

# **Wadena County**

## **Citizen Volunteer Monitoring Plan**

### **2004-2005**

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## Title Page

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Date Plan Completed: 4/27/05

Organization Name: Wadena County Water Resource Management

Name of Program: Wadena County Enhancement of Citizen Volunteer Monitoring

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Funding for this project was recommended by the Legislative Commission on Minnesota Resources (LCMR) from the Minnesota Environment and Natural Resources Trust Fund.

The goal of this grant is to enhance and expand the ability of citizen volunteers to collect water quality data that will be useful for lake and stream assessments and management. Minnesota Lakes Association and Rivers Council of Minnesota, with assistance from River Network, will work collaboratively to provide training, technical support, education and communications for individuals and organizations statewide interested in citizen volunteer lake and stream monitoring.

## Group Description

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What is your group's mission?

To evaluate and improve the current volunteer monitoring program in Wadena County so that data is collected for a purpose, is utilized and stored properly and promotes implementation of action items. Work with volunteers to insure continuity of testing at predetermined sites.

Expand and maintain the Wadena County citizen lake and stream monitoring program for the purpose of:

- Listing water impairments with the MN Pollution Control Agency
- Identifying priority areas to implement water quality improvement projects.
- Educating citizens and decision-makers about water quality issues.
- Securing additional funding to implement projects.
- Tracking trends in water quality and land use.

Geographical area covered:

The surface waters of Wadena County located within the Crow Wing River Watershed, the Redeye (Leaf) River Watershed and the Long Prairie River Watershed.

What type of organization are you? (circle one)

non-profit    local government    quasi-local government    other \_\_\_\_\_

When was your organization founded/started?

The Wadena County Local Water Resource Management Program was adopted by the Wadena County Board of Commissioners in 1993 and the Wadena Soil and Water Conservation District was given the responsibility for administration of the program. The first Water Resource Management Task Force meeting was held in 1993 and the first plan was written and approved in 1995. The second update was completed in Dec 2000 and will be updated a third time in 2005.

# of members (if any): **15 task force members**

# of paid staff (if any): **1**

## Introduction Narrative

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Wadena County has many miles of streams and a limited number of lakes. Not a lot of data is available on the water quality of these surface waters. The data that is available needs to be reviewed and organized and then the gaps filled in so that a big picture can be created which shows whether the water quality in Wadena County meets its designated uses or not. Due to funding constraints, local volunteers are a critical component to effective data gathering. Overall the assumption is that the current water quality is worth protecting but without the data to back this up it is difficult to argue that protection is the primary need.

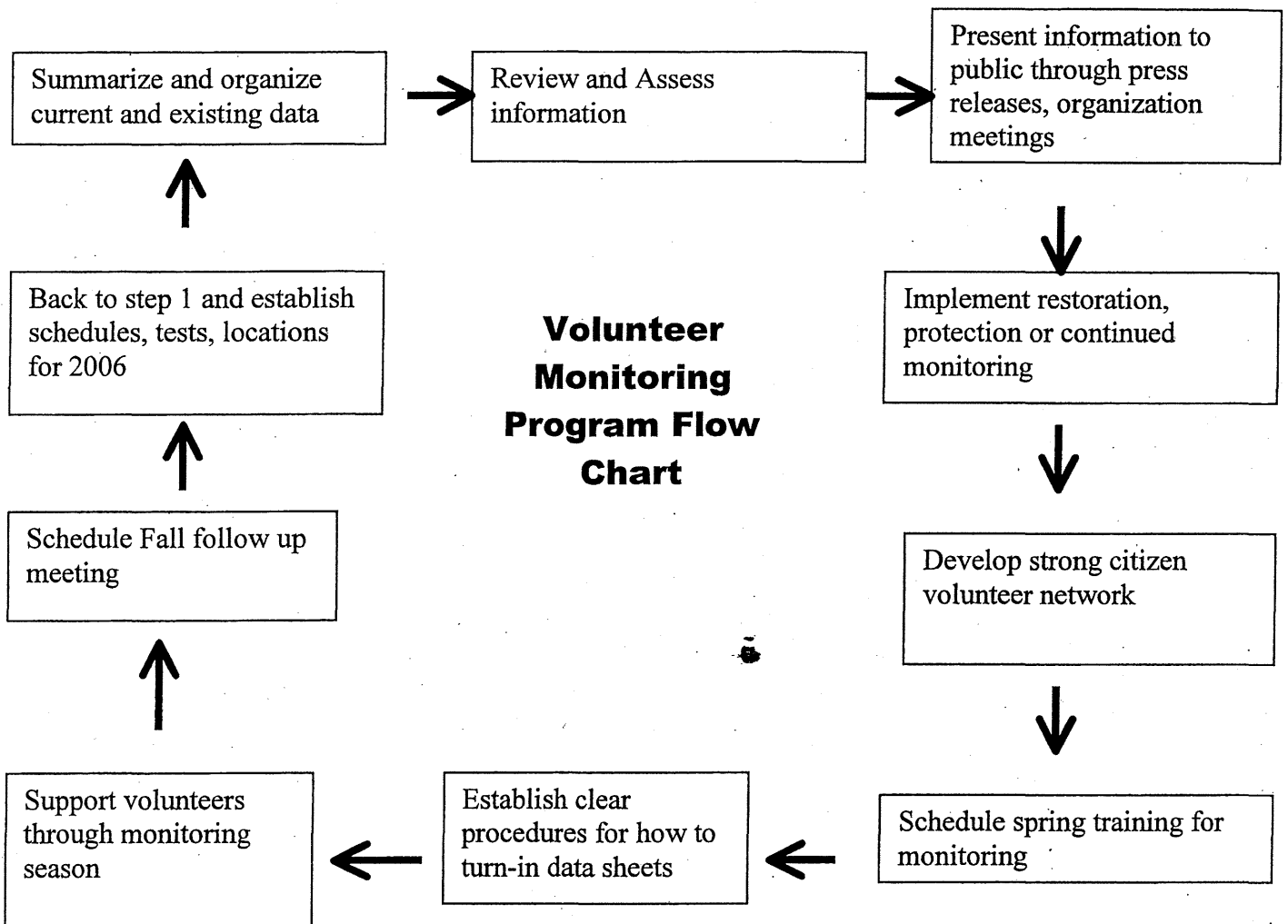
The goal of this monitoring plan is to take a snapshot of all of Wadena County as it is today by strengthening the existing volunteer monitoring program and to expand with additional sites. A system also needs to be established for continuing monitoring into the future. The information that is gathered is essential to an effective Water Resource Management Plan for protection and restoration of surface waters in Wadena County. The information will be shared with the appropriate local, state and federal organizations and agencies.

In addition, with the scattered data available several local organizations have raised specific questions in terms of water quality concerns that may be having an adverse affect on their individual water bodies. It is the intent of this monitoring plan to enhance and expand testing where needed to help answer these questions.

## Monitoring Program Cycle and Flow Chart

The intent of this plan is to have a clear data management process, a strong volunteer network and a system in place to insure continuity for the data, the volunteers and those who use the data. The following steps are circular in nature because as each step is addressed you move on to the next ultimately to begin the first step again in a new year. A clear data management process, a strong volunteer network and a system are all cogs in the wheels toward effective information gathering.

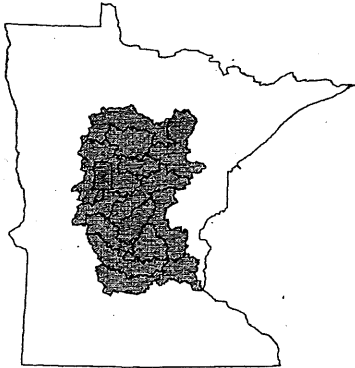
<b>Volunteer Monitoring Planning Steps</b>	<b>Timeline</b>
<b>(DATA)</b>	
1. Summarize and organize existing data	Fall 2004
A. Internal Information	
B. External Information	
2. Assess information	Winter 2005
A. Compare data to past data and benchmarks	
B. Identify gaps in data	
C. Determine what additional tests are needed to enhance current information	
D. Identify key locations that will add to existing information	
3. Present information to public through press releases, organization meetings	Winter 2005
A. Show what current data means	
B. Show how current data has been used	
4. Implement restoration or protection	Summer 2005
A. Develop needed action items	
<b>(VOLUNTEERS)</b>	
5. Develop strong citizen volunteer network	Winter 2005
A. Seek new volunteers for key areas	
B. Reward current volunteers with recognition	
a. Invite to SWCD Annual Banquet	
C. Emphasize at a minimum all monitoring will follow be MPCA Citizen Lake and Stream Volunteer programs	
D. Insure additional tests to be implemented for specific concerns are clearly explained	
6. Schedule spring training	Spring 2005
7. Establish clear procedures with volunteers for how they turn-in data sheets	Spring 2005
A. Give data sheets to Local Water Resource Management (Primary contact)	
B. Then Local Water Resource Management forwards to MPCA (Secondary contact)	
C. Clear Metadata	
8. Support volunteers through monitoring season	
9. Schedule Fall follow up meeting	Fall 2005
A. Discuss what worked, what didn't work, what is needed to make monitoring easier	
10. Back to step 1 and establish schedules, tests, locations for 2006	Fall 2005



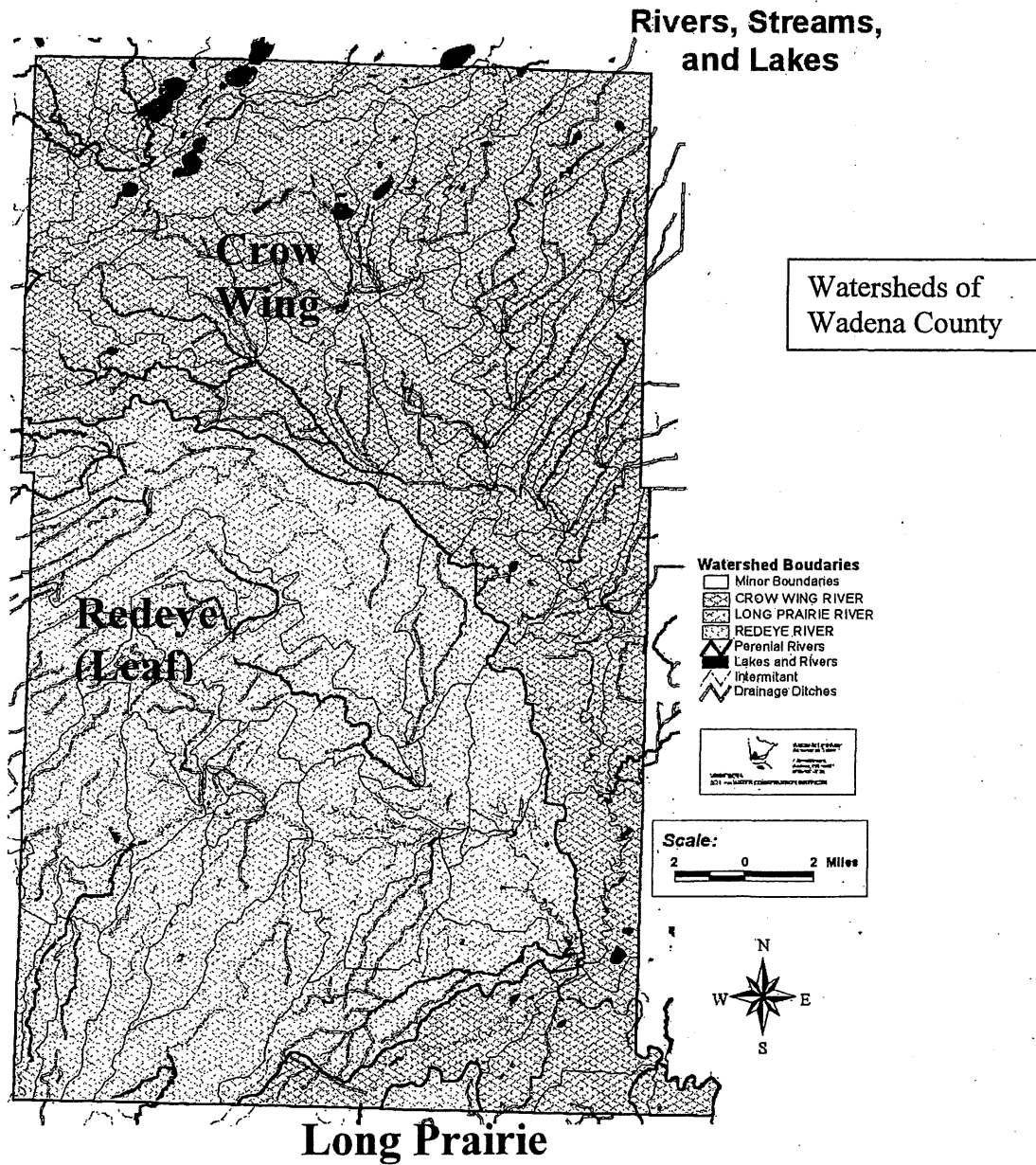


# 1.1 – Watershed Maps

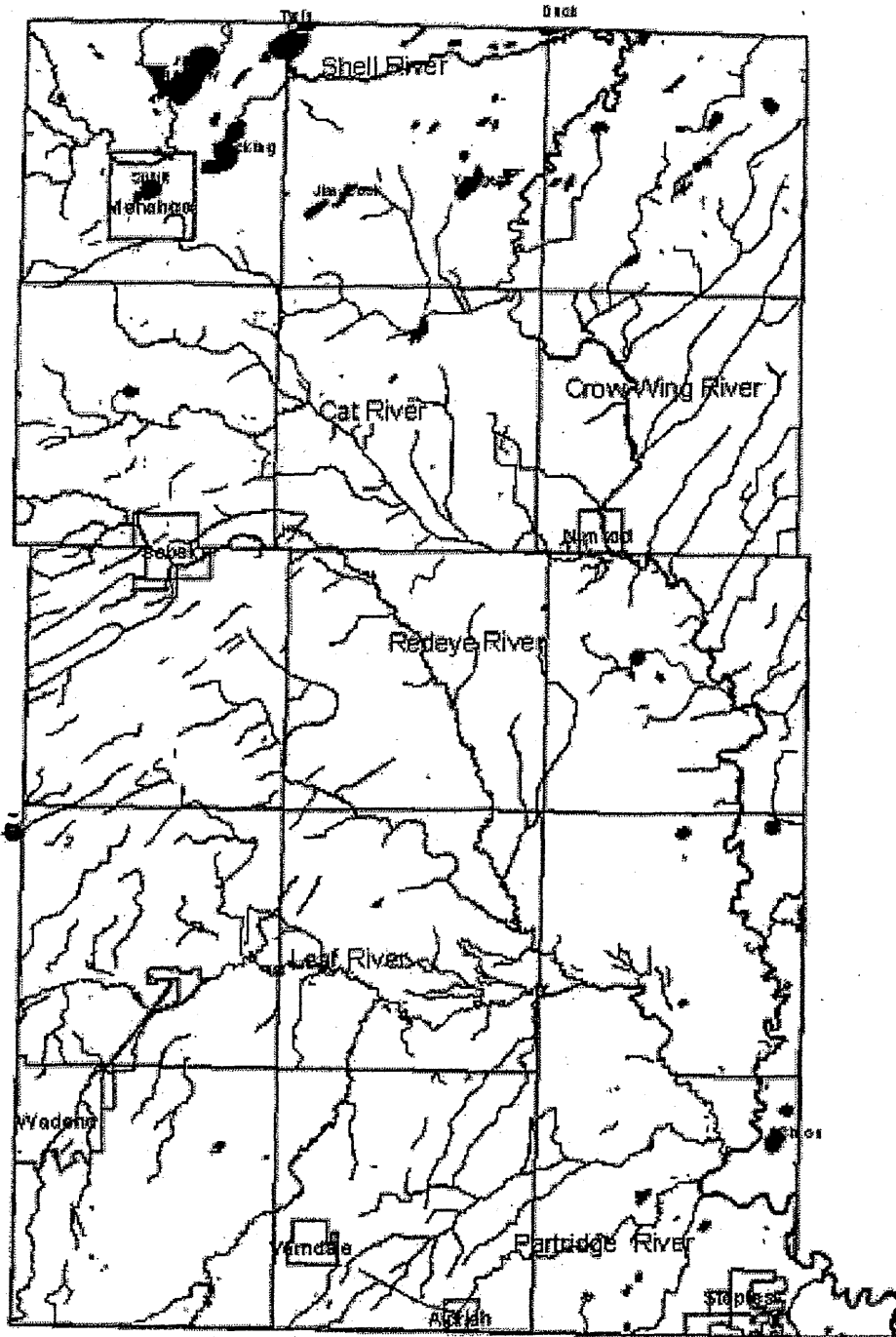
Attached is a watershed map with the waters of interest highlighted.







Wadena County Upper Mississippi River Basin



# Wadena Co. Major Surface Waters



-  Lakes
-  Streams
-  City Boundaries
-  County/Township Lines



## 1.2 - Watershed and Surface Water Information

**Watersheds: The portions of the Crow Wing River Watershed, Red Eye River Watershed and Long Prairie Watershed located within Wadena County.**

INFORMATION ITEMS	1995 Data
Major Basin	Upper Mississippi
Water Shed	1) Crow Wing River 2) Leaf and Red Eye River 3) Long Prairie
Eco Region	Northern Lakes and Forest North Central Hardwood Forest
Water Location	Wadena County
HUC	Crow Wing River 07010106 Red Eye 07010107 Long Prairie 07010108
Drainage of Water Sheds which contain Wadena County	Crow Wing River 1946.3 sq. miles of drainage Red Eye River 899.1 sq. miles of drainage Long Prairie 899.8 sq. miles of drainage
Land Uses	<p><b>Crow Wing River</b>            Coniferous Forests 24.8%            Cropland 14.8%            Mixed Woodlot 9.5%            Natural Areas-Mixed 7.7%            Natural Areas-grass 6.6%</p> <p><b>Red Eye/Leaf River</b>            Cropland 28.1%            Pastureland 7.4%            Irrigated Land 7.1%            Coniferous Forests 6.6%            Natural Areas-Deciduous 7.3%</p> <p><b>Long Prairie River</b>            Cropland 23%            Mixed Woodlot Forest 13.5%            Irrigated Land 12.5%            Natural Areas- Mixed 9.9%            Transportation Services 5.6%</p>

### 1.3 - Inventory of Watershed and Surface Water Uses

**Watersheds: The portions of the Crow Wing River Watershed, Red Eye River Watershed and Long Prairie Watershed located within Wadena County.**

USES	ANSWER
Primary Water Uses	Recreation-boating, canoeing, fishing, swimming,
Public Access and Location	DNR Website
Point source discharges	City of Park Rapids – Shell River City of Hewitt – Wing River
Important Native Species	Calcareous Fen – rare plants Prairie Chicken Eagles
Exotic species	Curly Leaf Pondweed
Fisheries Management Plans	Stocking, Blueberry, Upper and Lower Twin, Spirit, Duck Lakes
History	Logging Communities/Camps Native American Burial Mounds- Nimrod Old Wadena Trading Post Red River Ox Cart Trail
General Public Perceptions	Water Quality appears to be in decline, not as clear/clean as it used to be
Data Collection Organizations	Wadena County Water Resource Management Wadena County Soil and Water Conservation District MN Pollution Control Agency US Geological Society MN Department of Agriculture MN Department of Natural Resources

## 1.4 - Understanding State Standards that Define Your Water's Health

*This worksheet uses information from: Chapter 7050 of the State Water Quality Standards, 305(b) Assessed Waters Report, and 303(d) Impaired Waters List to define the health of our water's health.*

Most waters of Wadena County do not have specific use classifications in Chapter 7050 of the State Water Quality Standards and are therefore classified as the general use: Class 2B, 3B, 4A, 4B, 5 and 6 waters. In general, this means they are protected for warm water fisheries and uses.

