it is noted that historically, the MWW has effectively treated this source water to meet safe drinking water standards.

The overall intent of this SWPP is to establish a basis for:

- Focusing limited resources within the community to protect the drinking water source;
- Informed decision making regarding land use within the community; and
- Informed source water planning efforts for the Source Water Protection Area for the City of Minneapolis.

The contaminants of greatest concern to the Minneapolis water utility are: **Total suspended solids, sediment and suspended organics; Cryptosporidium; Other biological and microbiological organisms such as Fecal Coliform, Giardia and viruses; Nutrients, including phosphorus, nitrates and ammonia; Pesticides; Petroleum products; Organic solvents; Pharmaceuticals; Endocrine-disrupting chemicals and Radioactive materials.**

Sources of these contaminants were considered and prioritized as follows:

High Priority Sources: "Known Contaminants": Improper Manure Management, Known Stormwater Discharge Sites, Cropland Sediment Runoff, Streambank Erosion, Transportation Corridors, Hazardous Waste Clean Up Sites and Leaking Underground Storage Tanks.

Medium Priority Sources: "Potential Contaminants": Gravel and Mining, Residential Lawn Management, Above Ground Storage Tanks, Agriculture Chemical and Pesticide Applicators, NPDES permits, Underground Storage Tanks and Vehicle Salvage Yards.

Low Priority Sources: "Permitted and Regulated": Wells, Permitted Feedlots, Permitted Hazardous Waste Generators, Permitted Registered Storage Tanks and Permitted Solid Waste Sites.

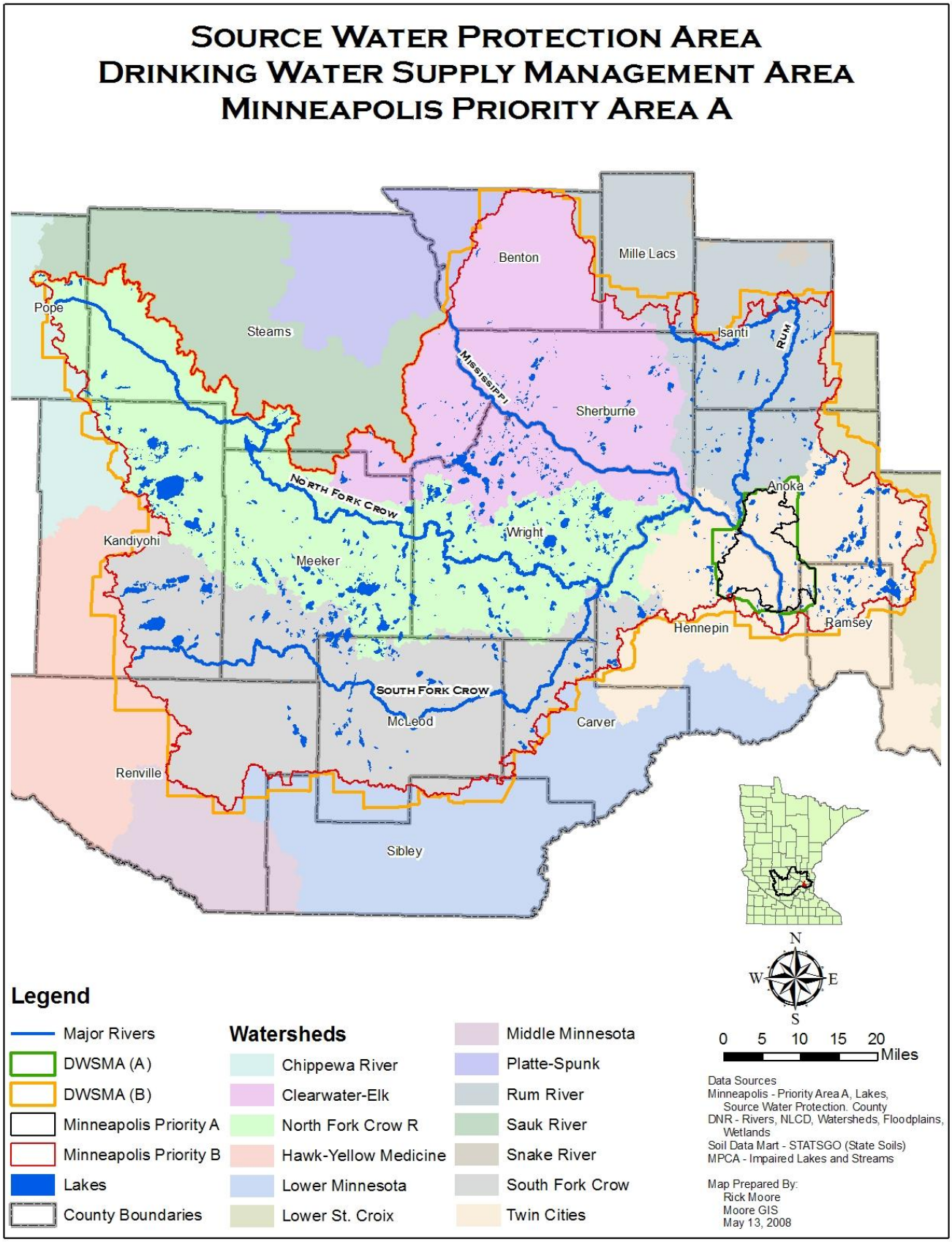
The sandy, coarse-textured outwash located along the River suggests a rapid infiltration to the upper aquifers and the loamy till soils found throughout the DWSMA are susceptible to erosion from wind and water. This contributed to the vulnerable status of the source water, which is the Mississippi River. This calls for focus on all potential contaminant sources located within the DWSMA. The Source Water Protection (SWP) Team intends to proactively work through a Clean Water Partnership Grant from the Minnesota Pollution Control Agency (MPCA) with counties, the cities located in the Source Water Protection Area (SWPA), township governments - local SWCDs, Local Water Management Planners (LWMP), Watershed Districts (WD) and Water Management Organizations (WMO) to establish protective Best Management Practices (BMP), education, monitoring and regulation within the SWPA. It is the hope of the SWP Team that through these programs and increased public awareness, habits will be established that will decrease the potential for future water problems and the community can continue to enjoy the current quality of water it has come to expect. This Plan is intended to provide prioritization of needs to better utilize the limited dollars available in efforts to protect and improve the drinking water resource.

The Upper Mississippi River Source Water Protection Project (UMRSWPP), a group consisting of three water suppliers (MWW, SPRWS, and the City of St. Cloud), MDH, Minnesota Rural Water Association (MRWA), the Metropolitan Council and the MPCA has spent considerable time, effort, and money to protect and facilitate the most effective use of the region's water supplies. Over the past four years, more than one million dollars have been spent on planning, data acquisition and activities to improve the resource. In addition to this, individual suppliers have contributed in their local areas.

Minneapolis Water Works is committed to protection of this resource. The amount spent on operations and maintenance varies greatly but runs about 50 million dollars annually. Old water lines are being re-lined to reduce the impact of corrosion on a priority driven basis. This utility conducts monthly meetings with water works staff to cooperatively work on security of the intake. A private security firm patrols the fenced shoreline within this area.

.

Figure One


SOURCE WATER PROTECTION AREA
DRINKING WATER SUPPLY MANAGEMENT AREA
MINNEAPOLIS PRIORITY AREA A
Benton
Mille Lacs
Pope
Steams
Isanti
RUM
MISSISSIPPI
Sherburne
NORTH FORK CROW
Anoka
Wright
Kandiyohi
Meeker
Hennepin
Ramsey
SOUTH FORK CROW
McLeod
Carver
Renville
Sibley
N
W
E
S
0 5 10 15 20
Miles
Legend
Major Rivers
DWSMA (A)
DWSMA (B)
Minneapolis Priority A
Minneapolis Priority B
Lakes
County Boundaries
Watersheds
Chippewa River
Clearwater-Elk
North Fork Crow R
Hawk-Yellow Medicine
Lower Minnesota
Lower St. Croix
Middle Minnesota
Platte-Spunk
Rum River
Sauk River
Snake River
South Fork Crow
Twin Cities
Data Sources
Minneapolis - Priority Area A, Lakes, Source Water Protection. County
DNR - Rivers, NLCD, Watersheds, Floodplains, Wetlands
Soil Data Mart - STATSGO (State Soils)
MPCA - Impaired Lakes and Streams
Map Prepared By:
Rick Moore
Moore GIS
May 13, 2008

CHAPTER ONE

DATA ELEMENTS AND ASSESSMENT

I. DATA ELEMENTS

The data elements described in this section are significant to understanding how environmental factors influence quality and the protection of source water. All components of the environment are interrelated, and data elements must be evaluated relative to one another and with respect to contaminant source locations and land use factors. The SWPAs have been delineated into areas of Priority A and B Areas according to the potential ability to contaminate the drinking water source, as outlined in Part One of this Plan.

All of these data elements must be considered within a "time of travel" context, particularly with respect to Priority A Area. An eight-hour time of travel was used in delineating the boundaries of Priority A Area. In the event of a contaminant release, eight hours is needed to provide sufficient lead time to maximize finished water storage capacity and close water intakes. Since a contaminant spill within the Priority A Area will likely reach the intake in less than eight hours, an early notification system must be established. Time of travel and the presence of potential contaminant sources are the central delineation components for the Priority A Area. Within these areas, all potential sources of contamination posing an immediate threat must be considered.

Priority B Area has the capacity to cause contamination to the drinking water source by both point and non-point sources. Potential contaminant sources within this area can be addressed by preventive management. These boundaries can be seen in **Figure One.**

A. PHYSICAL ENVIRONMENT DATA ELEMENTS

1. Precipitation

Precipitation in the form of rain or melting snow may convey a point or non-point source contaminant. Additionally, a heavy rain event or snowmelt may affect the time of travel of a contaminant. The larger the magnitude of a flood event (aerial coverage and intensity), the more magnified the potential hydrologic impact and catastrophic impacts to infrastructure, including water wells, surface water supplies, sanitary and storm water sewer systems and potential contaminant sources. However, larger floods tend to result in greater dilution of some contaminants. Some flash floods will cover one or two townships, while others may cover many counties.

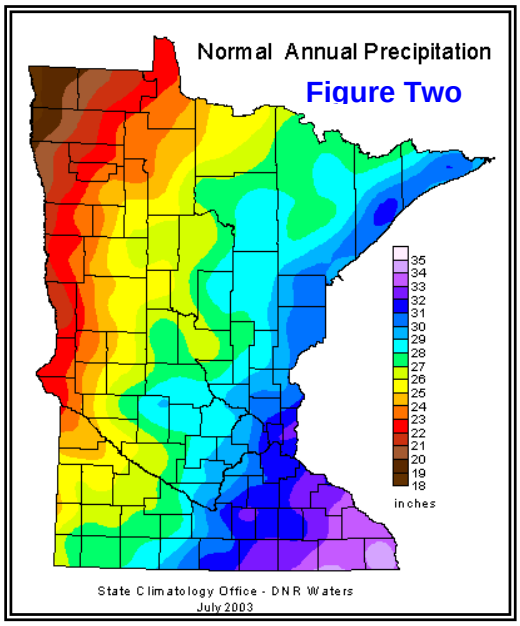


Figure Two

Figure Two shows the normal statewide annual precipitation according to the Minnesota Department of Natural Resources (DNR) Climatology office. The Climatology program exists to gather, archive, manage and disseminate historical climate data to address

questions involving the impact of climate on Minnesota. Rainfall data from all counties within the SWPA are located at http://climate.umn.edu/. Average annual precipitation varies within the SWP Area with gradual increases from northwest to southeast.

Large amounts of precipitation over a short period can lead to flood events. As water accumulates in the higher elevations of the SWPA, it increases in velocity and volume, moving toward the Mississippi River, conveying debris and stormwater drainage within it. What reaches the River system is dependent on vegetative cover within the waterways. Studies from agricultural settings suggest that a 15-foot wide grass buffer can achieve a 50% removal rate of nitrogen, phosphorous and sediment, and that a 100-foot buffer can reach closer to 70% removal of these constituents (Desbonette et al., 1994).

It is important to understand and compare the associated relative stream flows during those events. Precipitation averages described in **Table One** can be linked to stream flow, which could show past flooding. Stream flow data for the Sauk and Mississippi Rivers are based on historic low, median and high flow data. Stream flow velocity at the time of a contaminant release can be compared to these historically derived data to calculate time of travel of a contaminant. There is no evidence that heavy rain events are more or less likely in one location versus another.

Monthly Precipitation Totals from 2001 through 2005 in Inches **Table One**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2001	1.21	1.32	1.09	7.00	4.52	6.37	2.12	2.33	3.50	1.28	2.77	0.74	**34.25**
2002	0.46	0.36	1.38	3.23	2.83	8.31	5.20	8.30	3.90	4.21	0.09	0.21	**38.48**
2003	0.22	0.54	1.36	1.62	6.14	4.66	2.06	1.12	2.20	0.62	0.71	0.62	**21.87**
2004	0.23	1.10	2.11	1.94	6.25	3.06	3.37	1.20	4.21	2.14	0.93	0.43	**26.97**
2005	1.21	0.96	1.37	2.30	2.78	4.26	2.94	5.50	4.44	5.45	1.53	0.97	**33.71**

2. Geology

The corridor along the Mississippi River between the Twin Cities and Little Falls, which includes the areas of concern for SWP, lacks comprehensive geologic studies. This corridor is characterized by unconfined drift aquifers which are often shallow aquifers in sandy soils. Ground water in such a geologic environment has the potential to be influenced by anthropogenic activities and be directly connected to surface water, such as the Mississippi River and its tributaries. There is a particular need for detailed geologic information in view of the rapid population growth and land use changes taking place within the corridor. A management strategy for mapping and assessing available data for each individual priority area is required.

Geology is important in terms of interaction between ground water and surface water. It is important to note that aquifer boundaries do not match the boundaries of overlying surface watersheds. There is considerable information available about the geology along sections of the corridor between the Twin Cities and Little Falls, but the area lacks comprehensive geologic studies. Information from well logs is available for the entire area, but the scope and volume of the available data make it difficult to manage. Sensitivity to contamination based on soils and depth to bedrock is available statewide at http://www.health.state.mn.us/divs/eh/water/swp/maps/index.htm. This site shows

a collection of maps pertinent to protecting our groundwater resources. Areas designated as sensitive to groundwater contamination will be the focus of well investigation. The DNR and Minnesota Geologic Survey (MGS) have combined efforts in the completion of County Geologic Atlases and Regional Hydrogeologic Assessments in Minnesota. One of these has been completed for approximately half of the SWPA and most of the Mississippi corridor. Completed assessments are available at http://www.dnr.state.mn.us/waters/groundwater_section/mapping/index.html.

3. Soils

Important soils characteristics include adsorption/absorption capacity, infiltration and permeability rates, and distribution pattern of soils on a landscape. Soils vary over a region, due to variability in parent material, topography, vegetation, climate and time. County soil surveys reflect these differences in soil properties. There are "detailed" soil surveys for all counties in the SWPA. Soil surveys typically describe soil properties within 5 or 6 feet of the surface. This information is generally at a mapping scale that can be useful for broad-based planning.

