Rivers Council of Minnesota

1269 Second Street North, Suite 200, Sauk Rapids, MN 56379
PHONE 320-259-6800 • **FAX** 320-259-6678 • **E-MAIL** rivers@riversmn.org • **URL** www.riversmn.org

March 21, 2005

Justin Watkins
Cannon River Watershed Partnership
8997 Eaves Ave
Northfield, MN 55057

Dear Justin and CRWP team,

Your request for $3000 to help implement the Cannon River Watershed Partnership's citizen monitoring plan has been approved. Congratulations, and again, great job on the CRWP's citizen monitoring plan!

Enclosed is the check for $3,000. All monies must be accounted for with receipts and those receipts are due back to us by September 30, 2005. A brief final report is required no later than December 1, 2005.

It has been a pleasure working with you! The CRWP continues to be an outstanding partner, and we appreciate your involvement and leadership in this program. We will be in touch about other specific workshops that may be of interest and doing periodic check-ins to see how your monitoring plan is working out.

Great Work!

Angie

Angie Becker Kudelka, River Watch Director
Rivers Council of Minnesota

Rivers Council of Minnesota

1269 Second Street North, Suite 200, Sauk Rapids, MN 56379
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Hilary Ziols
Cannon River Watershed Partnership
8997 Eaves Avenue
Northfield, MN 55057

October 14, 2005

Dear Hilary,

We have received your final report and attachments for the RCM/MLA Citizen Volunteer Monitoring Plan program, as funded through LCMR*.

Your document satisfies the reporting requirements and completes the monitoring plan training, implementation, and contract components for the program.

It has been a pleasure to work with you, Justin, and Beth throughout this project. Please keep in touch with monitoring activities and updates on your program. Also let us know of future monitoring/training needs that may be of interest to you or your citizen volunteer monitoring group.

Sincerely,

Angie Becker Kudelka
River Watch Director
Rivers Council of Minnesota

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

CANNON RIVER WATERSHED PARTNERSHIP

Working to protect and improve the surface and groundwater resources and natural systems of the Cannon River watershed

Cannon River Watershed District Citizen Monitoring Plan Project

Final Report 9-30-05

The staff and Board of the Cannon River Watershed Partnership (CRWP) truly appreciate the opportunity to work under an LCMR appropriation with the Rivers Council of Minnesota. Ms. Angie Becker Kudelka has given us especially helpful and timely assistance in fulfilling our responsibilities.

Expenditures for this grant are summarized on the attached spreadsheet, "Rivers Council Monitoring Grant Final Report 09/30/05." We have been able to purchase all the equipment that will be needed to go forward to train and equip volunteers to do aquatic macroinvertebrate sampling.

The staff of Cannon River Watershed Partnership has turned over in 2005, with the departure of Justin Watkins, Watershed Analyst, and Joey Robison, Public Outreach Coordinator. Beth Kallestad became the new Watershed Analyst in early summer, and is now enjoying a maternity leave until mid-November. Hilary Ziols became the Outreach and Development Coordinator in December, 2004, and she and Beth have shared responsibility for guiding CRWP's Citizen Stream Monitoring Program. Hilary's background is as a licensed biology and earth sciences teacher, and she has knowledge of and experience with training people to identify aquatic macroinvertebrates. CRWP will also have a new executive director in the near future; the present director has resigned effective in October, 2005.

CRWP has good rapport with many of its stream monitors. Volunteers frequently send pictures of streams' response to rain events, and they participate enthusiastically in other programs. We believe that we have a willing corps to engage in macroinvertebrate sampling, but that effort will begin in earnest in 2006. We plan to hold a volunteer recognition event in early December, 2005, and the macroinvertebrate component will be announced at that time.

We plan to develop an effective training presentation which we can replicate and deliver to volunteer monitors at their sites.

If you have any other questions about CRWP's activities or use of grant funds, please do not hesitate to contact us.

Sincerely,

Hilary Ziols

Hilary Ziols
Outreach and Development Coordinator

Beth Kallestad

Beth Kallestad
Watershed Analyst

8997 Eaves Avenue • Northfield, MN 55057
507.646.8400 • Fax 507.646.8039 • staff@crwp.net • www.crwp.net

Rivers (ncil Monitoring Grant Final Report 09/30/05

Revenues	*from LCMR grant*	*CRWP Actual Expenses*	*total*
LCMR plan funding	$ 3,000		$ 3,000
CRWP CMP budget * 2 years		$ 8,000	$ 8,000
TOTAL REVENUES 2005-2006	**$ 3,000**	**$ 8,000**	**$ 11,000**
EQUIPMENT			
CSMP kit from MPCA	$ 600	$ 300	$ 900
CLMP kit from MPCA	$ 130	$ 130	$ 260
Thermometer	$ 376	$ 379	$ 755
tape-down devices	$ 240	$ 310	$ 550
aquatic nets (for macro sampling)	$ 384	$ 425	$ 809
hand magnifying glasses	$ 180	$ 130	$ 310
misc accessories for macro samp.	$ 240	$ 571	$ 811
(trays, tweezers, etc.)			
equipment subtotal	$ 2,150	$ 2,245	$ 4,395
PRINTING			
Printing of plan	$ 200	$ 72	$ 272
Printing of macro guides & reference	$ 200	$ 284	$ 484
Printing & distribution of reports and miscellaneous mailings	$ -	$ 400	$ 400
EVENTS			
Volunteer trainings	$ -	$ 600	$ 600
Volunteer recognition events	$ -	$ 1,000	$ 1,000
STAFF			
Coordinator salary		$ 6,000	$ 6,000
Salary for new macro component	$ 450	$ 450	$ 900
TOTAL EXPENSES 2005-2006	**$ 3,000**	**$ 11,051**	**$ 14,051**

REVENUE LESS EXPENSES 2005-2006	**$0**	**($3,051)**	**($3,051)**

In-Kind Contributions	*Description*	*Value*
CRWP staff	coordination of program;	$4,000
CSMP volunteers	40 people * 40 hours *$10	$16,000
CLMP volunteers	20 people * 25 hours *$10	$5,000
TOTAL IN-KIND VALUE 2005-2006		**$25,000**

✓$ 159.63 Student Secchi ✓ASK
✓$ 30.00 CSMP KIT ✓ASK
✓$ 30.00 CSMP KIT ✓ASK
✓$ 240.00 CSMP KIT ✓ASK
✓ $130.00 CLMP KIT ✓ASK
✓ $ 68.76 THERMO ✓ASK
✓ $620.56 THERMO ✓ASK
✓$ 424.65 NETS ✓ASK
✓$ 447.15 MISC MACRO ✓ASK
✓ $ 99.33 WADERS

✓$ 171.80 CSMP MANUALS ✓>ASK
✓$ 40.00 fact sheets
✓$ 100.00 Macro guides ✓ASK
✓$ 94.00 Living waters ✓ASK
45.00 Lamination ✓ASK

✓ $450 (463.42) ✓ASK

$3,090.88 ✓

Cannon River Watershed Partnership
Citizen Monitoring Plan

A Product of Cannon River Watershed Partnership

Winter 2004

Justin Watkins

Cannon River Watershed Partnership
Citizen Monitoring Plan

A Product of Cannon River Watershed Partnership
Winter 2004
Justin Watkins

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.

CRWP would like to thank LCMR, Rivers Council of Minnesota, Minnesota Lakes Association, River Network and Bryan Spindler (citizen monitor review) for providing funding, technical support and general guidance throughout the development of this plan.

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Cannon River Watershed Partnership (CRWP)

Our mission is to protect and improve the surface and ground water resources and the natural systems of the Cannon River watershed.

Contact Information:
8997 Eaves Avenue
Northfield MN 55057
507.646.8400
507.646.8039 fax
www.crwp.net
staff@crwp.net

Staff:

Cumming, Gordon (Executive Director (gordon@crwp.net))
Kennedy, Leslie (Administrative Assistant (leslie@crwp.net))
Watkins, Justin (Watershed Analyst (justin@crwp.net))
Ziols, Hilary (Outreach & Education Coordinator (hilary@crwp.net)

Board of Directors

Officers:
George Kinney, Chair
Elaine Feikema, Vice Chair
Andrew Murray, Treasurer
Allene Moesler, Secretary

Citizen Board Members:
Jim Bassett, Randolph
Elaine Feikema, Faribault
Merv Henke, Owatonna
George Kinney, Northfield
Sarah Kleeberger, Owatonna
Dave Legvold, Northfield
Allene Moesler, Cannon Falls
Andrew Murray, Dundas
Charles Richardson, Red Wing
Roy Srp, Waseca
Hugh Valiant, Waterville
Vern Wilker, Owatonna

County Commission Representatives:
Joe Harris, Dakota
Richard Samuelson, Goodhue
Bob Culhane, LeSueur
Jim Brown, Rice
Bruce Kubicek, Steele
Richard Androli, Waseca

Soil and Water Conservation District Representatives:
Brad Becker, Dakota
Donald Banks, Goodhue
Alvin Dietz, LeSueur
Wally Hildebrandt, Rice
Dave Currell, Steele
Jeff Ruedy, Waseca

CRWP Mission & Vision

Our Mission

The ***mission*** of the Cannon River Watershed Partnership is to:

- To protect and improve the groundwater resources and natural systems of the Cannon River Watershed.

CRWP accomplishes this mission by:

- Coordinating existing local and state government and citizen resources in implementing local water plans;
- Instilling a sense of watershed pride through education, information and special events; and
- Providing for cooperative management and protection of the watershed.

Our Vision

The ***vision*** of the Cannon River Watershed Partnership is to:

- Restore (Improve) the natural functions of the watershed so that it supports healthy, diverse natural communities and compatible human uses.

In striving to execute this mission every day, we intend to inspire watershed residents to become responsible stewards of their watershed.

That mission and vision is translated through the ***goals*** of the organization:

- **Restoration:** increase the quantity and quality of wetlands, wildlife, water resources, and natural vegetation.
- **Corridors and Buffers:** create and maintain corridors of vegetation, primarily along waterways, to provide habitat and to filter surface run-off;
- **Water Storage:** stabilize surface water flows to lessen streambank erosion, siltation, and flooding.
- **Growth Management:** manage and prepare for growth sot that natural areas, water resources, and prime farmlands are protected.
- **Agriculture**: reduce the impact of agriculture land use on the environment.
- **Urban and Rural Development:** reduce the impact of urban and rural development on the environment.
- **Waste Management:** reduce the generation of waste and the use of toxic products so as to minimize damage to the environment.

Citizen Monitoring Background

What is Citizen Monitoring?

With a vast landscape of water resources, and limited staff and funding, government agencies and other groups have been prompted to enroll the service of volunteers to monitor the health of our lakes and streams. The Minnesota Pollution Control Agency (MPCA) coordinates two programs – the Citizen Lake Monitoring Program (CLMP) and the Citizen Stream Monitoring Program (CSMP).

What Does Citizen Monitoring Involve?

There are many existing programs, some more complicated than others and each tailored to fit certain needs, but most involve monitoring the clarity of a particular waterbody at a fixed site. This is accomplished by means of a Secchi Disk (in a lake) or a transparency tube (in a stream). Both are very simple, affordable instruments that produce reliable, useful information.

How is the Collected Information Used?

Only a small fraction of our 12,000+ lakes and thousands of stream miles have been thoroughly assessed or even monitored at all; only recently have we realized the importance of monitoring our water. Thus, in many cases, information collected by volunteers is the only recorded data for a given waterbody. It's important to record this baseline information, so change over time can be tracked and linked to land use and other defining factors. In many cases, volunteer-collected data can supplement large-scale undertakings (monitoring projects, lake assessments, etc.) of the state or other entities – four or five volunteers can often double or triple the data-collecting capacity of local agency staff. [see "The Transparency Tube – Why Should I Use It?" for more]

Cannon River Watershed Local Program

CRWP began coordinating local stream monitoring volunteers in 1999: we used the MPCA program as our base, and expanded and edited as we saw fit according to our local environment. At that time, there were ten individuals involved – in a few short years that number grew to more than fifty (as of November 2004).

This Plan

As our monitoring program has grown, the need for a good guide and plan has become more evident. While the program features a good approach to monitoring (MPCA methods) and outstanding participation (most monitors in a single major watershed in Minnesota), it has become apparent that a formal record of our strategy would help streamline the effort and grow participation even further. This document will summarize our citizen monitoring program's philosophies and goals, and detail its procedures. It will be useful both as a technical reference for data users and decision makers, and as a guide for citizen monitors.

Example: Use of Citizen Monitoring Data

Using Citizen Stream-Monitoring Program data in Stream Assessments (from MPCA)

Since its inception in 1998, the Citizen Stream-Monitoring Program (CSMP) has planned to use data collected by its volunteers in the statewide stream assessment process. Transparency tube data will be used for determining turbidity impairments for the first time during the 2006 stream assessment. Stream water transparency, or clarity, is the core water quality measurement taken by CSMP volunteers. Transparency, measured in streams with a transparency tube (see inset), is closely linked with turbidity. Minnesota has a state standard for turbidity, against which water quality impairments can be assessed. Thus, by establishing a scientifically based link between transparency and turbidity, we can use an inexpensive, simple water quality measure tracked by volunteers to assess whether a stream is impaired.

From 1998 to 2002, simultaneous transparency tube and turbidity readings were collected across the state and an empirical relationship was developed between these two factors. Because the correlation between the two factors may be stronger at smaller spatial scales, the relationship was explored at the ecoregion and major watershed scales, as well as at the statewide scale. Further analysis determined that the statewide relationship was preferred, given the strength of the statewide correlation, and the lack of data and established transparency/turbidity correlations at the watershed and ecoregion scales.

A workgroup of water quality experts from the Minnesota Pollution Control Agency (MPCA) developed specific criteria for using transparency tube data in the turbidity assessment process, based on the previous five years of data collection and analysis. Specifications detailing the number of transparency observations, years of data, and distribution of data across seasons were determined by the workgroup (see attachment). Final recommendations were approved by MPCA management in June of 2004.

Example: Use of Citizen Monitoring Data (continued)

Criteria for Incorporating Transparency Tube Readings into Turbidity Assessment (from MPCA)

If sufficient turbidity measurements exist, only turbidity measurements will be used to determine impairment. If there are not sufficient turbidity measurements, any combination of independent turbidity, transparency, and total suspended solids observations may be combined to meet the outlined criteria for assessment.

If there are multiple observations of a single parameter in one day, the mean of the values will generally be used in the assessment process.

If there are observations of more than one of the three parameters in a single day, the hierarchy of consideration for assessment purposes will be turbidity, then transparency, then total suspended solids.

A waterbody is in **violation** of the turbidity standard if:

- A transparency tube reading is less than 20 centimeters.