Streams with other specific use classifications. No lakes have other specific use classifications:

Blueberry River (T138, 139 R35,36) **2C**

Cat Creek (T137 R35 S 4,9,10,11,12,13) **1B,2A,3B**

Cat River (excluding trout waters) (T136,137 R33,34,35,) **2C**

Farnham Creek (T135 R32 S5,6,7 T136 R 32 S 2,3,9,10,20,21,29,31) **1B,2A, 3B**

Fawn Creek (T134 R33 S22,27,33,34) **1B,2A, 3B**

Hay Creek (T134 R33 S7,8,9,10,11,17,18) **1B,2A, 3B**

Kettle Creek (T138 R35,36,37) **2C**

Kitten Creek (T137 R34,35) **2C**

Stocking Creek (T138 R35) **2C**

Union Creek (T134 R35 S 4,5,7,8,18,19,30,31 T135 R35 S 27,28,33,34) **1B,2A, 3B**

See Appendix A. for information key within 7050.0200 WATER USE CLASSIFICATIONS FOR WATERS OF THE STATE.

Many surface waters of Wadena County have not been assessed for the 305(b) Assessed Waters Report list. The waters listed below have been assessed and list what parameters it has been assessed for. The chart also indicates whether or not the surface water supports the Water Quality Standards for their Use Classification.

Crow Wing Watershed

Parameters are defined by testing to MPCA Water Use Classifications

River	Segment	Biological-Fish	Conventional	FCA	NPS	Swimmability	Toxics
Crow Wing River	Partridge River to Swan Cr			NS - Mercury			
Crow Wing River	Leaf River to Partridge River			NS - Mercury			
Crow Wing River	Farnham Cr to Leaf River			NS - Mercury			
Crow Wing River	Beaver Cr to Farnham Cr			NS - Mercury			
Crow Wing River	Cat River to Beaver Cr			NS - Mercury			
Crow Wing River	Big Swamp to Cat River	FS	FS	NS - Mercury	EX- BOD, Phos, TSS	FS	
Crow Wing River	Shell River to Big Swamp			NS - Mercury			
Farnham Creek	Unnamed Creek to Crow Wing	NS					

River	Segment	Biological-Fish	Conventional	FCA	NPS	Swimmability	Toxics
Shell River	Hay Cr to Crow Wing River	FS					
Kettle River	Class 2C change to Blueberry River	FS					
Blueberry River	Unnamed Cr to Kettle Cr	FS					
Unnamed Creek (.5 mi E. of S.R. 27, 4 mi. N.E. of Nimrod)	Unnamed Creek to unnamed Creek	FS					

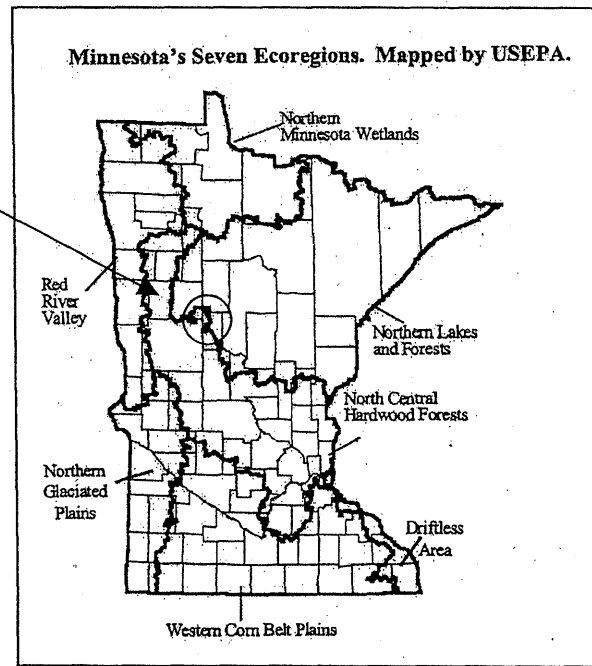
Redeye River Watershed

River	Segment	Biological-Fish	Conventional	FCA	NPS	Swimmability	Toxics
Redeye River	Leaf River to Crow Wing River		FS		EX- BOD, Phos, TSS		FS
Wing River	Headwaters to Leaf River	FS					
Unnamed Cr (1 mi. W. of US 71, 2mi. S of C.R. 1)	Unnamed Creek to unnamed Creek	NA-14					

FS=Fully Supporting NA or blank=Not Assessed PS=Partially Supporting NS=Nonsupporting EX=Exceeding Ecological Norms  
A blank space indicates no assessment has been done.

In 1996, as a component of the Wadena County Local Water Plan, the Citizen Lake Monitoring Program (CLMP) was implemented on 4 recreational lakes in the county with additional tests for Chlorophyll "a" and Total Phosphorus added. Testing has not been consistent from year to year or lake to lake. Results are recorded below to give a general idea of what local information exists. Results are compared to the North Central Hardwood Forest (NCHF) Ecoregion lakes, however, the Ecoregion transition from Northern Lakes and Forests and the Central Hardwood Forests is very apparent in the Northern portion of Wadena County. As an example, Spirit Lake has an Oak Savannah facing to the south and a Pine Forest facing to the north.

Location of the 4 recreational lakes



Results are listed below

Parameter	Eco-region range – North Central Hardwood Forest				Upper Twin	Lower Twin
	NCHF	Blueberry	Stocking	Spirit		
Total Phosphorus	23-50	83	41	20	38	36
Chlorophyll Mean	5-22	37	13	5	6	15
Chlorophyll Max	7-37	138	45	21	19	85
Secchi Disk	4.9-10.5	3	6	13	7	6

Numbers reflect averages of all known test data since 1996.

Carlson Trophic State Index

TSI<30 Classical Oligotrophy	Blueberry	Stocking	Spirit	Upper Twin	Lower Twin
TSI 30-40 Oligotrophic	63	54	44	50	53
TSI 40-50 Mesotrophic					
TSI 50-60 Classical Eutrophy					
TSI 60-70 Eutrophic					
TSI 70-80 Hypereutrophic					
TSI>80 Hypereutrophic					



## MPCA 2004 Impaired Waters List.

NOTE: The list appears to contain many waters that are impaired but what the list reflects is the segment lengths of the Crow Wing River as it flows between tributaries.

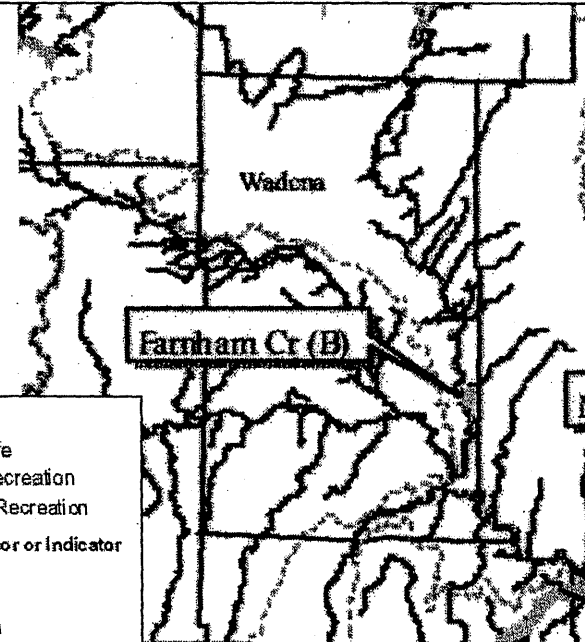
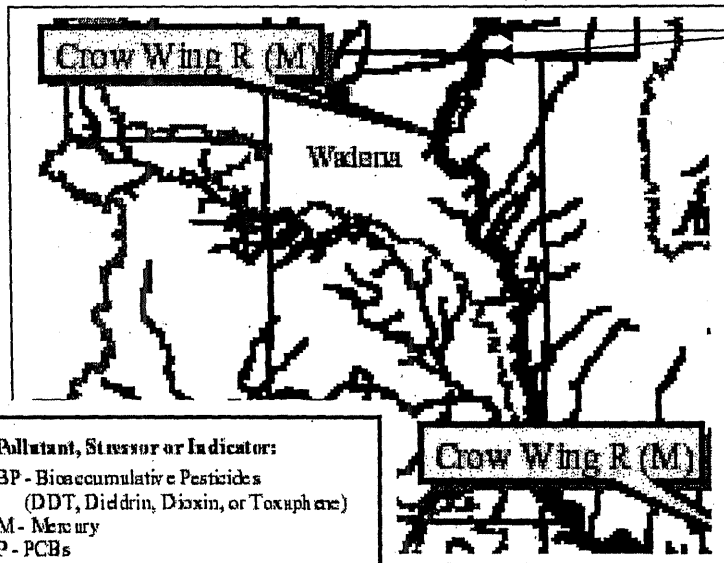
### UPPER MISSISSIPPI RIVER BASIN, Upper Portion

Reach	Yr <sup>12</sup>	New <sup>9</sup>	Assessment Unit ID <sup>10</sup>	DNR	Lake #	Affected use	Pollutant or stressor <sup>3</sup>	Target start// completion <sup>7</sup>	Category <sup>14</sup>
Crow Wing River; Headwaters (Eleventh Crow Wing Lk) to Shell R	98		07010106-523			Aquatic consumption	Mercury <sup>1</sup> FCA	1999//2011	5C
Crow Wing River; Shell R to Big Swamp Cr	98		07010106-516			Aquatic consumption	Mercury <sup>1</sup> FCA	1999//2011	5C
Crow Wing River; Big Swamp Cr to Cat R	98		07010106-515			Aquatic consumption	Mercury <sup>1</sup> FCA	1999//2011	5C
Crow Wing River; Cat R to Beaver Cr	98		07010106-514			Aquatic consumption	Mercury <sup>1</sup> FCA	1999//2011	5C
Crow Wing River; Beaver Cr to Tower Cr	98		07010106-513			Aquatic consumption	Mercury <sup>1</sup> FCA	1999//2011	5C
Crow Wing River; Tower Cr to Leaf R	98		07010106-512			Aquatic consumption	Mercury <sup>1</sup> FCA	1999//2011	5C
Crow Wing River; Leaf R to Partridge R	98		07010106-511			Aquatic consumption	Mercury <sup>1</sup> FCA	1999//2011	5C
Crow Wing River; Partridge R to Swan Cr	98		07010106-510			Aquatic consumption	Mercury <sup>1</sup> FCA	1999//2011	5C

Reach	Yr <sup>12</sup>	New <sup>9</sup>	Assessment Unit ID <sup>10</sup>	DNR	Lake #	Affected use	Pollutant or stressor <sup>3</sup>	Target start//completion <sup>7</sup>	Category <sup>14</sup>
Stocking Farnham Creek; Unnamed Cr to Crow Wing R	98		07010106-522		80-0037	Aquatic consumption	Mercury <sup>1</sup> FCA	1999//2011	5C
	02					Aquatic life	Fish IBI	2005//2012	5C

Mississippi River Basin: Headwaters to St. Croix River  
2004 Impaired Waters List: Bioaccumulative Toxics  
(per Section 303(d) Clean Water Act)

Mississippi River Basin: Headwaters to St. Croix River  
2004 Impaired Waters List: Conventional Parameters  
(per Section 303(d) Clean Water Act)



**Pollutant, Stressor or Indicator:**  
 BP - Bioaccumulative Pesticides (DDT, Dieldrin, Dioxin, or Toxaphene)  
 M - Mercury  
 P - PCBs

Impaired Stream/River  
 Lake Impaired by Mercury  
 Lake Impaired by PCBs  
 Lake Impaired by Mercury and PCBs  
 Stream/River  
 Open Water  
 Watershed  
 County

Mercury Impaired Waters

**Affected Use**

Aquatic Life  
 Aquatic Recreation  
 Aq Life & Recreation

**Pollutant, Stressor or Indicator**

A - Ammonia  
 B - Biotin  
 C - Chloride  
 F - Fecal coliform  
 O - Low oxygen  
 P - pH  
 T - Turbidity  
 Tm - Temperature  
 Stream/River  
 Open Water  
 Watershed  
 County

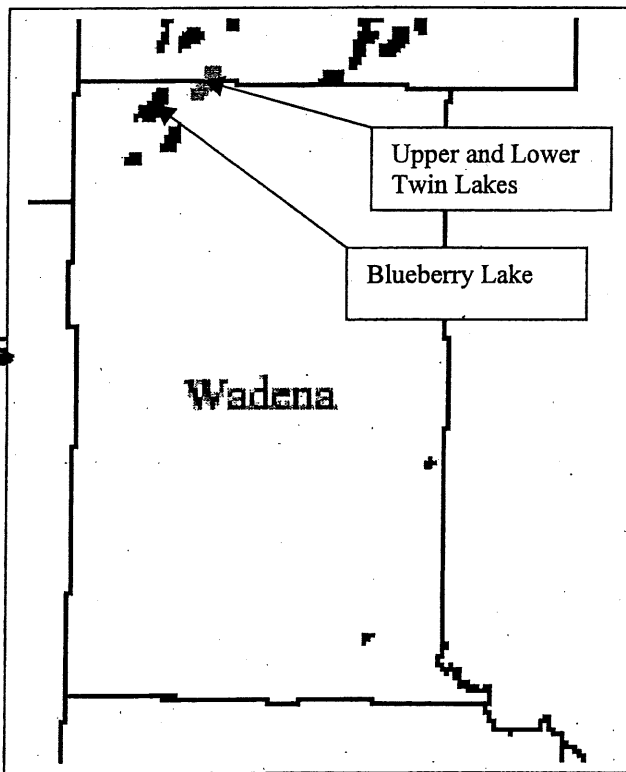
Impaired Water due to Low Score on Index of Biological Integrity

Does Ecoregion Data Indicate any Threats?

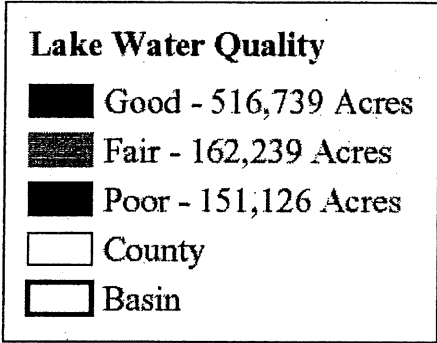
The Impaired Waters list indicates there is a need for problem solving of Mercury in fish. The state has indicated Mercury is a regional or national level concern and it will not be addressed in this plan.

Suspected resources which should be added to 305 (b) list:

Blueberry Lake does not meet Ecoregion parameters. It is unusually high in phosphorus, especially in July and August. It also has an overabundance of curly leaf pondweed. From the satellite imagery map produced from the Remote Sensory Laboratory (MN Water Resource Center) Blueberry Lake has "poor" water quality. Past CLMP+ testing indicates a highly Eutrophic state.



**Census of Water Clarity**  
Using satellite images taken from space, a statewide census of water clarity has been completed for the first time. Citizen volunteer data has been used to correlate and ground truth the information, specifically Secchi disk results.



11) Values: It is public perception that Wadena County is fortunate to have overall good surface water quality. The rivers and lakes are heavily used for a wide variety of recreational activities.

## 2.1 - Issues, Efforts to Address Those Issues, Evaluation, & Outcomes

*Note: MPCA currently has three Citizen Volunteer Monitoring Programs. For lakes there is the basic Citizen Lake Monitoring Program (CLMP) using visual observations and a Secchi disk. The Citizen Lake Monitoring Program Plus (CLMP+) includes the same parameters as the basic CLMP but adds Total Phosphorus, Chlorophyll "a" and temperature profiling test parameters. The MPCA Citizen Stream Monitoring Program (CSMP) is visual observations and a transparency tube test. For ease in clarification and expansion of testing parameters, the Wadena County Monitoring Plan expands the MPCA basic CSMP into a "+" and a "++" as additional test parameters are added to the base requirements of the CSMP. The MPCA currently does not recognize a CSMP+ or CSMP++ program.*

Monitoring Question / Issue	Known Effort to Address the Issue	Evaluating Known Efforts	Identifying Niches for Citizen Monitoring	Desired Future Outcomes
1. What are the water quality conditions of Wadena County surface waters according to MPCA Volunteer Monitoring Program test parameters?	Wadena County Water Plan began facilitating CLMP program in 1997 and helped coordinate additional testing for TP and Chlorophyll a parameters  CSMP began in 2002.  MPCA has tested some sites in the county for biological and some for chemical water quality standards	Smaller lakes should be added for testing  More CSMP sites are needed  Upper Mississippi River Basin Plan has recognized need for additional data in Wadena County watersheds	Add additional CLMP/CLMP+ /CSMP/CSMP+/CSMP++ monitoring program sites.	A detailed list of water bodies and test results in regards to clarity for local water resource management decision making in partnership with local organizations.  An effective screening tool in place for problem areas  Working in partnership with MPCA in data collection, recording and retention
2. What additional information is needed to understand the water quality conditions of Wadena County	Wadena County Water Plan has assisted in funding for establishing TSI ranking of the recreational lakes but has minimally assisted with other shallow natural environment lakes in the county	Some information has been gathered and analyzed which indicates expanded testing may be needed	Expand CLMP to "+" program where indicated and assist as many lakes in testing for minimal CLMP parameters and Total Phosphorus (TP), Chlorophyll a and temperature profile where	Additional information for better decision making of Local Water Resource Management and local organizations.  Working in partnership with MPCA in data collection,

Monitoring Question / Issue	Known Effort to Address the Issue	Evaluating Known Efforts	Identifying Niches for Citizen Monitoring	Desired Future Outcomes
lakes?	MPCA has minimal data on surface water conditions in Wadena County		feasible Add more CLMP sites on shallow natural environment lakes	recording and retention
3. How much do lake levels fluctuate from seasonal rainfall and where is the Overall High Water Level?	DNR currently uses lake level data to establish the OHWL	OHWL is becoming very valuable information because it is used to determine where and how development can occur on a lake.	More volunteers are needed for the shallow lakes in the county	Accurate OHWL data so that it is clear where development can or cannot occur
4. What additional information is needed to understand the water quality conditions of Wadena County streams?	Wadena County Water Plan has assisted in establishing CSMP sites but more are needed  MPCA has little data on streams and most is biological	Some information has been gathered and analyzed indicating expanding testing may be needed	Expand CSMP testing for Total Suspended Solids (TSS), Total Phosphorus and flow in streams where previous data indicates concerns	Additional information will be available for better decision making of Local Water Resource Management and local organizations.  Working in partnership with MPCA in data collection, recording and retention
5. What are the mussel populations and what is the health of their colonies in the Shell River System?	DNR completed a survey in 2003. No live species were found for 1 of the 9 common species expected	Long term monitoring efforts need to be established to determine overall health of mussel species	Citizens volunteers completing a Mussel inventory of the Shell River in partnership with the DNR and continuing monitoring over time	Knowledge of what types of mussels exist and the health of the colonies.  To push for protection if needed.  Working in partnership with the DNR

Monitoring Question / Issue	Known Effort to Address the Issue	Evaluating Known Efforts	Identifying Niches for Citizen Monitoring	Desired Future Outcomes
6. What is the source of the high phosphorus loading in Blueberry Lake?	Wadena Water Resource Management and Blueberry residents have been collecting TSI data intermittently since 1995.	Lab results show high peaks of phosphorus especially in July and August. Years not tested were 1998, 1999, 2000 and 2004	Additional monitoring of the tributaries for comparison and potential sources of Total Phosphorus.  Assist with insuring volunteers continue with data collection over time.	Identify or eliminate each of the inlets as a potential source of the noted phosphorus peaks  Possible listing on TMDL list so funds are available to address high phosphorus source
7. What affect does the west storm water drain have on the water quality of Spirit Lake?	Photos and citizen complaints have been recorded but no consistent testing has been done to determine extent of problem	It appears due to the constructed holding area that a flush of decaying debris is washed into the lake during rainfall events	Timely citizen monitoring before, during and after rainfall events at drain site  Data	Data proving or disproving there is an affect from the west storm drain on the water quality of Spirit Lake  Installation of a treatment system for storm water runoff
8. How effective is the newly installed storm water retention pond in treating storm water runoff before it reaches Spirit Lake?	Nothing is known at this time because pond was constructed in 2004	Visual inspections shows debris has been trapped in the vegetation planted in the pond treatment area.	Timely citizen monitoring of drain outlet before it enters retention pond and monitoring outlet as it exists pond area into the lake	Data indicating that the pond treats the storm water runoff before it enters the lake.