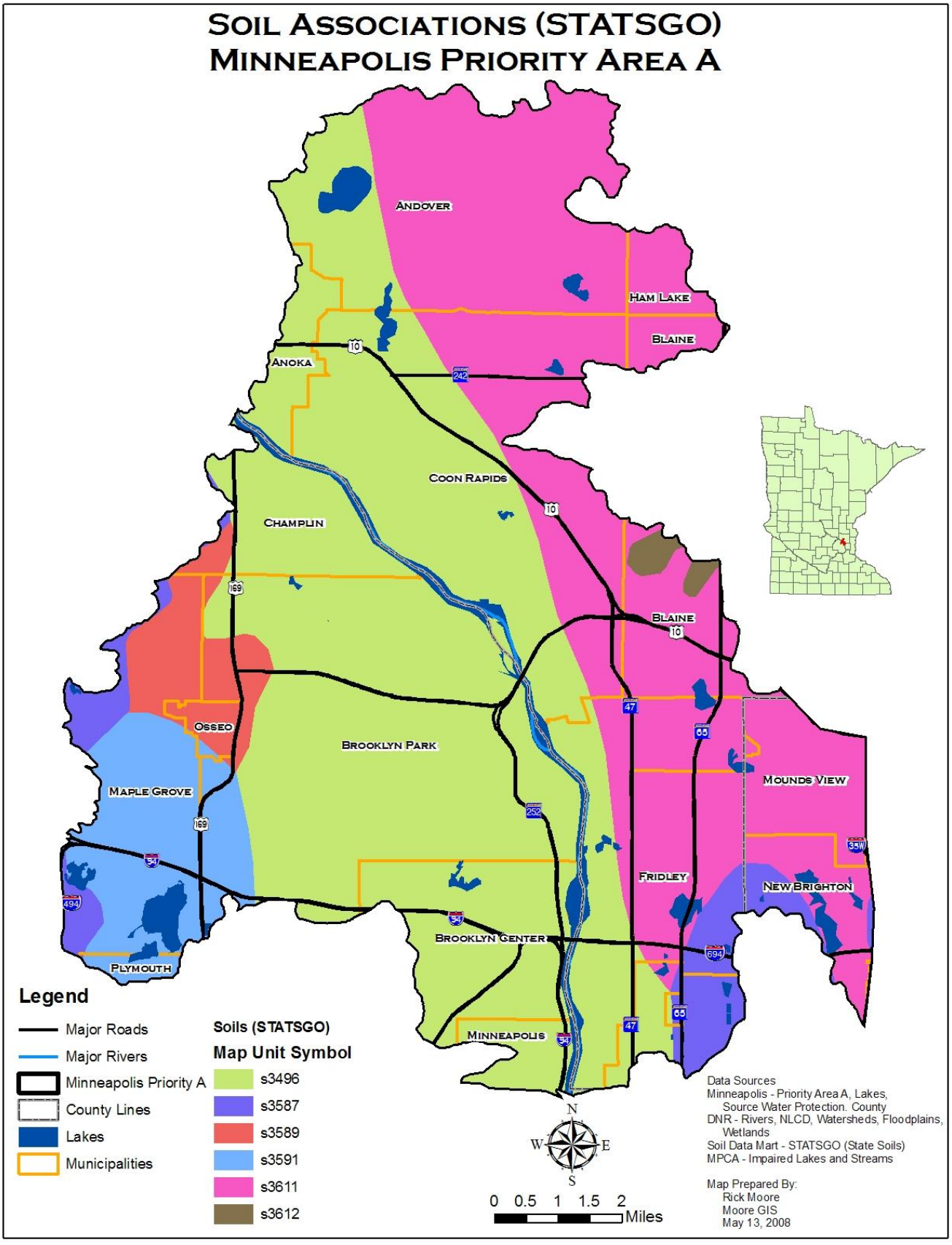
Figure Three shows the soil associations present in the Priority A SWPA. The s3496, s3589, s3611 and s3612 numbered soils are predominantly composed of sand from top to bottom, or peaty organic deposits overlying the sandy substrata. Typically, rapid infiltration rates exist in the sandy material with drainage ranging from poorly to well drained. These soils are typically found on outwash plains or river terraces. In the case of coarse-textured soils, land use is an important factor. If the land is shifted from agriculture to housing that is serviced by municipal sewers, soil properties may not be as important. If homes are in unsewered areas, aggressive septic system regulations should be applied. The coarse-textured soils typically have high permeability and infiltration rates, thereby allowing water to infiltrate quickly through the soil profile. Management of nitrogen fertilizer application rates is critical in matching expected crop yields with "no net loss of nitrogen" due to leaching to groundwater. These soils typically require greater levels of management for nitrogen and/or manure applications when used for agriculture. Additionally, spill response may be different in sandy areas as opposed to loamy or clay areas.

The s3591 numbered soils are a mix of coarse-textured soils formed mostly in reddish till that doesn't contain a lot of clay, likely from the Lake Superior basin. Infiltration rates vary from rapid to slow, depending on landscape position and overall soil development. Some peaty units are contained in this designation. It is not as completely sandy as the yellow unit, but not as much clay as the green unit.

The s3587 numbered unit is mostly clay-rich till originating from the Des Moines Lobe. It is characterized by slower infiltration rates. These soils are well to poorly drained, also containing some peaty units, but typically underlain by slowly permeable loam or clay loam, dense till.

On a broad scale, the s3496, s3589, s3611 and s3612 numbered area needs the most attention regarding nitrogen management or other contaminants of concern due to the reduced ability of the soils to attenuate spills, etc. What goes on the ground goes into the ground rapidly.

Figure Three



4. Water resources

Extensive natural surface waters are located within the SWPA. **Table Two** lists the Priority A and B Area protected waters as designated by the DNR. The official DNR Protected Waters Inventory, authorized by Minnesota Statutes, section 103G, is available at: http://www.dnr.state.mn.us/waters/watermgmt_section/pwi/maps.html.

SWP Area Protected Waters **Table Two**

	"A" Lakes	Public Water Wetlands	"B" Lakes	Public Water Wetlands	Undesignated Protected Waters
Minneapolis	32	99	1193	2358	64

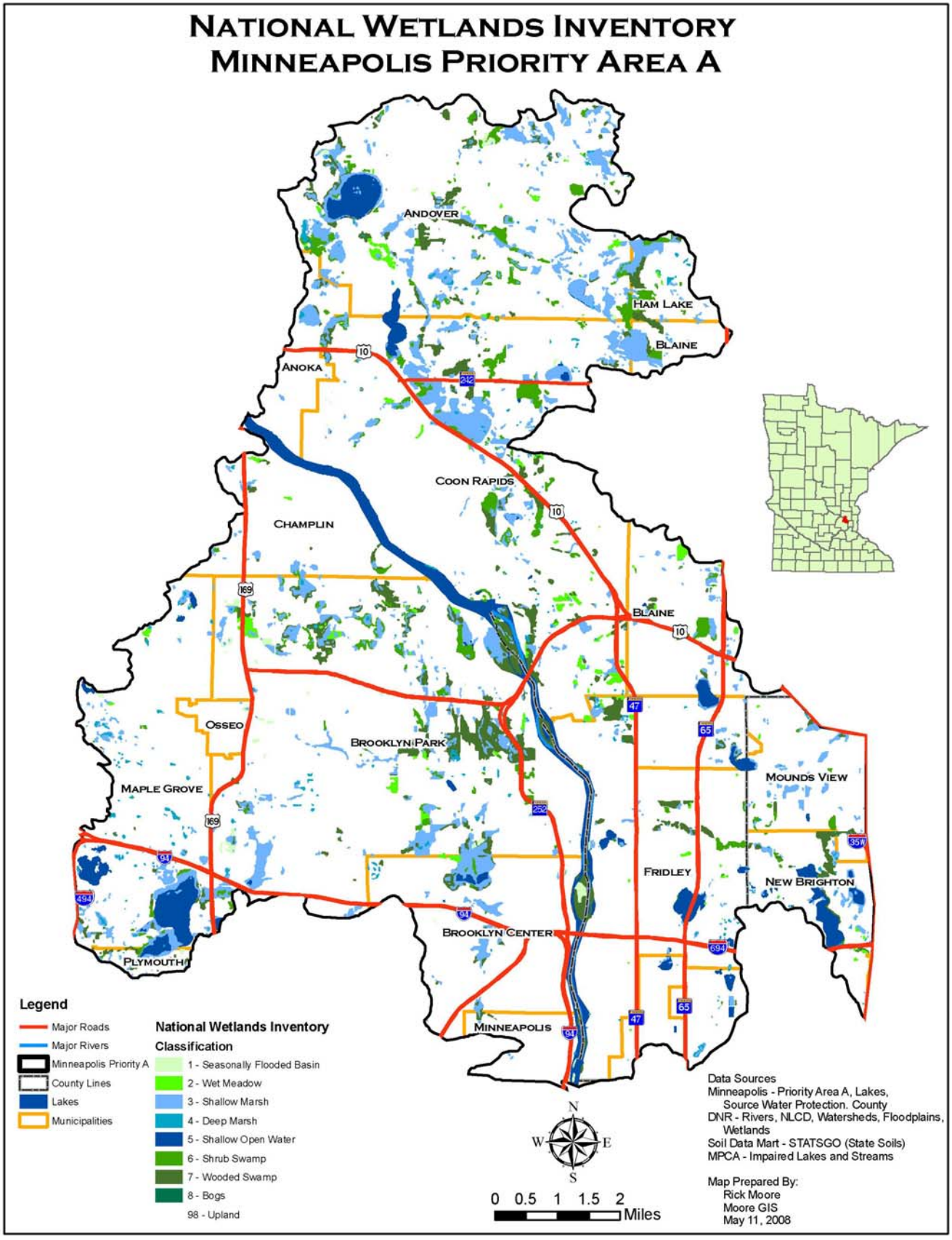
Public water wetlands within the DWSMA, as shown in **Figure Four,** are all types 3, 4, and 5 wetlands, as defined in United States Fish and Wildlife Service (USFWS) Circular No. 39 (1971 edition), that are ten or more acres in size in unincorporated areas or 2-1/2 or more acres in incorporated areas. Filling of wetlands for farming or development depletes the capacity for groundwater recharge, flood and sediment control. These areas provide natural regulation of surface water runoff during times of heavy rains. They also provide habitat for waterfowl, frogs, turtles and other wetland animals. A summary of wetland types is:

Type Three wetlands are **shallow marshes**. The soil is usually waterlogged early in the spring and often covered with six or more inches of water. Vegetation includes grasses, bulrushes, spikerushes, cattails, arrowheads, pickerelweed and smartweeds. Type Three wetlands protect water quality and shoreland, retain floodwater, provide habitat for waterfowl, amphibians and fish, and offer recreation, including hunting, fishing and canoeing.

Type Four wetlands are **deep marshes**. The soil is usually covered with water during spring and summer, anywhere from six inches to three feet. Vegetation includes cattails, reeds, bulrushes, spikerushes and wild rice. In open areas, pondweed, naiads, coontail, watermilfoils, waterweeds, duckweeds, waterlillies or spatterdocks may grow. These deep marshes may completely fill shallow lake basins, potholes, limestone sinks and depressions, or they may border open water. These wetlands provide water quality protection, floodwater detention, wildlife / fisheries habitat, and recreation, including hunting, fishing and canoeing.

Type Five wetlands are **open water** wetlands, including shallow ponds and reservoirs. The water is less than six feet deep and fringed by a border of emergent vegetation. Type Five wetlands provide floodwater detention, wildlife and fish habitat and recreation, including hunting, fishing and canoeing.

Figure Four


NATIONAL WETLANDS INVENTORY
MINNEAPOLIS PRIORITY AREA A
ANDOVER
HAM LAKE
BLAINE
ANOKA
COON RAPIDS
CHAMPLIN
BLAINE
OSSEO
BROOKLYN PARK
MAPLE GROVE
MOUNDS VIEW
FRIDLEY
NEW BRIGHTON
BROOKLYN CENTER
PLYMOUTH
MINNEAPOLIS
Legend
Major Roads
Major Rivers
Minneapolis Priority A
County Lines
Lakes
Municipalities
National Wetlands Inventory
Classification
1 - Seasonally Flooded Basin
2 - Wet Meadow
3 - Shallow Marsh
4 - Deep Marsh
5 - Shallow Open Water
6 - Shrub Swamp
7 - Wooded Swamp
8 - Bogs
98 - Upland
N
W
E
S
0 0.5 1 1.5 2
Miles
Data Sources
Minneapolis - Priority Area A, Lakes, Source Water Protection. County
DNR - Rivers, NLCD, Watersheds, Floodplains, Wetlands
Soil Data Mart - STATSGO (State Soils)
MPCA - Impaired Lakes and Streams
Map Prepared By:
Rick Moore
Moore GIS
May 11, 2008

While these wetlands are protected, numerous smaller wetlands exist and should be considered important to stormwater management in both quality and quantity of runoff during a storm event. Holding water back to allow sediment to precipitate and water to filter through the soil provides natural filtration of potential contaminants and reduction volume reaching the water courses. The state-wide National Wetlands Inventory is found on the DNR Data Deli website at: http://deli.dnr.state.mn.us/data_catalog.html. Wetlands should be clipped from the statewide map and included in this Plan as available.

Lake Classifications are defined by the DNR as follows:

- **Natural Environment Lakes** usually have less than 150 total acres, less than 60 acres per mile of shoreline and less than three dwellings per mile of shoreline. They may have some winter kill of fish, may have shallow, swampy shoreline and are less than 15 feet deep.
- **Recreational Development Lakes** usually have between 60 and 225 acres of water per mile of shoreline, between 3 and 25 dwellings per mile of shoreline, and are more than 15 feet deep.
- **General Development Lakes** usually have more than 225 acres of water per mile of shoreline and 25 dwellings per mile of shoreline and are more than 15 feet deep.

To find the designation of an individual lake, the DNR has “Lakefinder”. This website contains a composite of all available data on an individual lake, such as fishery reports, water quality information, lake level data and lake designation. While it is not readily available in a useable format for this extensive area, this information can be found in local zoning departments or at: http://www.dnr.state.mn.us/lakefind/index.html and should be included in the individual municipal plans in priority areas.

Public Waters and drainage points from minor watersheds to the Mississippi River, as shown in **Figure Five,** gives a view of the overland travel of water from high to low landforms. Public drainage ditches have been carved out of the landscape to facilitate drainage of agriculture land and / or to prevent channelized erosion on the land. Accurate maps are not readily available for all areas of the SWP Area. The benefits verses the detriments of these drainage systems must be assessed in priority areas of the SWPA. Attention must be paid to the quality of water leaving each watershed area in order to prioritize mitigation areas by greatest potential impact.

Floodplains within the SWPA are shown in **Figure Six**. Land uses within the floodplain of the Mississippi River and its tributaries above the sourcewater intakes are very important. This designated area is likely to flood with water during a large rain event, mixing whatever is on the ground with the River water. If soils in this area are not stabilized, sediment will also be carried downstream. This area should not contain contaminated soils or any land use that would potentially have products or by-products that are harmful to the drinking water resource.

Figure Five

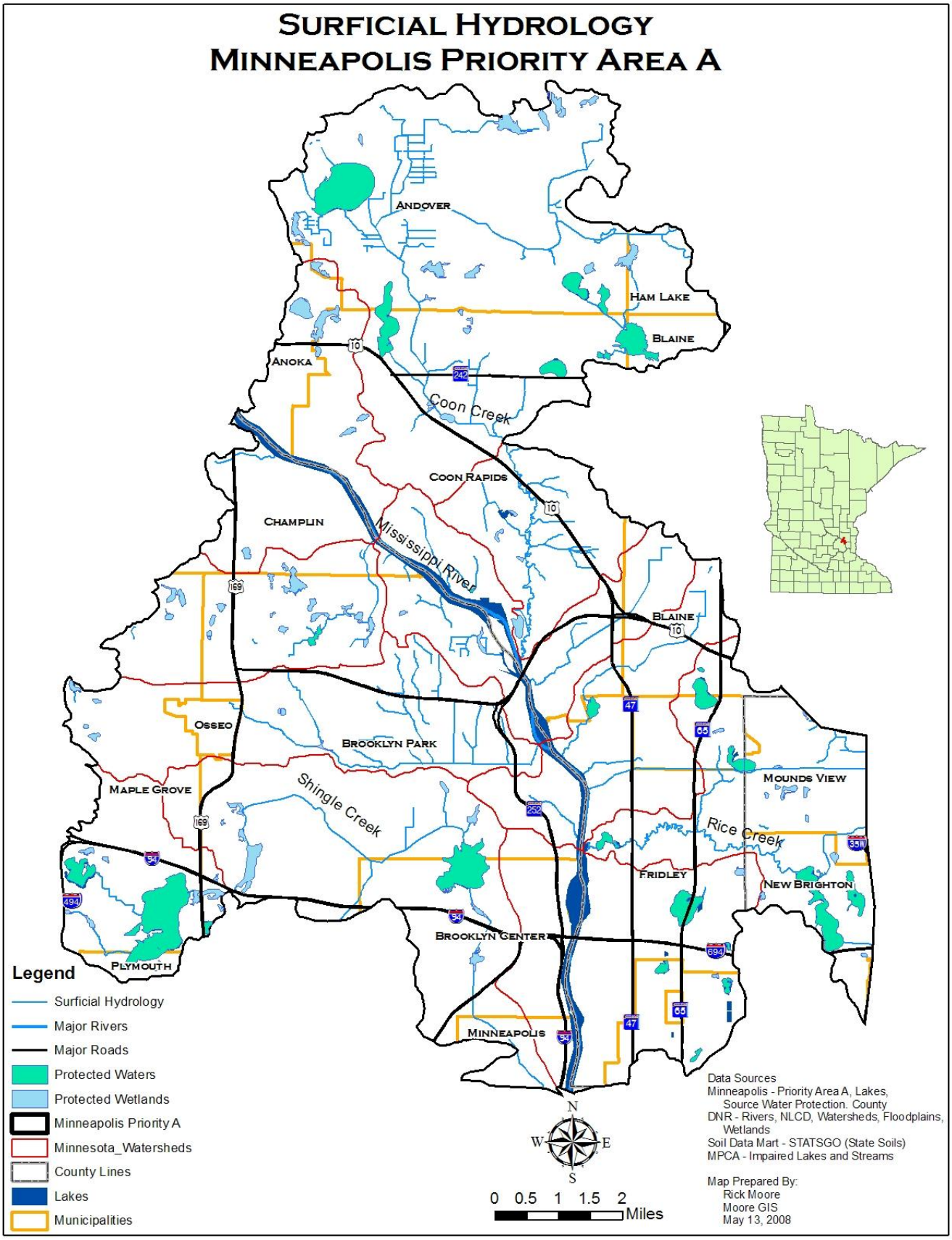
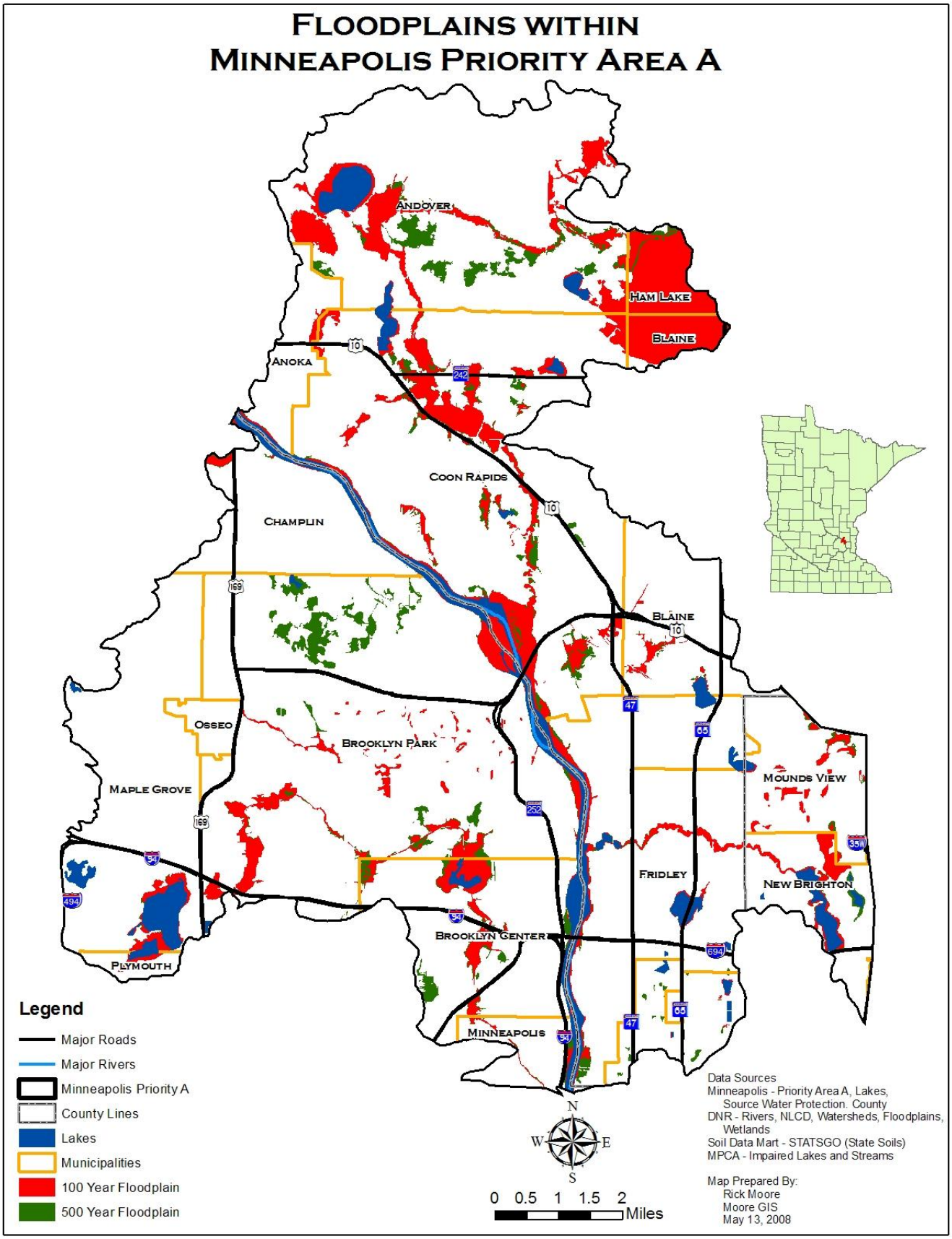