A waterbody is **impaired** if:

- There are at least 20 independent observations, from a minimum of 2 years over the 10 year assessment period.

  and

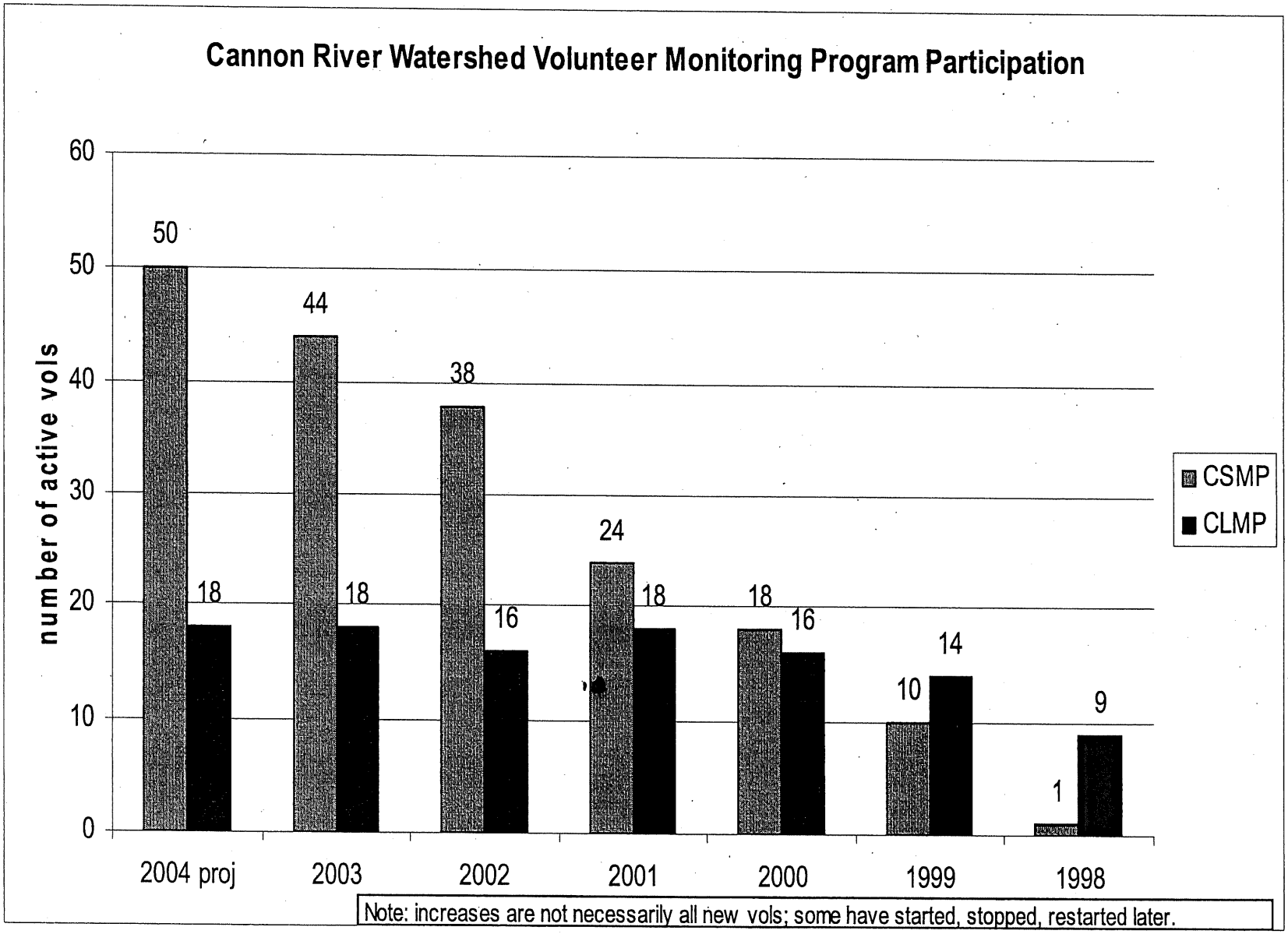
- Observations are distributed across years and months so as to be representative of the open water season (typically April – September).

  and

- At least 3 observations and 10% of observations are in violation of the standard.

  and

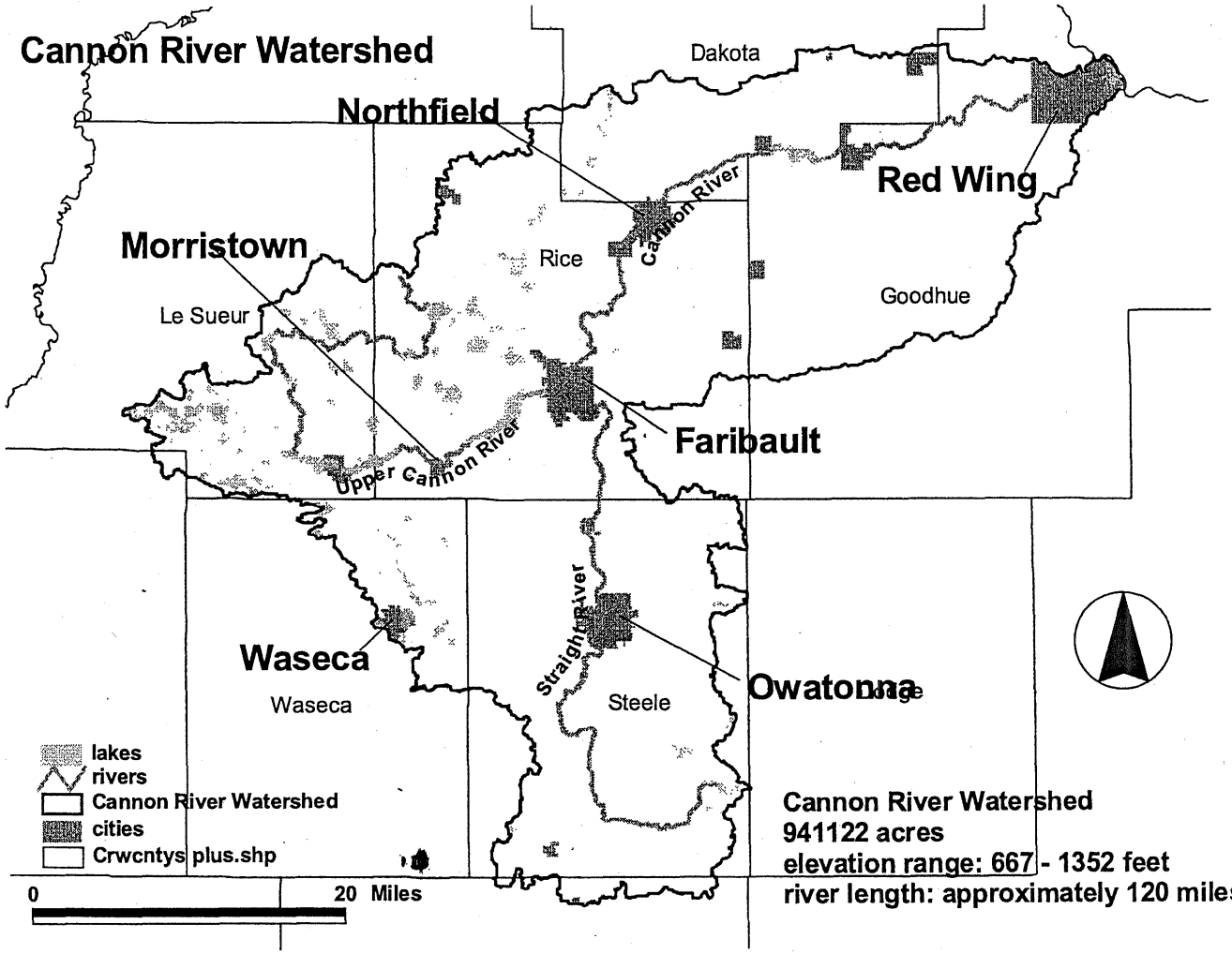
- Volunteer collected observations are corroborated by the judgment of MPCA staff, and by local resource and / or watershed project staff, if available.


Cannon River Watershed Volunteer Monitoring Program Participation
number of active vols
60
50
40
30
20
10
0
50
18
44
18
38
16
24
18
18
16
10
14
1
9
2004 proj
2003
2002
2001
2000
1999
1998
CSMP
CLMP
Note: increases are not necessarily all new vols; some have started, stopped, restarted later.

Cannon River Watershed Background

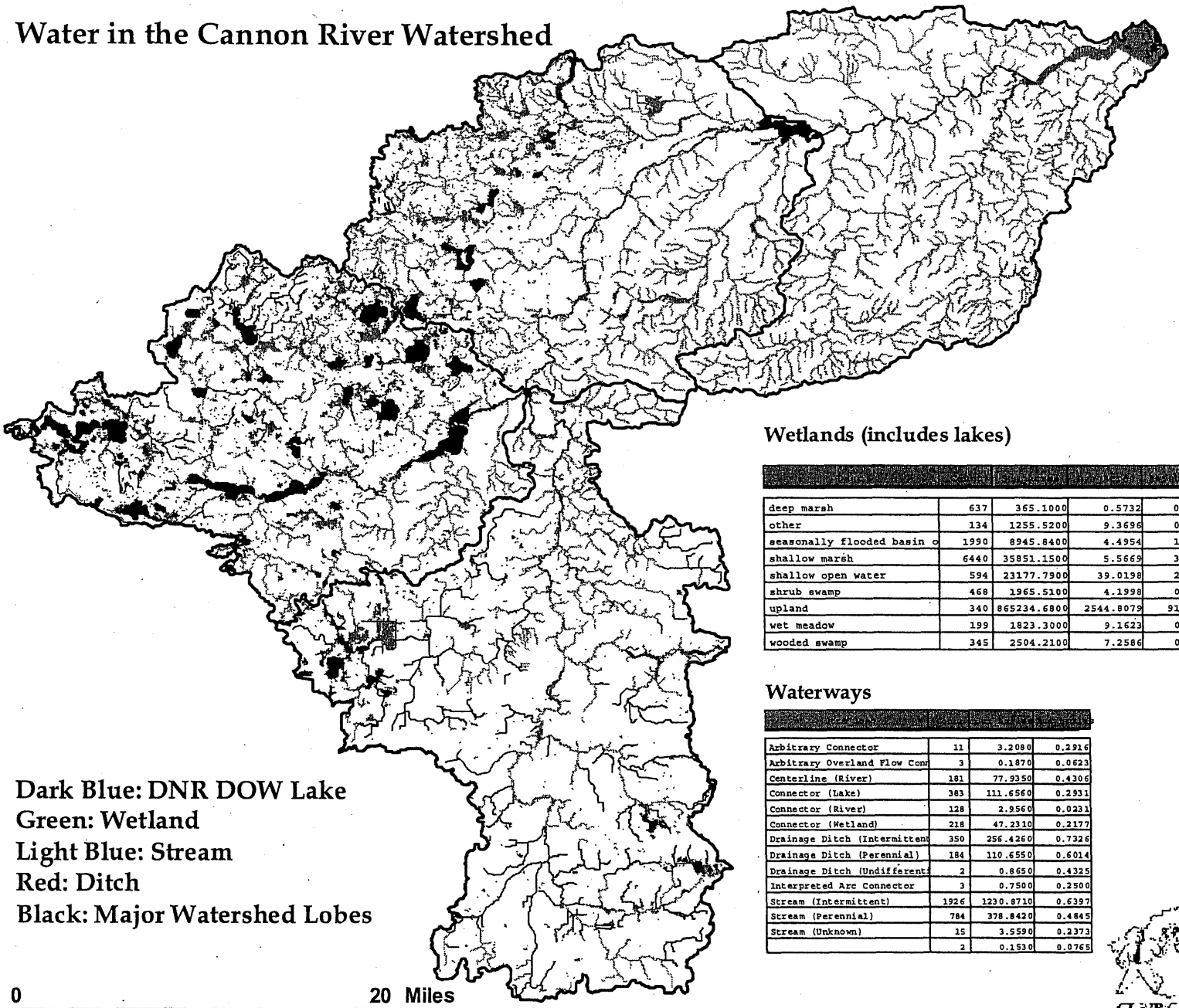
The Cannon River Watershed is made up of all of the land, lakes, rivers, and streams that drain into the Cannon River. The watershed area is 1,462 square miles and includes land in six counties: Dakota, Goodhue, Le Sueur, Rice, Steele, and Waseca. The largest tributary to the Cannon is the Straight River.

The watershed is home to many diverse areas- the largest remnants of Big Woods in the state, beautiful bluff lands, prairie, and rich farmland. It is also home to rare species such as the Dwarf Trout Lily, a small spring wildflower found no other place in the world but in southeastern Minnesota, primarily in the Cannon River Watershed.



CRWP GIS 2004

Water in the Cannon River Watershed



Wetlands (includes lakes)

deep marsh	637	365.1000	0.5732	0.0
other	134	1255.5200	9.3696	0.1
seasonally flooded basin o	1990	8945.8400	4.4954	1.0
shallow marsh	6440	35851.1500	5.5669	3.8
shallow open water	594	23177.7900	39.0198	2.5
shrub swamp	468	1965.5100	4.1998	0.2
upland	340	865234.6800	2544.8079	91.9
wet meadow	199	1823.3000	9.1623	0.2
wooded swamp	345	2504.2100	7.2586	0.3

Waterways

Arbitrary Connector	11	3.2080	0.2916
Arbitrary Overland Flow Conn	3	0.1870	0.0623
Centerline (River)	181	77.9350	0.4306
Connector (Lake)	383	111.6560	0.2931
Connector (River)	128	2.9560	0.0231
Connector (Wetland)	218	47.2310	0.2177
Drainage Ditch (Intermittent	350	256.4260	0.7326
Drainage Ditch (Perennial)	184	110.6550	0.6014
Drainage Ditch (Undifferent	2	0.8650	0.4325
Interpreted Arc Connector	3	0.7500	0.2500
Stream (Intermittent)	1926	1230.8710	0.6397
Stream (Perennial)	784	378.8420	0.4845
Stream (Unknown)	15	3.5590	0.2373
	2	0.1530	0.0765

Watershed and Surface Water Information

INFORMATION ITEMS	ANSWER
Major Basin	Lower Mississippi
Major Watershed	Cannon River
Hydrologic Unit Code	07040002
Ecoregions	Western Corn Belt Plains North Central Hardwood Forests
Location	Southeast Minnesota (Goodhue, Dakota, Rice, Le Sueur, Waseca, Steele Counties (see map))
Land Use	75-80% row crop agriculture 5-10% grassland 5-10% forest 5-10% urban & developed 0-5% other (wetland, mining, transportation)
Lake Acres	26,000 acres of water that has a DOW Lake ID 19,700 acres of "named" lakes (42 different lakes)
River & Stream Miles (DNR classification & measure-ments)	Intermittent stream: 1231 miles Perennial stream: 379 miles Intermittent ditch: 256 miles Perennial ditch: 111 miles
Major & Well Know Lakes	Circle, Fox, Mazaska, Roberds, General Shields, Cannon, Wells, Hunt, Kelly & Dudley, Byllesby
Major & Well Know Tributaries	Straight River, Chub Creek, Belle Creek, Little Cannon River, Crane Creek, Pine Creek, Trout Brook

Inventory of Watershed and Surface Water Uses

USES	ANSWER
Primary water uses	Recreation: boating, fishing, swimming Wastewater transport: countless individual sewage treatment systems (ISTS), several municipal and industrial discharges
Public accesses	Numerous throughout watershed
General public perceptions of the water	Generally seen as very poor – "muddy" and "green" are most common descriptors
Fish tested for mercury?	Yes – Minnesota Department of Health (MDH) fish advisories have been issued accordingly, and several river stretches and lakes are listed (303(d)) for mercury
Noteworthy cultural history	The Oneota Indian culture can be traced back to 10,000 AD near Red Wing where the Cannon joins the Mississippi. The Oneota lived in large villages on the river terraces.
Data collectors	Counties, Department of Natural Resources (DNR), Minnesota Pollution Control Agency (MPCA), Minnesota Department of Agriculture (MDA), Cannon River Waterhsed Partnership (CRWP), Citizen Stream Monitoring Program (CSMP), Citizen Lake Monitoring Program (CLMP)

State Classifications, Designated Uses and Impaired Waters

The Cannon River, from the northern city limits of Faribault (after confluence with Straight River) to its confluence with the Mississippi River , is classified as a 2B & 3B water, per Minnesota 7050 rules.