### 3.1 - Data Users and Data Uses

Question or Hypothesis	User/Decision Maker	Uses/Decisions	Potential Parameters
<p>1. What are the water quality conditions of Wadena County surface waters according to MPCA Volunteer Monitoring Program test parameters?</p>	<p>Wadena County Water Resource Management</p> <p>MPCA Volunteer Monitoring Program</p>	<p>Comparison of Wadena County surface water data to Ecoregion standards.</p> <p>Comparison of data between similar water bodies where feasible.</p> <p>If comparisons indicate an unacceptable trend identify additional test parameters that aid in identifying causes.</p> <p>If water quality conditions do not meet Ecoregion parameters, work with MPCA TMDL listing process</p>	<p><b>Lake</b></p> <ul style="list-style-type: none"> <li>- Secchi Disk</li> <li>- Visual Observation</li> </ul> <p><b>Stream</b></p> <ul style="list-style-type: none"> <li>- Visual Observation</li> <li>- Transparency Tube</li> <li>- Estimated Stream Stage</li> <li>- Precipitation</li> </ul>
<p>2. What additional information is needed to understand the water quality conditions of Wadena County lakes?</p>	<p>Wadena County Water Resource Management</p> <p>MPCA Volunteer Monitoring Program</p> <p>Local lake organizations</p> <p>County Commissioners</p>	<p>Additional parameters will result in long term Trophic State Indicator results for comparison of lakes to Ecoregion standards</p> <p>Work with MPCA CLMP+ program to determine quality of lakes to Ecoregion standards and have data recorded on STORET system</p>	<p><b>Lake</b></p> <ul style="list-style-type: none"> <li>- Secchi Disk</li> <li>- Visual Observation</li> <li>- Total Phosphorus</li> <li>- Chlorophyll-a</li> <li>- Precipitation</li> <li>- Temperature profile</li> </ul>
<p>3. How much do lake levels fluctuate from seasonal rainfall and where is the Overall High Water Level (OHWL) on each lake?</p>	<p>Wadena County Water Resource Management</p> <p>DNR Waters</p> <p>Wadena P&amp;Z</p> <p>City of Wadena</p> <p>City of Menahga</p>	<p>Shoreland Ordinances work from the OHWL on public waters and if data does not accurately reflect lake level, development or building can occur in shoreland that may be sensitive or prone to flooding.</p>	<p><b>Lake</b></p> <p>Water Level Gauge</p> <p>Precipitation</p>

Question or Hypothesis	User/Decision Maker	Uses/Decisions	Potential Parameters
4. What additional information is needed to understand the water quality conditions of Wadena County streams?	<p>Wadena County Water Resource Management</p> <p>MPCA Volunteer Monitoring Program</p> <p>Menahga Conservation Club</p>	<p>Additional information will aid in better understanding of water quality in streams</p> <p>To work with MPCA programs to determine quality of streams to Ecoregion standards and have data recorded on STORET system</p>	<p><b>Stream</b></p> <ul style="list-style-type: none"> <li>- Visual Observations</li> <li>- T-tube</li> <li>- Temperature</li> <li>- Tape Down Distance</li> <li>- Total Phosphorus</li> <li>- Total Suspended Solids</li> </ul>
5. What are the mussel populations and what is the health of their colonies in the Shell River System?	<p>Wadena County Water Resource Management</p> <p>DNR</p> <p>Menahga Conservation Club</p> <p>Hubbard and Wadena County Commissioners</p>	<p>Presence or lack of mussels and their diversity will indicate health of colonies and health of Shell River</p>	<p>A Mussel inventory at several locations on the lower Shell River segment before the confluence with the Crow Wing River</p>
6. What is the source of the high phosphorus loading in Blueberry?	<p>Wadena County Water Resource Management</p> <p>MPCA</p> <p>Blueberry Lake Association</p> <p>Wadena, Hubbard and Becker County Commissioners</p>	<p>Comparison between tributaries and lake for source of phosphorus</p> <p>Problem solving and implementation to reduce phosphorus source to lake</p> <p>Less curly leaf pondweed present in lake</p>	<p><b>Lake</b></p> <ul style="list-style-type: none"> <li>- Secchi Disk</li> <li>- Visual Observation</li> <li>- Total Phosphorus</li> <li>- Chlorophyll-a</li> <li>- Precipitation</li> <li>- Temperature profile</li> </ul> <p><b>Stream</b></p> <ul style="list-style-type: none"> <li>- Visual Observations</li> <li>- T-tube</li> <li>- Temperature</li> <li>- Tape Down Distance</li> <li>- Total Phosphorus</li> <li>- Total Suspended Solids</li> </ul>



Question or Hypothesis	User/Decision Maker	Uses/Decisions	Potential Parameters
<p>7. What affect does the west storm water drain have on the water quality of Spirit lake?</p>	<p>Wadena County Water Resource Management MPCA Spirit Lake Association City of Menahga</p>	<p>Comparison of water quality at storm drain against water quality data of deepest part of lake</p> <p>If comparisons indicate an unacceptable trend identify additional test parameters that may aid in identifying causes.</p> <p>If water quality conditions indicate a significant difference between water at storm drain and deep part of lake, work with the City of Menahga to install a treatment system</p>	<p><b>Lake</b></p> <ul style="list-style-type: none"> <li>- Secchi Disk</li> <li>- Visual Observation</li> <li>- Total Phosphorus</li> <li>- Chlorophyll-a</li> <li>- Precipitation</li> <li>- Temperature profile</li> </ul> <p><b>Stream</b></p> <ul style="list-style-type: none"> <li>- Visual Observations</li> <li>- T-tube</li> <li>- Temperature</li> <li>- Tape Down Distance</li> <li>- Total Phosphorus</li> <li>- Total Suspended Solids</li> </ul>
<p>8. How effective is the newly installed storm water retention pond in treating storm water runoff before it reaches Spirit Lake?</p>	<p>Wadena County Water Resource Management MPCA Spirit Lake Association City of Menahga U of M Extension DNR Fisheries</p>	<p>Information will be used to educate citizens on the effects of storm water on the lake</p> <p>Information will be used to document effect retention pond has on quality of water as it moves through the pond</p>	<p><b>Lake</b></p> <ul style="list-style-type: none"> <li>- Secchi Disk</li> <li>- Visual Observation</li> <li>- Total Phosphorus</li> <li>- Chlorophyll-a</li> <li>- Precipitation</li> <li>- Temperature profile</li> </ul> <p><b>Stream</b></p> <ul style="list-style-type: none"> <li>- Visual Observations</li> <li>- T-tube</li> <li>- Temperature</li> <li>- Tape Down Distance</li> <li>- Recreational Suitability</li> <li>- Total Phosphorus</li> <li>- Total Suspended Solids</li> </ul>

## 4.1 - Monitoring Assessment

*What is Your Monitoring Assessment(s)? This worksheet includes the following information:*

*\* Kind of Assessment: Condition/Trend or Impact Assessment:*

- *Primary data users and waters of interest*
- *To 305(B) or Not to 305(b)*
- *Screen or direct use*
- *Scale discussion*

1. What are the water quality conditions of Wadena County surface waters according to MPCA Volunteer Monitoring Programs test parameters?

- **Condition-Trend**
- **Lake Associations, Stream Organizations, Wadena SWCD, MPCA**
- **Crow Wing, Red Eye, Long Prairie Watersheds located in Wadena County**
- **305(b) (Secchi and t-tube)**
- **Screen**
- **Countywide**

2. What additional information is needed to understand the water quality conditions of Wadena County lakes?

- **Condition-Trend**
- **Lake Associations, Wadena SWCD, MPCA**
- **Blueberry, Stocking, Upper and Lower Twin, Duck, Morgan, Jim Cook East and West Lakes**
- **305(b) (Secchi, phosphorus, chlorophyll "a")**
- **Screen**
- **Crow Wing River Watershed lakes located in Wadena County**

3. How much do lake levels fluctuate from seasonal rainfall and where is the Overall High Water Level on each lake?

- **Condition-Trend**
- **DNR Waters, Wadena SWCD, Wadena County Planning & Zoning, City of Wadena, City of Menahga**
- **Lakes located in the Crow Wing Watershed in Wadena County**
- **Not 305(b)**
- **Screen**
- **Countywide**

4. What additional information is needed to understand the water quality conditions of Wadena County streams?

- **Condition-Trend**
- **Menahga Conservation Club, Wadena SWCD, MPCA**
- **Shell River**
- **305(b) (Total Suspended Solids, T-tube) not 305(b) (Phosphorus)**
- **Screen**
- **Crow Wing, Redeye (Leaf) River and Long Prairie Watersheds located in Wadena County**

5. What are the mussel populations and what is the health of their colonies in the Lower Shell River System?

- **Impact statement**
- **Menahga Conservation Club, Twin Lakes Association, Hubbard, Becker, Wadena SWCD, Hubbard, Becker, Wadena County Commissioners, Hubbard COLA, Becker COLA, City of Park Rapids, MPCA, DNR Fisheries**
- **Lower Shell River, Twin Lakes**
- **Not 305(b)**
- **Direct use**
- **Twin Lakes, Shell River**

6. What is the source of the high phosphorus loading in Blueberry Lake?

- **Impact statement**
- **Blueberry Lake Association, Twin Lakes Association, Hubbard, Becker, Wadena SWCD, Hubbard, Becker, Wadena County Commissioners, Hubbard COLA, Becker COLA, MPCA, DNR Fisheries**
- **Blueberry Lake, Shell River, Blueberry River, Unnamed Creek**
- **Not 305(b)**
- **Direct use**
- **Upstream tributaries of Blueberry Lake-Shell River, Blueberry River, unnamed creek**

7. What affect does the west storm drain have on water quality of Spirit Lake?

- **Impact statement**
- **Spirit Lake Association, Wadena SWCD, Menahga City Council, MPCA,**
- **Spirit Lake**
- **Not 305(b)**
- **Direct use**
- **West storm drain**

8. How effective is the newly installed storm water retention pond in treating storm water run off from the East storm drain before it reaches Spirit Lake?

- **Impact statement**
- **Spirit Lake Association, Wadena SWCD, Menahga City Council, MPCA, DNR Fisheries, U of M Extension**
- **Spirit Lake**
- **Not 305(b)**
- **Direct use**
- **East storm drain**

## 5.1 - Parameters

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All Parameters
Secchi Disk (lake)
Physical Condition (lake)
Suitability for Recreation (lake)
Color of Lake Water (lake)
Total Phosphorus (lake)
Chlorophyll-a (lake)
Temperature Profile (lake)
Lake Level (lake)
Precipitation (lake)
Transparency Tube (stream)
Estimated Stream Stage (stream)
Appearance (stream)
Recreational Suitability (stream)
Precipitation (stream)
Temperature (stream)
Tape Down Distance (stream)
Total Phosphorus (stream)
Total Suspended Solids (stream)
Mussel Survey/Inventory (stream)

## **Parameters in each Wadena County Citizen Volunteer Monitoring Program:**

### **NOTE:**

*The Minnesota Pollution Control Agency (MPCA) currently has three Citizen Volunteer Monitoring Programs. For lakes, the basic Citizen Lake Monitoring Program (CLMP) uses visual observations and a Secchi disk. The Citizen Lake Monitoring Program Plus (CLMP+) includes the same parameters as the basic CLMP but adds Total Phosphorus, Chlorophyll "a" and temperature profiling test parameters.*

*The MPCA Citizen Stream Monitoring Program (CSMP) is visual observations and a transparency tube test.*

*For ease in clarification and expansion of testing parameters, the Wadena County Citizen Volunteer Monitoring Plan expands the MPCA basic CSMP into a "+" and a "++" as additional test parameters are added to the base requirements of the CSMP. The Wadena County Plan is requiring volunteers to complete the optional parameters of Temperature and Tape Down Distance through the CSMP thus CSMP+. On special sites additional tests for Total Suspended Solids and Total Phosphorus are also added, thus CSMP++. The MPCA does not recognize a CSMP+ or CSMP++ program; they are only used in the Wadena County citizen monitoring plan.*

*The Minnesota Department of Natural Resources- Division of Waters (DNR-Waters) sponsors the volunteer lake level monitoring program. They also work in partnership with University of Minnesota (U of M) to track precipitation using citizen volunteers under the MN Climatological Network. In strategic locations, many CLMP and CSMP volunteers collect precipitation information that is shared with both the MN Climatological Network and the MPCA.*

*The DNR - River Ecology/Malacology Department is working with Wadena County to begin a citizen based mussel survey. No current mussel volunteer network exists in Minnesota.*

### **MPCA Citizen Lake Monitoring Program (CLMP)**

- Secchi Disk (lake)
- Physical Condition (lake)
- Suitability for Recreation (lake)
- Color of Lake Water (lake)

### **MPCA Citizen Lake Monitoring Program Plus (CLMP+)**

- Secchi Disk (lake)
- Physical Condition (lake)
- Suitability for Recreation (lake)
- Color of Lake Water (lake)
- Total Phosphorus (lake) +
- Chlorophyll-a (lake) +
- Temperature Profile (lake) +

### **DNR Lake Level Program (this is not part of the CLMP)**

- Lake Level (lake)
- Precipitation (lake)

**DNR/U of M Climatology Network**

Precipitation

**MPCA Citizen Stream Monitoring Program (CSMP)**

Transparency Tube (stream)  
Estimated Stream Stage (stream)  
Appearance (stream)  
Recreational Suitability (stream)  
Precipitation (stream)

**Wadena County Citizen Stream Monitoring Program Plus (CSMP+)**

Transparency Tube (stream)  
Estimated Stream Stage (stream)  
Appearance (stream)  
Recreational Suitability (stream)  
Precipitation (stream)  
Temperature (stream) +  
Tape Down Distance (stream) +

**Wadena County Citizen Stream Monitoring Program Plus Plus (CSMP++)**

Transparency Tube (stream)  
Estimated Stream Stage (stream)  
Appearance (stream)  
Recreational Suitability (stream)  
Precipitation (stream)  
Temperature (stream) +  
Tape Down Distance (stream) +  
Total Phosphorus (stream) ++  
Total Suspended Solids (stream) ++

**Wadena County and DNR Citizen Mussel Survey**

Mussel Inventory

## 5.2 - Sample Collection Methods and Sampling Quality Objectives

Parameter	Sampling Method & Source	Collection Equipment	Where in the Water Column?	Where Across the Transect?	Sample Storage Container & Preservation	Quantity of Sample Collected	Number of Samples Collected per Site
Secchi Disk (lake)	Visual Observation-MPCA CLMP manual	Secchi Disk	Epilimnion (Upper well mixed layer)	Maximum lake depth	Not Applicable (NA)	Not Applicable (NA)	Mean of two readings
Physical Condition (lake)	Visual Observation MPCA CLMP manual	N/A	Epilimnion (Upper well mixed layer)	Maximum lake depth	Not Applicable (NA)	Not Applicable (NA)	1 per interval
Suitability for Recreation (lake)	Visual Observation MPCA CLMP manual	N/A	Epilimnion (Upper well mixed layer)	Maximum lake depth	Not Applicable (NA)	Not Applicable (NA)	1 per interval
Color of Lake Water (lake)	Visual Observation MPCA CLMP manual	N/A	Epilimnion (Upper well mixed layer)	Maximum lake depth	Not Applicable (NA)	Not Applicable (NA)	1 per interval
Total Phosphorus (lake)	Integrated Depth Sample MPCA CLMP+ manual	integrated sampler	Epilimnion (Upper well mixed layer)	Maximum lake depth	RMB Lab Kits & Dept of Health depending on program - Acid-rinsed glass bottle store at 4 <sup>o</sup> C	2L bottle	1 per interval
Chlorophyll-a (lake)	Integrated Depth Sample MPCA CLMP+ manual	integrated sampler	Epilimnion (Upper well mixed layer)	Maximum lake depth	RMB Lab Kits & Dept of Health depending on program - Keep in dark at 4 <sup>o</sup> C	2L bottle	1 per interval
Temperature Profile (lake)	Direct Measure with probe MPCA CLMP+-manuf's manual	Temperature Digital Depth Counter	One foot intervals	Maximum lake depth	MPCA CLMP+	Not Applicable (NA)	1 per interval
Lake Level Gauge (lake)	Visual observation DNR Lake Level Minnesota manual	Visual observation & measurement of established gauge	Permanent or temporary gauge site	Not Applicable (NA)	Not Applicable (NA)	Not Applicable (NA)	1 per interval

Parameter	Sampling Method & Source	Collection Equipment	Where in the Water Column?	Where Across the Transect?	Sample Storage Container & Preservation	Quantity of Sample Collected	Number of Samples Collected per Site
Precipitation (lake)	Visual observation DNR Climatology network Mngage	4" dia. Rain Gauge	In open uncovered area	Not Applicable (NA)	Not Applicable (NA)	Not Applicable (NA)	1 per interval
Transparency Tube (stream)	Standard Grab Sample MPCA CSMP Manual	Grab sample-bucket to T-tube	At mid depth in a well mixed area	At mid-stream in a well mixed area	Not Applicable (NA)	Not Applicable (NA)	Mean of two readings
Estimated Stream Stage (stream)	Visual observation MPCA CSMP Manual	Visual observation & estimate	Along the surface of water it touches the bank	Along the surface of water it touches the bank	Not Applicable (NA)	Not Applicable (NA)	1 per interval
Appearance (stream)	Visual observation MPCA CSMP Manual	Visual observation & measurement	Any where in the stream	At mid-stream in a well mixed area	Not Applicable (NA)	Not Applicable (NA)	1 per interval
Recreational Suitability (stream)	Visual observation MPCA CSMP Manual	Visual observation & measurement	Any where in the stream	At mid-stream in a well mixed area	Not Applicable (NA)	Not Applicable (NA)	1 per interval
Precipitation (stream)	Visual observation MPCA CSMP Manual	4" dia. Rain Gauge	On post in open	Not Applicable (NA)	Not Applicable (NA)	Not Applicable (NA)	1 per interval
Temperature (stream)	Hold thermometer in water 2 mins MPCA CSMP Manual	Grab sample-bucket	At mid-stream and depth in a well mixed area	Not Applicable (NA)	Not Applicable (NA)	Not Applicable (NA)	1 per interval
Stream Stage Tape Down Distance (stream)	Always at the same location MPCA CSMP Manual	Measuring tape	At mid-stream and just at the surface of the stream	At mid-stream	Not Applicable (NA)	Not Applicable (NA)	1 per interval
Total Phosphorus (stream)	Standard grab sample CLMP+ Manual	Grab sample-bucket to RMB bottle	At mid-stream and depth in a well mixed area	At mid-stream in a well mixed area	RMB Lab Kits	2L bottle	1 per interval



Parameter	Sampling Method & Source	Collection Equipment	Where in the Water Column?	Where Across the Transect?	Sample Storage Container & Preservation	Quantity of Sample Collected	Number of Samples Collected per Site
Total Suspended Solids (stream)	Standard grab sample CLMP+ Manual	Grab sample-bucket to RMB bottle	At mid-stream and depth in a well mixed area	At mid-stream in a well mixed area	RMB Lab Kits	2L bottle	1 per interval
Mussel Survey/ Inventory (stream)	DNR is developing methods, to be determined	Visual observation and measurement	Substrate of river stream floor	To Be Determined	Not Applicable (NA)	To Be Determined	To Be Determined

**Representativeness:**

The columns of Sampling Methods, collection Equipment, where in the water column and where across the transect describe the DQOs for each parameter, which in turn demonstrate how representative the samples are of the water body being monitored

**Comparability:**

To ensure comparability based on sampling we will use standardized sampling procedures and documentation, provide volunteer training and use only those trained volunteers

### 5.3 - Analytical Methods

Parameter	Location of Sample Analysis	Maximum Holding Time	Analytical Method and Source	Reporting Units
Secchi Disk (lake)	Field	Not Applicable (NA)	CLMP Manual	½ Ft increments
Physical Condition (lake)	Field	Not Applicable (NA)	CLMP Manual	1-5 Numerical point scale
Suitability for Recreation (lake)	Field	Not Applicable (NA)	CLMP Manual	1-5 Numerical point scale
Color of Lake Water (lake)	Field	Not Applicable (NA)	CLMP Manual	Color that best describes water such as clear, green, etc.
Total Phosphorus (lake)	RMB Labs and MN Dept of Health (MDH) Labs*	28 days if preserved	RMB and MDH Laboratory has method/source on file	ug/L P
Chlorophyll-a (lake)	RMB Labs and MN Dept of Health (MDH) Labs**	Unfiltered 48 hrs/ filtered and frozen 30 days	RMB and MDH Laboratory has method/source on file	ug/L
Temperature Profile (lake)	Field	NA	Fishhawk Equipment manual	Degrees C/ foot
Precipitation (lake)	Field	Not Applicable (NA)	Rain gage instructions (DNR Dept of Climatology methods)	.100 <sup>th</sup> inches
Lake Level Gauge (lake)	Field	Not Applicable (NA)	N/A	100 <sup>th</sup> of feet
Transparency Tube (stream)	Field	Not Applicable (NA)	CSMP Manual	Cm

\* Wadena County is using 2 labs: for testing of Total Phosphorus and Chlorophyll "a" because only certain lakes are enrolled in the 2005 CLMP+ which utilizes the MDH lab, the remaining lakes will utilize the RMB Lab.