SURFICIAL HYDROLOGY
MINNEAPOLIS PRIORITY AREA A
ANDOVER
HAM LAKE
BLAINE
ANOKA
COON RAPIDS
CHAMPLIN
Coon Creek
Mississippi River
OSSEO
BROOKLYN PARK
MAPLE GROVE
Shingle Creek
MOUNDS VIEW
Rice Creek
FRIDLEY
NEW BRIGHTON
BROOKLYN CENTER
PLYMOUTH
MINNEAPOLIS
Legend
Surficial Hydrology
Major Rivers
Major Roads
Protected Waters
Protected Wetlands
Minneapolis Priority A
Minnesota_Watersheds
County Lines
Lakes
Municipalities
N
W
E
S
0 0.5 1 1.5 2
Miles
Data Sources
Minneapolis - Priority Area A, Lakes, Source Water Protection. County
DNR - Rivers, NLCD, Watersheds, Floodplains, Wetlands
Soil Data Mart - STATSGO (State Soils)
MPCA - Impaired Lakes and Streams
Map Prepared By:
Rick Moore
Moore GIS
May 13, 2008

Figure Six


FLOODPLAINS WITHIN
MINNEAPOLIS PRIORITY AREA A
ANDOVER
HAM LAKE
BLAINE
ANOKA
COON RAPIDS
CHAMPLIN
BLAINE
OSSEO
BROOKLYN PARK
MAPLE GROVE
MOUNDS VIEW
FRIDLEY
NEW BRIGHTON
BROOKLYN CENTER
PLYMOUTH
MINNEAPOLIS
Legend
Major Roads
Major Rivers
Minneapolis Priority A
County Lines
Lakes
Municipalities
100 Year Floodplain
500 Year Floodplain
N
W
E
S
0 0.5 1 1.5 2
Miles
Data Sources
Minneapolis - Priority Area A, Lakes, Source Water Protection. County
DNR - Rivers, NLCD, Watersheds, Floodplains, Wetlands
Soil Data Mart - STATSGO (State Soils)
MPCA - Impaired Lakes and Streams
Map Prepared By:
Rick Moore
Moore GIS
May 13, 2008

B. LAND USE DATA ELEMENTS

1. Land Use

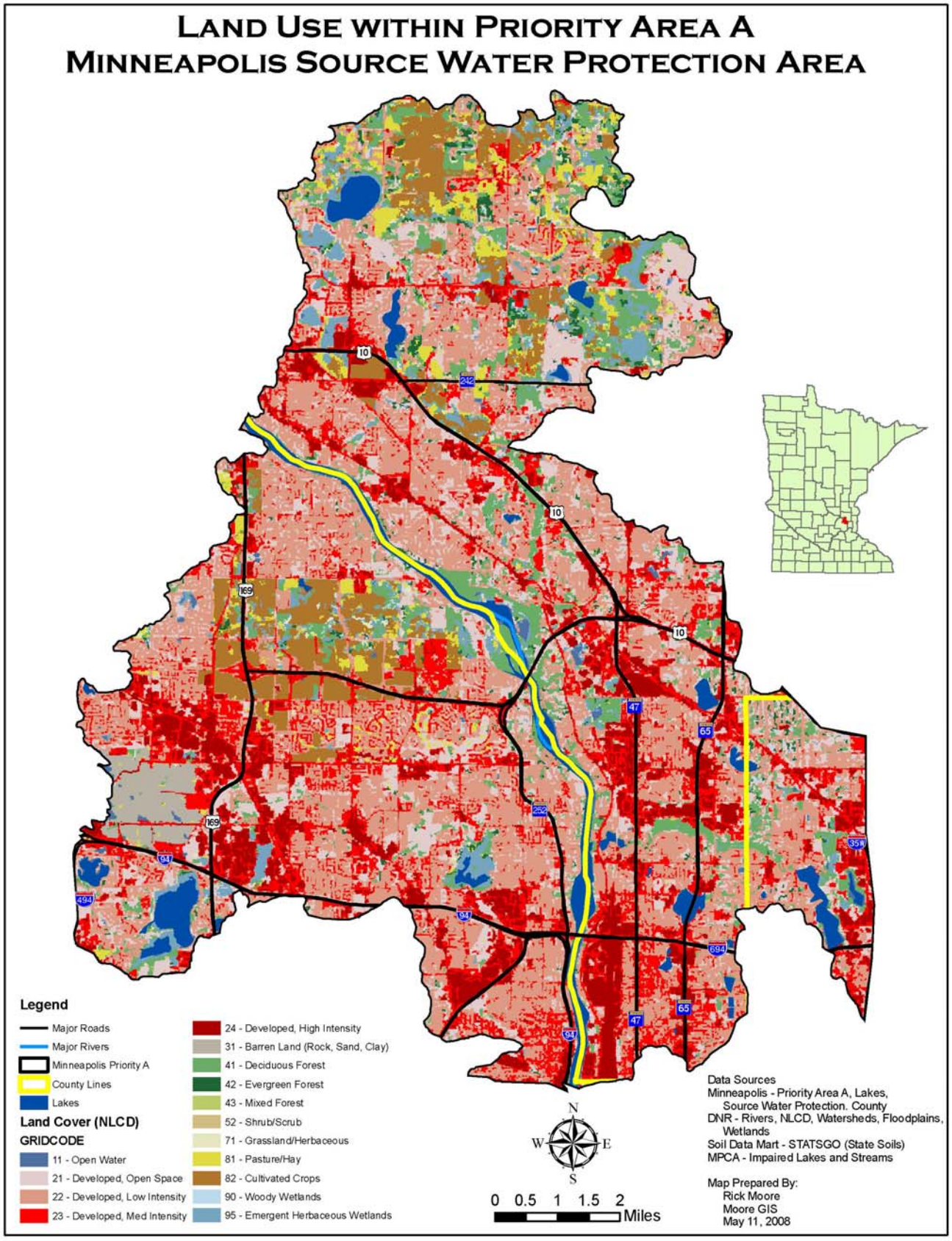
Parcel mapping provides a useful tool in the evaluation of where to target land use efforts. In a geographic area this large, obtaining this data and keeping it updated is prohibitive. The extent and accuracy of parcel mapping varies greatly by community and is not available for use in this Plan. Land use impacts on source water are evaluated within the context of the surrounding natural environment. Regarding land use, it is not necessarily a particular land use, but the specific activities associated with the land use, that can result in significant impacts on source water. For example, resort properties are areas where people go for relaxation and/or recreation. Resorts vary in size and amenities provided. Resorts can be pollution sources for surface and ground water. Large septic systems that are faulty are an unnecessary source of pollution in surface waters. Septic systems should be inspected regularly and repaired or replaced if needed. Natural shorelines tend to act as buffers for lakes and rivers. An unnatural shoreline can be a significant source of runoff for surface waters because it provides a direct route for pollutant travel.

Feedlots can influence source water to varying degrees depending on how the feedlot is managed. Manure management practices vary among feedlots; manure stockpiled on or applied to frozen ground can runoff quickly during a rapid snowmelt or heavy spring rain event. Runoff can contribute nutrient, sediment and pathogen loading to area surface waters. Pathogens include Cryptosporidium and Giardia, protozoa and other microorganisms that are difficult to remove/sterilize by conventional treatment. Nutrients, primarily in the form of nitrates, are not removed at surface water treatment facilities. Elevated levels of ammonia nitrogen in the surface water can cause problems with disinfection. Accidental spills or leaks, transportation accidents or leaks, temporary stockpile leaks and improperly abandoned sites are all cause for concern for surface water suppliers.

Land use compiled from the 2001 Landsat imagery has been utilized to determine potential non-point sources of contamination. Land uses within the Priority A Area, **Figure Seven,** should be targeted for BMPs. Close attention to how the land is used within close proximity to the River or its tributaries is important. The Minneapolis Water Works needs to primarily address varying densities of development and the potential impact to the drinking water supply.

Land use must be considered in the Priority B Area of the SWPA for potential non-point sources of contamination. The available data within this area - as shown in Part One of this Plan - are outdated, requiring confirmation. This land use information is based on data from http://deli.dnr.state.mn.us/data_catalog.html. This web site also contains public land survey information. The production of a map including this information becomes illegible. Adding this data to smaller scale maps in the implementation phase will be necessary. Zoning and present land use information is available from LGUs and will provide the most current data. Political boundaries can be found at: http://www.gis.leg.mn/.

Figure Seven



The Sauk and Crow Rivers in particular are significant contributors of contaminants to the Mississippi River. Forms of pollution in the Mississippi River and many of its tributaries include suspended solids, nutrients, oxygen-using materials, metals, pathogenic microorganisms, and several organic and inorganic chemical constituents. Maps and tables of the individual potential contaminant sources for each Priority Area are available in **Appendix II** in electronic format. Printed maps must be in a larger scale than is practical to include in this Plan.

Stormwater drainage and agricultural tiling systems are examples of how land use changes can dramatically influence contaminant transport and time of travel. Both can dramatically increase velocity from a contaminant release point to the source water. Rivers therefore can become more "flashy" than prior to when the drainage systems were in place. As development increases, the boundaries of the A Area will likely expand. Land use trends may be important to consider in delineating the areas. Issues of velocity and volume of transport often impact sediment or turbidity and associated contaminants.

2. Public utility services

Public utility maps are available, in various formats, in City and County offices throughout the SWP Area. Water and wastewater lines should have negligible impact on the water quality. Storm sewer outlets to the Mississippi River and tributaries will potentially impact the quality and quantity of the drinking water source. Inventory and mapping of these inlets/outlets is the first step toward identifying potential sources of contamination coming from the watershed. Public drainage systems have been created throughout the state to provide movement of water from poorly drained or eroding soils to tributaries and directly to the River. Mapping accuracy varies greatly by community. It is important to identify these systems within the SWPA as they contribute to the nutrient load. Management practices such as buffers and / or sedimentation basins will mitigate the impact.

Ground transportation corridors provide a potential source of contamination due to accidental spills and discharges. Interstate 94 and Highway 10 parallel the Mississippi River for much of its length in the SWPA. Numerous roadways cross and parallel the River in the metro area. Both the Burlington Northern (BN) and the Canadian Pacific (CP) Railways are within the areas of protection as well as underground pipelines. The Minnesota Department of Transportation (MNDOT), BN, CP, the Office of Pipeline Safety (OPS) and the Cities located within the SWP area all have plans for mitigation of possible spills.

The Mississippi River Defense Network (RDN) included an inventory of potential oil and chemical spill sources within one-half mile of the Mississippi and near the lower reaches of certain tributaries between the Mississippi River headwaters and St. Anthony Falls. Within this corridor, more than 3,300 potential spill sources were identified, including pipeline, highway, railroad river crossings and parallels, above- and below-ground petroleum and chemical storage tanks, agricultural chemical storage facilities and hazardous waste storage facilities.

C. WATER QUANTITY DATA ELEMENTS

1. Surface water quantity

The time of travel information was developed for Part One of the SWP Plan and has been completed by the USGS and/or the Army Corps of Engineers (ACOE). USGS gauging stations have been mapped in Part One of the Plan. Complete information on this study can be found in the **Appendix of Part I** and gauging station information is available on their website at: http://waterdata.usgs.gov/mn/nwis/rt. The hydrology contributing to the Mississippi, as shown in **Figure Eight**, is utilized to show time-of-travel.

Time of travel considerations are related to a single contaminant release and the duration it will take the contaminant to reach the source water intake. The US Army Corps of Engineers, utilizing the "Riverine Emergency Management Model" (REMM) measured travel times associated with flows at the 10% exceedance level (high flows), 50 % exceedance level (medium flows), and the 90% exceedance level (low flows). River miles noted refer to the point upstream of an intake where a contaminant release would require eight hours to reach the intake station during high flow conditions. The approximate eight-hour time of travel locations upstream of the Minneapolis intake are:

High flows:	**River Mile 871.1**
Medium flows:	**River Mile 866.51**
Low flows:	**River Mile 862.4**

The approximate times of travel from the Elk, Crow, and Rum Rivers and Elm, Coon, and Rice Creeks to the Minneapolis intake are as follows.