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. The turbidity standard for this class is 25 NTU.

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.

Much of the Cannon River and many of its tributaries share this common classification of warmwater streams. However, the watershed's trout stream miles are classified as 2A waters:

Class 2A waters. 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.

For these and for all water classifications, there exist corresponding **designated uses**. For example, a designated trout stream (class 2A) should support a coldwater fishery. Likewise, a class 2B water should allow for surface water contact by humans. If a pollutant affects one or more of a water's designated uses, it can be labeled **impaired** if sufficient data are available to document the problem. Such troubled waters are included on Minnesota's 303(d) list (impaired waters list: http://www.pca.state.mn.us/water/tmdl/index.html#tmdl). Once a water is listed, it is scheduled for an investigation of the problem, to be followed by a cleanup effort. The Cannon River Watershed includes many miles of impaired streams and rivers, and many acres of impaired lakes. The map on the following page would include even more impairments if sufficient data existed to document them. For more information regarding Minnesota's impaired waters, investigative reports and remedial efforts, visit the Minnesota Pollution Control Agency website: http://www.pca.state.mn.us/water.

For more detail regarding Minnesota's classification of waters, visit http://www.revisor.leg.state.mn.us/arule/7050/

Watershed Issues

The Cannon River Watershed's landscape and land use have produced a myriad of water quality issues with respect to its receiving waters. Overall, the basin exhibits symptoms that are indicative of nearly every problem imaginable; documented impairments include uses affected by excess nutrients, fecal coliform bacteria, mercury and turbidity (see map on following page). However, the many detailed issues can be generally summarized as follows: (1) the lakes are green, (2) the streams and rivers are brown, (3) much of the basin's water is often unsafe for human contact.

Green Lakes
Excess nutrients create a fairly constant nuisance algae presence in nearly all of the watershed lakes; extreme blooms and scums occur periodically throughout the open-water season. This increased aquatic productivity stresses lake ecosystems (fish kills, eventual shifts in animal and plant populations) and creates an aesthetically displeasing situation.
Stressor: phosphorus
Sources: cropland, urban land, municipal wastewater, septic systems, internal cycling

Brown Streams and Rivers
Excessive loading of suspended sediment, silt and other particulate matter makes for turbid, brown waterways. In extreme cases, the mass of "dirt" moving downstream can create an image of "flowing mud.." This increased concentration of suspended solids stresses river and stream ecosystems (embeddedness, smothering of organisms, decreased visibility, scouring of bed) and creates an aesthetically displeasing situation.
Stressor: suspended solids
Sources: cropland, urban land, strembanks, streambeds

Human Health Hazards
Pathogens associated with animal (including human) feces make many of our waters unsafe for human contact. This relatively invisible threat can be a significant danger to any animal interacting with impaired surface waters.
Stressor: fecal pathogens (a host of viruses, bacteria and protozoa); indicator is fecal coliform bacteria
Sources: cropland, urban land, municipal wastewater, septic systems, wildlife

While there many problems afflicting the Cannon River Watershed—many of which are interrelated, some of which encompass others—these are "the big three" issues with respect to actual water quality. Our citizen monitoring program strives to document various dimensions of each of these impairments (directly or indirectly).

Additionally, there are other concerns—social and cultural issues—that are addressed by our citizen monitoring program:
(1) Lack of times spent outdoors
(2) Lack of interaction with water
(3) Lack of understanding of general land and water dynamics

The program addresses these issues by simply putting people outside, near or in our surface waters. As volunteers accumulate water quality data, they typically take an interest in the driving forces behind observed conditions, and consequently the pursue and gain an appreciation of land and water interactions.

Issues, Efforts to Address Those Issues, Evaluation, & Outcomes

Issue, Monitoring Question or Hypothesis	Known Effort to Address the Issue	Evaluating Known Efforts	Identifying Niches for Citizen Monitoring	Desired Future Outcomes
pathogens: a human health threat primary: streams secondary: lakes	numerous efforts as prescribed by MPCA Regional TMDL (completed in 2003 with help from CRWP), including promotion of buffer strip installation (CRP), unsewered communities education, and encouragement for feedlot owners to sign open lot agreement	too early to measure success, but precedent suggests that these efforts will be successful, if we are able to fully implement these programs	in SE MN, water clarity in streams correlates fairly well with fecal coliform counts (pathogens generally enter the streams with sediment); tube can be used to indirectly detect pathogens in water	reduce bacteria loading to levels prescribed in TMDL, thus maintain waters that are safe for surface water contact
phytoplankton dominated systems and nuiscance algae blooms primary: lakes secondary: streams (mainly river impoundments and wide, slow segments)	numerous government programs administered via the Natural Resources Conservation Service (NRCS) and the county Soil and Water Conservation Districts (SWCDs) have been attempting to reduce phosphorus input to our surface waters for decades; additionally, many local efforts complement these on-going programs	MPCA recently commissioned Barr Engineering to assess all sources of phosphorus to MN waters; the report is a good summary of our nutrient problems, and is being used as a guide for management; additionally, local TMDL projects are addressing phosphorus loading in the Cannon River watershed; however, it is too early to determine the success of these efforts	citizen monitoring—particularly photographs, temperature data, and anecdotal observations—in both streams and lakes provides a good record of phytoplankton presence and/or systems conducive to phytoplankton growth; in lakes , water clarity is readily translated to TSI	reduce the frequency of nuisance algae blooms, decrease productivity in our surface waters, maintain good dissolved oxygen in our rivers and lakes; in general, attain swimmable and fishable waters through the Cannon River basin
degradation of aquatic communities due to excessive sediment loading primary: streams secondary: lakes	the same programs put forth to reduce nutrient loading also aim to address our sediment problems, as the pollutants are usually "partners" (see above text)	MPCA and Barr Engineering are working on a sediment study that will eventually identify sources; local TMDL projects will also address sediment	citizen monitoring of water clarity in both streams and lakes provides a good record of sediment presence; stream macroinvertebrate monitoring can assess quality of aquatic communities	decrease sediment loading to our waters; protect and improve aquatic habitat in moving waters, decrease infill rates in our lakes and reservoirs; create better aesthetics with respect to all waters in the basin

Monitoring Assessment Overview

The Cannon River watershed citizen monitoring effort is an ongoing condition/trend assessment. All information collected is added the MPCA database, and is used to assess the long-term health of our lakes and streams. While our undertaking seeks to further the essential goals of the MPCA citizen monitoring programs, it is further described by the goals and purposes listed below. The tables on the following pages outline the various dimensions of the program.

Goals of Our Citizen Monitoring Program

(what we're trying to do):

1. Gain a volunteer monitor for each watershed lake and in each of the 42 generalized subwatersheds – those subwatersheds that include a stream or ditch other than the Cannon River or Straight River.
2. Maintain participation from year to year by means of recognition and supplying of information and reports to volunteers.

Purposes of Our Citizen Monitoring Program

(why we are sponsoring this program):

1. Provide an opportunity for citizens to be directly and physically involved in an important watershed activity.
2. Collect baseline data; many water bodies suffer from a distinct lack of historical data.
3. Provide a *general* understanding of the characteristics of each lake and tributary of the Cannon River. Reaction to rain events, recovery from sediment influxes associated with those events, status of the biological community, and seasonal variation in stream flow are some examples of general information that can be obtained via our citizen monitoring program.
4. Provide a watershed "watchdog" network. As monitors will be in or near lakes and streams often, they will be provided many opportunities to record irregular happenings. Fish kills, strange sediment plumes, low dissolved oxygen, extensive algae blooms, and "cows in the stream" are some examples of events that would be worth noting.
5. Maintain opportunities to recruit project specific "helpers" for any given CRWP project. If we gain a uniform coverage of monitors throughout the watershed, we will be able to select individuals that can (if willing) aid our (staff) data collection efforts on an as-needed basis.
6. Provide loose direction for CRWP monitoring and management efforts. Citizen collected data could draw our attention to certain watersheds that might require higher resolution study or conservation efforts.
7. Provide educational case studies to all watershed citizens. Comparing the land use characteristics of two watersheds (of similar size) for which data is available is a good means of revealing the impacts of different land use practices.
8. Expand the MPCA CLMP and CSMP.

Data Users and Data Uses

Question or Hypothesis	User/Decision Maker(s)	Uses/Decisions	Potential Parameters
Do watershed streams support fishing, swimming and other uses?	Minnesota Pollution Control Agency (primary) Cannon River Watershed Partnership (secondary)	The State of MN has developed a transparency standard for streams; thus the general CSMP collected data can be used to determine if streams are fully supporting of a given use or uses. Waters that do not support designated uses will be added to the impaired waters list.	Clarity, stage, temperature, macroinvertebrate data and photographs are all useful in such a determination.
Are watershed streams exhibiting a trend or change in behavior over time?	Minnesota Pollution Control Agency (primary) Cannon River Watershed Partnership (primary)	Long-term data sets can be used to detect changes in watershed behavior, as reflected in stream water quality. Documentation of significant trends or changes will be merit further, more detailed investigation.	Clarity, stage, temperature, macroinvertebrate data, photos
How is urbanization and sprawl affecting streams that drain transitional landscapes?	Cannon River Watershed Partnership (primary) Local Cities (secondary)	Consistent CSMP data collection can capture any changes in water quality brought on by landscape alteration (our watershed is developing quickly). Such information could guide implementation of urban best management practices.	Clarity, stage, temperature, macroinvertebrate data, photos
How effective are the conservation measures promoted and administered by local and federal government units?	Soil and Water Conservation Districts (primary) Cannon River Watershed Partnership (secondary)	Consistent CSMP data collection can capture any changes in water quality brought on by implementation of agricultural management practices. Such information could be used to evaluate effectiveness and possibly shape future promotion accordingly.	Clarity, stage, temperature, photos
Are watershed lakes exhibiting a trend in water clarity?	Minnesota Pollution Control Agency (primary) Cannon River Watershed Partnership (primary)	Long-term data sets can be used to detect changes in watershed behavior, as reflected in lake water quality. Documentation of significant trends or changes will be merit further, more detailed investigation.	clarity
Do watershed lakes fully support fishing , swimming, and other uses?	Minnesota Pollution Control Agency (primary) Cannon River Watershed Partnership (secondary)	There exist ecoregion standards for lake transparency; thus the general CLMP collected data can be used to determine if lakes are fully supporting of a given use or uses. Waters that do not support designated uses will be added to the impaired waters list.	clarity

Citizen Monitoring Program Parameters

Parameters	Waterbody Type
transparency (tube)	streams
water level	streams
appearance & rec. suitability	streams
temperature	streams
rough flow estimate	streams
benthic macroinvertebrates	streams
bank & bed survey	streams
general visual (photos)	streams
transparency (secchi)	lakes
appearance & rec. suitability	lakes
general visual (photos)	lakes

Sample Collection Methods and Sampling Quality Objectives

Parameter	Sampling Method & Source	Collection Equipment	Where is the Water Column?	Where Across the Transect?	Sample Storage Container & Preservation	Quantity of Sample Collected	Number of Samples Collected per Site
transparency (tube) (streams)	standard grab sample-CSMP instructions	tube and simple bucket	middle to upper depth	representative flow	NA	NA	mean of two samples, per CSMP guide
water level (streams)	standard tape-down method, or use of stream gauge	tape measure or staff gauge	water surface	representative, consistent location	NA	NA	one, maybe a second for a check
temperature (streams)	standard grab sample-CSMP instructions	thermometer and simple bucket	middle to upper depth	representative flow	NA	NA	one, maybe a second for a check
rough flow estimate (streams)	measure water depth, stream width and flow velocity	leaf to toss in water and a tape measure	NA	NA	NA	NA	one, maybe a second for a check
benthic macroinvertebrates (streams)	rapid assessment and general observation of species present	cup or bucket	riffle rocks, bank detritus	riffles or near banks	NA	NA	one
bank & bed survey (streams)	Qualitative Habitat Evaluation Index	NA	NA	bed and banks	NA	NA	one
transparency (secchi) (lakes)	visual observation – CLMP manual	secchi disc	epilimnion (upper well mixed layer)	EPA prescribes point of max depth in lake; maybe multiple sites	NA	NA	average of two readings
appearance & rec. suitability (streams & lakes)	standard observation—MPCA instructions (CSMP/CLMP)	NA	water surface		NA	NA	one
general visual (photographs) (stream lakes)	basic photos of different water levels, site conditions, anomalous events	camera	NA	NA	NA	NA	one

Representativeness: if the protocols are followed and sites are properly selected, the measures of water clarity in both streams and lakes should be representative of the clarity of the corresponding general lobe or stretch of the waterbody.
Comparability: protocols are fairly simple and consistently provided to each volunteer monitor; measures of clarity are widely comparable between volunteers.
SEE APPENDICES A & B for sampling protocols and field sheets.