Parameter	Location of Sample Analysis	Maximum Holding Time	Analytical Method and Source	Reporting Units
Estimated Stream Stage (stream)	Field	Not Applicable (NA)	CSMP Manual	Low, Medium, High
Appearance (stream)	Field	Not Applicable (NA)	CSMP Manual	1-5 Numerical scale
Recreational Suitability (stream)	Field	Not Applicable (NA)	CSMP Manual	1-5 Numerical scale
Precipitation (stream)	Field	Not Applicable (NA)	Rain gage instructions	.100 <sup>th</sup> in
Temperature (stream)	Field	N/A	CSMP Manual	Degrees F
Stream Stage Tape Down Distance (stream)	Field	Not Applicable (NA)	CSMP Manual	Inches
Total Phosphorus (stream)	RMB Laboratory Detroit Lakes	28 days if preserved	RMB Laboratory has method/source on file	ug/L P
Total Suspended Solids (stream)	RMB Laboratory Detroit Lakes	7 days	RMB Laboratory has method/source on file	m/g L
Mussel Survey/ Inventory	Field	Not Applicable (NA)	TBD DNR	Types and quantities of mussels

## 5.4 - Data Quality Objectives for Own Analysis

Parameter	Brief Description of Method	Accuracy	Precision	Detection Limit/ Measurement Range
Secchi Disk (Lakes)	In field analysis, visual observation	Not Applicable (NA)	+ 0.2 m for duplicate readings by the same monitor as well as different monitors	DL=0.2m Range=0.2m – 10 m
Physical Condition (Lakes)	In field analysis, visual observation to numbered scale	Not Applicable (NA)	Not Applicable (NA)	DL=NA Range=1-5 subjective points
Suitability for Recreation (Lakes)	In field analysis, visual observation to numbered scale	Not Applicable (NA)	Not Applicable (NA)	DL=NA Range=1-5 subjective points
Color of Lake Water (Lakes)	In field analysis, visual observation to describe color of water at sample site such as clear, green, etc.	Not Applicable (NA)	Not Applicable (NA)	DL=NA subjective points
Temperature Profile (Lakes)	In field analysis, visual observation of foot meter and temperature gauge	Profiler calibrated and set to manufacturer's standards	± 0.5 degrees C for duplicate readings by the same monitor as well as different monitors	Range=0-30 degrees C
Precipitation (Lakes)	In field analysis, visual observation of 4" dia. rain gauge	Not Applicable (NA)	± .02" for duplicate readings by the same monitor as well as different monitors	DL=.00" Range=0.0"-10"
Lake Level Gauge (Lakes)	In field analysis, visual observation of lake level gauge	Gauge level set to elevation by DNR	± .02' for duplicate readings by the same monitor as well as different monitors	DL=.00 Range=0.00-6.70 100 <sup>th</sup> of ft
Transparency Tube (Stream)	In field analysis, visual observation of T-tube	Not Applicable (NA)	± 3cm for duplicate readings by the same monitor as well as different monitors	DL= 1 cm Range:<1 cm-60 cm or Range:<1 cm-100 cm
Estimated Stream Stage (Stream)	In field analysis, visual observation	Not Applicable (NA)	Not Applicable (NA)	DL=NA Range=low, normal, high

Parameter	Brief Description of Method	Accuracy	Precision	Detection Limit/ Measurement Range
Appearance (Stream)	In field analysis, visual observation to numbered scale	Not Applicable (NA)	Not Applicable (NA)	DL=NA Range=1-5 subjective points
Recreational Suitability (Stream)	In field analysis, visual observation to numbered scale	Not Applicable (NA)	Not Applicable (NA)	DL=NA Range=1-5 subjective points
Precipitation (Stream)	In field analysis, visual observation of 4" dia. rain gauge	Not Applicable (NA)	± .02" for duplicate readings by the same monitor as well as different monitors	DL=.00" Range=0.0"-10"
Temperature (Stream)	In field analysis, visual observation of thermometer	Temperature=± 1 degrees in comparison to NIST traceable thermometer	± 2 degrees F for duplicate readings by the same monitor as well as different monitors	DL=2 degrees F Range=0-200 degrees F
Tape Down Distance (Stream)	In field analysis, visual observation with tape measure	1/8" increment per manufacturer	± .5" for duplicate readings by the same monitor as well as different monitors	DL=.25" Range=0.00"-100"
Mussel Survey/ Inventory (Stream)	To Be Determined (TBD)	To Be Determined (TBD)	To Be Determined (TBD)	DL=NA Range=To Be Determined (TBD)

\*Note: The only parameters listed are those that are not done by a certified lab.

## 6.1 a - Sampling Site List by site

Site #	Brief Description of Location (Code for Segment, if any)	Type of Site	Parameters
SL 1	Spirit Lake Deepest Site Will GPS site later DNR Lake # 80-003900	Lake Condition/Trend	CLMP+ Secchi Disk Physical condition Suitability for Recreation Color of Lake Water Total Phosphorus Chlorophyll a Temperature profile  Precipitation Lake Level
SL 2	Spirit Lake <b>Note:</b> As no location was recorded for the data collected by the City of Menahga, the past data that has been collected will be attributed to SL 2		
SL 3	Spirit Lake East Storm Drain Drain Outlet Will GPS site later DNR Lake # 80-003900	Stream Condition/Impact	CSMP++ T-tube Temperature Visual perceptions Tape down measurement TSS Total Phosphorus
SL 4	Spirit Lake East Storm Drain Outlet Pond Outlet Will GPS site later DNR Lake # 80-003900	Stream Condition/Impact	CSMP++ T-tube Temperature Visual perceptions Tape down measurement TSS Total Phosphorus
SL 5	Spirit Lake West Storm Drain Drain Outlet Will GPS site later DNR Lake # 80-003900	Stream Condition/Impact	CSMP++ T-tube Temperature Visual perceptions Tape down measurement TSS Total Phosphorus
StL 1	Stocking Lake Deepest Site Will GPS site later DNR Lake # 80-003700	Lake Condition/Trend	CLMP+ Secchi Disk Physical condition Suitability for Recreation Color of Lake Water Total Phosphorus Chlorophyll a Temperature profile

Site #	Brief Description of Location (Code for Segment, if any)	Type of Site	Parameters
			Precipitation Lake Level
BBL	Blueberry Lake -Deepest Site -Will GPS site later	Lake Condition/Trend	CLMP+ Secchi Disk Physical condition Suitability for Recreation Color of Lake Water Total Phosphorus Chlorophyll a Temperature profile  Precipitation
UT	Upper Twin Lake Deepest Site Will GPS site later DNR Lake # 80-015700	Lake Condition/Trend	CLMP+ Secchi Disk Physical condition Suitability for Recreation Color of Lake Water Total Phosphorus Chlorophyll a Temperature profile  Precipitation
LT	Lower Twin Lake Deepest Site Will GPS site later DNR Lake # 80-003000	Lake Condition/Trend	CLMP+ Secchi Disk Physical condition Suitability for Recreation Color of Lake Water Total Phosphorus Chlorophyll a Temperature profile  Precipitation Lake Level
DL	Duck Lake DNR Lake # 29-014200	Lake Condition/Trend	CLMP+ Secchi Disk Physical condition Suitability for Recreation Color of Lake Water Total Phosphorus Chlorophyll a Temperature profile  Precipitation
JC2	Jim Cook East DNR Lake # 80-002702	Lake Condition/Trend	CLMP+ Secchi Disk Physical condition Suitability for Recreation Color of Lake Water

Site #	Brief Description of Location (Code for Segment, if any)	Type of Site	Parameters
			Total Phosphorus Chlorophyll a Temperature profile  Precipitation Lake Level
JC1	Jim Cook West Deepest Site Will GPS site later DNR Lake # 80-002701	Lake Condition/Trend	CLMP+ Secchi Disk Physical condition Suitability for Recreation Color of Lake Water Total Phosphorus Chlorophyll a Temperature profile  Precipitation Lake Level
ML	Morgan Lake Deepest Site Will GPS site later DNR Lake # 80-003800	Lake Condition/Trend	CLMP Secchi Disk Physical condition Suitability for Recreation Color of Lake Water  Precipitation
SiL1	Simon Lake DNR Lake # 80-000300	Lake Condition/Trend	Precipitation Lake Level
HzL	Hazel Lake DNR Lake # 80-000500	Lake Condition/Trend	Precipitation Lake Level
BB1	Blueberry River @BBL inlet	Stream Condition/ Assessment	CSMP ++ T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance TSS Total Phosphorus
BB 2	Blueberry River @ Hwy 71 (Bridge) Note: BB2 is an assessment site and only tested when sample is drawn for lab data	Stream Condition/ Assessment	CSMP ++ T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance TSS



Site #	Brief Description of Location (Code for Segment, if any)	Type of Site	Parameters
			Total Phosphorus
BB 3	Blueberry River Upstream Highway 71 (Pettersen Backyard-dock) Note: BB3 is a trend site and tested regularly per CSMP protocols	Stream Condition/Trend	CSMP T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation
BB 4	Blueberry River @ Fletcher's Bridge (Bridge)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
BB 5	Blueberry River at CoRd 16 (concrete culvert)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
CC 1	Cat Creek @ CoRd 26 (Culvert)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
CW 1	Crow Wing @ Huntersville CoRd 18 (Bridge)	Stream Condition/Trend CSMP	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
CW 2	Crow Wing @ Mary Brown Bridge CoRd 15	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature

Site #	Brief Description of Location (Code for Segment, if any)	Type of Site	Parameters
			Tape Down Distance
CW 3	Crow Wing @ Nimrod CoRd 12 (Bridge)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
CW 4	Crow Wing @ Oylen CoRd 9 (Bridge)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
CW 5	Crow Wing @ Wahoo Valley CoRd 7 (Bridge)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
CW 6	Crow Wing @ CoRd 30 (Bridge)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
CW 7	Crow Wing @ Warner Rd (Bridge)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
FC 1	Farnham Creek @ CoRd 30 (Culvert)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance

Site #	Brief Description of Location (Code for Segment, if any)	Type of Site	Parameters
FnC 1	Fawn Creek @ CoRd 2 (Culvert)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
KR 1	Kettle River @ Wadena Line Rd	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
KR 2	Unnamed Creek 2 to Kettle River Happy Hour Road (Culvert)	Stream Condition/Trend CSMP	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
KR 3	Unnamed Creek 1 to Unnamed Creek 2 (Kettle River) 107 <sup>th</sup> Ave. (Culvert)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
LR 1	Leaf River @ Leaf River Road	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
LR 3	Leaf River @ CoRd 23 (Bridge)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance

Site #	Brief Description of Location (Code for Segment, if any)	Type of Site	Parameters
LR 4	Leaf River @ CoRd 26	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
OC 1	OakCreekEast@285 <sup>th</sup> (east culvert) Note: OC1 and OC2 are small unnamed tributaries that join to create Oak Creek just after they pass under 285th	Stream Condition/Trend	CSMP T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation
OC 2	OakCreekWest@285 <sup>th</sup> (west culvert) see above	Stream Condition/Trend	CSMP T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation
PR 1	Partridge River @ Aldrich Hwy 10 (Bridge)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
PR 2	Partridge River @ 231 <sup>st</sup> Ave (culvert)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
PR 3	Partridge River @ Old Wadena (Bridge)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
RE 1	Redeye River @ Hwy 71 (Bridge)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation

Site #	Brief Description of Location (Code for Segment, if any)	Type of Site	Parameters
			Temperature Tape Down Distance
RE 2	Redeye River @ St Hwy 227 (Bridge)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
RE 3	Redeye River @ Cord 26 (Bridge)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
SC 1	Unnamed 1 to Stocking Lake CoRd 17 (culvert)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
SC 2	Unnamed 2 to Stocking Lake CoRd 17 (Culvert)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
SC 3	Stocking Creek @ Dam Lake Outlet (Dam Structure)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
SR 1	Shell River @ Hwy 71 (Concrete culvert)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation

Site #	Brief Description of Location (Code for Segment, if any)	Type of Site	Parameters
			Temperature Tape Down Distance
SR 2	Shell River @ BB Inlet	Stream Condition/ Assessment	CSMP++ T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance TSS Total Phosphorus
SR 3	Shell River @ outlet of BBL (Bridge)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
SR 4	Confluence of Shell/Fish Hook Rivers (Bridge)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
SR 5	Twin Lakes Bridge over Shell River (Bridge)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
SR 6	Shell River Outlet @ Lower Twin	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
SR 7	SR 7 Shell River @ Shell City Bridge (Bridge)	Stream Condition/Trend	CSMP++ T-tube Estimated Stream Stage Appearance

Site #	Brief Description of Location (Code for Segment, if any)	Type of Site	Parameters
			Recreational Suitability Precipitation Temperature Tape Down Distance TSS Total Phosphorus
UC 1	Union Creek @ CoRd 4 (Culvert)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
UC 2	Union Creek @ Alfred St. (Culvert)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
UN 1	Unnamed Creek @ BBL inlet Inlet site	Stream Condition/Assessment	CSMP++ T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance TSS Total Phosphorus
WC 1	Whiskey Creek @ CoRd 4 (Culvert)	Stream Condition/Trend CSMP	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance
WR 1	Wing River @ Hwy 10 (Bridge)	Stream Condition/Trend	CSMP + T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance

## 6.1b - Sampling Site List – by program

<u>Program</u>	<u>Site in Program/ Waterbody</u>	<u>Lab</u>
<b>CLMP</b> Secchi Disk Physical condition Suitability for Recreation Color of Lake Water	ML - Morgan Lake	
<b>CLMP+</b> Secchi Disk Physical condition Suitability for Recreation Color of Lake Water Total Phosphorus Chlorophyll a Temperature profile	SL1-Spirit Lake StL-Stocking Lake UT-Upper Twin Lake LT-Lower Twin Lake BBL-Blueberry Lake DL-Duck Lake JC1-Jim Cook East JC2-Jim Cook West	(RMB lab) (RMB lab) (MDH lab) (MDH lab) (MDH lab) (MDH lab) (MDH lab) (MDH lab)
<b>Lake Level Program</b> Precipitation Lake level	SL1 - Spirit Lake StL-Stocking Lake LT-Lower Twin SiL-Simon Lake HzL-Hazel Lake JC2-Jim Cook East JC1-Jim Cook West	
<b>CSMP</b> T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation	BB 3 - Blueberry River Upstream Highway 71 OC 1 - OakCreekEast@285 <sup>th</sup> OC 2 - OakCreekWest@285 <sup>th</sup>	
<b>CSMP +</b> T-tube Estimated Stream Stage Appearance Recreational Suitability Precipitation Temperature Tape Down Distance	BB 4-Blueberry River @ Fletcher's Bridge BB5 Blueberry River @ CoRd 16 CC1-Cat Creek @ CoRd 26 CW1-Crow Wing @ Huntersville CoRd 18 CW2-Crow Wing @ Mary Brown Bridge CoRd 15 CW3-Crow Wing @Nimrod CoRd 12 CW4-Crow Wing @ Oylen CoRd 9 CW5-Crow Wing @ Wahoo Valley CoRd 7 CW6-Crow Wing @ CoRd 30 CW7-Crow Wing @ Warner Rd FC1-Farnham Creek @ CoRd 30 FnC1Fawn Creek @ CoRd 2 KR1-Kettle River @ Wadena Line Rd KR2-Unnamed Creek 2 to Kettle River (Happy Hour Road) KR3-Unnamed Creek 1 to Unnamed Creek 2 (Kettle River)	



LR1-Leaf River @ Leaf River Road  
 LR3-Leaf River @ CoRd 23  
 LR4-Leaf River @ CoRd 26  
 PR1-Partridge River @ Aldrich Hwy 10  
 PR2-Partridge River @ 231<sup>st</sup> Ave  
 PR3-Partridge River @ Old Wadena  
 RE1-Redeye River @ Hwy 71  
 RE2-Redeye River @ St Hwy 227  
 RE3-Redeye River @ Cord 26  
 SC1-Unnamed 1 to Stocking Lake CoRd 17  
 SC2-Unnamed 2 to Stocking Lake CoRd 17  
 SC3-Stocking Creek @ Dam Lake Outlet  
 SR1-Shell River @ Hwy 71  
 SR3-Shell River @ BBL outlet  
 SR4-Confluence of Shell/Fish Hook Rivers  
 SR5-Twin Lakes Bridge over Shell River  
 SR6-Shell River Outlet @ Lower Twin  
 UC1-Union Creek @ CoRd 4  
 UC2 - Union Creek @ Alfred St.  
 WC1-Whiskey Creek @ CoRd 4  
 WR1-Wing River @ Hwy 10

◆-----◆  
**CSMP++**

T-tube  
 Estimated Stream Stage  
 Appearance  
 Recreational Suitability  
 Precipitation  
 Temperature  
 Tape Down Distance  
 TSS  
 Total Phosphorus