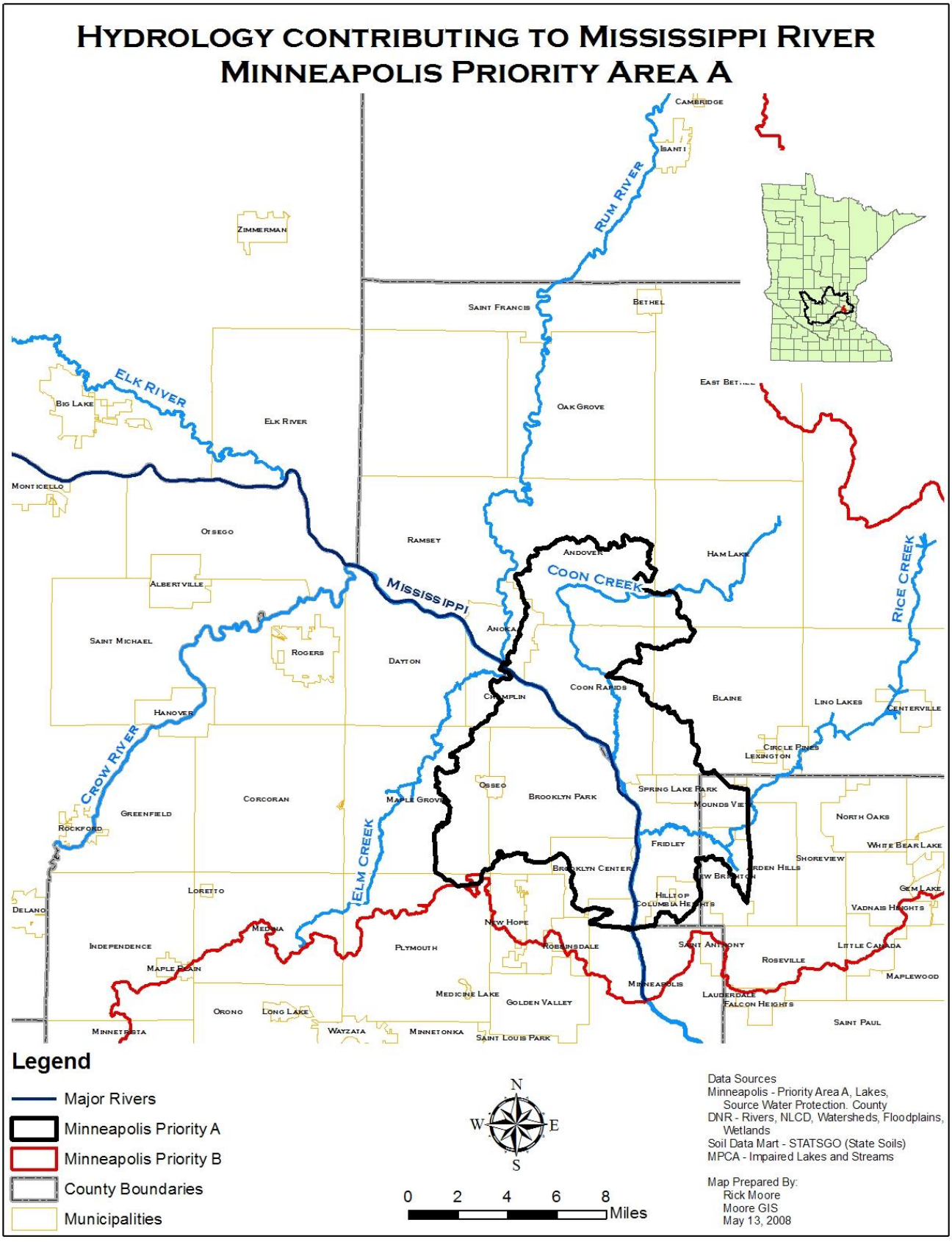
	High flows	Medium flows	Low flows
Elk River	**14 hrs 06 mins**	**37 hrs 49 mins**	**96 hrs 53 mins**
Crow River	**12 hrs 10 mins**	**33 hrs 30 mins**	**85 hrs 27 mins**
Rum River	**08 hrs 10 mins**	**23 hrs 40 mins**	**59 hrs 29 mins**
Elm Creek	**07 hrs 56 mins**	**23 hrs 02 mins**	**57 hrs 48 mins**
Coon Creek	**03 hrs 09 mins**	**06 hrs 19 mins**	**13 hrs 03 mins**
Rice Creek	**01 hr 34 mins**	**03 hrs 11 mins**	**06 hrs 55 mins**

The USGS estimated time of travel to the Mississippi River confluence from selected locations on the Elk, Crow, and Rum Rivers and Elm, Coon and Rice Creeks. A list of these locations, by tributary, and the estimated time of travel (in hours) for the leading edge of a contaminant plume from each location to the Mississippi River confluence is:

Elk River	High flows	Medium flows	Low flows
Orono Lake Dam	**0.61 hr**	**1.05 hrs**	**1.48 hrs**
Orono Lake inlet	**2.25 hrs**	**3.77 hrs**	**5.23 hrs**
BN Railroad	**4.38 hrs**	**7.35 hrs**	**10.21 hrs**
USGS gauge	**5.95 hrs**	**9.98 hrs**	**13.84 hrs**

Crow River	High flows	Medium flows	Low flows
Interstate 94 Bridge	**3.42 hrs**	**8.39 hrs**	**15.24 hrs**
St. Michael WWTP	**5.68 hrs**	**14.20 hrs**	**26.48 hrs**
Rockford USGS gauge	**10.90 hrs**	**27.25 hrs**	**50.84 hrs**

Figure Eight



Rum River	High flows	Medium flows	Low flows
Below Trott Brook	5.78 hrs	10.14 hrs	15.44 hrs
County Rd 22 USGS gauge	9.84 hrs	17.28 hrs	26.41 hrs

Elm Creek	High flows	Medium flows	Low flows
US 169	0.31 hr	0.75 hr	1.18 hrs
Elm Creek Road USGS gauge	4.28 hrs	9.60 hrs	14.23 hrs
Below Rush Creek confluence	5.46 hrs	12.24 hrs	18.11 hrs
93rd Ave N	8.89 hrs	20.09 hrs	29.93 hrs

Coon Creek	High flows	Medium flows	Low flows
Northdale Blvd	4.95 hrs	6.98 hrs	11.58 hrs
S Coon Creek Drive	8.82 hrs	12.41 hrs	20.49 hrs

Rice Creek	High flows	Medium flows	Low flows
Long Lake Rd	4.61 hrs	6.39 hrs	11.20 hrs
Baldwin Lake outlet	10.43 hrs	14.37 hrs	24.79 hrs

Surface water is used for irrigation of cropland, municipal drinking water, livestock production and other high water need occupations. Permits are required for use of surface water in excess of 10,000 gallons per day or one million gallons per year. High water use can affect the quantity of water available for the drinking water supply. The permitting authority is the DNR and a listing of uses, sources and permitted amounts, reported by county, can be found on the DNR website at: http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/idxloc.pdf. They are listed in **Appendix III** of this document by county. There are no known water use conflicts. Further assessment will be required to determine any conflicts.

2. Groundwater quantity

Due to the limited data on hydraulic connections between surface water and ground water, it is difficult to estimate the effect of groundwater use on availability of surface water. Upon completion of the USGS Mississippi River Base Flow Study, this information should be more readily available. There are no known water use conflicts.

The number of high capacity wells located within the SWPA is too large to include in this report. Wells located within the Priority A Area and/or in alluvial soils should be inventoried and assessed for potential effects on the quantity of water available in the River system. Permits are required for use of groundwater in excess of 10,000 gallons per day or one million gallons per year. The highest use of groundwater is agricultural irrigation. The permitting authority is the DNR and a listing of uses, sources and permitted amounts, reported by county, can be found at: http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/idxloc.pdf as well as listed in the **Appendix III** of this document.

D. WATER QUALITY DATA ELEMENTS

1. Surface water quality

Surface water quality data may indicate areas that have shown a persistent impairment or may show where increased human activity has increased contaminant loading. If such areas fall within or near a SWPA, they could indicate that future problems may arise as activity increases. The MPCA evaluates surface water quality using the Clean Water Act goals of "fishable and swimmable"; drinking water use is not addressed. The agency is currently investigating how such drinking water evaluation might be accomplished.

The MPCA prepares a list of waters (lakes and river reaches) that have been determined to be "impaired" by one or more of an array of constituents. These constituents relate to the Clean Water Act goals of "fishable" or "swimmable"; they do not relate to drinking water standards. However, certain constituents, such as Fecal coliform or turbidity, would be of concern from a drinking water perspective. The following information, **Table Three,** and mapping, **Figures Nine A-C,** are derived from the 2006 Total Maximum Daily Load (TMDL) list found on the MPCA website at: http://www.pca.state.mn.us/water/tmdl/index.html. A reach of impaired water may extend beyond the delineated SWPAs. Investigations of possible sources of contamination associated with the impairment may fall outside the delineated SWPA. The seven nutrient impacted lakes within the Minneapolis area are a concern that needs to be addressed. While the mercury impacted lakes will be dealt with by the MPCA, they should be treated as priority lakes for mitigation due to their proximity to the River.

MPCA IMPAIRED WATERS **Table Three**

Municipality		**Minneapolis**	
SWP Priority Area		**A**	**B**
Number of Impaired Waterways		**25**	**210**
Impairment	Ammonia		2
	Fish Index of Biotic Integrity (IBI)	3	50
	Invertebrate IBI	8	24
	Chloride	1	1
	Dissolved Oxygen	2	16
	Fecal Coliform	6	48
	Mercury	14	171
	Turbidity		26
	Polychlorinated Biphenyl (PCB)	13	36
Affected Use	Aquatic Consumption	8	117
	Aquatic Life	11	31
	Aquatic Life and Aquatic Consumption		14
	Aquatic Life and Aquatic Recreation		6
	Aquatic Life, Aquatic Recreation, Aquatic Consumption		29
	Aquatic Recreation		
	Aquatic Recreation and Aquatic Consumption	6	13
Total		**25**	**210**
Municipality		**Minneapolis**	
SWP Area		**A**	**B**
Number of Impaired Basins		**9**	**128**
Impairment	Mercury	3	85
	Nutrients	7	55
	PCB		3
Affected Use	Aquatic Consumption	2	73
	Aquatic Recreation	6	43
	Aquatic Recreation and Aquatic Consumption	1	12
Total		**9**	**128**

Figure Nine A

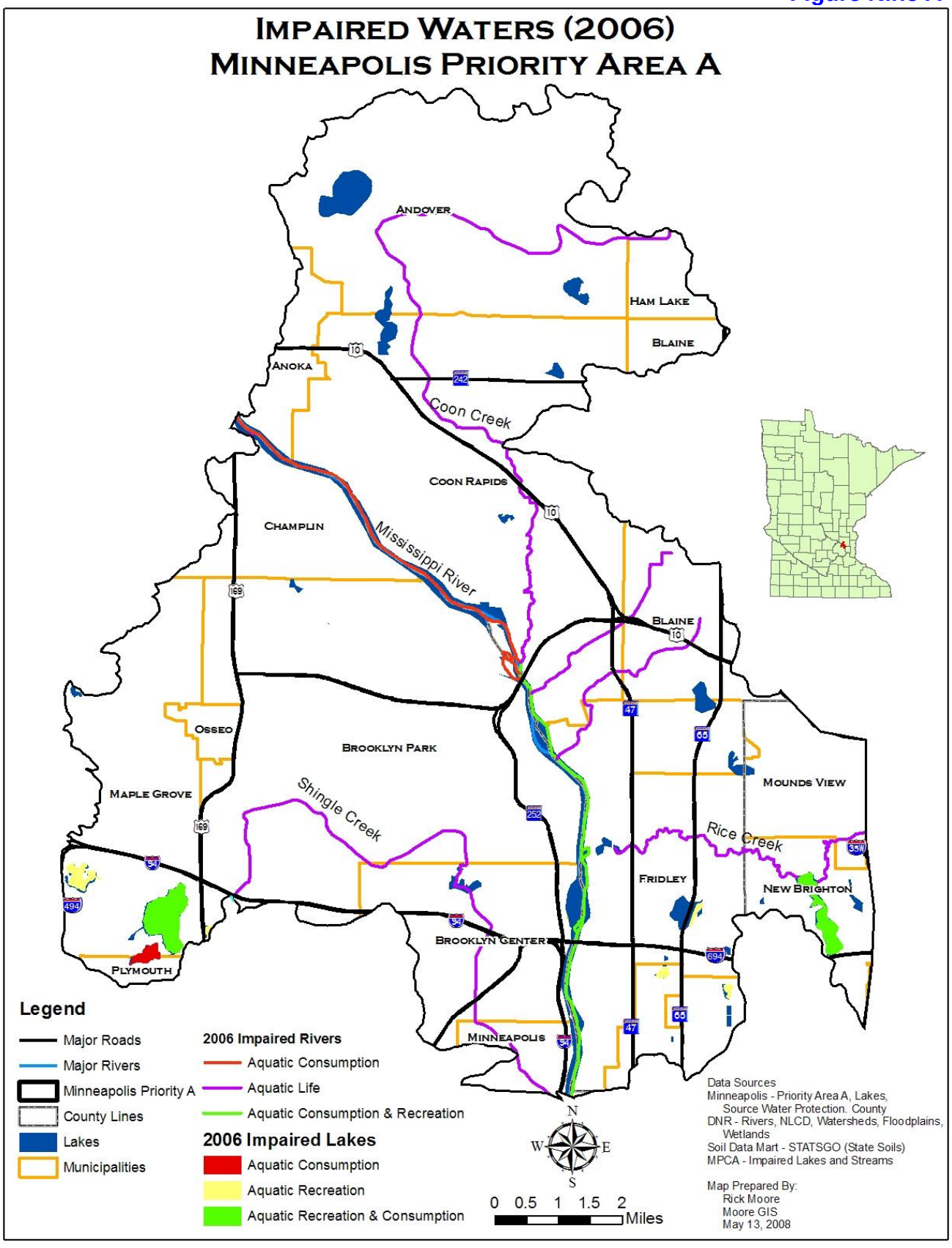


Figure Nine B

Minneapolis Source Water Protection Area and Impaired Streams

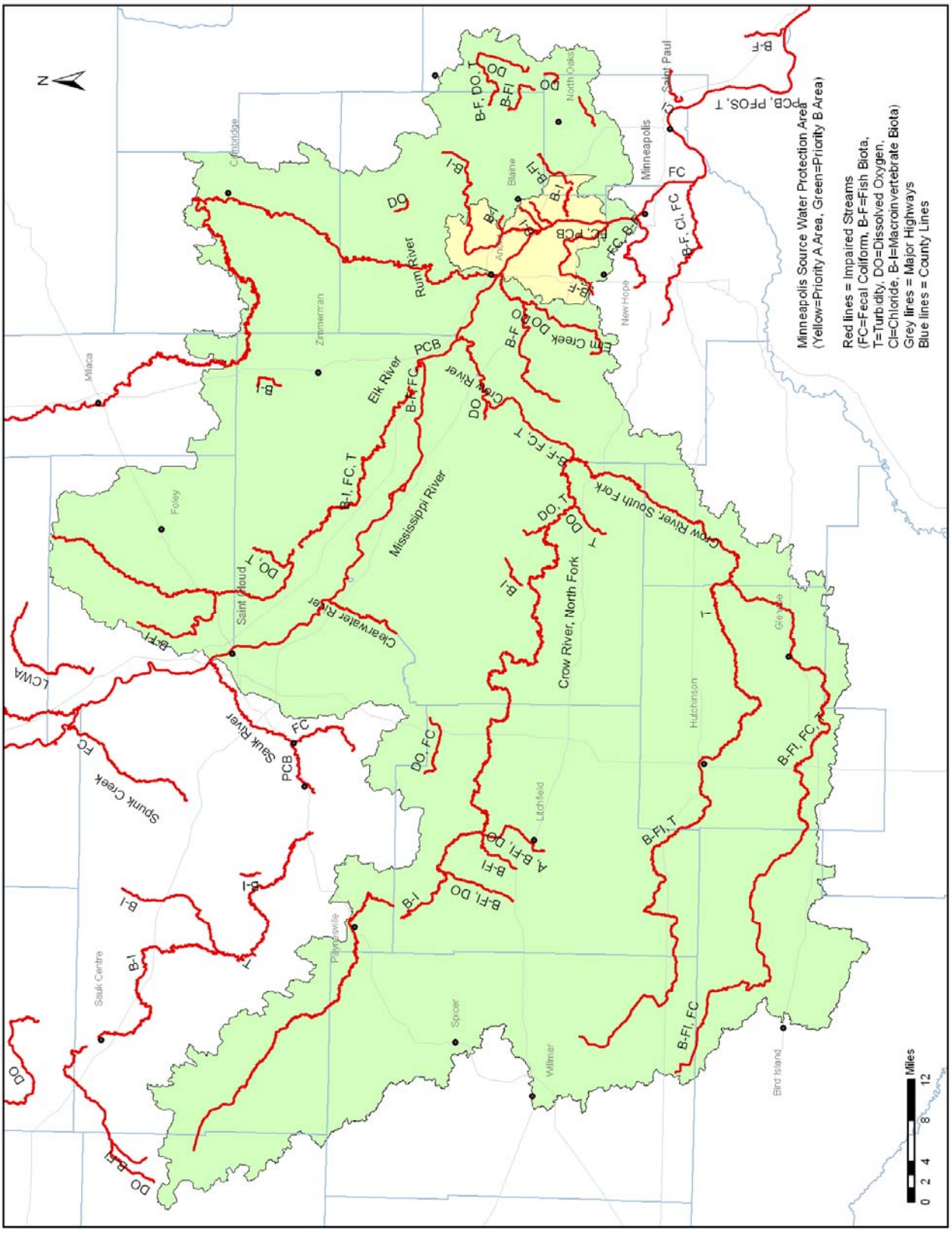
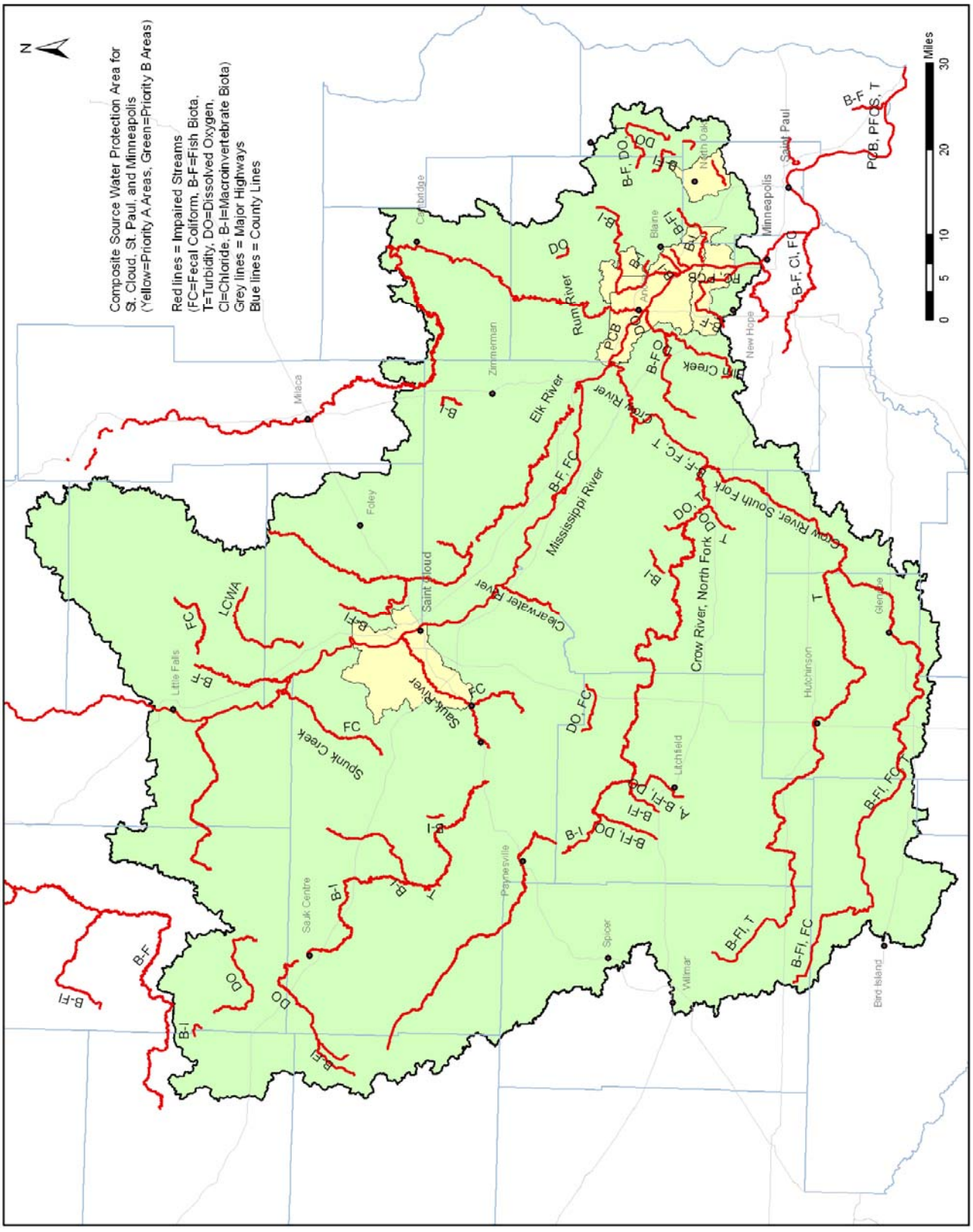