Analytical Methods

Parameter	Location of Sample Analysis	Maximum Holding Time	Analytical Method and Source	Reporting Units
transparency (tube) (streams)	field	NA	CSMP instructions	centimeters (cm)
water level (streams)	field	NA	CSMP instructions	inches (in) (or feet (ft))
temperature (streams)	field	NA	standard thermometer	degrees fahrenheit (F))
rough flow estimate (streams)	field	NA	simple mathematical computation	cubic feet per second (cfs)
benthic macroinvertebrates (streams)	field	NA	ultra-rapid assessment protocol	count & specie
bank & bed survey (streams)	field	NA	QHEI protocol	various measurements and observations
transparency (secchi) (lakes)	field	NA	CLMP handbook	feet (ft) (later converted to meters (m))
appearance & rec. suitability (streams & lakes)	field	NA	CLMP & CSMP instructions	rating
general visual (photographs) (stream lakes)	field	NA	CLMP & CSMP instructions	NA

Data Quality Objectives

Parameter	Brief Description of Method (all field collected)	Accuracy	Precision	Detection Limit/ Measurement Range
transparency (tube) (streams)	visual observation via transparency tube	NA	± 5 cm for duplicate or comparison reading	range: 0 – 60 cm (some tubes longer)
water level (streams)	tape down device or stream gauge used to record water level	NA	± 0.5 in for duplicate or comparison reading	minimum: dry channel maximum: none
temperature (streams)	standard themometer (Forestry Suppliers 89110; Enviro-Safe Armor Case model)	± 1 F	± 1 F	range: 0—200 F
rough flow estimate (streams)	simple computation using stream dimensions and estimated velocity	NA	not precise –meant to be very general number	minimum: dry channel maximum: none
benthic macroinvertebrates (streams)	CRWP ultra-rapid assessment	NA	not precise –meant to be very general assessment	NA
bank & bed survey (streams)	QHEI protocol	NA	NA	NA
transparency (secchi) (lakes)	visual observation via secchi disk	NA	± 0.5 ft for duplicate or comparison reading	DL: 0.25 ft range: 0.25 – 20 feet; can be greater if longer cord used
appearance & rec. suitability (streams & lakes)	visual observation, rated according to MPCA systems	NA	NA	NA
general visual (photographs) (stream lakes)	standard photographs	NA	NA	NA

Sample Site List: Streams (all basic CSMP sites: tube, stage, etc.)

csmp #	name	water	active?	2003	2002	2001	2000	1999	phone	address	city	zip
NA	Dack, Roger	Mud Creek	y?		y?	y	y	y	507.645.5068	2480 300 St. W	Northfield	55057
503	Baldini, David	Crane Creek	y	y	y	y	n	n	507.835.3697	36428 169 St.	Waseca	56093
NA	Bongard, Phylis	Straight River	y	n	n	n	n	n	507.334.8986	24783 Babcock Ave.	Faribault	55021
673	Butler, Chuck	Cannon River	y	y	n	n	n	n	651.388.7800	1121 East Ave	Red Wing	55066
505	Carr, Chuck	Cannon River	y	y	y	n	n	n	507.332.7109	1831 NW 16 St.	Faribault	55021
609	Collins, Steve	Little Cannon River	y	y	y	n	n	n	507.645.4943	828 Ivanhoe Drive	Northfield	55057
611	Dalton, Dick	Little Cannon River	y	y	y	n	n	n	507.263.3991 or 50	31158 55th Ave. Way	Cannon Falls	55009
341	Dorr, Carmen	Cannon River	y	y	y	y?	n	n	507.332.9781	8600 173rd Court W	Faribault	55021
NA	Fetterly, Jeanette	Falls Creek	y	y	y	n	n	n		901 Summerfield Dr. #5	Northfield	55057
NA	Fetterly, Jeanette	Straight River	y	y	y	n	n	n		901 Summerfield Dr. #5	Northfield	55057
70	Fetterly, Richard	Straight River	y	y	n	n	n	n	507.334.2497	25540 Eaton Ave. S	Faribault	55021
296	Fetterly, Richard	Rush Creek	y	y	y	y	y	y	507.334.2497	25540 Eaton Ave. S	Faribault	55021
651	Ghei, Gita	Cannon River	y	y	n	n	n	n	612.845.8798	154 Tower View Drive	Red Wing	55066
612	Gillispie, Katy	Prairie Creek	y	y	y	n	n	n	507.645.9789	Box 72	Dennison	55018
644	Goerwitz, Richard	Spring Creek	y	y	n	n	n	n	507.645.7015	203 Woodley St. W.	Northfield	55057
NA	Heintzler, Dan & Lisa	Straight River	y	n	n	n	n	n	507.334.1612 (931	1208 Cuylee Bay	Faribault	55021
182	Helgeson, Rodney	Rice Creek	y	y	y	y	y	y	507.645.5971	9697 Decker Ave.	Northfield	55057
505	Hetletvedt, Marcia	Cannon River	y	y	y	n	n	n	507.331.2436	1000 SW 8th St.	Faribault	55021
504	Holden, John	Cannon River	y	y	y	y	n	n	507.645.9371	12600 Eaton Ave.	Northfield	55057
505	Hovland, Dana & Annette	Cannon River	y	y	y	n	n	n	507.331.9276 or 50	827 8th Ave. NW	Faribault	55021
665	Johnson, Bruce	Pine Creek	y	y	n	n	n	n	507.263.2857	County Road 17	Cannon Falls	55009
340	Johnson, Erik & Melanie	Cannon River	y	y	n	n	n	n				
689	Keele, Max	MacKenzie Creek	y	y	n	n	n	n				
NA	Kjerland, Dean	Cannon River	y	n	n	n	n	n			Northfield	55057
111	Larson, Cathy	Cannon River	y	y	y	y	y	y	507.645.8008	13772 Cabot Ave.	Dundas	55019
112	Larson, Cathy	Wolf Creek	y	y	y	y	y	y	507.645.8008	13771 Cabot Ave.	Dundas	55019
340	Larson, Steve	Cannon River	y	y	y	y	n	n	651.388.8502	1509 W 6th St.	Redwing	55066
725	Lason, Steve	Spring Creek	y	y	n	n	n	n	651.388.8502	1509 W 6th St.	Redwing	55066
NA	Lemm, Kevin	multiple?	y	y	n	n	n	n	507.444.2452	540 West Hills Circle	Owatonna	55060
247	Lundstrom, Ann	Chub Creek	y	y	y?	y	y	n	507.663.1846	30457 Canada Ave.	Northfield	55057
99	McCutchan, Alden	Little Cannon River	y	y	y	y	y	y	507.789.5735	40210 CO 14 Blvd.	Kenyon	55946
292	Mogren, Gary	Straight River	y	n	n	n	n	n	507.333.5341	224 NE Second St.	Faribault	55021
742	Montez, Jan	Cannon River	y	y	n	n	n	n	507.263.4205	5256 Hwy 19 Blvd	Cannon Falls	55009
736	Murray, Andrew	Limber Lost Creek	y	y	n	n	n	n	507.663.1654	4626 Telemark Road	Dundas	55019
NA	Nicholson, Robert	Spring Creek	y	n	n	n	n	n	507.664.3834	702 Point Lane	Northfield	55057
44	Norman, B-J	Belle Creek	y	y	y	y	y	y	651.258.4507	15400 Norelius Rd.	Welch	55089
636	Peters, Willie	Straight River	y	y	y	n	n	n	507.333.0130	3301 245th St.	Faribault	55021
616	RB Nature Center	Straight River	y	y	y	y	y	n	507.332.7151	PO Box 186	Faribault	55021
505	Sanborn, Lynn	Cannon River	y	y	y	y	n	n	507.334.9579	618 NW 3rd St.	Faribault	55021
670	Schrage, Sheryl	Cannon River	y	y	n	n	n	n				
608	Schumacher, John	Trout Brook	y	y	y	n	n	n	507.263.0267	26295 Orlando Ave.	Cannon Falls	55009
727	Schwendeman, Peg	Chub Creek	y	y	n	n	n	n	507.263.3801	5035 250th St. E	Hampton	55031
614, 615	Skinner, Charley	Heath Creek	y	y	y	n	n	n	507.663.1730	2385 Union Lake Trail	Northfield	55057
33	Steenhoek, Rose Ann & Gene	Prairie Creek	y	y	y	y	y	y	507.645.6414	15150 Giefer Ave.	Northfield	55057
732	Thompson, Duane	Belle Creek	y	y	n	n	n	n	651.258.4199	31520 Quiet Way	Welch	55089
733	Thompson, Duane	Belle Creek	y	y	n	n	n	n	651.258.4199	31520 Quiet Way	Welch	55089
NA	Velasquez, David	Cannon River	y	y	y	y	?	n	507.263.2985	29687 82nd Ave. Way	Cannon Falls	55009
669	Wangen, Roy	Cannon River	y	y	n	n	n	n				
NA	Zielske, Dan	Cannon River	y	y	n	n	n	n	507.685.2169	11350 230 St. W.	Morristown	55052

Sample Site List: Lakes (all basic CLMP sites)

name	Lake	DNR ID	phone	address	city	zip	active?	2003	2002	2001	2000	1999	1998
Burke, Kathryn	Beaver		507.433.5251	2910 12th Ave NW	Austin	55912	y	n	n	n	n	n	
Flaherty, David	Volney	40-0033		RR 2, Box 130-B	Le Center	56057	y	y	y	n	n	n	
Gardner, Doug	Jefferson	40-0092					y	y	y	n	n	n	
Hollatz, Dennis	Kohlmeier	74-0019		1727 Greenwood Pl	Owatonna	55060	y	y	y	y	y	n	
Jameson, Tom	German	40-0063		92 S Maple Ave	Le Center	56057	y	y	y	y	y	y	
Luehrs, Virgil	Cedar	66-0052		8435 Hennepin Way Box 75, C-1	Morristown	55052	y	y	y	y	y	y	
McGuire, Richard & Carol	Roberds	66-0018		17500 Roberds Lake Ct.	Faribault	55021	y	y	y	y	y	n	
Moesler, Guenther	Byllesby	19-0006		29411 Endress Way	Cannon Falls	55009	y	y	y	n	y	n	
Nerison, Larry	Jefferson	40-0092		RR 1, Box 99-H	Adams	55909	y	y	y	y	y	n	
Nugent, Shawn	Circle	66-0027		3200 - 124th St W	Faribault	55021	y	y	y	y	n	n	
Pederson, Ben	Jefferson	40-0092		P.O. Box 145	Amboy	56010	y	y	y	y	n	n	
Roessler, Genevieve	Fish	40-0051		Rt 1, Box 139-H	Elysian	56028	y	y	y	y	y	y	
Schwake, Gary & Bonnie	Tetonka	40-0031		710 Virginia St. W.	Waterville	56096	y	y	y	y	y	n	
Scott, Jane & Richard	French	66-0038		1209 Sumac Ln	Northfield	55057	y	y	y	y	y	y	
Spindler, Bryan	Cannon	66-0010	507.332.0659	4828 Echo Ct.	Faribault	55021	y	y	n	n	n	n	
Stratmoen, Lois	Fox	66-0029		400 Ivanhoe Ave	Northfield	55057	y	y	y	y	y	y	
Tuma, Ted	Roberds	66-0018	507.334.2004	3659 Chappuis Trail	Faribault	55021	y	y	n	n	n	n	n
Wenthe, Fred	Circle	66-0027	507.650.0865	12890 Cyrus Trail	Faribault	55021	y	n	n	n	n	n	n
West, Warren "Buster"	Jefferson	40-0092		#10 Tomahawk Pt.	Cleveland	56017	y	y	y	y	y	y	

Sampling Schedule

Parameter(s)	Frequency	Completeness	Time of Day	Time of Year	# of Years	Special Weather Conditions
transparency (tube) (streams)	7-10 days, plus rain events	all individual event data valuable; for general stream assessment, minimum one reading per 14 days, plus at least half of major events	daylight hours only	open water period (typically April through October)	continuous	cover all stream stages, rising and falling legs of hydrograph
water level (streams)	7-10 days, plus rain events (record with tube data)	all individual event data valuable; for general stream assessment, minimum one reading per 14 days, plus at least half of major events	any	open water period (typically April through October)	continuous	cover all stream stages, rising and falling legs of hydrograph
temperature (streams)	7-10 days, plus rain events (record with tube data)	all individual event data valuable; for general stream assessment, minimum one reading per 14 days, plus at least half of major events	any, but should be consistent	open water period (typically April through October)	continuous	cover all stream stages, rising and falling legs of hydrograph
rough flow estimate (streams)	a few instances per year, during differenct stages	optional	any	open water period (typically April through October)	continuous	cover various stream stages, rising and falling legs of hydrograph
benthic macroinvertebrates (streams)	once per season	optional	any	summer months	continuous	do not attempt during or immediately after high, scouring flow conditions
bank & bed survey (streams)	once per season	optional	daylight hours only	open water period (typically April through October)	continuous	record during low flow conditions
transparency (secchi) (lakes)	10-14 days	minimum of one reading per month, June through September	daylight hours only (prefer 1000-1500)	summer months (June through September)	continuous	clear, calm days are best; focus on maintaining consistency
appearance & rec. suitability (streams & lakes)	collect with tube (streams) and secchi (lakes) data	observations should be recorded with every transparency record	daylight hours only	open water period (typically April through October)	continuous	none
general visual (photographs) (stream lakes)	variable—at least once per season	optional	daylight hours only	open water period (typically April through October)	continuous	none

Quality Control Measures

Parameters	% Quality Control Samples		Evaluation
	Field Blanks	Field Dups.	
transparency (tube) (streams)	NA	25%	duplicate by monitor and/or comparison with another trained volunteer
water level (streams)	NA	25%	duplicate by monitor, or check tape down against stream gauge (or vise versa)
temperature (streams)	NA	25%	duplicate from another sample, and/or check against another meter
rough flow estimate (streams)	NA	NA	
benthic macroinvertebrates (streams)	NA	NA	
bank & bed survey (streams)	NA	NA	
transparency (secchi)	NA	25%	duplicate by monitor and/or comparison with another trained volunteer
appearance & rec. suitability (streams & lakes)	NA	NA	
general visual (photographs) (stream lakes)	NA	NA	

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

Instrument and Equipment Requirements

1) Equipment Type: transparency tube
2) Documentation: CSMP documentation is very sufficient
3) Inspection, Calibration, and Maintenance: clean it with a bottle brush now and then

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1) Equipment Type: secchi disk
2) Documentation: CLMP documentation is very sufficient
3) Inspection, Calibration, and Maintenance: keep it clean and shiny, consider repainting if necessary. CALIBRATE CORD each year – check it with a measuring tape and remark if necessary – volunteers have documented "shrinking cords" in the past that would produce false readings (too good).