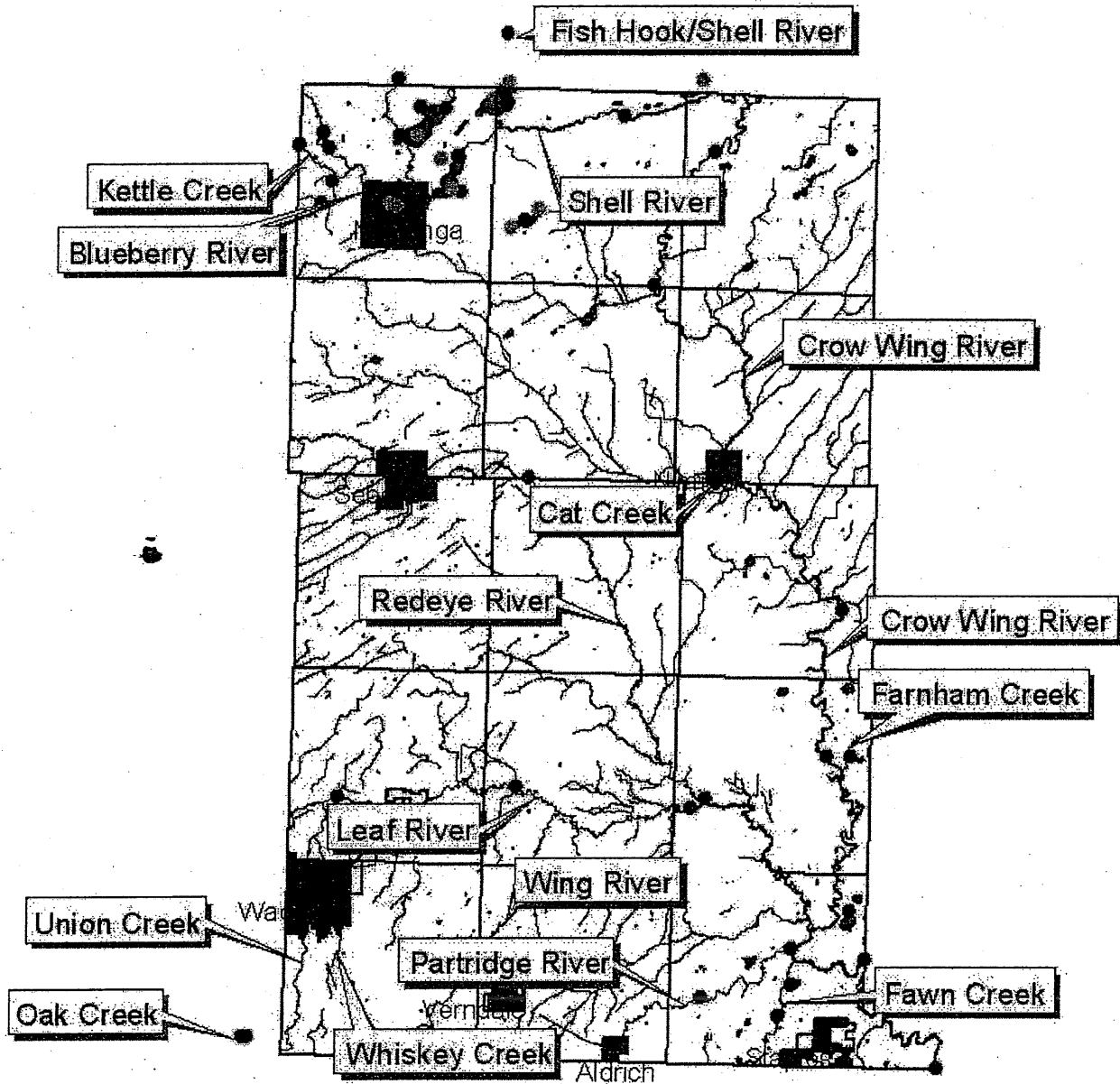
BB1 - Blueberry River @BBL inlet  
 BB2 - Blueberry River @ Hwy 71  
 UN1-Unnamed Creek @ BB inlet  
 SR2-Shell River @ BB Inlet  
 SR7-Shell River @ Shell City Bridge  
  
 SL 3 – Spirit Lake Storm Drain Out  
 SL 4 – Spirit Lake Pond Outlet  
 SL 5 – Spirit Lake West Storm Drain

◆-----◆  
**Mussel Survey**

Shell River  
 Sites TBD

## 6.2 - Site Map

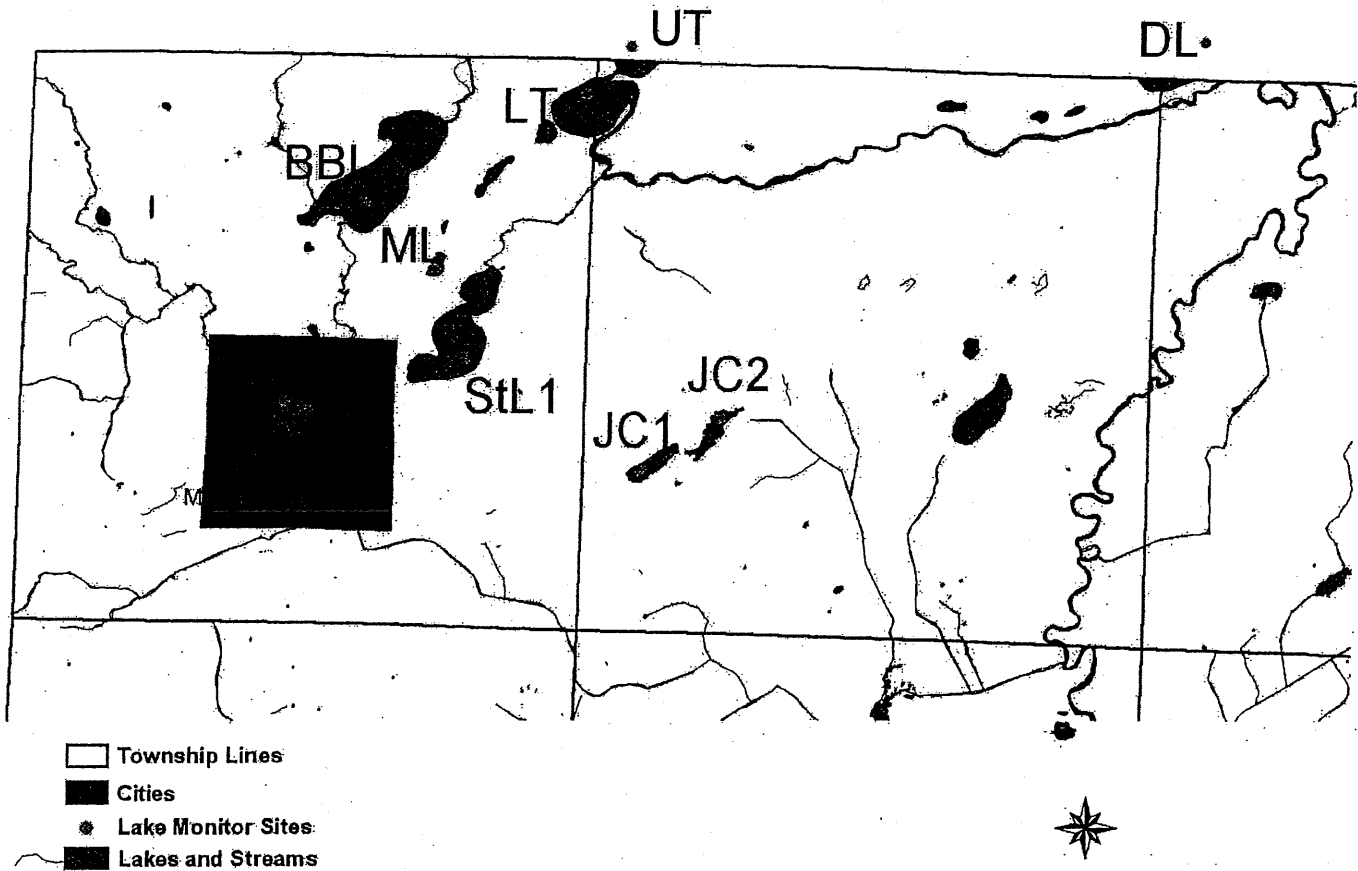
### Wadena County Streams and Monitoring Sites



- Township Lines
- Cities
- DNR Lake Level Monitor Sites
- Stream Monitor Sites
- Lake Monitor Sites
- Lakes and Streams



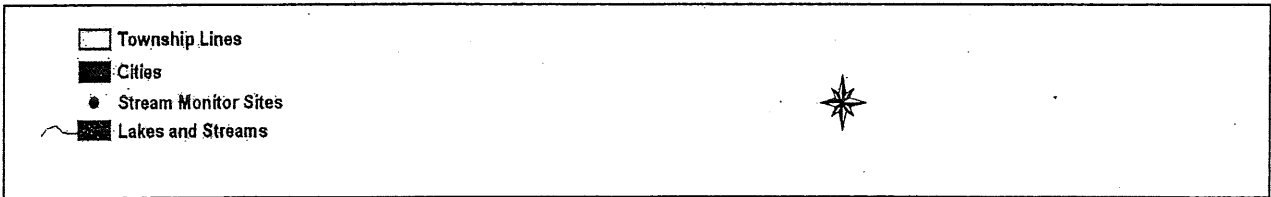
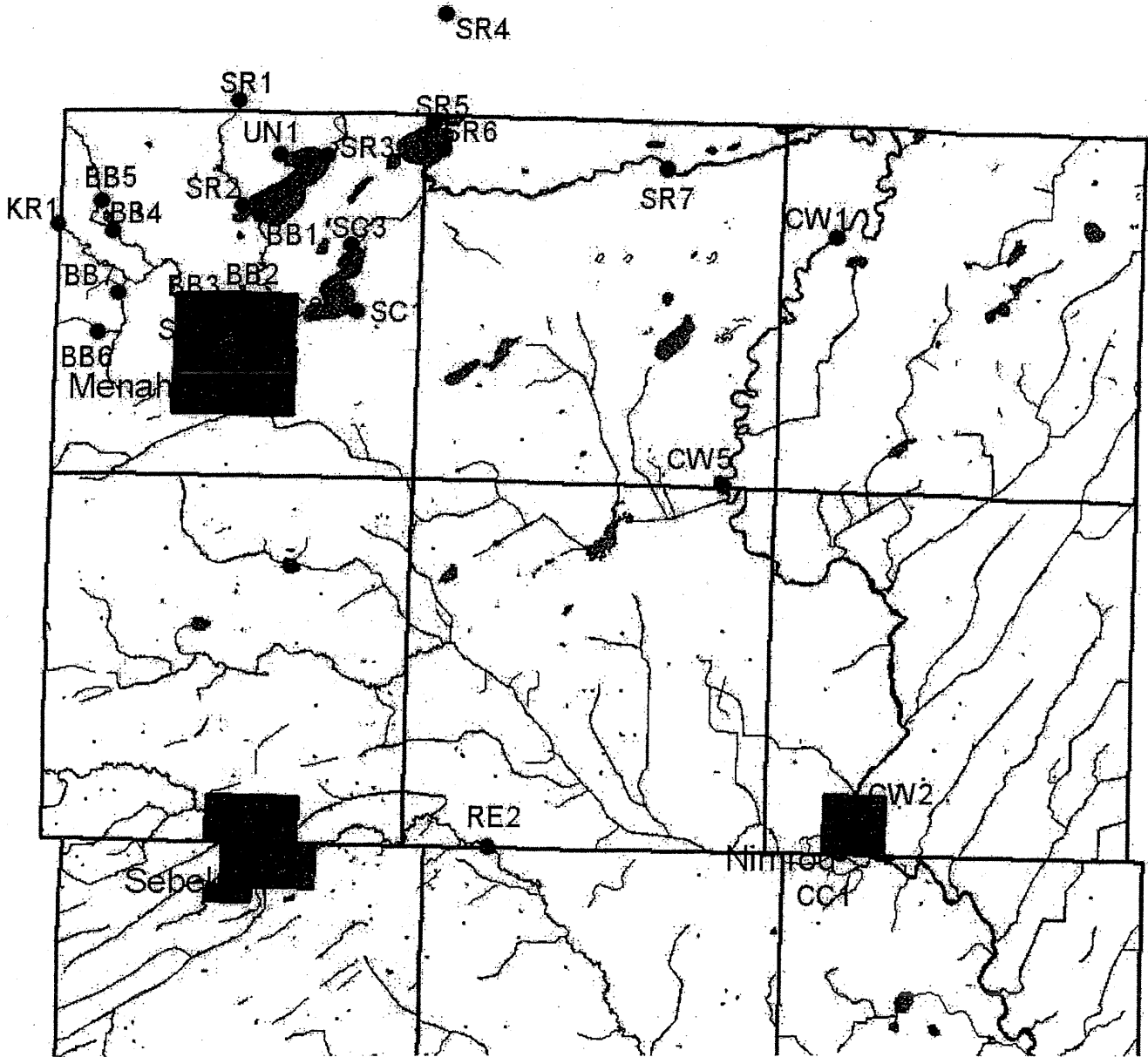
## 2005 Lake Monitoring Sites



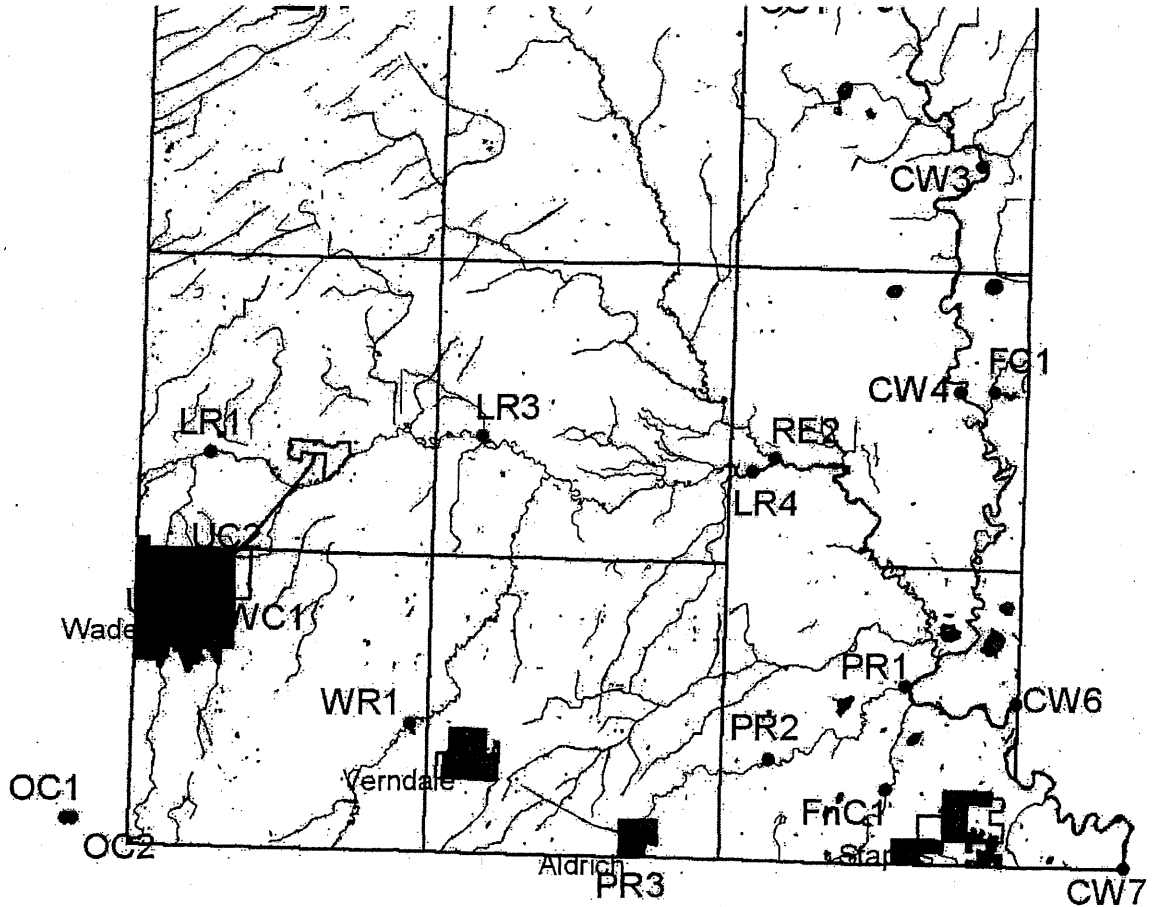
Northern Tier of Wadena County





Bathymetric maps (if available) will be provided to each lake monitor to identify the deepest site. Test sites to be Global Positioned for monitoring consistency.

# 2005 Stream Monitoring Sites North 1/2 of Wadena County



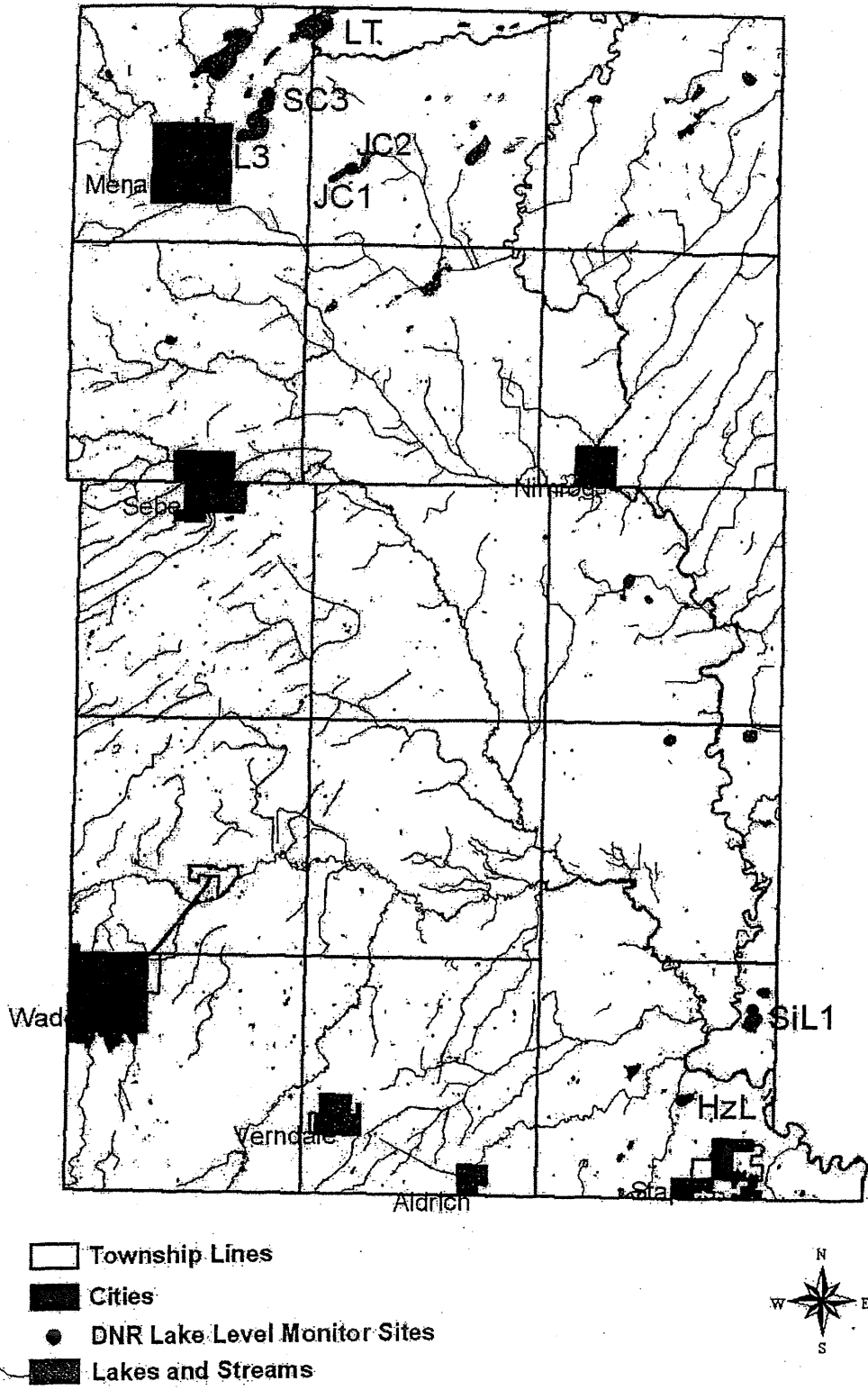
# 2005 Stream Monitoring Sites South 1/2 of Wadena County