Figure Nine C

Composite Source Water Protection Area and Impaired Streams



Any hazardous wastes that contain more than 50 parts per million of PCBs are subject to regulation under the Toxic Substances Control Act. In addition to the Mercury, Fecal coliform and PCB, this area has a reach with turbidity and dissolved oxygen problems. Biological monitoring using an index of biological integrity (IBI) detects changes in biological conditions caused by various human actions. It was found the biological integrity of the invertebrates and fish are compromised in the Minneapolis Priority A Area. It has 25 impaired reaches including Fecal coliform, Chloride, PCB, Dissolved Oxygen and compromise to fish and invertebrates. The detection of these substances in the intake water requires treatment for removal.

2. Groundwater Quality

Geology is important in terms of interaction between ground water and surface water. It is important to note that aquifer boundaries do not match the boundaries of overlying surface watersheds. Generally, ground water discharges to surface water. Ground water quality will influence the quality of surface water where ground water discharges to the River. In most cases, local ground water quality will likely be better than nearby river water quality.

The corridor along the Mississippi River between the Twin Cities and Little Falls lacks comprehensive geologic studies. In addition, this corridor is characterized by unconfined drift aquifers, which are often shallow aquifers in sandy soils. Ground water in such an environment holds the potential to be more directly connected to surface water, such as the Mississippi River and its tributaries. Relatively limited data are available within the SWPA as to specific locations where surface waters are recharged by or discharge to ground water. There is a particular need for such detailed geologic information in view of the rapid population growth and land use changes taking place within this corridor.

Groundwater quality can vary dramatically both horizontally and vertically. Data cannot be extrapolated over short distances. If groundwater in alluvial shallow aquifers adjacent to SWPAs is contaminated, it suggests that the aquifer is sensitive to pollution. Many alluvial aquifers exist within several miles of the Mississippi River. If the aquifer contributes or could contribute significant amounts of water to the surface water body, then indirectly, the surface water body would be sensitive to pollution via subsurface pathways.

Due to the limited data on hydraulic connections between surface and groundwater, all streams and waterways should be considered as gaining from ground water under normal climatic conditions until proven otherwise. This lack of detailed data on interaction between surface water and ground water represents an informational need that should be addressed. Therefore, the acquisition of this additional information is an important future management strategy of this SWP Plan.

II. ASSESSMENT OF DATA ELEMENTS

A. USE OF THE SURFACE INTAKE

Water from the Mississippi River is the exclusive source of drinking water for the Minneapolis Water Works (MWW), drawing an average of 65 MGD to an estimated 0.5 million residents.

B. QUALITY AND QUANTITY OF WATER SUPPLYING THE PUBLIC WATER SUPPLY SURFACE INTAKE

According to Part One of the Sourcewater Protection Plan, typical Mississippi River flow is approximately 3.9 billion gallons per day. Fecal coliform and PCBs are found in the River system from Coon Creek inlet to Upper St. Anthony Falls in several areas and from the Crow to Rum River inlets. While the quality of the source water varies depending on rainfall, time of year and other factors such as land use, all three water suppliers meet or exceed drinking water standards for finished water supplied by the MDH. The most recent Consumer Confidence Report is recorded in **Appendix IV** of this Plan.

C. THE LAND AND WATER USES IN THE DRINKING WATER SUPPLY MANAGEMENT AREA

Due to the vulnerable status of the SWP Area, the identification of contaminant sources within the delineated Priority A Area must be completed and prioritized for mitigation. Management strategies to improve the quality of runoff into the River, along with actions to prevent contamination from accidental spills are a high priority in the Priority B Area. Proactive management of agricultural feedlots and stormwater runoff must be included as part of the management strategies of this Plan.

CHAPTER TWO

POTENTIAL CONTAMINANT SOURCE INVENTORY (PCSI) AND PRIORITIES

I. DESCRIPTION OF HOW THE PCSI WAS CONDUCTED

A preliminary listing of the known potential contaminants was supplied to the SWP Team by the MDH and was based on Federal and State permit information. Location of contaminants could be +/- several thousand feet. Gross maps and data base files of the contaminants are electronically available in **Appendix II** of this document and must be evaluated for accuracy and refined in both the Priority A and B Areas.

II. SUMMARY OF PCSI

The potential contaminants listed in the "B" Area of **Table Four,** must be evaluated according to their proximity to the source water, the ability of the soils in the area to assimilate the contaminant and known data about the impact. All contaminants within the "A" areas must be assessed for potential contamination and prioritized for mitigation.

Potential Contaminant Source Inventory Totals **Table Four**

Priority Area	Minneapolis Source Water Protection Area A	B
Above Ground Storage Tanks	198	921
Agricultural Chemicals	44	1518
Animal Feedlot Permit	--	904
Delisted Permanent List of Priorities	4	25
Dump	58	300
Hazardous Waste Generator Investigative Clean-up	5	28
Hazardous Waste Generator Permit	1751	7511
Leaky Underground Storage Tanks	474	2327
NPDES	11	174
Registered Storage Tank Permit	773	3681
Solid Waste Permit Site	10	75
Underground Storage Tanks	2007	9325
Vehicle Salvage Yards	13	85
CERCLIS Sites	1	1
Federal Superfund Sites	4	7
NFRAP Sites	8	71
State Superfund Sites	13	26
Transportation Crossings	67	908

Non-point land uses within the Priority B Area such as agriculture pasture and cropland, septic systems, development and stormwater must also be assessed for potential contamination based on the same criteria listed above. The best available data for this determination are the land use maps and the PCSI. This information is in data sets utilizing "broad brush" areas and is of questionable accuracy. WDs and LGUs may be able to assist in refining and supplementing the data available. It is important to verify and prioritize this data for management strategies.

III. IDENTIFICATION OF CONTAMINANTS OF CONCERN

It is necessary to establish geographic and contaminant priorities to effectively manage the contaminants that pose the greatest risk to public water supplies.

The contaminants listed in the Environmental Protection Agency's "National Primary Drinking Water Standards" are a concern to all public water suppliers. Of these listed contaminants, and in addition to them, the Minneapolis water suppliers have identified contaminant priorities on the basis of:

1. High levels of the contaminant in the source water,
2. Limitations of water treatment technologies,
3. Contaminant concentrations that could contribute to the creation of disinfection byproducts,
4. Lack of monitoring data, and
5. Lack of knowledge regarding contaminants, sources or health effects.

The contaminants of greatest concern to the Minneapolis Water Department are listed below. The listing is not ranked by priority.

- **Total suspended solids, sediment and suspended organics**
  - These contaminants are able to carry metals, bacteria and organisms, some of which are known to be precursors to disinfection byproducts.
- **Cryptosporidium**
  - This organism is a parasite present in the Mississippi River that is difficult to remove or can pass through conventional treatment processes.
- **Other biological and microbiological organisms, such as Fecal Coliform, Giardia and viruses**
- **Nutrients, including phosphorus, nitrates and ammonia**
  - Can promote algae growth and can impair water treatment processes because they are difficult to remove.
- **Pesticides**
  - Including insecticides, fungicides and herbicides
- **Petroleum products**
- **Organic solvents**
- **Pharmaceuticals**
- **Endocrine-disrupting chemicals**
- **Radioactive materials**

IV. PRIORITIZATION OF SOURCES

After identifying the contaminants of concern, the SWP Team has investigated both the point and non-point uses within the DWSMA, with focus on the Priority A Area. They then determined the potential sources of these contaminants. These potential sources were then assessed by their ability to influence the surface water intakes and prioritized for implementation strategies as follows:

High Priority Sources: "Known Contaminants"

- Improper Manure Management.
- Known Stormwater Discharge Sites.
- Cropland Sediment Runoff.
- Streambank Erosion.
- Transportation Corridors.
- Hazardous Waste Clean Up Sites.
- Leaking Underground Storage Tanks.

Medium Priority Sources: "Potential Contaminants"

- Gravel and Mining.
- Residential Lawn Management.
- Above Ground Storage Tanks.
- Agriculture Chemical and Pesticide Applicators.
- NPDES permits.
- Underground Storage Tanks.
- Vehicle Salvage Yards.

Low Priority Sources: "Permitted and Regulated"

- Wells.
- Permitted Feedlots.
- Permitted Hazardous Waste Generators.
- Permitted Registered Storage Tanks.
- Permitted Solid Waste Sites.

V. DESCRIPTION OF POTENTIAL CONTAMINANT SOURCES THAT MAY NEED FURTHER INVESTIGATION FOR PLAN IMPLEMENTATION

Potential contaminant sources identified within the Priority B Area need to be assessed to determine their capacity to enter the River system and influence the quality of withdrawal for drinking water. Each minor watershed needs to be reviewed for the potential contaminant sources from land use management practices and the feasibility of stormwater conveyance into the Mississippi River.

Within the Priority A Area, feedlot assessments must be completed and reviewed for potential impact. Leaking Underground Storage Tanks (LUST) should be mapped over a soils layer to determine the potential for groundwater contamination and assessed for the potential to enter the River. Stormwater inlets to the River need to be tested to determine watershed areas of concern and potential contaminant transport.

CHAPTER THREE

IMPACT OF CHANGES ON PUBLIC WATER SUPPLY INTAKE

I. CHANGES IDENTIFIED IN THE SOURCE WATER PROTECTION AREA

A. PHYSICAL ENVIRONMENT

1. Precipitation

Climate change is occurring and continues to occur in Greater Minnesota. Global warming is expected to raise the average annual temperature of the Twin Cities in the next few years. An increase in the percentage of water vapor content in the air will shift the type of weather from dry to humid resulting in an increase of rainfall intensity and quantity. This may have significant impacts on wetlands and other physical features. Erosion of marginally vegetated soils and utilizing our wetlands beyond the natural capacity will minimize the benefits of the storage and filtration capacity.

2. Geology

The corridor between St. Cloud and St. Paul is rapidly developing into residential homes for commuting families. Expected changes in the geology include the grading involved in development and more wells into the aquifer. Areas with little protection to the aquifer should be designated sensitive to development pressure.

3. Soils

The soils within the SWPA will not change, however land shifts from agriculture to residential development in the coarse-textured soils along the River corridor are expected. As residential populations increase, so does the potential need for services such as underground storage tanks for gasoline and other amenities.

4. Water Resources

With increased development, we can anticipate a decrease in natural wetlands and an increase in man-made retention basins. Individual lakes are known to show development impacts from increases in impervious surfaces and sedimentation from vegetation removal and alteration of natural shorelines. Buffers along water courses and tributaries could impact the River in a positive way.

B. LAND USE

1. Land Use

Urban development in the metropolitan area and particularly the Interstate 94 corridor between the 94/494/694 intersection in Maple Grove and St. Cloud is rapid. Projected growth in the metropolitan area is an additional 1,000,000 individuals by 2050. The anticipated development is beginning to occur in rural areas west of and adjacent to the metro area. This will result in the establishment and / or expansion of water and wastewater systems. This presents a challenge to the aquifer.

A large feedlot within runoff proximity could present direct impacts to the drinking water resource. In addition, long-term impacts to the groundwater may occur. Management of the size and / or location of feedlots within the SWPA to mitigate potential contamination issues are important to the protection of the source water.

2. Public Utility Services

The increase of public utilities is inevitable with the predicted rise in residential development. Water, wastewater and transportation corridors will need to accommodate this growth. Stormwater must be managed such that no further impact to the River will occur.

C. SURFACE WATER

1. Quality

Surface water throughout the SWPA shows results of human impacts to quality due to total suspended solids and other undesirable contaminants. Lakes have been showing gradual degradation with regard to clarity and production of algae. The waterways are impacted by suspended sediment and nutrient runoff; however the main River system has shown improvement in the past 100 years. Taste and odor incidents have been a chronic problem but have become less frequent and intense over time. Coliform is found in the intake waters year-round. Increased rainfall activity will exacerbate the runoff and contaminant potential.

2. Quantity

The anticipated changes in quantity of the surface waters are somewhat unknown. Predictions of increased rainfall, if true, will increase the quantity in the River system and recharge to the aquifer.

D. GROUNDWATER

1. Quality

There are no anticipated changes to the groundwater quality within the SWPA. Mitigation of potential sources of contamination will help maintain the good quality of this resource.

2. Quantity

Changes in groundwater quantity are not anticipated; however development and industrial use increases will affect the quantity. High-capacity wells located within the alluvial soils bordering the River will be inventoried and monitored for potential impact. Cooperation with the DNR regarding new applications within this area will be pursued and input offered.

II. IMPACT OF CHANGES

A. EXPECTED CHANGES IN WATER USE

Minneapolis Water Works uses an average of 65 MGD to service their area. From 1998 to 2003 the Minneapolis service area population increased by 5.7%, but from 2003 to 2006 the increase was 1.5%. Minneapolis Water Works supplies water to almost half of the Hennepin County population with some cities like Richfield inquiring about connecting for emergency supply. The most likely increase, based on the 2000 Water Supply, Emergency, and Conservation Plan for MWW, is about 3 – 5%.

B. INFLUENCE OF EXISTING WATER AND LAND GOVERNMENT PROGRAMS AND REGULATION

The quality of source water is directly impacted by existing water, land and government programs and regulations. The Mississippi River and the tributaries draining into it are regulated locally based on floodplain and shoreland regulation standards outlined in Minnesota Rules, Chapter 6120. Cities and Counties enforce these protective rules through zoning. SWCD and the Natural Resources Conservation Service (NRCS) work with landowners to implement the Conservation Reserve Program (CRP) and other set-aside programs that are important to provide a buffer between the waterways and the use of the land. The Conservation Reserve Enhancement Program (CREP), enacted legislatively, would add additional incentives for land preservation. Another important protective regulation is the Wetland Conservation Act (WCA). This program is charged with minimizing and mitigating wetland destruction.

In the Metropolitan area WMOs are mandated LGUs (M.S. 103B.201) that exist over the seven-county metro area. The water managers with a state-approved, locally adopted plan generally have the authority to compel LGUs, such as municipalities, to adopt or delegate minimum regulatory controls. They also have the authority to run outreach programs, construct projects, and cooperate with other units of government.