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1) Equipment Type: thermometer
2) Documentation: Enviro-Safe Easy Read Armor Case Thermometer manual
3) Inspection, Calibration, and Maintenance: calibrate thermometer periodically

Field and Laboratory Sheets

Type of Sheet:	**Citizen Stream Monitoring Proram (CSMP) data sheet**
Copies Attached (Y/N):	**YES (in Appendix B)**
Type of Sheet:	**Citizen Lake Monitoring Program (CLMP) data sheet**
Copies Attached (Y/N):	**YES (in Appendix B)**
Type of Sheet:	**Macroinvertebrate ultra-rapid assessment sheet**
Copies Attached (Y/N):	**YES (in Appendix B)**
Type of Sheet:	**Qualitative Habitat Evaluation Index (QHEI) worksheet**
Copies Attached (Y/N):	**YES (in Appendix B)**

Data Transfer, Entry, and Validation

Name of Sheet Or Database	Data Transfer	Data Entry	Validation	Final Resting Place
CSMP datasheet	volunteers send sheets to CRWP; in some cases vols enter data themselves and send spreadsheet; CRWP tabulates and digitizes data and passes on to MPCA	data ultimately entered by CRWP and MPCA	random check of at least 10% of all data entry by volunteer or intern	EPA STORET DB and CRWP DB
CLMP datasheet	volunteers send sheets to MPCA; in some cases, volunteers enter data online	data entered by MPCA or vols themselves	random check of at least 10% of all data entry by volunteer or intern	EPA STORET DB

Miscellaneous and Problem Data

Parameter	*Data Entry Protocol for "Problem" Data
missing data	cell is left blank (not entered as zero)
illegible data	best effort is made to decipher characters by means of examination of other entries; as a last resort, volunteer is contacted and questioned

As we encounter new situations that may affect data and data entry, this section may be adjusted accordingly,

Meta-data

PROJECT INFORMATION

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

STATION INFORMATION

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

Meta-data Continued

MONITORING RESULTS

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

Compare 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?
transparency (tube)	**Benchmarks** (1) state turbidity standard (20 cm clarity (corresponds to 25 NTU)) (2) ecoregion standards (tube data can be translated to turbidity estimates and compared) (3) watershed-specific or stream-specific benchmarks according to normal conditions and historical data. This would allow for site by site comparison of data over time **Methodology** number of exceedences of standards and duration of exceedences will define any existing problem or impairment; significant changes at individual sites over time would indicate the need for further investigation of potential problems	CRWP MPCA	Not necessarily – MPCA and other groups can and do use the data for various purposes – not just comparison to benchmarks
transparency (secchi)	**Benchmarks** ecoregion standards **Methodology** mean, max and min water clarity values should all be within the respective ecoregion ranges	CRWP MPCA	Not necessarily – MPCA and other groups can and do use the data for various purposes – not just comparison to benchmarks
macroinvertebrates	**Benchmarks** (1) general: basic indices that relate species diversity and richness to water quality (2) site-specific: data at each site will act as an on-going benchmark **Methodology** simple observations of macroinvertebrates will provide basic assessments at	CRWP	No required protocol; this component of stream monitoring is an optional, complementary measure to be exercised periodically

Data Interpretation and Assessment

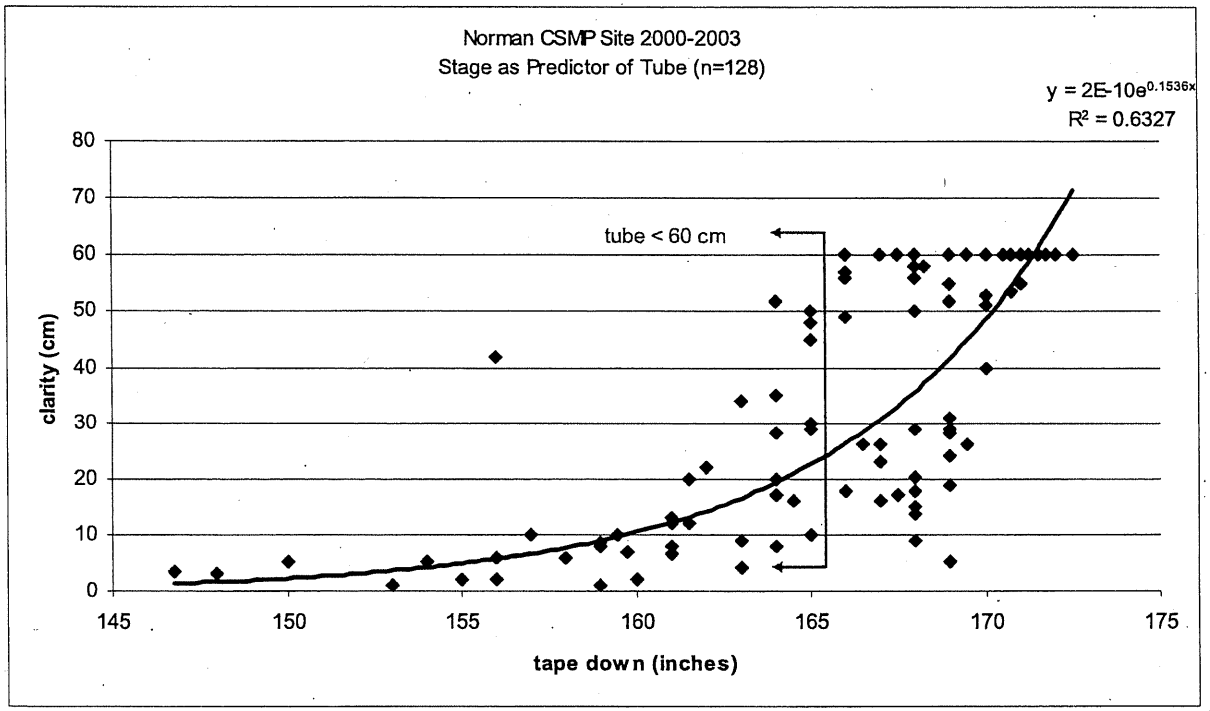
1) Questions Used to Develop Findings and Conclusions	2) Potential Statistical Summaries	3) Potential Data Displays
Single Parameters		
How do means compare to ecoregion values?	compute simple means and ranges	create bar graph comparing site means to ecoregion values
Do values for lake sites match model predictions?	compute simple means, run predictive lake model	bar graph comparing observed and predicted values
Are similar watersheds producing similar stream data (at different sites)?	compare stream clarity ranges and durations of turbid flows at different sites	maps of similar watersheds; graphical depictions of ranges and durations
How do current values compare to any available historical data?	compute simple means and ranges	bar graph comparing historical to recent values
Does the data set produce any significant trend in clarity?	compare yearly means and ranges	plot means and ranges over time
Comparing Parameters		
Does clarity data correlate with TP, TSS and other parameters (collected	statistical evaluation of data pairings	scatter plots with trend lines
Is clarity driven by water level?	statistical evaluation of data pairings	scatter plots with trend lines; bar graph of clarity values and water level data
Is clarity correlated to time of year?	weekly or monthly simple means and ranges	graphical comparison of means and ranges from each month
Is there a water level threshold at which clarity is always decreased (even if no rain recently)?	examine clarity, water level and local precipitation data	graph of tube vs water level (see following example)
Are TSIS, TSIC and TSIP good predictors of one another?	compute simple means and ranges	display TSI values on Carlson's scale

Data Interpretation and Assessment

Example of Simple Transparency Tube Data Analysis
Volunteer: B-J Norman
Stream: Belle Creek

1999 CSMP Data: Norman records no >60 cm clarity readings from 6/29 to 8/29, and each time she recorded appearance it was "muddy."

According to the extensive set of CSMP data collected by Norman, Belle Creek's clarity (at her site—recall large watershed) appears to be a function of both precipitation and stream stage (unlike many other sites throughout the Cannon River watershed at which clarity is strongly related to precipitation, but not to stage). At tape-down (TD) <=165 cm, she never recorded a clarity of >60 cm, and at TD <=160 cm no clarity readings of >10 cm. Her 6/26/01 and 6/28/01 tube readings of 26 cm (both days) followed a week during which no rain fell, and a ten day period during which only 0.27 inches were recorded (her own precipitation records). However, significant precipitation fell June 13-15, and the water level at her site was still relatively high when she recorded those tube readings (TD 166.5 and 167 inches respectively). The limited data recorded at additional sites in 2003 (Thompson CSMP, CRWP at ATV bridge) document a similar correlation between stage and clarity



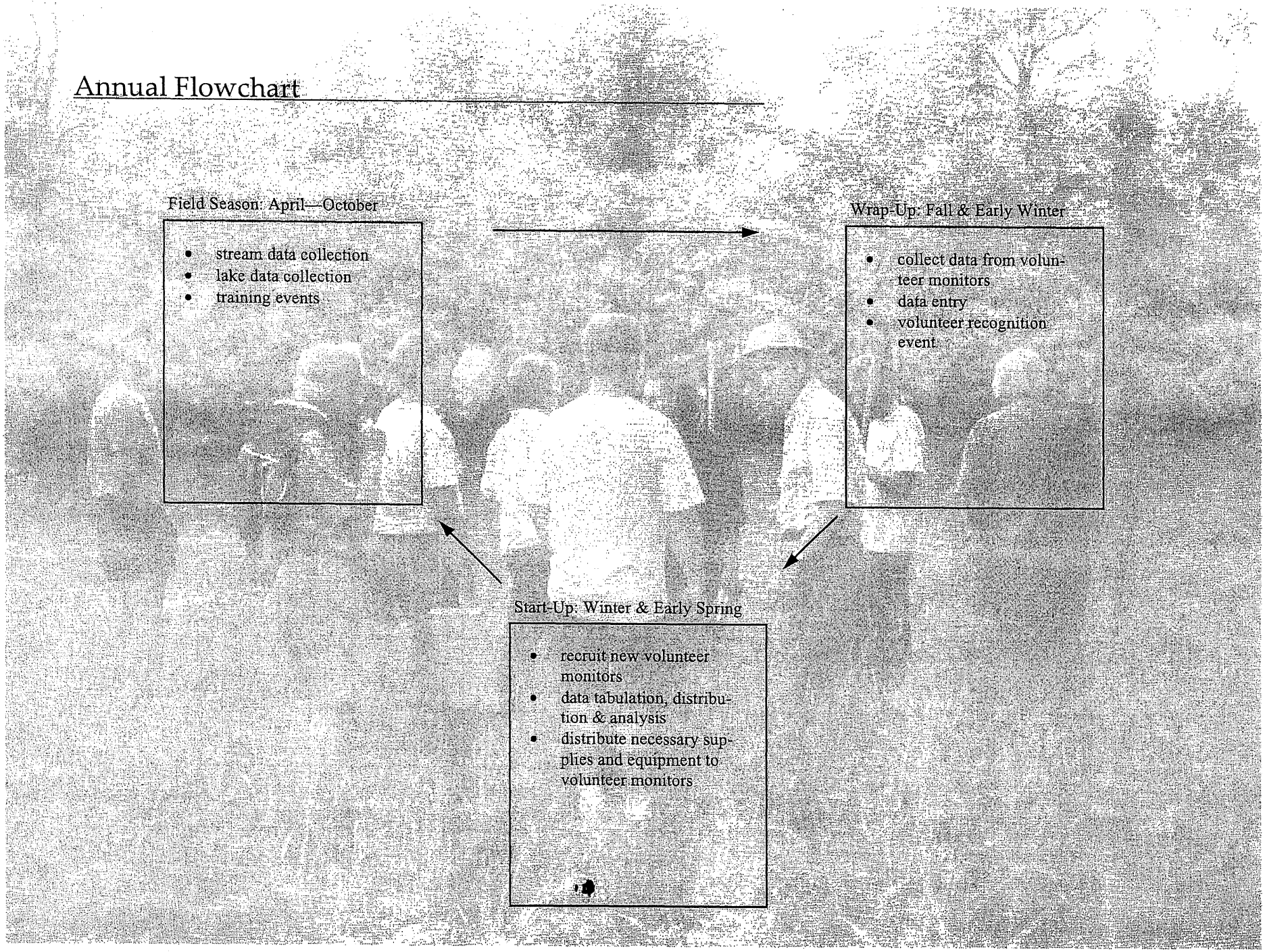
Reporting, Presenting, and Planning for change

what formats will be used to tell your story?	target Audiences	raw data	summarized data	interpreted data	photos	maps	illustrations	stories	other
			tables	graphs					
annual summary document	CRWP members & BOD, volunteers		x	x		x	x	x	x
annual presentation	CRWP members & BOD, volunteers		x	x		x	x	x	x
3 or 4 year summary	CRWP members & BOD, volunteers, cities, counties (inc. SWCDs) in watershed		x	x	x	x	x	x	
web interface	any internet users		x	x		x	x	x	
data exchange	MPCA	x							

Where/When will message be delivered? Should present information to BOD at a monthly meeting – there are representatives from each county on the Board; we can also make a presentation available to cities or counties. We should not offer interpretation and recommendations each year – time scale is too short (3-4 years is a better interval). An annual 1-2 page summary should be created and mailed to the volunteer monitors.

What would you expect to happen as a result of your report or presentation? Presentation of information could guide policy, management and education efforts for watershed counties and cities Additionally, it could steer any more detailed monitoring in the basin.

Annual Flowchart



Contact Information

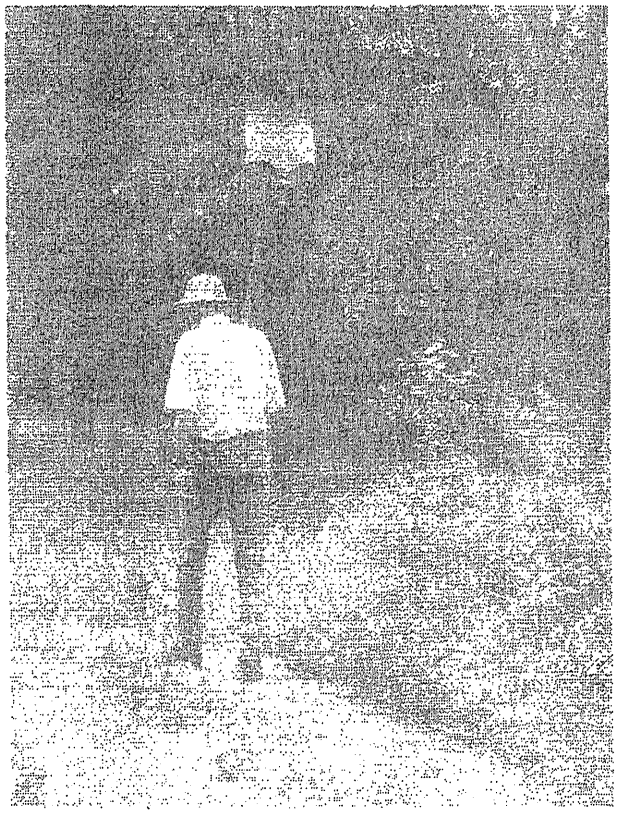
Technical Support Contacts	Title, if applicable	Address	Phone	Email
Justin Watkins CRWP	Local CMP Coordinator	8997 Eaves Ave Northfield MN 55057	507.646.8400	justin@crwp.net
Jennifer Klang MPCA	MN CLMP Coordinator	520 Lafayette Road St. Paul MN	800.657.3864	jennifer.klang@pca.state.mn.us
Laurie Sovell MPCA	MN CSMP Coordinator	520 Lafayette Road St. Paul MN	800.657.3864	laurie.sovell@pca.state.mn.us
Pam Skon MPCA	MN CLMP & CSMP Co-ordinator	520 Lafayette Road St. Paul MN	800.657.3864	pam.skon@pca.state.mn.us

Other Contact Information

See Appendix C for the watershed's city, county and all other contact information included in the *Conservation Directory for the Cannon River Watershed.*

Follow Up Measures

Group/Audience	*How Follow-up will happen:*	*Schedule*
volunteer monitors	support, mailings, events, reports	maintain communication throughout year; at least one mailing per year; at least one event per year;
data users	make annual reports available to each; send 3-4 year report and summary to each	communicate yearly; mailing every 3-4 years (at a minimum)



Evaluation

Annual Evaluation Components	*Questions to Ask:*	*Tools used for evaluation*
data use	Was all data received and tabulated in an orderly fashion?	staff verification of submissions from each volunteer
monitoring plan	Does plan reflect practical reality, or are revisions necessary?	plan review
volunteer relations	Is participation steady?	mailings, events, actual data submission

3 to 5 Year Evaluation Components	*Questions to Ask:*	*Tools used for evaluation*
data use	Are we collecting the right information at the appropriate locations?	counsel with data users
watershed vision	Is maintenance of this plan still compatible with our vision?	plan review

Appendix A: Sampling Protocols

Citizen Stream-Monitoring Program Instructions

SAFETY FIRST!