-  Township Lines
-  Cities
-  Stream Monitor Sites
-  Lakes and Streams



# 2005 DNR Lake Level Monitoring Sites



### 6.3 - Sampling Schedule

Parameter(s)	Frequency	Completeness	Time of Day	Time of Year	# of Years	Special Weather Conditions
Secchi Disk (Lakes)	Weekly	Minimum needed (100% of the following) 1 sample/month/site 5 months (May-Sept)	Between 10 a.m. and 3 p.m.	Growing Season May thru Sept	10	On bright calm days
Physical Condition (Lakes)	Weekly	Minimum needed (100% of the following) 1 sample/month/site 5 months (May-Sept)	Between 10 a.m. and 3 p.m.	Growing Season May thru Sept	10	On bright calm days
Suitability for Recreation (Lakes)	Weekly	Minimum needed (100% of the following) 1 sample/month/site 5 months (May-Sept)	Between 10 a.m. and 3 p.m.	Growing Season May thru Sept	10	On bright calm days
Color of Lake Water (Lakes)	Weekly	Minimum needed (100% of the following) 1 sample/month/site 5 months (May-Sept)	Between 10 a.m. and 3 p.m.	Growing Season May thru Sept	10	On bright calm days
Total Phosphorus (lakes)	Monthly	Minimum needed (100% of the following) 1 sample/month/site 5 months (May-Sept)	Between 10 a.m. and 3 p.m.	Growing Season May thru Sept	9	Collect at same time as Secchi disc readings
Chlorophyll-a (lakes)	Monthly	Minimum needed (100% of the following) 1 sample/month/site 5 months (May-Sept)	Between 10 a.m. and 3 p.m.	Growing Season May thru Sept	9	Collect at same time as Secchi disc readings
Temperature Profile (Lakes)	Monthly	Minimum needed (100% of the following) 1 sample/month/site 5 months (May-Sept)	Between 10 a.m. and 3 p.m.	Growing Season May thru Sept	10	Collect at same time as Secchi disc readings
Precipitation (Lakes)	Daily	100% needed – Data is recorded cumulatively to cover missed days	Same time every day	March-October	Ongoing	Not Applicable (NA)

Parameter(s)	Frequency	Completeness	Time of Day	Time of Year	# of Years	Special Weather Conditions
Lake Level Gauge (Lakes)	Once weekly and after rainfall event of 2"two in	15 weeks/3 storm events	Anytime	Ice In/Ice Out	10	Not Applicable (NA)
Transparency Tube (Streams)	Weekly	20 weeks plus 4 rain events (minimum 75% of this for a complete sample)	Same time of day	Ice Out/Ice In	10	Take at low flow, averages and high flow (rain events)
Estimated Stream Stage (Streams)	Weekly	20 weeks plus 4 rain events (minimum 75% of this for a complete sample)	Same time of day	Ice Out/Ice In	10	Take at low flow, averages and high flow (rain events)
Appearance (Streams)	Weekly	20 weeks plus 4 rain events (minimum 75% of this for a complete sample)	Same time of day	Ice Out/Ice In	10	Take at low flow, averages and high flow (rain events)
Recreational Suitability (Streams)	Weekly	20 weeks plus 4 rain events (minimum 75% of this for a complete sample)	Same time of day	Ice Out/Ice In	10	Take at low flow, averages and high flow (rain events)
Precipitation (Streams)	Daily	100% needed	Same time every day	March-October	Ongoing	Not Applicable (NA)
Temperature (Streams)	Weekly	20 weeks plus 4 rain events (minimum 75% of this for a complete sample)	Same time of day	Ice Out/Ice In	10	Take at low flow, averages and high flow (rain events)
Tape Down Distance (Streams)	Weekly	20 weeks plus 4 rain events (minimum 75% of this for a complete sample)	Same time of day	Ice Out/Ice In	10	Take at low flow, averages and high flow (rain events)
Total Phosphorus (Streams)	Monthly	100% - 5 months plus 3 rain events (now in budget you have 3 rain)	Same time of day	Ice Out/Ice In	10	Take at low flow, averages and high flow (rain events)



Parameter(s)	Frequency	Completeness	Time of Day	Time of Year	# of Years	Special Weather Conditions
Total Suspended Solids (Streams)	Monthly	100% - 5 months plus 3 rain events (now in budget you have 3 rain)	Same time of day	Ice Out/Ice In	10	Take at low flow, averages and high flow (rain events)
Mussel Survey/ Inventory	Once every other year.	100% needed	Not a consideration	August	Ongoing	Take when flow is low in August

## 7.1 - Quality Control Measures

Parameters			
	Field Dups. 2 different samples at same site and time	Split Samples 1 sample split and sent to two labs	Evaluations
Secchi Disk (lake)	Each sample	NA	Performed by trained volunteers in the field
Total Phosphorus (lakes)	1 sample every other year = approx 6 of all samples%	1 Split Sample	Performed by certified labs (RMB and MDH)
Chlorophyll "a" (lakes)	1 sample every other year = approx 6 % of all samples	1 Split Sample	Performed by certified labs (RMB and MDH)
Temperature Profile (lakes)	TBD	NA	Performed in field with trained volunteers and read as the expected result within defined limits. Help is gotten if accuracy & precision isn't reached.
Lake Level Gauge (lakes)	Each sample	NA	Performed by trained volunteers in the field
Transparency Tube (stream)	Each Sample	NA	Performed by trained volunteers in the field
Temperature (stream)	Each sample	NA	Performed by trained volunteers in the field
Tape Down Distance (stream)	At the very least every other sample	NA	Performed by trained volunteers in the field
Total Phosphorus (stream)	5% random	NA	Performed by certified lab
Total Suspended Solids	5% random	NA	Performed by certified lab
Mussel Survey/ Inventory			Performed by trained volunteers in the field

**Response Action:** If a response action is needed, we will define the problem and troubleshoot to determine the problem source. Once identified the problem will be resolved according to established guidelines.

## 7.2 - Instrument and Equipment Requirements

### CLMP

- 1) **Equipment Type:** Secchi Disk
- 2) **Documentation:** Received from MPCA
- 3) **Inspection:** Verify markings on rope to make sure they are clear and rope has not shrunk or is worn. . Make sure disk is not severely scratched.
- 4) **Calibration:** Each spring, measure distance between markings has not changed from 6". Recalibrate rope if they have.
- 5) **Maintenance:** Keep clean and dry

### CLMP+

- 1) **Equipment Type:** Temperature Profiler (Fishawk)
- 2) **Documentation:** To be purchased, follow manufacturer recommendations
- 3) **Inspection:** To be purchased, follow manufacturer recommendations
- 4) **Calibration:** To be purchased, follow manufacturer recommendations
- 5) **Maintenance:** To be purchased, follow manufacturer recommendations

- 1) **Equipment Type:** Integrated sampler for total phosphorus and chlorophyll. "a"
- 2) **Documentation:** Purchased from RMB Laboratory
- 3) **Inspection:** Check to make sure stored and cleaned as directed below
- 4) **Calibration:** Calibration not required
- 5) **Maintenance:**
  - a. Clean at the beginning of each sampling season
    - In a clean container dissolve ½ box of baking soda in 1 gallon of water
    - Plug one end and fill half way with cleaning solution
    - Plug other end and rotate and tilt sampler to clean all surfaces, making sure not to damage sampler ends
    - Discard cleaning solution and repeat until all the cleaning solution is used
    - Rinse thoroughly 3 times with tap water
  - b. Storage when not in use
    - Store DRY and corked on both ends
    - Store away from kids, pets and other animals such as mice
    - For added protection, cover each end with a new plastic bag and fasten them

- 1) **Equipment Type:** Rain Gauge
- 2) **Documentation:** Purchased from Productive Alternatives,
- 3) **Inspection:** Make sure no cracks are visible in plastic components Check to make sure stored and cleaned as directed below
- 4) **Calibration:** No calibration is needed
- 5) **Maintenance:** Wash periodically with mild soap or detergent and warm water, using a household bottle brush. Don not use solvents or abrasives to clean gauge and do not wash the gauge in your dishwasher. Do not allow accumulated water to freeze in the gauge

## CSMP

- 1) **Equipment Type:** Transparency tube
- 2) **Documentation:** Received through CSMP program from MPCA
- 3) **Inspection:** Make sure no cracks are visible in plastic components Check to make sure tube is cleaned as directed below
- 4) **Calibration:** No calibration is needed
- 5) **Maintenance:** Your tube will last longer if it is kept clean and protected from scratches. Change the location of the clamp on the release-valve tubing frequently, and fully release the clamp between uses to avoid crimping. Store out of the sun

- 1) **Equipment Type:** Rain Gauge
- 2) **Documentation:** Received through CSMP program from MPCA
- 3) **Inspection:** Make sure no cracks are visible in plastic components Check to make sure stored and cleaned as directed below
- 4) **Calibration:** No calibration is needed
- 5) **Maintenance:** Wash periodically with mild soap or detergent and warm water, using a household bottle brush. Do not use solvents or abrasives to clean gauge and do not wash the gauge in your dishwasher. Do not allow accumulated water to freeze in the gauge

- 1) **Equipment Type:** Non-Mercury Thermometers
- 2) **Documentation:** To be purchased, follow manufacturer recommendations
- 3) **Inspection:** Make sure it is not cracked or broken
- 4) **Calibration:** Place in container of ice water, should read 32 degrees F
- 5) **Maintenance:** Store in cool dry area

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- 1) **Equipment Type:** Measurement tape
- 2) **Documentation:** To be purchased, follow manufacturer recommendations
- 3) **Inspection:** To be purchased, follow manufacturer recommendations
- 4) **Calibration:** To be purchased, follow manufacturer recommendations
- 5) **Maintenance:** Make sure it is kept clean and away from sand

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## 8.1 - Field and Laboratory Sheets

**Quantity and design of Field and Laboratory Sheets may change if programs change. They are attached in Appendix D by the programs that will be using them.**

- D.1. CLMP Field Data Sheet
- D.2. CLMP+ Field Data and Observation Sheet
  - D.2.i. CLMP+RMB Chain of Custody Sheet
  - D.2.ii. CLMP+ MDH Lake Lab Sheet
- D.3. CSMP/CSMP+ Field Data Sheet
  - D.3.i. CSMP Rain Gauge Sheet
- D.4. CSMP++ Field Data Sheet
  - D.4.i. CSMP++ RMB Lab Chain of Custody sheet
- D.5. DNR Lake Level Data Sheet
- D.6. DNR/U of M Climatological Network Data Sheet

## 8.2 - Data Transfer, Entry, and Validation

*This is the pathway each field and laboratory sheet follows from beginning, through data entry and validation to its final resting place and who has responsibility for each step.*

<b>Name of Sheet Or Database</b>	<b>Data Transfer</b>	<b>Data Entry</b>	<b>Validation</b>	<b>Final Resting Place</b>
<b>CSMP/CSMP+ /CSMP++ Field Sheet Database</b>	<b>Volunteer to turn in all data sheets to Wadena County Water Resource Management</b>	<b>Data entered by Wadena County Water Resource Management</b>	<b>Wadena County Water Resource Management validates data</b>	<b>1 copy of data to remain with Wadena County Water Resource Management and originals are sent to MPCA</b>
<b>CSMP++ Laboratory Sheets</b>	<b>RMB labs to send test results to Wadena County Water Resource Management</b>	<b>Data entered by Wadena County Water Resource Management</b>	<b>Wadena County Water Resource Management validates data</b>	<b>Data to remain with Wadena County Water Resource Management</b>
<b>MPCA CLMP Field Sheet Database</b>	<b>Volunteer to turn in all data sheets to Wadena County Water Resource Management</b>	<b>Data entered by Wadena County Water Resource Management</b>	<b>Wadena County Water Resource Management validates data</b>	<b>1 copy of data to remain with Wadena County Water Resource Management and originals are sent to MPCA</b>
<b>CLMP+ Field Sheet Database</b>	<b>Volunteer to turn in all data sheets to Wadena County Water Resource Management</b>	<b>Data entered by Wadena County Water Resource Management</b>	<b>Wadena County Water Resource Management</b>	<b>Wadena County Water Resource Management</b>
<b>CLMP+ RMB Laboratory</b>	<b>RMB labs to send test results to Wadena County</b>	<b>Data entered by Wadena County Water Resource</b>	<b>Wadena County Water Resource</b>	<b>1 copy of data to remain with Wadena</b>

<b>Name of Sheet Or Database</b>	<b>Data Transfer</b>	<b>Data Entry</b>	<b>Validation</b>	<b>Final Resting Place</b>
<b>Sheets</b>	<b>Water Resource Management</b>	<b>Management</b>	<b>Management validates data</b>	<b>County Water Resource Management and originals are sent to MPCA</b>
<b>DNR/U of M Climatological Network Precipitation Program Database</b>	<b>Volunteer to turn in all data sheets to Wadena County Water Resource Management</b>	<b>Data entered by Wadena County Water Resource Management</b>	<b>Wadena County Water Resource Management validates data</b>	<b>1 copy of data to remain with Wadena County Water Resource Management and originals are sent to Climatological Network</b>
<b>DNR Lake Level Program Database</b>	<b>Volunteer to turn in all data sheets to Wadena County Water Resource Management</b>	<b>Data entered by Wadena County Water Resource Management</b>	<b>Wadena County Water Resource Management validates data</b>	<b>1 copy of data to remain with Wadena County Water Resource Management and originals are sent to DNR Waters</b>

### 8.3 - Miscellaneous and Problem Data

*Missing values, detection limits, nonsensical data, ranges, narratives, etc., will be recorded as problems occur for each parameter listed below.*

Parameter	*Data Entry Protocol for "Problem" Data
Secchi Disk (Lakes)	
Physical Condition (Lakes)	
Suitability for Recreation (Lakes)	
Color of Lake Water (Lakes)	
Total Phosphorus (Lakes)	
Chlorophyll-a (Lakes)	
Temperature Profile (Lakes)	
Precipitation (Lakes)	
Lake Level Gauge (Lakes)	
Transparency Tube (Streams)	
Estimated Stream Stage (Streams)	
Appearance (Streams)	
Recreational Suitability (Streams)	
Precipitation (Streams)	
Temperature (Streams)	
Tape Down Distance (Streams)	
Total Phosphorus (Streams)	
Total Suspended Solids (Streams)	
Mussel Survey/ Inventory (Streams)	

\*We will continue to fill in this worksheet as problem data occur.



## 8.4 - Meta-data

(Modified from MPCA Volunteer Surface Water Monitoring Guide Appendix F) Checks in the columns indicate where the meta-data can be found. Blank rows indicate that meta-data element is not used.

### PROJECT INFORMATION

Meta-data element	In the Moni. Plan	On Field or Lab Sheet	In Data Entry Program	Other:
Project ID	X	X	X	
Project name	X			
Project purpose	X			
Start date	X	X	X	
Planned duration	X			
Lead organization name	X			
Project manager (with contact Info)	X			
Other Contact (like MPCA rep, SWCD rep)	X			
Sampling personnel	X	X	X	
Sample medium	X	X		
Sample collection methods	X			
Equipment Used	X	X		
Field measurement methods	X	X		
Comments about data transfer, Submission	X		X	
Project Study Area	X	X		
Design & sampling frequency	X	X	X	
Programs associated	X			
Cooperating Org.	X			
QA plan summary/reference	X		X	

### LABORATORY

Meta-data element	In the Moni. Plan	On Field or Lab Sheet	In Data Entry Program	Other:
Lab ID	X			
Laboratory name (w/ address and contact info)	X	X		
Citation for lab (Manual or Handbook).	X			
Parameter	X	X		
Sample fraction	X	X		
Reporting units	X			
Comparable standard method	X		X	
Field preservation method	X	X		
Detection limit	X		X	
Lab certified for parameter?	X			
Length of Analysis	X			
Temperature basis	X			

### STATION INFORMATION

Meta-data element	In the Moni. Plan	On Field or Lab Sheet	In Data Entry Program	Other:
Project station ID	X	X	X	
Related station	X		X	
Station name	X	X	X	
Station type	X	X	X	
Waterbody type (stream, lake, wetland)	X	X	X	
Station description	X		X	
Site ID	X	X	X	
Ecoregion name	X		X	
Travel directions	X		X	
Station latitude-longitude or UTM			X	
Geo-positioning method			X	
Datum		X	X	
Map scale			X	
Site lat-long			X	
State/county	X	X	X	
HUC code	X		X	
River Reach		X	X	
DNR Lake ID	X	X	X	
Habitat Type	X		X	

**MONITORING RESULTS**

<b>Meta-data element</b>	<b>In the Moni. Plan</b>	<b>On Field or Lab Sheet</b>	<b>In Data Entry Program</b>	<b>Other:</b>
Station and site ID	X	X	X	
Date		X	X	
Time		X	X	
Station ID	X	X	X	
Site ID	X	X	X	
Activity ID, type and category	X	X	X	
Medium	X	X		
Sample depth	X	X	X	
Sampling personnel	X	X	X	
Activity comments		X	X	
Sample collection method and equipment	X	X		
Sample preservation	X	X	X	
Lab ID	X	X	X	
Lab sample ID	X	X	X	
Lab certified?	X		X	
Results	X	X	X	
Field/lab ID	X	X	X	
Lab Sample Temperature	X	X	X	
Remark codes	X	X	X	

**OTHER**

<b>Meta-data element</b>	<b>In the Moni. Plan</b>	<b>On Field or Lab Sheet</b>	<b>In Data Entry Program</b>	<b>Other:</b>

## 9.1 - Compare Your Data with Benchmarks

1) Parameter	2) Analytical Benchmark and Methodology You Will Use	3) Who Will Analyze the Data?	4) Do the Data Users Require this Protocol?
Secchi Disk (Lakes)	<p><b><u>Benchmarks</u></b> Swimmable Use Support in NCHF</p> <p><b><u>Methodology</u></b> Secchi Disk: <u>&gt;1.2 m (3.9 ft) (TSI &lt;57) = full support</u> NCHF single value &lt;1.2 m is considered unacceptable</p>	Wadena Water Resource Management MPCA	<p>Yes, MPCA will use this information to make a 305b judgment. Twelve data sets of paired values for SD, TP and CHL "a" are needed for a 303d determination</p> <p>Yes, SWCD will accept this protocol as well</p>
Physical Condition (Lakes)	<p><b><u>Benchmarks</u></b> Swimmable Use Support in NCHF</p> <p><b><u>Methodology</u></b> Scaled numerical summary 1-5 with 1 most desired and 5 least Compare to numerical value data collected over time and with other lakes within the watershed</p>	Wadena Water Resource Management MPCA	<p>Yes, MPCA uses additional information to further understand other data collected</p> <p>Yes, SWCD will accept this protocol as well</p>
Suitability for Recreation (Lakes)	<p><b><u>Benchmarks</u></b> Swimmable Use Support in NCHF</p> <p><b><u>Methodology</u></b> Scaled numerical summary 1-5 with 1 most desired and 5 least Compare to numerical value data collected over time and with other lakes within the watershed</p>	Wadena Water Resource Management MPCA	<p>Yes, MPCA uses additional information to further understand other data collected</p> <p>Yes, SWCD will accept this protocol as well</p>
Color of Lake Water (Lakes)	<p><b><u>Benchmarks</u></b> Swimmable Use Support in NCHF</p>	Wadena Water Resource	Yes, MPCA uses additional information to further understand

1) Parameter	2) Analytical Benchmark and Methodology You Will Use	3) Who Will Analyze the Data?	4) Do the Data Users Require this Protocol?
	<u>Methodology</u> Descriptive value	Management MPCA	other data collected Yes, SWCD will accept this protocol as well
Total Phosphorus (lakes)	<u>Benchmarks</u> Swimmable Use Support in NCHF <u>Methodology</u> TP: < 40 ug/l (TSI <57) = full support NCHF single value > 40 ug/l not fully supporting	Wadena Water Resource Management MPCA	Yes, MPCA will use this information to make a 305b judgment. Twelve data sets of paired values for SD, TP and CHL "a" are needed for a 303d determination Yes, SWCD will accept this protocol as well
Chlorophyll-a (Lakes)	<u>Benchmarks</u> Swimmable Use Support in NCHF <u>Methodology</u> CHL "a": < 15mg/l (TSI <57) = full support NCHF single value > 15 mg/l not fully supporting	Wadena Water Resource Management MPCA	Yes, MPCA will use this information to make a 305b judgment. Twelve data sets of paired values for SD, TP and CHL "a" are needed for a 303d determination Yes, SWCD will accept this protocol as well
Temperature Profile (Lakes)	<u>Benchmarks</u> Fisheries Management Plans per lake and choice of game fish <u>Methodology</u> Data acceptance is dependent on desired fish populations per lake	Wadena Water Resource Management MPCA DNR	MPCA is utilizing this information to expand the current CLMP program and is looking at this parameter for inclusion
Precipitation (Lakes)	<u>Benchmarks</u>	Wadena Water Resource	DNR, U of M utilize and accept

1) Parameter	2) Analytical Benchmark and Methodology You Will Use	3) Who Will Analyze the Data?	4) Do the Data Users Require this Protocol?
	Benchmark comparison of data to time and location of other rain monitors <u>Methodology</u> No criteria for comparison, used as resource to understand other data	Management MPCA	data into climatology network
Lake Level Gauge (Lakes)	<u>Benchmarks</u> Track data over the long time <u>Methodology</u> Calculate average lake level over time to establish OHWL	Wadena Water Resource Management MPCA	Ecoregion criteria are pending for stream data so consistent protocols are necessary for data comparison
Transparency Tube (Streams)	<u>Benchmarks</u> Compare to other stream data within county and within watersheds  <u>Methodology (Tentative criteria)</u> A waterbody is in <b>violation</b> of the turbidity standard if: <ul style="list-style-type: none"> <li>• A transparency tube reading is less than 20 centimeters.</li> </ul> A waterbody is <b>impaired</b> if: <ul style="list-style-type: none"> <li>• There are at least 20 independent observations, from a minimum of 2 years over the 10 year assessment period. and</li> </ul> Observations are distributed across years and months so as to be representative of the open water season (typically April – September). and <ul style="list-style-type: none"> <li>• At least 3 observations and 10% of observations are in violation of the standard.</li> </ul>	Wadena Water Resource Management MPCA	Wadena Water Resource Management will use this protocol on all t-tube data submitted by trained volunteers and submit to the MPCA.