WDs and WMOs have programs in place to provide both financial and technical assistance to property owners on BMPs. Their monitoring programs provide data on the impacts of land use and their strategic plans have goals common to this Plan. Support for existing programs will help in implementation of strategies outlined in Chapter Six.

One challenge of protecting this area lies in the fact that regulatory authority belongs to the following (shown in **Figure Ten**):

- Counties: Anoka, Hennepin and Ramsey:
- Cities: Dayton, Anoka, Andover, Ham Lake, Coon Rapids, Blaine, Maple Grove, Osseo, Brooklyn Park, Spring Lake Park, Mounds View, Fridley, New Brighton, Hilltop, Columbia Heights, Minneapolis, Robbinsdale, Crystal, New Hope, Plymouth and Brooklyn Center:
- Watershed Management Organizations (WMO): Elm Creek, Lower Rum River, West Mississippi River, Six Cities, Shingle Creek and Mississippi River; and
- Watershed Districts (WD): Rice Creek and Coon Creek.

The cities requiring Wellhead Protection Area Plans are:

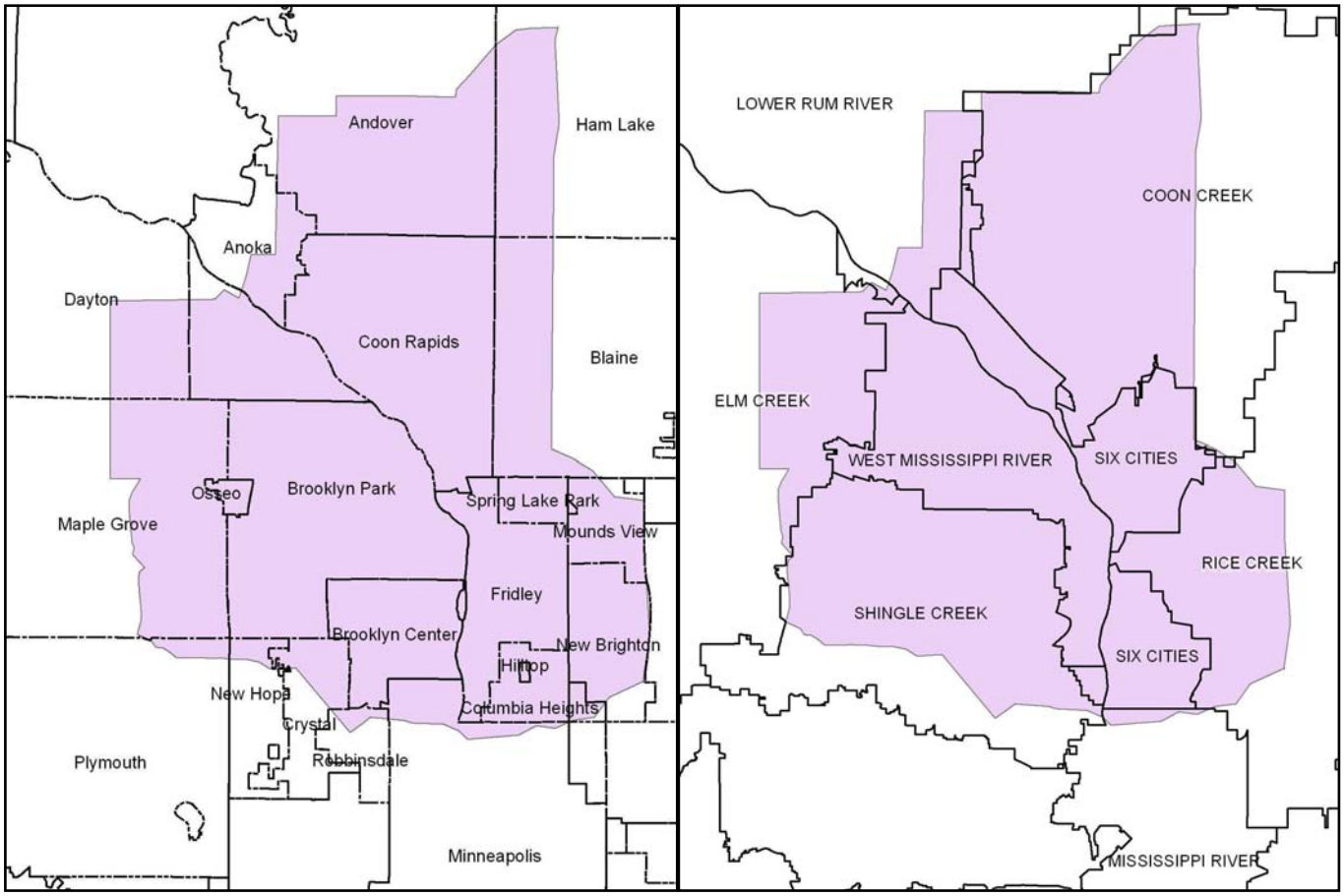
- Andover, Anoka, Blaine, Coon Rapids, Fridley, Spring Lake Park, Brooklyn Park, Brooklyn Center, Dayton, Maple Grove, Plymouth and Robbinsdale.

Maps and geospatial data for these areas is available at: www.health.state.mn.us. Protection issues with these communities may be common to or potentially conflict with the strategies identified in this Plan. Working cooperatively on strategies with these authorities is beneficial to both the City of Minneapolis and the city developing the WHP Plan.

Figure Ten

Minneapolis DWSMA – A

Cities **WMO / WD**



C. Administrative, Technical, and Financial Considerations

The City of Minneapolis intends to implement this plan by participating in the Upper Mississippi River Source Water Protection Project (UMRSWPP) in conjunction with the cities of St. Paul and St. Cloud. The grant funding resources available to continue this project are expected to continue. The City intends to continue to work with the UMRSWPP to explore additional funding sources of priority strategies.

The Cities of Minneapolis, St. Cloud and the St. Paul Board of Water Commissioners have put forth a cooperative effort to support SWP, with commitments to continue implementation. A SWP Team has been formed and is actively involved in the planning process.

The three public utilities involved, the Metropolitan Council, USGS, DNR, MRWA, MDH, MPCA, USGS and the ACOE provided technical assistance for this Plan. The Upper Mississippi River Source Water Protection Project Coordinator provided facilitation grant writing and documentation.

CHAPTER FOUR

ISSUES, PROBLEMS, AND OPPORTUNITIES

I. LAND USE ISSUES, PROBLEMS AND OPPORTUNITIES

A. SOURCE WATER

The Mississippi River and its tributary rivers and streams show immediate negative response to poor land use decisions. Contamination of the land within runoff proximity will lead to source water contamination. Contaminants contained in the sediment will enter the River system during high rainfall events. This source water system is vulnerable to contamination from land use issues.

Opportunities resulting from this determination include: establishment of educational programs on BMPs; outreach assistance to property owners in the form of set-aside programs; cost-share for BMPs; proper disposal assistance for hazardous waste; and regulatory enforcement if necessary. These actions will be completed with cooperation of local government officials and programs.

B. GROUND WATER

The areas of concern for contamination from land use practices are located adjacent to the Mississippi River and tributaries in the sandy, alluvial soils. This presents the opportunity to further study the connectivity between these soils and the surface waters. LGUs are a resource for collaboration on the permitted land uses within this area and possible requirements for mitigation with the permits.

Geographic areas where aquifers serving as public water supplies are close to surface waters have the potential to be hydraulically connected with one another and provide a transport mechanism for cross-contamination in one or both directions. Understanding where such hydraulic connections and the potentials for cross-contamination exist would enhance source water protection and wellhead protection efforts, particularly in the event of a large contaminant release.

The areas where surface waters and aquifers are hydraulically connected should be identified and mapped. In such areas, contaminants can be transported from ground water to surface water or surface water to ground water. Depending on surficial flow conditions, transport can be in both directions, in the same area, at different times. Pumping from an aquifer can intensify this flow mechanism and contaminant transport. It is important to inventory and manage potential sources of point and non-point contaminants that could enter surface and ground water in areas where hydraulic connection could provide a mechanism of cross-contamination. There has been one unsuccessful attempt to obtain this information: the UMRSWPP team will proceed to gather this information if it can be obtained in a cost-effective manner.

C. THE DRINKING WATER SUPPLY MANAGEMENT AREA

The Drinking Water Supply Management Area / Source Water Protection Area is broken down into “A” and “B” areas of concern. The Priority A Area is within an eight-hour time-of-travel from the intake of the water supplier. These are clearly the higher priority areas.

The Priority B Area provides a conduit to the source water intake but is further than eight hours away.

The management and dissemination of available data within this area is a challenge. It is difficult to produce a PCSI map that is valuable because of the size of the DWSMA and the numerous potential contaminants. Data management opportunities include breaking the data into manageable areas, starting with the highest potential contamination areas. There is a need to develop a systematic approach to compiling and assessing data as required in this Plan.

Also related to the large area are the numerous governing agencies within the DWSMA. Establishing a working relationship with the watershed groups and other local government units (LGU) within the SWPA presents an opportunity to share expertise and funding for common priorities.

The largest potential impact to the DWSMA at present is stormwater runoff from developed, unvegetated land and/or from pavements. Agricultural runoff is also a significant impact.

Studying sedimentation processes will help to establish effective controls. Controlling the large volume of sediment that enters the River will positively impact the water quality. Requiring NPDES permits for future development and managing runoff without impacting the River will be the challenge.

II. IDENTIFICATION OF:

A. PROBLEMS AND OPPORTUNITIES DISCLOSED AT PUBLIC MEETINGS AND IN WRITTEN COMMENT

The general public has expressed no concerns at public meetings. Issues identified at the SWP Team meetings include education, agriculture impacts and sedimentation.

B. DATA ELEMENTS

The State's SWP Guidance Document requires that existing information be utilized in developing the initial SWP Plan. Much of the data collected and utilized to delineate the Upper Mississippi SWPA and DWSMA and to determine vulnerability of the surface intake to possible contamination comes from regional sources on a large scale. While much regional information and data are being used as supplied by MDH, the UMRSWPP team has initiated verification of many of the potential contaminant sources through further study of the movement of water and its effects.

The team will continue to compile data collected by all entities regarding groundwater and surface water to track potential changes in quality. This plan will be updated every ten years as recommended by the State of Minnesota. Current data will be utilized in update.

C. STATUS AND ADEQUACY OF OFFICIAL CONTROLS, PLANS, AND OTHER LOCAL, STATE, AND FEDERAL PROGRAMS ON WATER USE AND LAND USE

The SWP Team feels adequate protection of the SWPA is available through existing land use ordinances in the cities, counties and other local controls. Programs available for landowners to control detrimental land use practices are available. Identification of problem sites and education of the landowner is the preferred method of mitigation.

CHAPTER FIVE

SURFACE WATER INTAKE PROTECTION GOALS

I. GOALS

THE OVERALL GOAL OF THE SOURCE WATER PROTECTION PLAN IS TO:

Reduce the likelihood of a River contamination event.

TO ACCOMPLISH THIS GOAL THE CITY WILL:

Promote public health, protect the environment, encourage economic development, manage community infrastructure and reduce current drinking water treatment costs by improving the quality of source waters and maintaining a potable drinking water supply at a reasonable cost for all residents of the community, now and into the future.

IN ADDITION THE CITY WILL:

Promote and support the communication and working relationships developed through this planning process between the City of Minneapolis and the Cities of St. Paul and St. Cloud.

IN ADDITION THE CITY WILL:

Promote and support communication and working relationships between the City of Minneapolis and other LGU, public water suppliers, watershed districts, water management organizations, joint powers boards and Soil and Water Conservation Districts within the Mississippi River SWPA.

IN ADDITION THE CITY WILL:

Actively support public and consumer understanding of, and involvement in, managing land uses within the Mississippi River watersheds and protecting Mississippi River drinking water intakes.

II. THE SOURCE WATER PROTECTION PLAN WILL ACHIEVE THESE GOALS THROUGH:

- **Public education programs**
- **Dissemination of appropriate and timely information**
- **Coordination with other surface water protection efforts**
- **Emergency response procedures**
- **Implementation of BMPs for all identified categories of potential contaminant sources**
- **Enhancement, including financial support, of other local drinking water protection efforts**
- **Data Collection and analysis**

CHAPTER SIX

OBJECTIVES AND PLANS OF ACTION

I. ESTABLISHING PRIORITIES

The core of this SWP Plan is the identification and implementation of effective contaminant source management strategies that will protect a public water supply intake from potential contamination. These management strategies may range from non-regulatory activities, such as public education, to regulatory activities such as adoption of new ordinances. Both point and non-point source contamination management will be focused on within the Priority A Area. The focus of the Priority B Area will be primarily non-point sources, with attention to pertinent point sources such as NPDES and known impact areas. This will be further explored and refined during the implementation process.

As it is likely that not all of the action steps proposed in this Plan could be implemented immediately following approval, the management strategies listed in this chapter have been prioritized based on the following factors:

1. Knowledge of contamination of the public water supply intake;
2. Types and quantities of the potential contamination sources;
3. Location of the potential contaminant source in relation to the intake;
4. Capability of the source water to attenuate or dilute a contaminant;
5. Capability of the geologic material in the SWP area to absorb a contaminant;
6. Existence and effectiveness of existing official controls;
7. Time required to obtain cooperation; and
8. Administrative, legal, technical and financial resources needed.

Based upon these factors, the availability of resources and the priorities determined in Chapter Five of this Plan, the SWP Planning Team will concentrate management efforts on the following categories and subsequent strategies to create awareness of sourcewater protection and help prevent future contamination of the drinking water resource:

- **A. SWP Education & Awareness:**
- **B. Urban Stormwater Management:**
  1. **Community Plans and Known Stormwater Discharge Sites (NPDES)**
  2. **Streambank Erosion**
  3. **Turf Management**
  4. **Residential Hazardous Waste**
  5. **Impaired Waters**
- **C. Agriculture Management:**
  1. **Feedlots / Manure Management**
  2. **Erosion from Row Crop Farming**
  3. **Agriculture Chemicals**
- **D. Transportation Corridor & Spills:**
  1. **Mississippi River Defense Network**
- **E. Commercial & Industrial Management Practices:**
  1. **Tank Management**
  2. **Hazardous Materials Management**
  3. **Dump Sites**
  4. **Vehicle Salvage Yards**
  5. **Permitted Solid Waste Sites**
- **F. Well and ISTS Management:**
- **G. Data Collection and Analysis:**
  1. **PCSI**
  2. **SF Crow River**
  3. **Mississippi Gain/Losses**
- **H. Administration:**

The following outline of strategies will be prioritized by the UMRSWPP group. Measures will be implemented if and when funding becomes available. The designated "source of action" will either take the lead in the action identified or support the action if initiated by the UMRSWPP.

II. MANAGEMENT STRATEGIES

A. SWP EDUCATION AND AWARENESS MANAGEMENT PRACTICES

OBJECTIVE A-1: CREATE A PUBLIC AWARENESS CAMPAIGN INVOLVING THE SWP AREA AND PROTECTION OF THE DRINKING WATER RESOURCE.

MEASURE A-1-1: Support the development and maintenance of the UMRSWPP web site to provide continuous update of current activities and archive of applicable documents and data.

Source of Action: City of Minneapolis
Cooperators: MRWA, UMRSWPP
Timeline: 2009 - 2011
Estimated Cost: In-kind time to supply information to developer
Goal Achieved: Disseminate information on general SWP and the UMRSWPP project and provide venue for questions from LGUs and public.

MEASURE A-1-2: Establish an electronic newsletter to send to local government and general public contacts of pertinent interests.

Source of Action: City of Minneapolis
Cooperators: MRWA, UMRSWPP
Time Frame: 2009 - 2010
Estimated Cost: $2,000 (Grant, Cash, and In-kind)
Goal Achieved: Disseminate information on general SWP and the UMRSWPP project and provide venue for questions from LGUs and public.

MEASURE A-1-3: Host an annual or semiannual workshop to provide information on UMRSWPP content, to discuss issues that are common to SWP and local governments and update local officials on accomplishments.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MRWA, MDH, Met Council, WMOs and WDs
Timeline: 2009 - 2016
Estimated Cost: $2,000 (Grant, Cash, and In-kind)
Goal Achieved: Local government "buy-in" to project with local participation in workshop and potential technical and financial assistance with meeting project goals.

MEASURE A-1-4: Establish education fact sheets, poster displays, flyers, radio and television ads as appropriate to get the message to users of the watersheds in the SWP Area.

Source of Action: UMRSWPP
Cooperators: City of Minneapolis, MRWA, MDH, LGU, WD, WMO
Time Frame: 2009 - 2011
Estimated Cost: $25,000 (Grant, Cash, and In-kind)

Goal Achieved: Establish a better understanding of the SWP area and the need to protect it. Develop a cause / effect relationship between land use and the quality of the drinking water resource.

MEASURE A-1-5: Participate as a sponsor or co-sponsor of educational activities (water festivals, environmental fairs, county fairs, etc.) in the watershed protection area as the opportunity arises.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, LGU, WD, WMO, MRWA, MDH
Timeline: 2009 and on-going
Estimated Cost: In-kind staff time
Goal Achieved: Public visibility of the project and establishment of a better understanding of the SWP area and the need to protect it. Develop a cause / effect relationship between land use and the quality of the drinking water resource.