The first priority of stream monitoring is your safety. If you wade in a stream to take measurements, never enter fast-moving water or areas of unknown depth. If there is any question about your safety, record visual observations only from a secure location (*Appearance, Recreational suitability, and Estimated Stream stage*).

WHERE TO MONITOR YOUR STREAM:

Select one location on your stream, and monitor at that site throughout the season. Ideally, you want to choose a location that is typical of the stream. Choose a spot that is somewhat deep and flowing. Avoid shallow, fast running rocky areas ("riffles") and stagnant deep areas ("pools").

WHEN TO MONITOR YOUR STREAM:

Try to visit your stream at the **same time** of day every time you monitor. There are two times when you should monitor your stream: once a week during the stream-monitoring season, and as needed, in response to significant rainfall events.

1. Weekly Stream Readings:
   Measurements should be taken at least once a week, especially during the months of April through September. A minimum of one measurement a month is needed for participation in the program. We encourage you to monitor more frequently than once a week at first, to help us determine how often measurements should be taken. Additional measurements taken earlier or later in the year are welcome, and all measurements will be entered into the U.S. Environmental Protection Agency's water quality database, called STORET.
2. Rainfall Event Stream Readings:
   In addition to your weekly stream monitoring, measurements should be taken daily for 2-3 days (or longer) after a significant rain event, if possible. We refer to these additional measurements as "Rainfall Event Stream Readings." Monitoring after a rain event allows you to detect potential changes in stream condition related to precipitation and runoff.

How do you know when a rainfall is significant? If the soil is saturated to the touch (i.e. during spring when there is a lot of water in the ground), a small amount of rain can produce a "significant" event. If the soil is very dry to touch, a larger amount of rain will have to fall to initiate runoff and potential changes in streams. You may want to adjust the length of your daily measurement period (e.g. 4-5 days), depending on how quickly rainwater travels from the land to the stream channel and past your sampling location. Once you have monitored a few rainfalls, use your best judgment to determine when a rainfall is significant, and how long stream conditions change in response to a rain event. Then take enough daily measurements to capture that change. You may find that daily measurements are not frequent enough to capture rapid changes, and decide to take readings more frequently. As a *general* rule of thumb, a rainfall of approximately 1/2-inch in a relatively short period of time can result in a significant runoff event.

COMPLETING THE "SITE INFORMATION SHEET":

1. Fill in your name, address, telephone number and group affiliation (if any).
2. Fill in the stream name and county where you monitor.
3. Indicate the number of miles and direction of your monitoring site from the nearest town.
4. Indicate whether you collect your water sample from a bridge.
5. Describe how to get to your site using landmarks found on a county road map (e.g. road names, intersections, etc.).
6. Draw a sketch of your sampling site, including any dominant features such as ditches, tile outlets, bends, bank vegetation, etc. to become familiar with its characteristics.
7. On the enclosed county maps, please mark the location of your stream-sampling site(s) with an "X" and your rain gauge location with an "O". Return one map to the MPCA at the end of the season with your data, and retain the other map for your records.

USER PERCEPTION ASSESSMENTS (Appearance and Recreational Suitability):

Your personal assessment of the stream water helps characterize what is happening in and around your stream. The 'Appearance' of stream water may provide information about material in it. The 'Recreational Suitability' assessment reflects how the water's appearance affects the benefits that you receive from the stream such as swimming, fishing, and aesthetic enjoyment. Include only water quality conditions when making your assessments. Do not factor weather conditions into your assessment. **Fill in the "Appearance" and "Recreational Suitability" columns before you take your transparency reading so your perception assessment is not biased.**

Appearance:

Each time that you monitor your stream, please record the one number that best describes the appearance of stream water within one meter of your sampling site.

1 = **Clear** - crystal clear, transparent water
2 = **Milky** - not quite crystal clear; cloudy white or gray
3 = **Foamy** (natural or from pollution- generally detergents, nutrients or dissolved organic matter) several inches of foam that does not brush apart easily is generally pollution
4 = **Tea-colored** - clear, but tea-colored due to wetland or bog influences
5 = **Muddy** - cloudy brown due to high sediment levels
6 = **Green** - might indicate excess nutrients released into the stream
7 = **Green OR Muddy plus one or more of the following**:
- extensive floating scum on the stream or washed up on shore
- strong foul odor

Recreational Suitability:

Please use the one number each day you sample that best describes your opinion of how suitable the stream water is for recreation and aesthetic enjoyment.

1 = **Very Good:**	Beautiful; could not be better
2 = **Good:**	Very minor aesthetic problems; excellent for body-contact recreation (swimming, wading, frog catching, etc.)
3 = **Fair:**	Body-contact recreation and aesthetic enjoyment slightly impaired
4 = **Poor:**	Recreation potential and level of enjoyment of the stream substantially reduced (would not swim but boating/canoeing okay)
5 = **Very Poor:**	Swimming and aesthetic enjoyment of stream nearly impossible

HOW TO TAKE STREAM TRANSPARENCY READINGS:

Do **not** wear sunglasses while taking a measurement, as this affects the accuracy of your reading. If you wear photogradient prescription sunglasses, please try to prevent them from darkening by wearing a hat or visor with a wide rim.

1. Collect your water sample in a clean bucket or bottle at mid-stream & depth. A paint bucket from your local hardware store works well:

   a. Wading or from streambank: **Always sample safely** - don't wade into fast-moving water or areas of unknown depth. If you cannot sample safely, record visual observations only (*Appearance, Recreational suitability, Estimated Stream stage*). If a sample from mid-stream and depth is not possible, avoid stagnant water and sample as far from the shoreline as is safe.
      - Try not to stir up the bottom
      - Face upstream as you fill your bucket.
      - Avoid collecting sediment from the stream bottom and materials floating on the water surface

   b. From atop a bridge or culvert:
      - With a rope tied to its handle, lower your bucket to the stream and collect water
      - Pull the bucket back up, taking care not to bounce the rope or bucket on the side of the bridge / culvert

2. Take your tube readings in open conditions. Avoid direct sunlight by turning your back to the sun if necessary.

3. Swirl the water in your sampling bucket or bottle so that materials do not settle on the bottom and pour the water into the tube until the symbol on the bottom is not visible.

4. While looking down into your tube, open the valve at the bottom and slowly release water until you can JUST begin to make out the symbol on the bottom. Note this depth.

5. Release a bit more water until the symbol is visible. When you can see the screw in the middle of the black and white symbol, it is "visible." Note this depth.

6. Record the average of the two depths taken in steps 4. and 5. on your data sheet to the nearest centimeter (average = depth from step 4 + depth from step 5, divided by 2). If the symbol is visible when your tube is full, indicate this on the data sheet (e.g. > 60 cm). **Remember to write >60 if you can clearly see the symbol when the tube is full (not just 60).**

NOTE: 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.

HOW TO RECORD PRECIPITATION & RAINFALL EVENT INFORMATION:

Install your rain gauge on a post that you walk past each day so that you will be reminded to read and empty the gauge daily, noting when a significant rainfall occurs (detailed instructions on the installation and operation are found inside the gauge). Try to read and empty your rain gauge at the same time each day. You will record daily rain amounts on your rain gauge datasheet and fill in the 'Rain Event?' column on your stream datasheet as follows:

1. Recording rainfall on **rain gauge datasheet:**
   Each time you empty your rain gauge, record the rainfall amount to the nearest one hundredths of an inch (e.g. .02) on the Rain Gauge datasheet.

2. Filling in the 'Rainfall Event?' Column on **Citizen Stream-Monitoring Datasheet**:
   a. Put a "Y" in the "Rain event?" column each time that you take stream measurements in response to a rain event.

   b. Put an "N" in the "Rainfall event?" column each time you take weekly stream measurements that are not in response to a rain event.

HOW TO RECORD STREAM STAGE:

Stage refers to stream water level, or height, and measures the amount of water present. It is important to record stage information to determine how changes in water level are affected by rainfall, and how they affect transparency.

a. Estimated Stage (estimate) – **REQUIRED - Please estimate the water level each time you sample**. This refers to the relative amount of water flowing in the stream channel as shown by a rough visual estimate of the water level. Normal, Low and High are broad categories so don't agonize too much over which category to choose.

N=normal	Water covers 1/3 to 2/3 of the distance from the stream bottom to the top of the bank.
L=low	Water covers 1/3 or less of the distance form the stream bottom to the top of the bank.
H=high	Water covers 2/3 or more of the distance from the stream bottom to the top of the bank. Water may be over the stream bank – flooding - at some point.

b. Tape Down Distance (inches) – **OPTIONAL** - If you take stream readings from a bridge or culvert and would like to *measure* changes in the water level in addition to recording an *estimate* (low, normal, high), follow the method described on the following page. If you will not be sampling from a bridge or road culvert, please contact me at 507/389-1925, toll free 1-800-657-3864, e-mail: laurie.sovell@pca.state.mn.us to discuss other options.

c. Water Level Height (inches) - **OPTIONAL** - If you measure the water level from a benchmark on the bottom of the stream, or a gauge is installed at your site, record the water level height in inches and tenths of inches in this column.

The 2 most important concepts to understand when *measuring* stream stage are:

- establishing a **fixed** location, called a reference point, for measurement
- measuring stage from that exact reference point each time.

It is essential to thoroughly document the exact location of your measurement point. Mark your reference point with paint or a permanent marker. If possible, take a stage measurement from a bridge or a fixed location at the top of a culvert so that your reference point is secure. Measure the distance from your established reference point to the top of the stream water:

1. Using a tape measure or a rope on which inches have been marked, lower the end marked "0" from your reference point to the water surface.

2. Note the distance on your end of the tape or rope to the nearest inch. **Be sure to record stage in total number of inches OR feet and inches!**

3. Record this distance in the stream stage (meas.) column on your data sheet. Note that a smaller number reflects a higher stream stage; a larger number a lower stage.

OTHER MEASURES:

Temperature:
Water temperature influences what lives in your stream, particularly fish such as trout that cannot tolerate high temperatures. If you would like to monitor temperature and have a non-mercury thermometer available, hold the thermometer in the stream or sample water for 2 minutes, stirring it a bit. Record the temperature in degrees Fahrenheit.

Picture Taken and Comments:
Pictures document changes at your site over time. If possible, take photographs of your site under a variety of conditions. Write "Picture" in this space each time a picture is taken. Once developed, date each photograph and keep them with other site records. Also use this space to record anything unusual that you observe during a sampling visit to your site; note things like recent severe weather, construction activities occurring upstream, changes in adjacent land use, or a dramatic change in the appearance of stream water.

THANK YOU! THANK YOU! THANK YOU! THANK YOU! THANK YOU! THANK YOU!

Preface

This booklet has been prepared to help answer any questions that new or veteran volunteer monitors might have about the Citizen Lake-Monitoring Program and/or monitoring in general. Did you know that participants in the Citizen Lake-Monitoring Program belong to the longest-running volunteer lake monitoring program in the nation? Volunteer lake monitors are one of Minnesota's most important lake water quality tracking systems. The Minnesota Pollution Control Agency thanks the volunteer monitors for all their hard work and dedication toward protecting and improving the surface waters of Minnesota. It is our hope that you will find this booklet useful as well as informative.

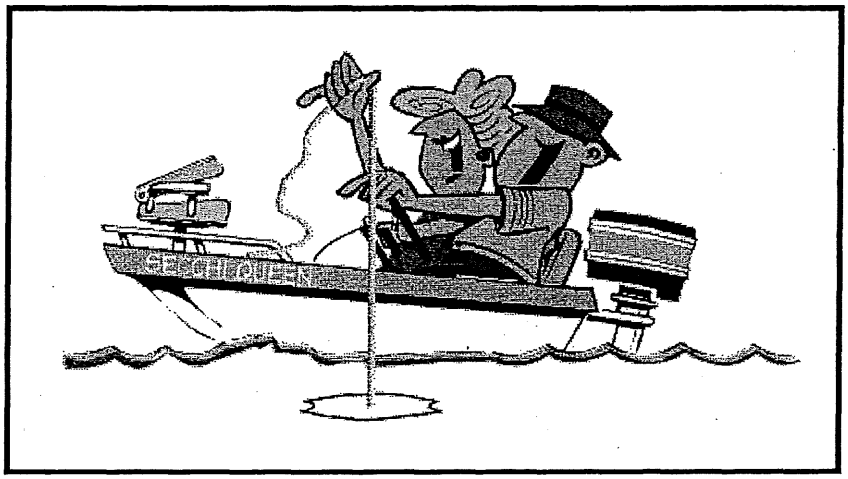
Table of Contents

List of Figures

Introduction

Because lakes are so central to Minnesota's economy and way of life, it is imperative that we try to maintain and improve their water quality. The Citizen Lake-Monitoring Program (CLMP) requires minimal time and expense, yet it provides data that is essential for achieving these goals. The CLMP is a cooperative program combining the technical resources of the Minnesota Pollution Control Agency (MPCA) and the volunteer efforts of citizens statewide who collect water quality data on their lakes. The Citizen Lake-Monitoring Program (CLMP) was first initiated in 1973 at the University of Minnesota by Dr. Joe Shapiro. During that first year, volunteers monitored 74 lakes. Administration of the CLMP was transferred to the Minnesota Pollution Control Agency (MPCA) in 1978. This program continues to be a cost-effective mechanism for obtaining good basic water quality data on many of our State's lakes.

The CLMP involves voluntary participation of citizens residing on or near lakes or those who are frequent lake users. These participants are asked to take weekly transparency measurements on their lake during the summer using a Secchi disk. At least eight to ten readings per season are required in order to adequately define each summer's water quality. Data from the CLMP are entered into the U.S. Environmental Protection Agency's water quality database (called STORET) along with all other water quality data collected by the Minnesota Pollution Control Agency (MPCA). For many lakes, CLMP data is the only water quality information available. Information about the water quality of Minnesota's lakes is vital for assessing their physical condition and recreational suitability. Since tourism in Minnesota is largely water-based, good water quality is very important. These data are used to analyze water quality trends, characterize trophic status, and provide a basis for water quality goal setting. The participation of citizen volunteer monitors in the CLMP effectively increases the monitoring capabilities of the state. They provide the state and others with valuable information on the water quality of Minnesota's lakes. Through this process, the volunteers can learn about the water quality of lakes in their area and gain a greater awareness of the causes and effects of lake degradation.



What is a Secchi disk?

A Secchi disk is a circular metal plate attached to a calibrated rope. It is probably the least expensive and easiest to use tool in water quality monitoring. One of the best aspects of the Secchi disk is that the information provided by the Secchi disk is easily interpreted by volunteers and can be used to detect water quality trends in lakes.