1) Parameter	2) Analytical Benchmark and Methodology You Will Use	3) Who Will Analyze the Data?	4) Do the Data Users Require this Protocol?
	<p>and</p> <ul style="list-style-type: none"> <li>• Volunteer collected observations are corroborated by the judgment of MPCA staff, and by local resource and / or watershed project staff, if available.</li> </ul>		
Estimated Stream Stage (Streams)	Compare to same spot stream data over time for use in water chemistry comparisons.	Wadena Water Resource Management	Wadena Water Resource Management will use this protocol on all estimated Stream Stage Data submitted by trained volunteers and submit to the MPCA.
Appearance (Streams)	Compare to same spot stream data over time for use in water chemistry comparisons.	Wadena Water Resource Management	Wadena Water Resource Management will use this protocol on all appearance data submitted by trained volunteers and submit to the MPCA.
Recreational Suitability (Streams)	Compare to same spot stream data over time for use in water chemistry comparisons.	Wadena Water Resource Management	Wadena Water Resource Management will use this protocol on all recreational suitability data submitted by trained volunteers and submit to the MPCA.
Precipitation (Streams)	<p><b><u>Benchmarks</u></b> Benchmark comparison of data to time and location of other rain monitors</p> <p><b><u>Methodology</u></b>  Used to correlate and understand TSS and TP</p>	Wadena Water Resource Management	Wadena Water Resource Management will use this protocol on all precipitation data submitted by trained volunteers and submit to the MPCA. And DNR/U of M

1) Parameter	2) Analytical Benchmark and Methodology You Will Use	3) Who Will Analyze the Data?	4) Do the Data Users Require this Protocol?
Temperature (Streams)	Compare to same spot stream data over time for use in water chemistry comparisons.	Wadena Water Resource Management	Wadena Water Resource Management will use this protocol on all temperature data submitted by trained volunteers and submit to the MPCA.
Tape Down Distance (Streams)	Compare to same spot stream data over time for use in water chemistry comparisons.	Wadena Water Resource Management	Wadena Water Resource Management will use this protocol on all tape down distance data submitted by trained volunteers and submit to the MPCA.
Total Phosphorus (Streams)	<p><b><u>Benchmarks</u></b> Compare to other stream data within watershed, county and within major watersheds</p> <p><b><u>Methodology</u></b> Inter-quartile Range of Concentrations for Minimally Impacted streams in Minnesota by Eco-region. Data from 1970-1992 TP : 70-170 (ug/L) (micrograms per liter)</p>	Wadena Water Resource Management	Wadena Water Resource Management will use this protocol
Total Suspended Solids (Streams)	<p><b><u>Benchmarks</u></b> Compare to other stream data within watershed, county and within major watersheds</p> <p><b><u>Methodology</u></b> TSS: 8-18 (mg/l)</p>	Wadena Water Resource Management	Wadena Water Resource Management will use this protocol



1) Parameter	2) Analytical Benchmark and Methodology You Will Use	3) Who Will Analyze the Data?	4) Do the Data Users Require this Protocol?
Mussel Survey/ Inventory	<u>Benchmarks</u> First Inventory will be used to establish future reference  <u>Methodology</u> TBD (9 known species of mussels in Shell River)	Wadena Water Resource Management  DNR	Yes, DNR and Water Resource Management will accept survey results

## 9.2 Data Interpretation and Assessment

### Decide how you will develop findings and conclusions

1) Questions Used to Develop Findings and Conclusions	2) Potential Statistical Summaries	3) Potential Data Displays
<i>Single and Comparing Parameters</i>		
Lakes-How do the results of each parameter's mean compare to Ecoregion guidelines?	Calculate seasonal means for all parameters and see if they fall within the ranges for our Ecoregion for each water body	Column graph with Ecoregion high and low parameters compared to Seasonal average Seasonal median Max and Min Range Quartiles
Lakes-Did the parameters analyzed exceed the maximum or minimum levels in the water quality criteria? If so, when, where and how often?	Plot data points over time for each water body	Line graph with Ecoregion high and low parameters for each water body compared to Seasonal average Seasonal median Max and Min Range Quartiles
Lakes-What % of the time does each parameter exceed the water quality criteria?	Calculate the % of exceedences by dividing the total number of samples at each site.	Plot % exceedence for each parameter for each site on a column graph, arranged upstream to downstream compared to Seasonal average Seasonal median Max and Min Range Quartiles.
Lakes/Streams: Which sites had the greatest range of results?	Find the highest and lowest results for each parameter and each site	Plot maximum and minimum, connect to show range compared to Seasonal average Seasonal median Max and Min Range Quartiles
Streams-How does temperature compare to designated uses for Water Quality Stds?	Find highest temperature recorded	Plot temperatures over time compared to Seasonal average Seasonal median Max and Min Range Quartiles
Lakes-What is the TSI for Secchi, TP, and Chl "a" and how do they compare	Calculate TSI	Plot all similar lakes to compare values

1) Questions Used to Develop Findings and Conclusions	2) Potential Statistical Summaries	3) Potential Data Displays
with Ecoregion values?		
Streams-What is the relationship between TP and TSS?	Use all TP and TSS data (not just summaries)	Plot both parameters as a combination graph, with each represented by a column. Visually compare.  Plot both parameters against each other on a line graph
What is the relationship between TP/TSS and tape down measurement?	Use all TP and TSS with tape down measurement data on consistent time lines	Plot tape down measurement in line graph over time with TSS and TP compared to Seasonal average Seasonal median Max and Min Range Quartiles
Lakes and Streams-What do results for each parameter look like when comparing sites within watersheds?	Use all data from lakes	Plot individual line graphs over time showing each lake parameter
Are there seasonal trends where data points are higher than others?	Compare the same sites from month to month and year to year	Line graph with Ecoregion high and low parameters with dates clearly shown
Does TP/TSS correlate with precipitation patterns?	Compare rainfall with TP/TSS results	Line graph with Ecoregion high and low parameters with dates clearly shown
Is there a source for the high phosphorus peaks in blueberry Lake?	Compare inlets to Blueberry Lake for phosphorus	Column graph with TP comparison for each inlet
Does Transparency correlate with precipitation patterns?	Compare t-tube results with rainfall amounts	Line graph
What is the diversity of the mussels?	Calculate number of each species found	Pie chart
What is the size of the colonies of mussels?	Calculate number of species and type at each site	Bar graph

### 3) Describe how you will develop conclusions.

We will develop our conclusions by comparing our findings over both time (each site over time) and space (compare sites to each other) and Water Quality Standards criteria if available. We expect to do this on an annual basis and will include our conclusions in a written technical report to be available to all monitors. However, we do see three circumstances where conclusions might not be annual:

1. If there is reason to draw attention to preliminary findings in the middle of a monitoring season (i.e. a significant event like a fish kill or known manure spill).
2. As some parameters and sites are for condition and trend assessment, we plan to continue monitoring over “wet”, “dry” and “normal” years in order to make more definitive and representative conclusions.
3. When possible we will see if our streams and lakes are fully, partially or non-supporting according to the 305(b) methodology but expect to need 3 years of data before we draw final conclusions.

Upon producing our initial findings and conclusions, our technical committee agrees to look at the data, findings and conclusions and check for accuracy. As appropriate, we want to share information as outlined in worksheet 10.1, reporting, presenting and planning for change.

**4) List Quality Control Questions you will ask about your data to determine if it can support your findings and conclusions.**

- How many samples were taken at each site? Did it meet our data quality requirement we set?
- Were samples collected at the right time of day? Were samples collected within the time specified by the lab? Were samples collected through the whole sampling season?
- What were the results of the duplicates we collected during the sampling season? Did they meet the data quality objectives?
- Was the data checked against the field notes?
- Did our data checker find any transcription errors?

## 10.1 - Reporting, Presenting, and Planning for change

1) Who will be responsible for preparing the reports and presentations? **Kari Tomperi Wadena County Water Resource Management Technician**

2) - 4):

2) What formats will be used to tell your story?	3) Target Audiences	4)	Raw data	summarized data		inter- preted data	photos	maps	illustra- tions	stories	Other:
				tables	graphs						
Power Point	Lake/River Org , SWCD, Co. commissioners			x	x	x	x	x	x		
Power Point	Water Resource Management Task Force			x	x	x	x	x	x		
Technical Report	Volunteer Monitor Training, MPCA, Wadena SWCD, Water Resource Management Task Force		x	x	x	x	x	x	x		
Non-formal written report	Lake/River Org, local realtors		x			x	x	x	x		
SWCD Newsletter	County Citizens			x	x		x	x			
Water Body Management Plans	Lake/River Org			x	x	x	x	x	x	x	

5) Where/When will message be delivered?

Technical Report will be passed out at Spring volunteer monitor training, Non-formal written report will be passed out at Lake/River organization meetings. SWCD newsletter is mailed to all rural county residents and lake shore owners. Power point presentations will be given

at informational meetings for County commissioners and city councils. Information will be available for River/Lake organizations to insert into management plans.

6) What would you expect to happen as a result of your report or presentation?

I would expect data users to seek further information, make land-use changes, and investigate possible causes and solutions.

## 11.1 - Task Identification and Timeline

Monitoring Goal or Assessment (optional):

Dates Covered by Timeline:

Target Start Date	Target End Date	Main Category (Planning, Training Monitoring, etc.)	Task / Activity Description	Person(s) Responsible to Organize/ Evaluate	Notes of Resources Needed to Carry- Out Task	Fill in Date When done
11/18/04		Planning	Complete Volunteer monitor plan	Kari Tomperi		
		Planning	Work with Pam Skon MPCA to establish clear monitoring protocol for data flow	Kari Tomperi		
		Planning	Solicit new volunteers and make sure they are all properly registered with MPCA	Kari Tomperi Lakes/Rivers Org's	Funds to cover registration fees	
	Feb; 2005	Planning	Find volunteers for key sites that do not currently have a monitor	Kari Tomperi		
12/1/05	3/15/05	Inventory	Determine what is available for equipment and what is needed for 2005 season.	Kari Tomperi	Funds to cover misc. repairs equipment	
	3/15/05	Inventory	Research and purchase Temperature profiler and flow meter	?	Ask Lake/River orgs to help cover costs	
3/15/05	3/31/05	Training	Schedule training sessions for volunteers	Kari Tomperi Bob Borash RMB Lab	Call RMB Labs and schedule times	
	5/10/05	Training	Meeting/Training session w/volunteers	Kari Tomperi	Funding is needed for mailing	
	5/2005	Training	Coordinate volunteers for mussel survey	Kari Tomperi DNR RCM	DNR	
	10/2005	Implementation	Collect raw data samples and record	Volunteers		

Target Start Date	Target End Date	Main Category (Planning, Training, Monitoring, etc.)	Task / Activity Description	Person(s) Responsible to Organize/Evaluate	Notes of Resources Needed to Carry-Out Task	Fill in Date When done
	8/2005	Implementation	Complete mussel survey	Volunteers	DNR	
TBD	TBD	Management	Observation of volunteers	Water Resource Management		
	11/2005	Management	Collect and organize data	Kari Tomperi Pam Skon		
		Management	Copy data forms and forward to MPCA	Water Resource Management		
		Management	Summarize data on SWCD computers	Water Resource Management		
		Management	Present data	Volunteers Kari Tomperi		

Training will include:

- giving volunteers sampling instructions on each parameters and take home sheets with methods
- CLMP+ samplers – instructions about where/when to collect 5 samples and how to turn in samples using chain of custody sheets
- CSMP++ samplers – instructions on when to take storm events readings (amt rain needed) in addition to monthly readings, and how to turn in samples using the chain of custody sheets
- All monitors will get instruction on finding their location and how to make sure data sheets get turned into SWCD



## 11.2 - Volunteer Monitors Contact Information

WaterDataMonitors2005								
Program	ID	1stName	2ndName	Address	City	St	Zip	Water
CLMP	ML1	Lefty	Lindblom	10961 St. Hwy 87	Menahga	MN	56464	Morgan Lake
CLMP+	BBL	Lefty	Lindblom	10961 St. Hwy 87	Menahga	MN	56464	Blueberry Lake
CLMP+	DL1	DeWayne	Mead	22414 Duck Lake Road	Menahga	MN	56464	Duck Lake
CLMP+	JC1	Lefty	Lindblom	10961 St. Hwy 87	Menahga	MN	56464	Jim Cook West
CLMP+	JC2	Lefty	Lindblom	10961 St. Hwy 87	Menahga	MN	56464	Jim Cook East
CLMP+	LT	Don	Broughton	16377 River Lake Dr.	Menahga	MN	56464	Twin Lake-Lower
CLMP+	SL1	Lefty	Lindblom	10961 St. Hwy 87	Menahga	MN	56464	Spirit Lake
CLMP+	StL1	Mark	Hepokoski	36780 Stocking Lake Trail	Menahga	MN	56464	Stocking Lake
CLMP+	UT	Don	Broughton	16377 River Lake Dr.	Menahga	MN	56464	Twin Lake-Upper
CSMP	BB3	Kyle	Peterson	231 3rd St NW	Menahga	MN	56464	Blueberry River
CSMP+	BB4	Char	West	38000 111th Ave.	Menahga	MN	56464	Blueberry River
CSMP+	BB5	Lefty	Lindblom	10961 St. Hwy 87	Menahga	MN	56464	Blueberry River@CoRd16
CSMP+	CC1	Denise	Ratchke	23206 Acorn St.	Nimrod	MN	56478	Cat Creek
CSMP+	CW	Joyce	Langston	27548 240th St.	Verndale	MN	56481	Crow Wing River
CSMP+	CW	Mel	Wiens	11862 261st Ave.	Staples	MN	56479	Crow Wing River
CSMP+	CW1	Curt	Sumner	22572 374th St.	Menahga	MN	56464	Crow Wing River
CSMP+	CW2	George	Lilly	30076 Huntersville Rd	Sebeka	MN	56477	Crow Wing River
CSMP+	CW3	Glen	Motzko	27966 Co Rd 7	Verndale	MN	56481	Crow Wing River
CSMP+	CW4	John	Long	19745 Wahoo Valley Dr.	Staples	MN	56479	Crow Wing River
CSMP+	CW5	Sharon	Tate	36710 141st Ave	Menahga	MN	56464	Crow Wing River
CSMP+	CW6	Kerry Lindgren	Staples-Motley High School	401 Centennial Lane	Staples	MN	56479	Crow Wing River
CSMP+	FC1	Glen	Motzko	27966 Co Rd 7	Verndale	MN	56481	Crow Wing River
CSMP+	KR1	Lefty	Lindblom	10961 St. Hwy 87	Menahga	MN	56464	Kettle River
CSMP+	KR2	Lori	Elmore	10705 St. Hwy 87	Menahga	MN	56464	Kettle River
CSMP+	KR3	Lori	Elmore	10705 St. Hwy 87	Menahga	MN	56464	Kettle River
CSMP+	LR1	Anne	Oldakowski	19161 145th Ave	Wadena	MN	56482	Leaf River
CSMP+	LR3	Kent	Solberg	18618 Cord 23	Verndale	MN	56481	Leaf River
CSMP+	OC1	Ivan	Reinke	62619 285th St.	Wadena	MN	56482	Leaf River
CSMP+	OC2	Ivan	Reinke	62619 285th St.	Wadena	MN	56482	Leaf River
CSMP+	PR2	Jim	Tyrell	12034 123st Ave.	Staples	MN	56479	Partridge River

WaterDataMonitors2005

Program	ID	1stName	2ndName	Address	City	St	Zip	Water
CSMP+	PR3	Jim	Tyrell	12034 123st Ave.	Staples	MN	56479	Partridge River
CSMP+	PR4	Glen	Motzko	27966 Co Rd 7	Verndale	MN	56481	Partridge River
CSMP+	RE1	Jerry	Siegel	221 Us Hwy 71	Sebeka	MN	56477	Red Eye River
CSMP+	RE2	Mary	Harrison	14835 274th St.	Sebeka	MN	56477	Red Eye River
CSMP+	RE3	Lorraine	Lajeunesse	19520 230th St.	Verndale	MN	56481	Red Eye River
CSMP+	SC1	Mike	Mattson	36883 Taylor's Beach Rd.	Menahga	MN	56464	Stocking Lake
CSMP+	SC2	Mike	Mattson	36883 Taylor's Beach Rd.	Menahga	MN	56464	Stocking Lake
CSMP+	SC3	Delroy	Ronning	36975 Taylor's Beach Rd.	Menahga	MN	56464	Stocking Lake
CSMP+	SL6	Wayne	Rost	City of Menahga P.O. Box C	Menahga	MN	56464	Spirit Lake
CSMP+	SL2	Mike	Callahan	418 Main St. SW	Menahga	MN	56464	Spirit Lake
CSMP+	SR1	Lefty	Lindblom	10961 St. Hwy 87	Menahga	MN	56464	Shell River
CSMP+	SR2	Lefty	Lindblom	10961 St. Hwy 87	Menahga	MN	56464	Shell River
CSMP+	SR3	Chuck	Tritz	39418 Lodge Dr.	Menahga	MN	56464	Shell River
CSMP+	SR4	Chuck	Tritz	39418 Lodge Dr.	Menahga	MN	56464	Shell River
CSMP+	SR5	Chuck	Tritz	39418 Lodge Dr.	Menahga	MN	56464	Shell River
CSMP+	SR6	Don	Broughton	16377 River Lake Dr.	Menahga	MN	56464	Shell River
CSMP+	UC1	Wadena	SWCD	4 Alfred St NE	Wadena	MN	56482	Union Creek
CSMP+	UC1	Molly	Costin	106 Summit Ave. NE	Wadena	MN	56482	Union Creek
CSMP+	WC1	Molly	Costin	106 Summit Ave. NE	Wadena	MN	56482	Whiskey Creek
CSMP+	WR1	Kenneth	Carlson	13806 161st Ave	Wadena	MN	56482	Wing River
CSMP++	BB1	Lefty	Lindblom	10961 St. Hwy 87	Menahga	MN	56464	Blueberry River Inlet
CSMP++	BB2	Lefty	Lindblom	10961 St. Hwy 87	Menahga	MN	56464	Blueberry River
CSMP++	SL3	Lefty	Lindblom	10961 St. Hwy 87	Menahga	MN	56464	Spirit Lake
CSMP++	SL4	Lefty	Lindblom	10961 St. Hwy 87	Menahga	MN	56464	Spirit Lake
CSMP++	SL5	Lefty	Lindblom	10961 St. Hwy 87	Menahga	MN	56464	Spirit Lake
CSMP++	SR2	Lefty	Lindblom	10961 St. Hwy 87	Menahga	MN	56464	Shell River Inlet
CSMP++	SR7	Melvin	Messer	20445 394th St.	Park Rapids	MN	56470	Shell River
LL	HzL							Hazel Lake
LL	SiL1	Lola	Kirschman	14914 273rd Ave	Staples	MN	56479	Simon Lake