B. URBAN STORMWATER MANAGEMENT PRACTICES

OBJECTIVE B-1: DEVELOP WORKING RELATIONSHIP WITH COMMUNITIES REGARDING STORMWATER MANAGEMENT IN HIGH PRIORITY AREAS.

MEASURE B-1-1: Support stormwater management plans for communities within areas of concern in SWP areas, providing education and recommendations for inclusion of SWP strategies.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MPCA, Individual water managers, MRWA, MDH
Timeline: 2009 - 2016
Estimated Cost: $10,000 (Grant, Cash, and In-kind)
Goal Achieved: Communities will consider the land use / drinking water resource connection during plan development, allowing UMRSWPP the opportunity to provide expertise and funding for management strategies.

MEASURE B-1-2: Determine which potential contaminants need detailed inventory within Priority A Area by assessing geographic boundaries and land use patterns.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, WMO, WD, SWCD, MPCA, NRCS
Timeline: 2009 - 2010
Estimated Cost: $10,000 (Grant, Cash, and In-kind)
Goal Achieved: Inventory of potential contaminants will be limited to the highest impact to the drinking water resource.

MEASURE B-1-3: Develop a protocol to complete a detailed contaminant source inventory for the contaminants of concern.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, WMO, WD, SWCD, MPCA, NRCS
Timeline: 2010
Estimated Cost: $10,000 (Grant, Cash, and In-kind)

Goal Achieved: Inventory of potential contaminants will be limited to the highest impact to the drinking water resource.

MEASURE B-1-4: Complete detailed contaminant source inventory as determined.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, WMO, WD, SWCD, MPCA, NRCS
Timeline: 2009 - 20011
Estimated Cost: $10,000 (Grant, Cash, and In-kind)
Goal Achieved: Inventory of potential contaminants will be limited to the highest impact to the drinking water resource.

MEASURE B-1-5: Map existing NPDES permit sites and assess discharge parameters, proximity to intake and potential for influence.

Source of Action: City of Minneapolis
Cooperators: MPCA, UMRSWPP, Cities within SWP Area
Timeline: 2009 - 2012
Estimated Cost: $4,000 plus in-kind staff time
Goal Achieved: Permitted NPDES sites will be either eliminated from the list of potential contaminant concerns or addressed as new implementation need.

MEASURE B-1-6: Map and GPS locate all storm water outfalls on the Mississippi River and major tributaries within Priority A Area.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MPCA, DNR, Met Council, WMO, WD
Timeline: 2010 - 2012
Estimated Cost: $20,000 plus in-kind staff time
Goal Achieved: Direct potential contributors to the River system will be identified.

MEASURE B-1-7: Map and GPS locate all private and public drainage ditch outfalls within Priority A Area.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MPCA, DNR, Met Council, WMO, WD
Timeline: 2010 - 2012
Estimated Cost: $20,000 plus in-kind staff time
Goal Achieved: Direct potential contributors to the River system will be identified.

MEASURE B-1-8: Gather information on storm-shed for storm outfalls and ditch outfalls within areas of concern.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, DNR, MPCA, WMO, WD, Met Council
Timeline: 2011 - 2012
Estimated Cost: In-kind staff time
Goal Achieved: Quantification of potential impact will be made possible by understanding not only the monitoring data gathered, but the volume associated with it.

MEASURE B-1-9: Develop a monitoring protocol to establish a characterization of contaminant contribution due to stormwater outfalls and drainage ditch outfalls.

Source of Action: City of Minneapolis
Cooperators: MPCA, USGS, MDH, DNR
Timeline: 2011
Estimated Cost: In-kind staff time
Goal Achieved: Missing data will be collected to assist in decision-making strategies regarding prioritization.

OBJECTIVE B-2: REDUCE SEDIMENT FROM STREAMBANK EROSION.

MEASURE B-2-1: Develop an agreement with the CROW and SRWD to inventory and map areas that need buffers to reduce sediment loading.

Source of Action: UMRSWPP
Cooperators: City of Minneapolis, SWCD, SRWD, CROW, NRCS, BWSR, landowners
Timeline: 2009 - 2010
Estimated Cost: $3000 plus In-kind staff time
Goal Achieved: Areas of erosion will be analyzed for their capacity to produce sediment and the likelihood of that sediment entering the River system.

MEASURE B-2-2: Promote continuous CRP signup for buffers along priority streams, ditches and wetlands.

Source of Action: UMRSWPP
Cooperators: City of Minneapolis, SWCD, NRCS, LGU, WD, WMO
Time Frame: 2009, and on-going
Estimated Cost: In-kind staff time
Goal Achieved: Highly erodible lands will maintain cover, reducing sediment run-off to the River and decreasing turbidity and suspension of nutrients.

MEASURE B-2-3: Establish a funding mechanism and provide supplemental funding to existing programs to establish grass buffer strips in areas identified as priority in these watersheds.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, SWCD, SRWD, CROW, NRCS, BWSR, landowners
Timeline: 2009 - 2011
Estimated Cost: $100,000 per year for three years
Goal Achieved: Sediment reduction from buffers will decrease the TSS within the River system.

OBJECTIVE B-3: LAND OWNERS WITHIN THE PRIORITY AREAS WILL UNDERSTAND THE POTENTIAL IMPACT OF TURF MANAGEMENT TO THE RIVER SYSTEM.

MEASURE B-3-1: Send turf management educational information to land owners located within the riparian areas of the SWP Area.

Source of Action: City of Minneapolis, UMRSWPP

Cooperators: MRWA, MDH, landowners

Timeline: Every two years, starting in 2009

Estimated Cost: $4,000 plus LGU to mail

Goal Achieved: Land owners within the SWP Area will have a better understanding of source water protection and the connection between their own land use and the quality of the drinking water.

OBJECTIVE B-4: PROMOTE PROPER DISPOSAL OF HOUSEHOLD HAZARDOUS WASTE THROUGH INCENTIVE AND EDUCATION.

MEASURE B-4-1: Insert "Upper Mississippi River Source Water Protection Project" information in utility billings.

Source of Action: City of Minneapolis

Cooperators: UMRSWPP, Drinking water utilities

Time Frame: Every other year, starting in 2009

Estimated Cost: $4,000 plus in-kind time

Goal Achieved: Land owners within the SWP Area will gain an understanding of cause / effect of their disposal of household hazardous wastes.

MEASURE B-4-2: Support Household Hazardous Waste collection days though notification of land owners of the dates.

Source of Action: City of Minneapolis

Cooperators: UMRSWPP, Drinking water utilities

Timeline: Annually

Estimated Cost: In-kind time, printing costs

Goal Achieved: Land owners will have the opportunity to properly dispose of contaminants that might otherwise reach the drinking water supply.

MEASURE B-4-3: Work with Watershed Districts and Water Management Organizations in designing school programs on household hazardous waste.

Source of Action: City of Minneapolis

Cooperators: UMRSWPP, WD, WMO, LWMP

Timeline: 2009 - 2012

Estimated Cost: $6,000 (Grant, cash and in-kind)

Goal Achieved: Understanding of the need for proper use and disposal of household hazardous waste will become a lifestyle for the school-age generation. Education may "trickle-down" to parents.

OBJECTIVE B-5: WORK TO ELIMINATE KNOWN IMPAIRMENTS ALONG THE RIVER SYSTEM AND WITHIN THE SWP AREA OF MINNEAPOLIS.

MEASURE B-5-1: Elevate the priority of addressing impaired waters within the SWP Area.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MPCA, LGUs, WDs, WMO
Time Frame: 2009, on-going
Estimated Cost: In-kind time
Goal Achieved: Implementation dollars to mitigate impaired waters can be used to address the same issues listed within this plan.

C. AGRICULTURE MANAGEMENT PRACTICES

OBJECTIVE C-1: INVENTORY THE PERTINENT NON-POINT CONTAMINANT SOURCES (FEEDLOTS AND MANURE MANAGEMENT) LOCATED WITHIN THE SWP AREA.

MEASURE C-1-1: Delineate a focus area that would allow for direct conveyance of contaminants to the Mississippi River and its tributaries.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, SRWD, CROW, SWCD, NRCS, MPCA
Timeline: 2009
Estimated Cost: In-kind staff time
Goal Achieved: Create a manageable area for focus of limited resources.

MEASURE C-1-2: Develop protocol to conduct an accurate contaminant source inventory and determine which potential contaminants are important to include – such as feedlots and slurry storage.

Source of Action: City of Minneapolis, UMRSWPP
Cooperators: County Feedlot Managers, MPCA, SWCD, NRCS, WD, WMO
Time Frame: 2009
Estimated Cost: In-kind staff time
Goal Achieved: Prioritization of unmanageable volume of listed PCSI data to contaminants most likely to affect the drinking water resource.

MEASURE C-1-3: Conduct contaminant source inventory of determined potential contaminants within the designated area.

Source of Action: City of Minneapolis, UMRSWPP
Cooperators: County Feedlot Managers, MPCA, SWCD, NRCS, WD, WMO
Timeline: 2009 - 2010
Estimated Cost: $30,000 (Grant, Cash, and In-kind)
Goal Achieved: Non-point contaminant sources will be inventoried and assessed for potential impact to the drinking water resource. Limited implementation funding will be utilized for maximum impact.

MEASURE C-1-4: Promote the Conservation Reserve Enhancement Program (CREP) in the CROW, SRWD and other identified areas of concern.

Source of Action: City of Minneapolis, UMRSWPP
Cooperators: SRWD, CROW, SWCD, NRCS
Timeline: 2009 - 2016
Estimated Cost: In-kind staff time
Goal Achieved: Allow land to be preserved with deeply rooted vegetation or buffers and/or large tract conservation.

MEASURE C-1-5: Supplement existing programs to provide further incentives to land owners in designated priority areas.

Source of Action: City of Minneapolis, UMRSWPP
Cooperators: County Feedlot Managers, MPCA, SWCD, NRCS, WD, WMO
Time Frame: 2009 - 2012
Estimated Cost: $200,000 (Grant, Cash, and In-kind)
Goal Achieved: Education, incentive and assistance will mitigate potential problems from improper manure management.

OBJECTIVE C-2: REDUCE SEDIMENTATION TO THE MISSISSIPPI RIVER DUE TO SOIL EROSION FROM ROW CROP FARMING.

MEASURE C-2-1: Work with local agencies to provide EQIP dollars to cropland in highly erodible areas for no-till cropping ($30/acre) and/or reduced tillage ($15/acre).

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, NRCS, SWCD, LGU, WD, WMO
Timeline: 2009 - 2016
Estimated Cost: In-kind time plus added incentives
Goal Achieved: Highly erodible lands will maintain cover, reducing sediment run-off to the River, decreasing turbidity and suspension of nutrients.

MEASURE C-2-2: Promote annual winter CRP signup for funding of set-aside acres of highly erodible soils within priority cropped areas.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, SWCD, NRCS, LGU, WD, WMO
Time Frame: 2009, and on-going
Estimated Cost: In-kind time plus added incentives
Goal Achieved: Highly erodible lands will maintain a long-term cover crop of native grasses, reducing sediment run-off to the River and decreasing turbidity and suspension of nutrients.

D. TRANSPORTATION CORRIDOR AND SPILLS MANAGEMENT PRACTICES

OBJECTIVE D-1: DEVELOP AN EARLY WARNING SYSTEM FOR WITHIN THE EIGHT-HOUR TIME OF TRAVEL AREA.

MEASURE D-1-1: Identify potential spill sites of concern to the drinking water resource.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, RDN, DNR, USGS
Time Frame: 2009 - 2011
Estimated Cost: $40,000 (Grant, cash and in-kind)
Goal Achieved: Identify the contaminant sources of greatest concern to water suppliers.

MEASURE D-1-2: Prepare a public water supplier spills notification protocol for use by the State Duty Officer, MPCA, other governmental entities and responsible parties.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, RDN, MDPS, owners of facilities identified in PCSI
Time Frame: 2009 - 2011
Estimated Cost: In-kind staff time
Goal Achieved: Improve the effectiveness and timeliness of notification of public water suppliers in the event of an upstream contaminant release.

OBJECTIVE D-2: UPDATE TRAINING OF FIRST RESPONDERS ON THE MISSISSIPPI RIVER TO MAINTAIN SPILL RESPONSE PREPAREDNESS.

MEASURE D-2-1: D-2-2: Work with MPCA to identify priorities regarding the first responder update training.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, RDN, MPCA, First Responders
Time Frame: 2009 - 2011
Estimated Cost: $2,000 plus In-kind staff time
Goal Achieved: First responder training will be updated to incorporate new priorities, including the eight-hour time-of-travel for the Minneapolis SWPA.

MEASURE D-2-2: Cooperate with MPCA in the first responder update training, emphasizing special needs in protecting surface water intakes on the Mississippi River.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, RDN, MPCA, First Responders
Time Frame: 2009 - 2012
Estimated Cost: In-kind staff time
Goal Achieved: First responders will develop an understanding of the need to protect the surface water intakes of the drinking water suppliers and the urgency of protecting the eight-hour time-of-travel from them.

OBJECTIVE D-3: UPDATE MISSISSIPPI RIVER DEFENSE NETWORK DATA BASES WITHIN THE HIGHEST PRIORITY SWP AREA.

MEASURE D-3-1: Advise UMRSWPP staff of RDN data resources.

Source of Action: UMRSWPP
Cooperators: RDN
Time Frame: 2009 - 2011
Estimated Cost: $6,000 (Grant, cash and in-kind)
Goal Achieved: Improve the quality of RDN data within the high-priority source water protection area.

OBJECTIVE D-4: EVALUATE THE PLACEMENT, CONDITION AND NEED FOR REPLACEMENT OF MISSISSIPPI RIVER DEFENSE NETWORK SPILL RESPONSE EQUIPMENT.

MEASURE D-4-1: Review with first responders the condition of spill response equipment.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MPCA, RDN
Time Frame: 2009 - 2009
Estimated Cost: In-kind staff time
Goal Achieved: Determine the status of existing RDN spill response equipment.

MEASURE D-4-2: Review with water suppliers the location of cached spill response equipment relative to their intake protection needs.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, RDN
Time Frame: 2009
Estimated Cost: In-kind staff time
Goal Achieved: Determine the adequacy of existing spill response equipment locations to protect the Minneapolis Mississippi River intake.

MEASURE D-4-3: Assist MPCA as necessary in obtaining replacement and new spill response equipment.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, RDN
Time Frame: 2009 - 2011
Estimated Cost: In-kind staff time
Goal Achieved: Maximize the capacity to protect Mississippi River surface water intakes in the event of an upstream contaminant release.

E. COMMERCIAL AND INDUSTRIAL MANAGEMENT PRACTICES

OBJECTIVE E-1: TRAINING, EDUCATION AND REGULATION OF ABOVE AND BELOW GROUND TANK OWNERS.

MEASURE E-1-1: Work with the MPCA to sponsor a training session locally for tank owners in the SWP Area.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MPCA, tank owners
Timeline: 2009 and on-going as necessary
Estimated Cost: $1,000 plus In-kind by cooperators
Goal Achieved: Education of owners in SWP Area, potential for contamination of drinking water resource and proper tank maintenance and practices.

MEASURE E-1-2: Assist regulated tank owners with leak detection and record keeping.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MPCA, tank owners
Timeline: 2009, and on-going
Estimated Cost: In-kind by cooperators
Goal Achieved: Education of owners in SWP Area, potential for contamination of drinking water resource and proper tank maintenance and practices.

MEASURE E-1-3: For all above ground storage tanks, encourage proper monitoring of secondary contaminant for cracks and early detection of leaks and notify the tank owner of any leaks, etc., to ensure that proper repair and clean-up occurs.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MPCA, owners, LGU, watershed groups, State Agencies
Time Frame: 2009 - 2013
Estimated Cost: In-kind by MPCA, utilities
Goal Achieved: Assure structural integrity of secondary confinement systems.

MEASURE E-1-4: Work with the appropriate authorities to enact and enforce requirements for underground and above ground storage tanks not regulated by local, county or state agencies.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, LGUs, MPCA, owners
Time Frame: 2009 - 2016
Estimated Cost: In-kind by staff
Goal Achieved: Assure structural integrity of unregulated tanks.

MEASURE E-1-5: Make grant and/or loan funds available for above ground storage tanks without secondary containment.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, LGUs, MPCA, owners
Time Frame: 2009 - 2016
Estimated Cost: $5,000 per year for 8 years
Goal Achieved: Provide incentives for secondary confinement, protecting the drinking water resource from spill runoff.

MEASURE E-1-6: Work with the appropriate authorities to monitor and mitigate LUST sites to prevent contamination from entering the River system.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, LGUs, MPCA, owners
Time Frame: 2009 - 2016
Estimated Cost: In-kind by staff
Goal Achieved: Track impacts of LUST and assure clean-up of contaminants.

OBJECTIVE E-2: PROMOTE EDUCATION AND PROPER DISPOSAL OF COMMERCIAL HAZARDOUS WASTE IN THE SWP AREA.