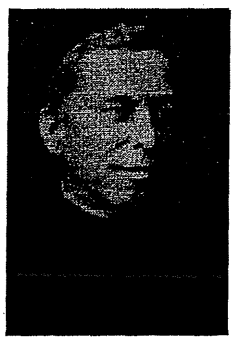
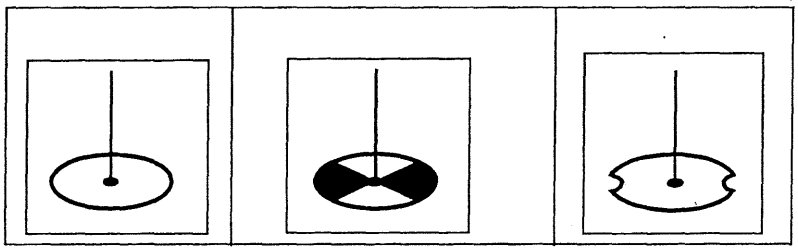


Figure 1.
Pietro Angelo Secchi
(1818-1878)

The Secchi disk is named after Fr. Pietro Angelo Secchi (Figure 1), scientific advisor to the Pope and astrophysicist. Secchi was asked by Commander Cialdi, head of the Papal Navy, to measure the transparency in the Mediterranean Sea. The first disk was lowered from the papal yacht, *l'immacolata Concezion* (Immaculate Conception), on April 20, 1865 (Carlson and Simpson, 1996). There have been many revisions to the first disks used by Secchi in terms of size and color. The two most common colors variations in use today are the all-white disk and the black and white quadrant version disk (Figure 2). In Minnesota, we use an all-white, 8 inch diameter metal disk with notched sides for rope storage when the disk is not in use.

Figure 2. Secchi Disk Color and Style Varieties



All-White **Black & White Quadrant** **Minnesota's**

What does a Secchi disk Measure?

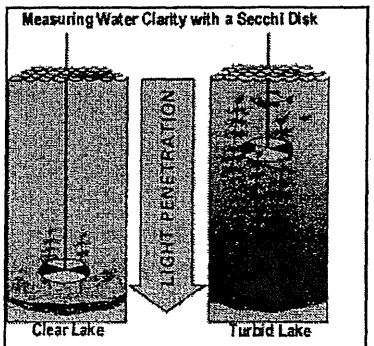


Figure 3.

Water transparency is a quick and easy measurement that tells scientists a lot about a lake's water quality. First, it indicates the amount of light penetration into a lake (Figure 3). Second, Secchi transparency provides an indirect measure of the amount of suspended material in the water, which in many cases is an indication of the amount of algae in the water. Long-term transparency monitoring by CLMP volunteers provides a valuable basis for detecting trends in water quality. Generally, the sooner water-quality problems are detected, the easier and less expensive it is to restore the lake to its previous state.

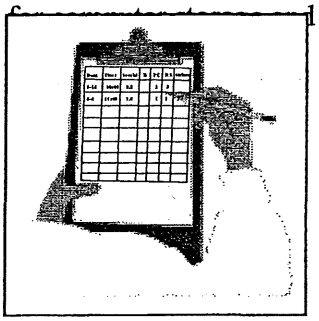
How to Take and Record Secchi Readings

Readings should ideally be taken once a week, at least three days apart, primarily during the months of June through September between 10 a.m. and 3 p.m. on bright, calm days. A minimum of one reading per month is needed to provide meaningful information about your lake. You should select **ONE** location, well off-shore and in a deep part of the lake, and continue monitoring at that one site throughout the summer (See page 5 on selecting a monitoring location).

Travel to your designated monitoring location and then anchor your boat.

Do **not** wear sunglasses while making a reading, as this affects the accuracy of your reading. If you wear photogradient prescription eyeglasses, please try to prevent them from darkening by wearing a hat or visor with a wide brim.

Lower the Secchi disk into the lake on the shaded side of the boat, until the disk just disappears completely from view. (If you can see the disk on the lake bottom and cannot find deeper water, please write a capital **B** in the column after the 'Secchi Transparency' column. If the lake is choppy, try taking the reading from the stern). Note the disk's depth using the marks on the cord. Lower the disk a bit farther and then raise it until it just reappears, then note this depth. Average the two depths to the nearest 1/2 foot to get the Transparency Reading. (More exact readings are difficult to convert



retrieval reasons, but are still welcome.)

Record this average in the appropriate column on the Secchi Datasheet. Also record the date and time of this reading. [If you monitor more than one location (site) on a lake, each site must have a **SEPARATE and DIFFERENT** time recorded.]

You may find that your lake is exceptionally clear and that the rope is not long enough. If so, feel free to add more line. Dacron, or other polyester, is the preferred cord material as nylon has a tendency to stretch when wet as well as being adversely affected by repeated exposure to sunlight. However, be careful when marking it at the half-foot and foot intervals to make sure that the new segment matches the original cord. If the markings on the line become indistinct, re-mark them with a water-proof felt pen or with yarn threaded through the line. It is always a good idea to calibrate your Secchi disk rope before beginning each monitoring season to be sure your rope markings reflect accurate

measures. Your disk will last longer and give better service if it is kept clean and protected from scratches and direct sunlight which can damage the paint.

Additional Lake Monitoring Information

Following the "Transparency" column, are columns for recording additional information that will help to accurately denote what is taking place in and around your lake. The first two columns ask for an assessment of the amount of algae present and for its effect on the recreational suitability of the. **It is important to note that if you do fill out these columns, you should do so before you take your Secchi reading to keep your observations from being biased by your knowledge of the transparency.**

Physical Condition

Please use the ONE number, each day that you sample, that best describes the physical condition of the lake water AT YOUR SAMPLING SITE. **It is important that you fill out this column before you take your Secchi reading.**

1 = Crystal clear water
2 = Not quite crystal clear - a little algae present/visible
3 = Definite algae green, yellow, or brown color apparent
4 = High algal levels with limited clarity and/or mild odor apparent
5 = Severely high algae levels with one or more of the following: massive floating scums on the lake or washed up on shore, strong, foul odor, fish kill

Suitability for Recreation

Please use the ONE number, each day that you sample, that best describes your opinion of how suitable the lake is for recreation and aesthetic enjoyment. **It is important that you fill out this column before you take your Secchi reading.**

1 = Beautiful, could NOT be better
2 = Very minor aesthetic problems; excellent for swimming, boating
3 = Swimming and aesthetic enjoyment slightly impaired because of algae levels
4 = Desire to swim and level of enjoyment of the lake substantially reduced because of algae levels (i.e., would not swim, but boating is okay)
5 = Swimming and aesthetic enjoyment of the lake nearly impossible because of algae levels

Color of Lake Water

The "Color of Lake Water" column is to record the color of the lake water at your sampling site. Please write down the color (i.e., clear, green, tea-stained...etc.) that best describes the lake, at your sampling site, each and every time that you take a Secchi disk reading.

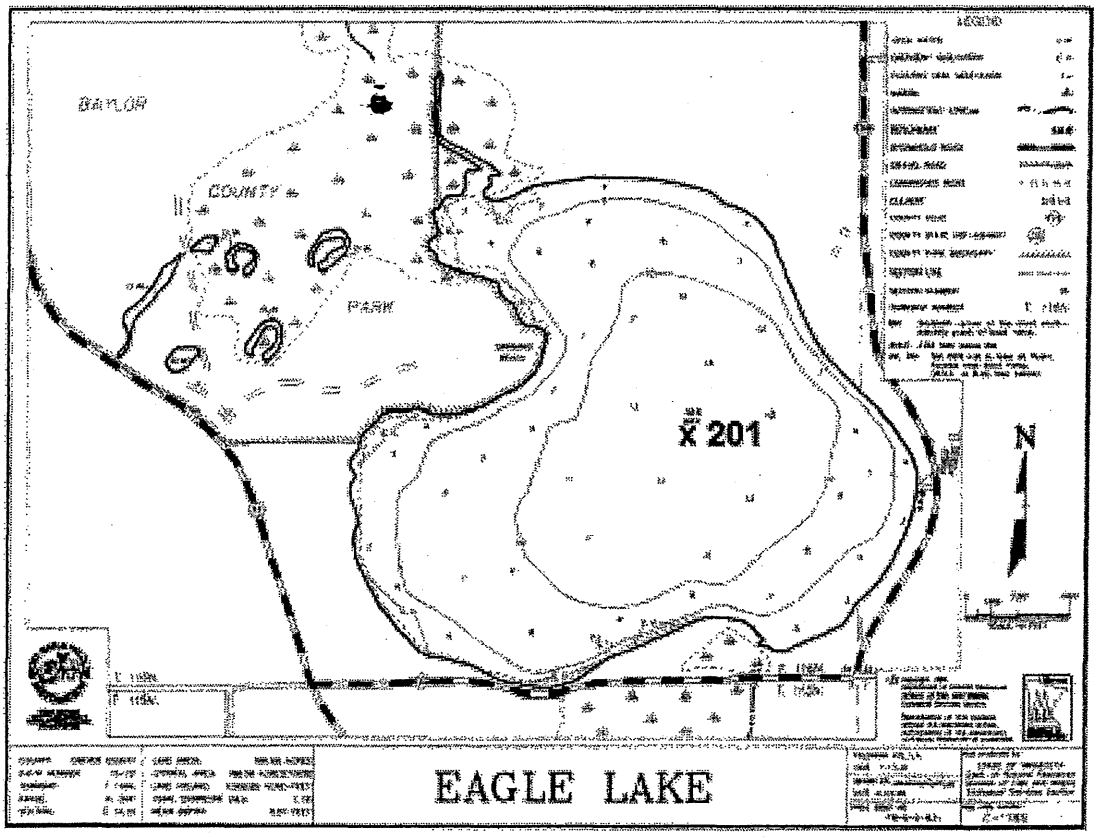
Other Notes

The last column is for you to record information about that sampling day for your own use, such as-- saw three loons today, slightly cloudy with wind from NE, lake treated with copper sulfate.

Selecting a Monitoring Location

Some Secchi transparency monitoring sites have been selected based on their convenience (e.g. out in front of the cabin), rather than on how representative of the lake they were. However, when selecting a monitoring site, try to pick a location that represents or depicts the water quality of the whole lake. This can be accomplished by studying a depth contour map (bathymetric map) of the lake and choosing a location that is deep and centrally located in the lake (Figure 4). The site should be away from the shoreline, weed beds, underwater bars, points, islands, and river or stream inlets; as these areas may influence the water transparency.

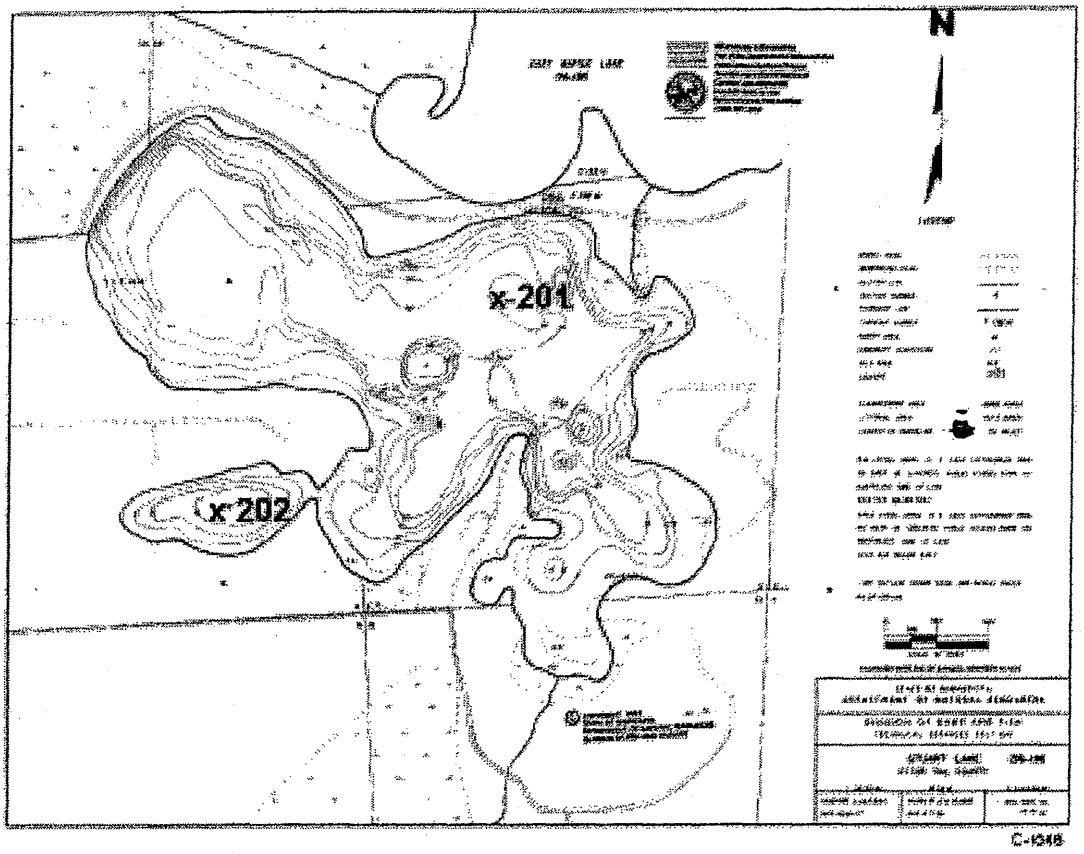
Figure 4. Representative Site Centrally Located on Eagle Lake, Carver County



Some lakes may have two or more significant bays or basins. In these cases, we identify the main basin (that portion of the lake with the largest area and water volume) and pick

the most representative site (primary site). We then select representative sites in the remaining significant basins (secondary sites) (Figure 5). Secondary sites are important because water quality can vary between the different bays or parts of a lake, and the primary site may only truly represent the water quality of the main basin. By monitoring the secondary sites we can determine if differences in water quality exist between the various basins.

Figure 5. Representative Sites for Multiple Site Selection
Stuart Lake, Otter Tail County

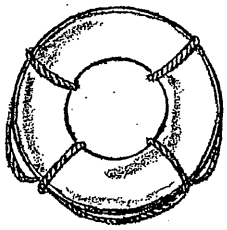


If you would like help in selecting a monitoring site, please contact the CLMP Program Coordinator or your regional office staff for assistance (Appendix). It is important to remember that consistent monitoring at the same site increases the ability to detect trends in water quality. When traveling to your site, use equipment such as a depth finder or GPS (Global Positioning Satellite) units on your initial trips until you become familiar with shoreline landmarks. This will make it easier to accurately find your site(s) the next time you monitor.

Site Number System

Within each lake, the MPCA has a unique site numbering system to track sites over time. All lake monitoring locations are marked on a series of lake maps and stored in 3-ring binders in the St. Paul office. Monitoring sites are denoted with a number prefix for each organization/group that conducts monitoring activities. For example: if the site number was 104, the "100" prefix indicates that the monitoring was done by MPCA staff. All locations monitored by CLMP participants begin with a "200" prefix number (e.g. 201, 202, 203...etc.). By looking at the site number, one can quickly find out not only *who* did the monitoring, but also *where* on the lake that monitoring site is located. The numbers are assigned on a "first come, first served" or rather, "first monitored, first numbered" basis. For example: John Smith is the first person to monitor his lake. His site is located in the northern end of the lake (Site 201). The following year, Mark Doe begins monitoring on the same lake directly in the middle of the lake at a second site (Site 202). Remember, consistency is the key to detecting long-term water quality trends. When you start monitoring at a specific site, please try to return to that same site each following year. If you participate in more than one monitoring group, such as CLMP or COLA (Coalition of Lake Association), you need to be sure you are writing down the correct site number for that group's data. If you have any questions, you can always contact the CLMP Program Coordinator or one of the regional office staff in your area.