## 11.3 - Committees and Data Users Contact Information

*The Wadena County Water Resource Management Task Force directs and prioritizes the responsibilities of the Water Resource Management Technician. The Task Force reviews all water quality data and addresses any concerns that may be identified.*

WRMTF2004									
Membership	First Name	Last Name	Phone	Title	Company	Address 1	City	ST	Zip
Citizen	Gary	Peters	631-7707	Water Department Foreman	City of Wadena	P.O. Box 30	Wadena	MN	56482
Citizen	Jerry	Breid				62507 State Hwy 29	Wadena	MN	56482
Citizen	Jerry	Siegel	218-837-5793		CSMP	221 US Hwy 71	Sebeka	MN	56477
Citizen	Hugo	Pulju	218-564-5288	President	Spirit Lake Association	P.O. Box 307	Menahga	MN	56464
Citizen	Chuck	Tritz	218-564-4464	President	Twin Lakes Association	39418 Lodge Dr.	Menahga	MN	56464
Citizen	Marvin	Runyan	218-445-5810		SWCD	10293 CoRd 23	Verndale	MN	56481
Citizen	Leofwin	Lindblom	218-564-4004		CLMP/CSMP	10961 St Hwy 87	Menahga	MN	56464
Citizen	Orville	Meyer	894-1972	Commissioner	Wadena County	29034 Warner Road	Staples	MN	56479
Citizen	Mel	Weins	894-		CSMP	11862 261st Ave	Staples	MN	56479
Citizen	Melvin	Kinnunen	218-564-4334		SWCD	34730 CoRd 23	Menahga	MN	56464
Citizen	John	Finnegan	218-631-2918		Knob Hill Sportsman Club	21479 CoRd 66	Wadena	MN	56482
Citizen	Mark	Hepokoski	218-564-5122		Stocking Lake Association	P.O. Box 292	Menahga	MN	56464
Citizen	Tom Larson		218-564-4557	Mayor	City of Menahga	P.O. Box C	Menahga	MN	56464

**Data Users:**

WRMTF2004									
Membership	First Name	Last Name	Phone	Title	Company	Address 1	City	ST	Zip
Technical	Deana	Skov	218-631-7604	Administrator	Wadena County Planning and Zoning	415 So. Jefferson St.	Wadena	MN	56482
Technical	Karen	Nelson	218-631-7629	Manager	Wadena County Public Health	22 Dayton Ave. SE	Wadena	MN	56482
Technical	Norm	Krause	218-894-1053		Central Lakes College	P.O. Box 99	Staples	MN	56479
Technical	Tim	Crocker	320-616-2471	Hydrologist	DNR-Waters	16543 Haven Rd	Little Falls	MN	56345
Technical	Don	Sirucek	218-894-0086		MDA Central Lakes College	P.O. Box 99	Staples	MN	56479
Technical	Dan	Steward	218-828-2598	Board Conservationist	BWSR	217 So. 7th St. Ste. 202	Brainerd	MN	56401
Technical	Donald	Hansen	763-783-	Supv. Hydrologist	USGS	2280 Woodale Dr	Mounds View	MN	55112
Technical	Will	Yliniemi	218-732-3391	Regional Extension Educator	U of M Extension	201 Fair Avenue	Park Rapids	MN	56470-1483
Technical	Sheila R.	Grow	651-215-0768	Hydrologist, Environmental Health	MN Dept. of Health	P.O. Box 64975	St. Paul	MN	55164-0975
Technical	Jim	Hodgson	218-828-6065		MPCA	1800 College Rd	Baxter	MN	56425
Technical	Jeff	Hrubes	218-828-6065		MPCA	1800 College Rd	Baxter	MN	56425
Technical	Jennifer	Klang	1-800-657-3864	CLMP Coordinator	MPCA	520 Lafayette Rd N.	St. Paul	MN	55155
Technical	Laurie	Sovell	1-800-657-3864	CSMP Coordinator	MPCA	520 Lafayette Rd N.	St. Paul	MN	55155
Technical	Pam	Skon	1-800-657-3864	CSMP/CLMP	MPCA	520 Lafayette Rd N.	St. Paul	MN	55155

***Organizations who have a special interest in a single water body or bodies.***

<b>Name/Organization</b>	<b>Address</b>	<b>Water Bodies</b>
City of Menahga	P.O. Box C Menahga, MN 56464	Spirit Lake
Spirit Lake Association	P.O. Box 269 Menahga, MN 56464	Spirit Lake
Twin Lakes Association	Menahga, MN 56464	Twin Lakes Shell River
Blueberry Lake Association	Menahga, MN 56464	Blueberry Lake Blueberry River Shell River
Stocking Lake Boosters	Menahga, MN 56464	Stocking Lake
Menahga Conservation Club	Menahga, MN 56464	Shell River

## 11.4 Overall Budget

### Revenues:

<i>Item</i>	<i>Description</i>	<i>Budget</i>
<b>LCMR Funds</b>	<i>Mon plan funds</i>	\$3,000
<b>Organizations (7)</b>	<i>\$250 each</i>	\$1,250
Blueberry	250	
Stocking	250	
Twin	250	
MCC	250	
Spirit	250	
Knobhill		
Duck		
<b>MPCA</b>	<i>CLMP+ funds</i>	\$1,200
<b>TOTAL REVENUE</b>		<b>\$5,450</b>

### In-Kind Contributions:

<i>Item</i>	<i>Description</i>	<i>Value</i>
Volunteer hours		
59 Sites	Training (3hrs), testing (5x2 hr), data management (5 x 1 hr) = 3+10+5 = 18x59=1,062	1,062x15/hr=\$15,930
Wadena Staff time for volunteer coordination	Coordination, Training, Site Visit, Data Entry=220	220X\$20.00=\$8,240
Mussel survey	25 volunteers 3 days 25x24=600	600x15/hr=\$9,000
<b>TOTAL IN-KIND VALUE</b>		<b>\$33,170</b>

**Expenses:**

<i>Item Description</i>	<i>Price description</i>	<i># of units</i>	<i>From LCMR Grant</i>	<i>From Other Funds</i>	<i>TOTAL</i>
Secchi Disks	\$10	2 kits	\$ 20.00		\$ 20.00
T-Tube/Rain gauge	\$10	19 kits	\$ 190.00		\$ 190.00
Thermometer	\$7	29 thermometer	\$ 203.00		\$ 203.00
Tape measure for tape down	\$10	29 measures	\$ 290.00		\$ 290.00
Fishhawk Temperature Profiler for lakes	\$215	4 units	\$ 649.00	\$ 211.00	\$ 860.00
CLMP+ (TP/Chlor) 5 samples of each (RMB labs)	\$200/lake for a season (monthly May-Sept)	2 lakes StL Stocking SL1 Spirit		\$ 400.00	\$ 400.00
CLMP+ (TP/Chlor) 5 samples of each (MDH labs)	\$200/lake for a season (monthly May-Sept)	6 lakes UT-Upper Twin LT-Lower Twin BBL-Blueberry DL-Duck JC1-Jim Cook East JC2-Jim Cook West		\$ 1,200.00	\$ 1,200.00
1 Quality Control Split Sample	\$40 per lab RMB& MDH	1 random sample split and sent to both labs for qc check.	\$ 40.00	\$40.00	\$ 80.00
CSMP++ \$24/sample (TP/TSS) 5mo's/3 rain events = 8 times x \$24	\$192/site/yr	8 Streams BB1 Bluebry Inlet BB2 Bluebry River SL3 Spirit Inlet SL4 Spirit Inlet SL5 Spirit Inlet SR2 Shell Inlet SR7 Shell River UN1 Un' Creek	\$ 1,536.00		\$ 1,536.00
5% quality control Duplicate samples	\$24 sample x3 times(TP/TSS)	Random qc check,	\$ 72.00		\$ 72.00
Deliver samples to Lab	\$0.37/mile	8 trips to RMB @ 90 mi. per trip		\$ 266.40	\$ 266.40
Postage	\$0.37/letter	Training Notice		\$ 20.72	\$ 20.72

	\$0.37/letter	Pre-paid postage for data return from volunteer		20.72	\$ 20.72
Copying Monitoring Plan	\$20 binders, \$100 printing			\$ 120.00	\$ 120.00
		<b><u>TOTALS</u></b>	<b>\$3000.00</b>	<b>\$2278.84</b>	<b>\$5278.84</b>

**3) Balance:** Revenue \$5,450 -Expenses (\$5,278.84) = \$171.16  
Positive balance will be used for copies, training and organization materials.

Additional budget documentation is available upon request.



## 12.1 - Follow-up

<i>Group/Audience</i>	<i>How Follow-up will happen:</i>	<i>Schedule</i>
Citizen Volunteer Monitors	<p>Send monitoring report to each Lake/River org</p> <p>Data report &amp; recognition</p> <p>Contact to verify volunteer is able to monitor for new season and has everything needed, find replacement if needed</p> <p>Training session</p>	<p>1 time/year-January</p> <p>1 time/year-SWCD Annual Banquet March</p> <p>1 time/year Spring</p> <p>1 time/year Spring</p>
Data Users-Lake/River Org's	Send monitoring report summary to each Lake/River org	1 time/year Fall
Data Users-MPCA	<p>Send monitoring report</p> <p>Phone call</p>	<p>1 time/year November</p> <p>1 time/year March to talk about any changes and to check-in to see how they have been using report</p>
Data users-Water Resource Management Task Force (WRMTF)	Present monitoring report, ask if any new developments need to be addressed or reprioritized	4 times/year at quarterly meetings

## 12.2 - Evaluation

<i>Annual Evaluation Components</i>	<i>Questions to Ask:</i>	<i>Tools used for evaluation</i>
Data Use	Did the data collected answer data user's questions? Did my decision makers use my data?	Written survey with follow up phone call to Lake/River Org's
Data Use	Did monitoring answer my questions/hypothesis?	Review actual monitoring data and information
Data Management	Am I satisfied with how data is managed and stored?	Internal Inspection checks
Monitoring Plan	Is monitoring plan still applicable for the following year?	Read through plan to determine areas needing revision, clarification
Volunteer Management	Were Volunteers comfortable with the training and feedback process?	Personal evaluations mailed out in November. Follow up phone call in February.
Volunteer Management	Am I satisfied with their participation?	Review overall yearly results, determine if any problems
Volunteer Management	What volunteers plan to continue? Where are new volunteers needed?	Interviews with volunteers
Cost Analysis	Do I have appropriate funds to continue the same monitoring?	Review budgets costs and determine available funds
QA/QC	Is the quality of our monitoring data still meeting our data users' needs?	Annual conversations with Lake/River Org's
QA/QC	Is the quality of our monitoring data still meeting our data users' needs?	Annual conversations with our analytical laboratory
QA/QC	Is the quality of our monitoring data still meeting our data users' needs?	Annual conversations with MPCA

<i>3 to 5 Year Evaluation Components</i>	<i>Questions to Ask:</i>	<i>Tools used for evaluation</i>
Monitoring Plan	What parts worked? What parts need	Utilize Water

	updating/modifications?	Resource Management Task Force to review plan.
Monitoring Plan	Have my issues changed as a result of the monitoring?	Surveys, group input, conversations
Watershed Vision	Has the vision for Wadena County changed because of the monitoring information?	Surveys, group input, conversations

Where will the results of the evaluation be stored/accessed?

Wadena SWCD, MPCA, Storet, DNR

# Appendices

## Appendix A

7050.0200

### **WATER USE CLASSIFICATIONS FOR WATERS OF THE STATE.**

#### **(Wadena County)**

##### Subpart 1.

**Introduction.** Based on considerations of best usage in the interest of the public and in conformance with the requirements of the applicable statutes, the waters of the state shall be grouped into one or more of the classes in subparts 2 to 8.

##### Subpart. 2.

**Class 1 waters, domestic consumption.** Domestic consumption includes all waters of the state which are or may be used as a source of supply for drinking, culinary or food processing use or other domestic purposes, and for which quality control is or may be necessary to protect the public health, safety, or welfare.

**Class 1B waters.** The quality of Class 1B waters of the state shall be such that with approved disinfection, such as simple chlorination or its equivalent, the treated water will meet both the primary (maximum contaminant levels) and secondary drinking water standards issued by the United States Environmental Protection Agency.

##### Subpart. 3.

**Class 2 waters, aquatic life and recreation.** Aquatic life and recreation includes all waters of the state which do or may support fish, other aquatic life, bathing, boating, or other recreational purposes, and where quality control is or may be necessary to protect aquatic or terrestrial life or their habitats, or the public health, safety, or welfare.

**Class 2A waters; aquatic life and recreation.** The quality of Class 2A surface waters shall be such as to permit the propagation and maintenance of a healthy community of cold water sport or commercial fish and associated aquatic life, and their habitats. These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable. This class of surface waters is also protected as a source of drinking water.

**Class 2B waters.** The quality of Class 2B surface waters shall be such as to permit the propagation and maintenance of a healthy community of cool or warm water sport or commercial fish and associated aquatic life, and their habitats. These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable. This class of surface water is not protected as a source of drinking water.

**Class 2C waters.** The quality of Class 2C surface waters shall be such as to permit the propagation and maintenance of a healthy community of indigenous fish and associated aquatic life, and their habitats. These waters shall be suitable for boating and other forms of aquatic recreation for which the waters may be usable.

##### Subpart. 4.

**Class 3 waters, industrial consumption.** Industrial consumption includes all waters of the state which are or may be used as a source of supply for industrial process or cooling water, or any other industrial or commercial purposes, and for which quality control is or may be necessary to protect the public health, safety, or welfare.

**Class 3B waters.** The quality of Class 3B waters of the state shall be such as to permit their use for general industrial purposes, except for food processing, with only a moderate degree of treatment.

##### Subpart. 5.

**Class 4 waters, agriculture and wildlife.** Agriculture and wildlife includes all waters of the state which are or may be used for any agriculture purposes, including stock watering and irrigation, or by waterfowl or other wildlife, and for which quality control is or may be necessary to protect terrestrial life and its habitat or the public health, safety, or welfare.

**Class 4A waters.** The quality of Class 4A waters of the state shall be such as to permit their use for irrigation without significant damage or adverse effects upon any crops or vegetation usually grown in the waters or area, including truck garden crops.

Subpart. 6.

**Class 5 waters, aesthetic enjoyment and navigation.** Aesthetic enjoyment and navigation includes all waters of the state which are or may be used for any form of water transportation or navigation, or fire prevention, and for which quality control is or may be necessary to protect the public health, safety, or welfare.

Subpart 7.

**Class 6 waters, other uses.** Other uses includes all waters of the state which are or may serve the above listed uses or any other beneficial uses not listed herein, including without limitation any such uses in this or any other state, province, or nation of any waters flowing through or originating in this state, and for which quality control is or may be necessary for the above declared purposes, or to conform with the requirements of the legally constituted state or national agencies having jurisdiction over such waters, or any other considerations the agency may deem proper.

Subpart. 8.

**Class 7 waters, limited resource value waters.** Limited resource value waters include surface waters of the state which have been subject to a use attainability analysis and have been found to have limited value as a water resource. Water quantities in these waters are intermittent or less than one cubic foot per second at the once in ten year, seven-day low flow as defined in part, subpart 7. These waters shall be protected so as to allow secondary body contact use, to preserve the groundwater for use as a potable water supply, and to protect aesthetic qualities of the water. It is the intent of the agency that very few waters be classified as limited resource value waters. The use attainability analysis must take into consideration those factors listed in Minnesota Statutes, section, subdivisions 2 and 3. The agency, in cooperation and agreement with the Department of Natural Resources with respect to determination of fisheries values and potential, shall use this information to determine the extent to which the waters of the state demonstrate: A. the existing and potential faunal and floral communities are severely limited by natural conditions as exhibited by poor water quality characteristics, lack of habitat, or lack of water; or B. the quality of the resource has been significantly altered by human activity and the effect is essentially irreversible; and C. there are limited recreational opportunities (such as fishing, swimming, wading, or boating) in and on the water resource. The conditions in items A and C or B and C must be established by the use attainability analysis before the waters can be classified as limited resource value waters.

## Appendix B

### **Desired Fish Temperature for Spawning and Feeding**

Optimal Temperatures for Different Species of Fish

Peak Feeding Temperatures (°F)

Spawning Temperatures (°F)

Largemouth Bass	62-65	Lake Trout	50
Smallmouth Bass	60-63	Brook Trout	58
Walleye (peak before 60°F)	43-63	Muskellunge	63
Northern Pike	40-52	Northern pike	66
Crappie	60-65	Smallmouth Bass	68
Bluegill	66-70	Yellow Perch	68
		Walleye	69
		Bluegill	69
		Crappie	71
		Largemouth Bass	73

Minnesota Lake Association's "Sustainable Lakes Planning Workbook: A Lake Management Tool" (page 4-12).

### III. Budget Request Form

A. Group Name: Wadena County SWCD  
 B. Fiscal Agent: (Name/Address/Phone of C/o Malinda Dexter  
 Wadena SWCD  
 4 Alfred St. NE  
 Wadena, MN 56482  
 Person responsible to receive/handle funds: 218-631-3195 x3  
 C. Name that should appear on the check Wadena SWCD  
 D. Amount requested \$ 3,000

#### D. Overall Budget

##### Revenues:

<i>Item</i>	<i>Description</i>	<i>Budget</i>
<b>LCMR Funds</b>	<i>Mon plan funds</i>	\$3,000
<b>Organizations (7)</b>	<i>\$250 each</i>	\$1,250
Blueberry	250	
Stocking	250	
Twin	250	
MCC	250	
Spirit	250	
Knobhill		
Duck		
<b>MPCA</b>	<i>CLMP+ funds</i>	\$1,200
<b>TOTAL REVENUE</b>		<b>\$5,450</b>

##### In-Kind Contributions:

<i>Item</i>	<i>Description</i>	<i>Value</i>
Volunteer hours		
59 Sites	Training (3hrs), testing (5x2 hr), data management (5 x 1 hr) = 3+10+5 = 18x59=1,062	1,062x15/hr=\$15,930
Wadena Staff time for volunteer coordination	Coordination, Training, Site Visit, Data Entry=220	220X\$20.00=\$8,240
Mussel survey	25 volunteers 3 days 25x24=600	600x15/hr=\$9,000
<b>TOTAL IN-KIND VALUE</b>		<b>\$33,170</b>



**Expenses:**

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5% quality control Duplicate samples	\$24 sample x3 times(TP/TSS)	Random qc check,	\$ 72.00		\$ 72.00

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Postage	\$0.37/letter	Training Notice		\$ 20.72	\$ 20.72
	\$0.37/letter	Pre-paid postage for data return from volunteer		\$ 20.72	\$ 20.72
Copying Monitoring Plan	\$20 binders, \$100 printing			\$ 120.00	\$ 120.00
		<b><u>TOTALS</u></b>	<b>\$3000.00</b>	<b>\$2278.84</b>	<b>\$5278.84</b>

**3) Balance:** Revenue \$5,450 -Expenses (\$5,099) = \$230.38

Positive balance will be used for copies, training and organization materials.

Additional budget documentation is available upon request.