MEASURE E-2-1: Locate and identify each Hazardous Waste Generator in the River corridor area and the remainder of Priority A Area.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MPCA, tank owners
Timeline: 2009 - 2010
Estimated Cost: In-kind by cooperators
Goal Achieved: Reduce or eliminate hazardous waste in the Mississippi River to protect public health and to reduce the cost of water treatment.

MEASURE E-2-2: Distribute hazardous waste pollution prevention information to Hazardous Waste Generators. Send a letter from the SWPP Team explaining the relationship between land use and the drinking water resource.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MPCA, owners
Time Frame: Every other year, starting in 2009
Estimated Cost: In-kind by MPCA, utilities
Goal Achieved: Education of owners in SWP Area regarding the potential for contamination of drinking water resource from their management practices.

MEASURE E-2-3: Work with local municipalities having regulatory authority to provide pollution prevention programs for Hazardous Waste Generators.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, LGUs, owners
Time Frame: 2009, and on-going
Estimated Cost: In-kind by LGU, utilities
Goal Achieved: Empowerment, collaboration and incentive for LGUs to make management of Hazardous Waste Generators a priority.

OBJECTIVE E-3: MANAGE DUMP SITES THROUGH PERMITTING, EDUCATION AND ENFORCEMENT.

MEASURE E-3-1: Educate, encourage and assist LGUs in the establishment of comprehensive solid waste management programs.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, LGUs, MPCA
Timeline: 2009 - 2016
Estimated Cost: In-kind by staff
Goal Achieved: Assure proper solid waste disposal.

OBJECTIVE E-4: INVENTORY, ASSESS AND REGULATE EXISTING SALVAGE YARDS TO PROMOTE CLEAN-UP AND PREVENT FURTHER USE IN PRIORITY AREAS.

MEASURE E-4-1: Work with owners, LGUs and MPCA as liaison on regulation and enforcement of existing salvage yards that are known polluters.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, LGUs, MPCA, salvage yard owners
Timeline: 2009 - 2016
Estimated Cost: In-kind by staff
Goal Achieved: Presentation of solutions and reaching a consensus toward a plan to clean up existing contaminant sites.

MEASURE E-4-2: Work with LGUs and MPCA to explore funding to assist salvage yard owners in clean up of contaminants.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MPCA, LGUs
Time Frame: 2009 - 2016
Estimated Cost: In-kind staff time and grant dollars as available
Goal Achieved: Cost assistance to salvage yard owners to provide clean-up.

OBJECTIVE E-5: INVENTORY AND ASSESS FOR POTENTIAL IMPACT TO THE DRINKING WATER SUPPLY ALL PERMITTED SOLID WASTE SITES IN PRIORITY AREAS.

MEASURE E-5-1: Work with owners, LGUs and MPCA as liaison on regulation and enforcement of existing solid waste sites that are known polluters.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, LGUs, MPCA, salvage yard owners
Timeline: 2009 - 2016
Estimated Cost: In-kind by staff
Goal Achieved: Presentation of solutions and reaching a consensus toward a plan to clean up existing contaminant sites.

MEASURE E-5-2: Work with LGUs and MPCA to establish funding to assist owners.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MPCA, LGUs
Time Frame: 2009 - 2016
Estimated Cost: In-kind staff time
Goal Achieved: Cost assistance to solid waste owners to provide clean-up.

F. INDIVIDUAL SEWAGE TREATMENT SYSTEM (ISTS) MANAGEMENT PRACTICES

OBJECTIVE F-1: DETERMINE IMPACT OF ISTS ON THE SURFICIAL DRINKING WATER SUPPLY IN THE MISSISSIPPI RIVER.

MEASURE F-1-1: Inventory ISTS located within sandy, riparian areas and in heavy soils where surface contamination may have potential to run into the Mississippi River or its tributaries. Work with LGUs to educate and enforce existing regulations regarding non-compliant ISTS.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, LGU, MPCA
Time Frame: 2009 - 2011
Estimated Cost: In-kind staff time
Goal Achieved: Potential sources of contamination will be identified for upgrade.

MEASURE F-1-2: Mail "Septic System Owner's Guide" to property owners with ISTS residing within the determined priority areas.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, LGU, MPCA, WD, WMO
Time Frame: 2009
Estimated Cost: $12,000 plus in-kind staff time
Goal Achieved: ISTS owners will gain an understanding of how their system works, needed maintenance to keep it working properly, and how to tell if it isn't working.

G. Data Collection and Analysis Management Practices

Objective G-1: Perform an inventory of Potential Contaminants of concern within the SWP Area.

MEASURE G-1-1: Review the PCSI within SWP areas and assess available data to establish needs for additional information.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MDH, MPCA
Time Frame: 2009 - 2010
Estimated Cost: $15,000 (Grant, Cash, and In-kind)
Goal Achieved: Existing data will be evaluated for usefulness and completeness.

MEASURE G-1-2: Delineate boundaries of highest priority areas of concern within the SWP areas through review of existing data.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MPCA, LGU, MDH
Time Frame: 2009 - 2012
Estimated Cost: $30,000 (Grant, Cash, and In-kind)
Goal Achieved: Prioritize areas within the SWP areas for concentration of efforts in areas of greatest potential to affect the drinking water resource.

MEASURE G-1-3: Describe needs for additional and refined data within SWP areas.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MDH
Time Frame: 2009 - 2012
Estimated Cost: $21,000 (Grant, Cash, and In-kind)
Goal Achieved: Identification of data needed to adequately assess the potential for contamination within the designated priority areas.

MEASURE G-1-4: Identify LGUs that have local data within the SWP areas and work with them to establish list of existing data available and incorporate it into the Plan.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MDH, LGUs
Time Frame: 2009 - 2012
Estimated Cost: $15,000 (Grant, Cash, and In-kind)
Goal Achieved: Establish working relationship with LGUs by sharing existing data and incorporating their data into Plan.

MEASURE G-1-5: Hire a consultant and evaluate anticipated land and water use changes in the SWP areas.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MDH, LGUs
Time Frame: 2009 - 2011
Estimated Cost: $150,000 (Grant, Cash, and In-kind)
Goal Achieved: Provide UMRSWPP with information needed for future planning and potential areas for education and/or incentives.

OBJECTIVE G-2: DETERMINE METHODOLOGY ON PILOT SECTION OF THE MISSISSIPPI RIVER FOR MEASUREMENT OF GROUND WATER GAINS AND LOSSES.

MEASURE G-2-1: Perform an inventory of the potential contaminant sources based on the results of the groundwater gains and losses study.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MDH, USGS
Time Frame: 2011
Estimated Cost: $5,000 (In-kind)
Goal Achieved: Identification of contaminant sites.

MEASURE G-2-2: implement appropriate educational efforts and BMPs as described earlier for the inventory of potential contaminant sources based on the groundwater gains and losses study.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, USGS, MDH
Time Frame: 2010 - 2011
Estimated Cost: $5,000 (Grant, Cash, and In-kind)
Goal Achieved: Education is needed to assist with preventing future events and forming collaborative relationships.

OBJECTIVE G-3: INVESTIGATE IMPAIRED WATERS LOCATED WITHIN THE SWP AREA TO DETERMINE THEIR IMPACT TO THE DRINKING WATER SUPPLY.

MEASURE G-3-1: Participate in the TMDL study process in priority areas of impaired waters along the Mississippi River.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MPCA, WMO, WD, MDH, LGU
Time Frame: 2009 and on-going
Estimated Cost: In-kind time
Goal Achieved: Work collaboratively in cleaning up impaired areas of the River, utilizing the expertise and funding the TMDL program provides.

H. ADMINISTRATION

OBJECTIVE H-1: MRWA WILL WORK WITH LGUS AND THE CITY OF MINNEAPOLIS TO PROVIDE TECHNICAL ASSISTANCE IN PUBLIC INFORMATION AND DOCUMENTATION.

MEASURE H-1-1: SWP coordinator will provide fiscal management and overall coordination of contract with MRWA.

Source of Action:	City of Minneapolis
Cooperators:	UMRSWPP, MRWA, MDH, LGU, WD, WMO
Timeline:	2009 - 2011
Estimated Cost:	$8,000 (Grant, Cash, and In-kind)
Goal Achieved:	Fiscal responsibility for grant dollars and assurance that required elements are completed.

OBJECTIVE H-2: IMPLEMENTATION OF SWPP WILL OCCUR WITH PRIORITIZATIONS FOLLOWED, REGULAR MEETINGS OF THE TEAM AND REPORTING AND ACCOUNTING FOR GRANT FUNDS.

MEASURE H-2-1: Prepare project progress reports, work plan amendments and final report to MPCA.

Source of Action:	City of Minneapolis
Cooperators:	MDH, MPCA, Consultant
Timeline:	2009 - 2011
Estimated Cost:	$12,000 (Grant, Cash, and In-kind)
Goal Achieved:	The Implementation Plan will be followed, the terms of the grant will be adhered to and fiscal accountability will occur.

MEASURE H-2-2: Produce technical documents and reports on project activities for reporting purposes.

Source of Action:	City of Minneapolis
Cooperators:	UMRSWPP, MPCA, MDH
Time Frame:	2009 - 2011
Estimated Cost:	$6,000 (Grant, Cash, and In-kind)
Goal Achieved:	Preparation of project documents as needed in the course of the project for use by project sponsors and partners in decision making and prioritization.

MEASURE H-2-3: Prepare project documents for broad distribution in a variety of formats.

Source of Action:	City of Minneapolis
Cooperators:	UMRSWPP, Consultant, MRWA, MDH, MPCA, LGU, WD, WMO
Timeline:	2009 - 2011
Estimated Cost:	$6,000 (Grant, Cash, and In-kind)
Goal Achieved:	Material will be collated in one central area and utilized on web page, in newsletters, summary documents and status reports.

MEASURE H-2-4: Prepare papers for presentation at conferences and other forums.

Source of Action: City of Minneapolis
Cooperators: Consultant, UMRSWPP**,** MRWA, MDH, MPCA, LGU, WD, WMO
Timeline: 2009 - 2011
Estimated Cost: $6,000 (Grant, Cash, and In-kind)
Goal Achieved: Consistent material will be available for presentations.

OBJECTIVE H-3: ESTABLISH A POSITION OF SWP COORDINATOR WHO WILL CONDUCT INITIATION OF ALL MANAGEMENT STRATEGIES FOUND IN THE PLAN, PROVIDE FISCAL ACCOUNTABILITY AND PROVIDE PROGRESS REPORTS AS REQUIRED.

MEASURE H-3-1: Plan and facilitate monthly project management meetings.

Source of Action: City of Minneapolis
Cooperators: Consultant, UMRSWPP, MPCA, MDH, MRWA
Time Frame: 2009 - 2012
Estimated Cost: $25,000 (Grant, Cash, and In-kind)
Goal Achieved: Project continuity and accountability will occur with minutes and scheduled meetings.

MEASURE H-3-2: Coordinate the work of project staff and contractors on all project activities.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, Consultant, MDH, MPCA, MRWA, LGU, WD, WMO
Timeline: 2009 - 2012
Estimated Cost: $15,000 (Grant, Cash, and In-kind)
Goal Achieved: Project continuity and accountability will occur.

MEASURE H-3-3: Serve as a liaison to agencies, LGUs and other groups.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, LGU, WD, MRWA, MDH, WMO, MPCA
Timeline: 2009 - 2012
Estimated Cost: $15,000 (Grant, Cash, and In-kind)
Goal Achieved: One central source of information to eliminate multiple answers to the same questions.

MEASURE H-3-4: Project Coordinator will oversee all project administration.

Source of Action: City of Minneapolis
Cooperators: MPCA, MDH
Timeline: 2009 - 2012
Estimated Cost: $30,000 (Grant, Cash, and In-kind)
Goal Achieved: All aspects of the existing grant will be coordinated by one person, with progress tracking, scheduling, budget and payment requests.

OBJECTIVE H-4: IDENTIFY POTENTIAL CONTAMINANTS AND THEIR SOURCES AND WORK WITH LGUS TO IMPLEMENT STRATEGIES IDENTIFIED IN THIS PLAN.

MEASURE H-4-1: Inventory and notify affected governmental units of Source Water Protection adoption.

Source of Action: City of Minneapolis
Cooperators: MDH, LGU, WD, WMO
Time Frame: 2009 - 2012
Estimated Cost: $13,000 (Grant, Cash, and In-kind)
Goal Achieved: Local government agencies will develop an understanding of SWP and their opportunities for collaboration in the implementation of this Plan.

MEASURE H-4-2: Identify priority areas to implement SWP strategies through review of geographic areas and contaminants and evaluation of data provided by LGUs.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, MDH, LGU, WD, WMO
Timeline: 2009 - 2012
Estimated Cost: $20,000 (Grant, Cash, and In-kind)
Goal Achieved: Local data and expertise will be utilized to determine actual areas of potential contamination.

MEASURE H-4-3: Identify local government partners to assist in the implementation of SWP strategies. Develop a relationship with them in the SWPA by jointly signing a memorandum of cooperation

Source of Action: UMRSWPP
Cooperators: LGU, WD, MRWA, MDH, WMO, MPCA
Timeline: 2009 - 2012
Estimated Cost: $16,000 (Grant, Cash, and In-kind)
Goal Achieved: Development of relationships locally to assist in working with local landowners and within the parameters of local regulations to assist in implementation of this Plan.

MEASURE H-4-4: Identify and develop BMPs appropriate for SWP, providing financial and in-kind assistance to LGUs for implementation of these practices.

Source of Action: City of Minneapolis
Cooperators: UMRSWPP, DNR, BWSR, MDA, LGU, WD, WMO, MPCA, MDH
Timeline: 2009 - 2012
Estimated Cost: $130,000 (Grant, Cash, and In-kind)
Goal Achieved: Money and expertise for on-the-ground practices will be put in place to mitigate designated pollutants identified by LGUs and the UMRSWPP.

MEASURE H-4-5: Seek to establish a regular funding source for implementation of the SWPP.

Source of Action:	City of Minneapolis, UMRSWPP
Cooperators:	MRWA, WD, WMO, LGU
Time Frame:	2009 – 2012 and on-going
Estimated Cost:	$13,000 (Grant, Cash, and In-kind)
Goal Achieved:	Money for continued implementation and study of the SWP Plan will be established on a long-term basis

MEASURE H-4-6: Establish broad endorsement of SWPP in adopted plans from Minnesota State Agencies, LGUs and Federal Agencies with prioritization of programs toward drinking water protection where appropriate.

Source of Action:	City of Minneapolis
Cooperators:	LGU, MPCA, DNR, MDH, MDA, SWCD, USFWS
Timeline:	2009 - 2012
Estimated Cost:	$2,000 (Grant, Cash, and In-kind)
Goal Achieved:	By working locally and building outward to establish this area as high priority, protective measures and financial assistance will be more readily available.

MEASURE H-4-7: Work in cooperation with ground water based water suppliers and their Wellhead Protection Planning process within the project area.

Source of Action:	City of Minneapolis
Cooperators:	MRWA, MDH,
Timeline:	2009 - 2016
Estimated Cost:	$8,000 (Grant, Cash, and In-kind)
Goal Achieved:	Common contaminant issues will provide additional funding and assistance in mitigation.

CHAPTER SEVEN

EVALUATION PROGRAM

I. IDENTIFYING A STRATEGY TO EVALUATE THE EFFECTIVENESS OF MANAGEMENT STRATEGIES

The success of the SWP management strategies must be evaluated in order to determine whether the SWP plan is actually accomplishing what the UMRSWPP team has set out to do. This evaluation must be conducted annually, or when a plan is amended. It will need to encompass the entire DWSMA, be based on the health risk the contaminant presents to the intake and specify the approach used. The following activities will be implemented to:

1. Track the implementation of the objectives identified in the previous section of this SWP plan,
2. Determine the effectiveness of specific management strategies regarding the protection of the drinking water supply, and
3. Identify possible changes to these strategies, which may improve their effectiveness.

- Continued monitoring of the source water at the intake for pollutants identified in Chapter Two of this plan;
- Annual documentation of the implementation of management strategies identified in Chapter Six of this plan; and
- Dissemination of new and existing data for trends and / or changes in the water quality with changes in the use of the land.

This evaluation will be used to focus the selection of management strategies in subsequent amendments of the SWP plan and must be submitted to MDH annually.

CHAPTER EIGHT

ALTERNATIVE WATER SUPPLY / CONTINGENCY STRATEGY

I. PREPARING THE CONTINGENCY STRATEGY FOR AN ALTERNATIVE WATER SUPPLY

Minnesota State Rules 4720.5280 "Alternative Water Supply; Contingency Strategy" addresses requirements for Wellhead Protection. These same strategies apply to Sourcewater Protection. It states, in part, "A wellhead protection plan must have a contingency strategy that addresses disruptions of the water supply caused by contamination or mechanical failures of the public water supply system."

The MDH has determined that the conservation plans that are required to be submitted to the DNR would fulfill this requirement because they address many of the same elements that are required for a contingency strategy for an alternative water supply.

The City of Minneapolis has developed an approved "Water Conservation Plan" with the DNR. A current copy of the DNR approval letter can be found in **Appendix V** of this plan.