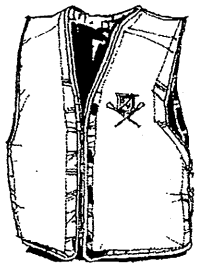
Safety Issues



Please remember to always take the appropriate safety precautions when conducting your monitoring activities. What may seem like simple, routine monitoring can turn dangerous very quickly. Using the "buddy system" is not only be more fun when conducting monitoring activities, it can also reduce danger in case of an emergency. Following are some safety tips to ensure your safety while conducting your monitoring activities:

1. Always know and follow all boating rules.
2. Learn how to swim.
3. Always make sure you and all occupants of your boat (especially children) wear their PFD-personal floatation device (life jacket) at all times.
4. If your boat should tip over and it still floats, stay with it. If it capsizes, try to right it and re-board. If you cannot right your boat, climb on top and hang on. Immersion in cold water can rapidly cause hypothermia.
5. Always obey signs and keep away from lock and dam structures on river systems.
6. Never consume alcohol while boating – this can potentially be a deadly combination.
7. Watch out for other boaters to avoid collisions – for your safety as well as theirs.
8. Minnesota weather can change quickly, so be alert to current weather conditions. Watch for wind shifts or distant lightening.
9. Tell someone where and when you are going and when you expect to return. This will help authorities looking for you find you faster.

10. If you get caught in rough waters, head to shore making sure to head into heavy waves at an angle.



Taking appropriate safety precautions refers to not only following safety boating tips, but also having safety equipment along that can help you in times of emergency. Some equipment listed below is optional and some is actually required by Minnesota boating laws, depending upon watercraft and waterbody size. Check your Minnesota Boating Guide booklet to see what equipment is required for your boat.

1. Personal Flotation Devices (PFD's). Make sure you have a PFD for each passenger, and the right types for your watercraft, including throwable devices such as buoyant boat cushions and ring buoys.
2. Navigational Lights.
3. Fire Extinguishers – especially for motorized boats.
4. Signaling System. A whistle, horn, bell, flags or flares work well as distress signals.
5. Bailing Device. A coffee can, ice cream pail or minnow bucket can work well.
6. Anchor and Line.
7. Paddle and/or Oars.
8. Flashlight.
9. Small Tool Kit. Carry a few basics such as screwdriver, pliers, hammer, and wrench along with a few common spare parts for your particular motor.
10. First Aid Kit.
11. Radio. A portable or two-way radio to catch weather reports can be a handy piece of equipment.
12. Compass and charts (or portable GPS unit) can be useful on unfamiliar or large bodies of water.

The Minnesota Department of Natural Resources (MDNR) offers boating safety information. Some of the free publications you can get include: Minnesota Boating Guide, Hypothermia: The Cold Facts and Danger-Thin ice. Call the Boat & Water Safety Section of the MDNR at (651)-296-6157 or toll-free at (888)-MINNDNR for more information.

Trophic State Index

Secchi transparency data can be used to convey information on the quality of lakes and allow for estimation of the amount of algae (chlorophyll a) and nutrient (phosphorus) status of a lake. Carlson's Trophic State Index (TSI) is a common means for characterizing a lake's trophic state (overall health) and associating Secchi, chlorophyll a, and phosphorus measurements. Comparing phosphorus, chlorophyll-a and Secchi transparency on Carlson's Trophic State Index scale can establish current trophic status and establish interrelationships between these three variables. It is assumed that Secchi is

a good estimator of trophic status (overall health or productivity) for your lake and comparing these variables on the scale will help to confirm this assumption.

The term "trophic status" refers to the level of productivity in a lake. Carlson's Trophic State Index (TSI, Carlson 1977) is one means available to examine the relationship between total phosphorus, chlorophyll a, and Secchi disk readings in a lake and its trophic status (overall health). Individual TSI values can be calculated from the following equations:

Total phosphorus TSI (TSIP) = 14.42*[ln(TP average)] + 4.15

Chlorophyll a TSI (TSIC) = 9.81*[ln(Chlorophyll a average)] + 30.6

Secchi disk TSI (TSIS) = 60 - (14.41*[ln(Secchi average)])

Total phosphorus and chlorophyll a are measured in micrograms per liter (µg/L) and Secchi disk transparency is measured in meters (3.281 feet per meter). The ln function in these equations is the "natural log" which is different than the "log" function. [The ln key is generally found next to the log key on most calculators.] The TSI scale ranges from 0 (ultra-oligotrophic) to 100 (hypereutrophic). Low trophic values (oligotrophic) are often associated with very clean and clear lakes such as those found in the Boundary Waters Canoe Area. High and or increasing trophic status values indicate more eutrophic (greener, less healthy) conditions. Although total phosphorus and chlorophyll a concentrations are not measured in the CLMP, the summer-mean Secchi transparency generally provides a good indication of trophic status for Minnesota's lakes and can be used to estimate likely ranges of total phosphorus and chlorophyll a for your lake (Figure 6).

Trends

Detecting trends in lake water quality over time is a primary goal for many lake managers and a concern for local units of government and citizens. Detecting trends requires taking numerous measurements over several years. For lakes, a minimum of 8-10 years of data (with 4 or more readings per season) are typically required to detect trends in trophic status. Secchi transparency is one of the best parameters for characterizing lake trophic status and detecting trends. It provides an economical means to assess water quality, estimate lake trophic status, and document water quality trends over time. Transparency is the preferred parameter for many reasons: low cost, easily incorporated into volunteer lake monitoring programs, and it allows for the collection of a large number of samples in a given sampling period on many different lakes.

Figure 6. Carlson's Trophic State Index
R.E. Carlson

TSI < 30 Classical Oligotrophy: Clear water, oxygen throughout the year in the hypolimnion, salmonid fisheries in deep lakes.

TSI 30 - 40 Deeper lakes still exhibit classical oligotrophy, but some shallower lakes will become anoxic in the hypolimnion during the summer.

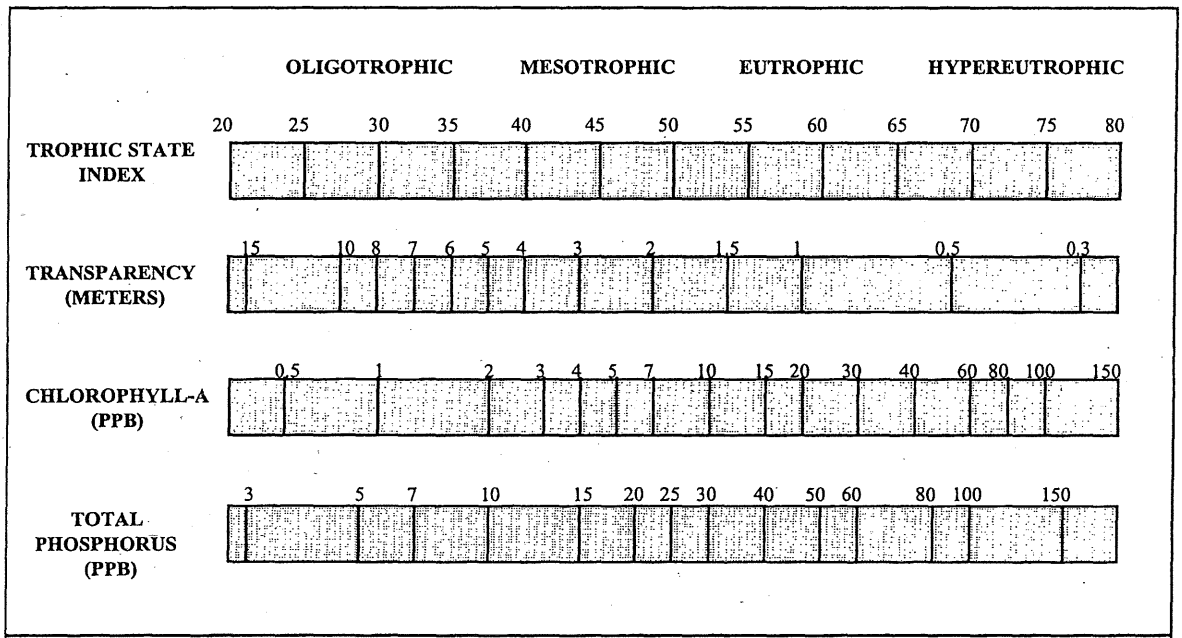
TSI 40 - 50 Water moderately clear, but increasing probability of anoxia in hypolimnion during summer.

TSI 50 - 60 Lower boundary of classical eutrophy: Decreased transparency, anoxic hypolimnia during the summer, macrophyte problems evident, warm-water fisheries only.

TSI 60 - 70 Dominance of blue-green algae, algal scums probable, extensive macrophyte problems.

TSI 70 - 80 Heavy algal blooms possible throughout the summer, dense macrophyte beds, but extent limited by light penetration. Often would be classified as hypereutrophic.

TSI > 80 Algal scums, summer fish kills, few macrophytes, dominance of rough fish.



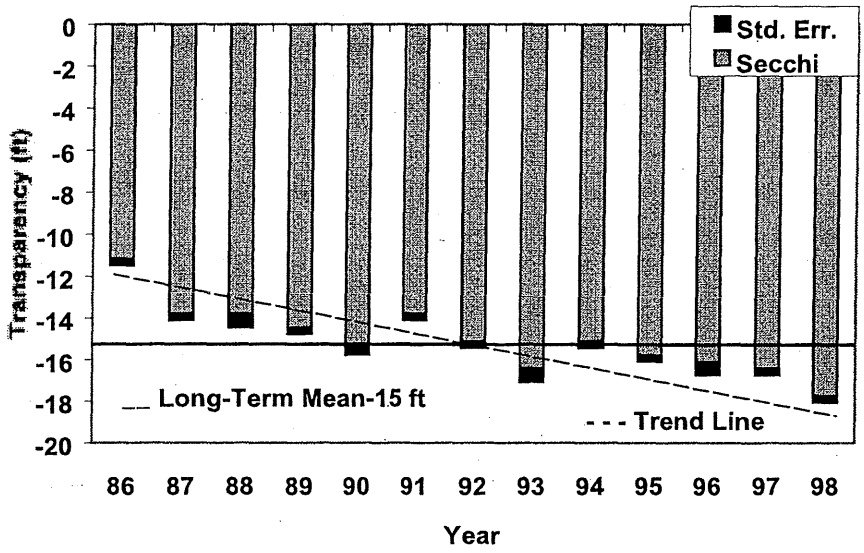
After Moore, l. and K. Thornton, [Ed.]1988. Lake and Reservoir Restoration Guidance Manual. USEPA>EPA 440/5-88-002.

Plotting the summer-mean transparency readings of a lake over time is one means for identifying patterns or trends over time (Figure 7). Summer-mean transparency of a lake often varies from year to year in response to changes in the amount of algae. Variation in the amount of algae may be caused by changes in amounts of nutrient reaching a lake, fisheries composition, and/or climatic changes. It is important to consider these factors when trying to determine if significant long-term changes have occurred or if changes are merely natural variation in a living system. Based on an analysis of several lakes with long-term Secchi transparency data, yearly mean transparencies tend to vary within one to two feet (or about 20 percent) of the long-term mean (Heiskary and Lindbloom, 1993). Consistent variation of more than 20 percent of the long-term mean (or consistent increasing or decreasing summer-means) may be indicative of a trend.

In addition to plotting the data, it is helpful to statistically analyze the data. Kendall's tau-b is a non-parametric statistical test that has been used by MPCA to assess trends in Secchi transparency over time. The Kendall's tau-b (R_k) ranges from -1 to 1. The closer the value is to ± 1, the stronger the trend. A probability level (p) ≤ 0.1 was used as a basis for identifying significant trends in transparency. At this p level, there is a 10 percent chance of identifying a trend when none exists. Simply stated, the smaller the p value for our analysis, the more likely the trend is real. When performing trend analysis, it is important to consider the strength of the correlation, p-level, and number of years of data before determining if the trend is "significant"; and if further investigation, including additional monitoring, is warranted.

What's the next step after you've identified a possible trend? Gathering historic data on the lake and its watershed is a good place to start. This can include reviewing existing water quality data as well as information on land uses within the watershed of the lake. Examining activities in the watershed may provide anecdotal and perhaps quantitative information which might help substantiate or explain why a trend has occurred. Collecting additional water chemistry, in particular additional trophic status data -- phosphorus and chlorophyll-a, is helpful as well. Comparing current water quality data to historic data can also help to understand trend findings. It is important to develop a monitoring plan before collecting additional chemistry data. This plan should help you decide what questions you are trying to answer and what parameters and sampling frequency will best help you answer those questions. It should be developed cooperatively by a committee of representatives from state agencies such as the Minnesota Department of Natural Resources and MPCA, local units of government, and lake association members.

Figure 7. Summer Mean Secchi Transparency
Big Turtle Lake (31-0725), Itasca County



Entering Data On-Line via the Web

The following is a option for volunteers who have completed at least one year in the program. Volunteers need to complete at least one year in the program because their 200-series site number is assigned after the first year of monitoring. Following are some "Helpful Hints" on filling out the On-Line Data Entry Report Form. This on-line entry form is divided into two sections: Personal Data and Secchi Data. You will need to enter information in both sections to ensure accurate and rapid entry of your data. Some information is required (this is noted on the form) and your data cannot be stored without it. Please refer to your personalized colored insert(s) of On-Line Web Entry Information for data entry ease.

Filling out the Personal Data Section

Once you are in the system, the first thing you'll need to do is choose your name from the listbox of names provided. This information is a "REQUIRED" field. If your name is not in the list, you'll have to call Jennifer Klang at 1-800-657-3864. In some cases, a company or group name will appear (ex: Carver Co. Environmental Services, Wolf Ridge Environmental Learning Center). If you belong to this group, select this name and type your own name in the column "Name of person taking reading."

Next you will need to fill in your password. This information is a "REQUIRED" field and you will not be able to store data without it. This number has been provided to you on a colored insert. It is the same number as your CLMP ID number which is the last four digits in the Bar-code that appears over your name on your data sheet. If you don't know your CLMP ID number, please contact Jennifer Klang at (651)282-2618 or 1-800-657-3864.

Now fill in the Lake ID number for your lake. This information is a "REQUIRED" field and is provided for you on a colored insert.

Type in your Lake Name in the space provided. This information is provided to you on a colored insert. This information is also a "REQUIRED" field.

Next type in the Site #. This information is a "REQUIRED" field. This is a 200 series number (ex: 201, 202) which tells us where you took your Secchi readings. It is provided for you on a colored insert.

If your sampling location this year is approximately the same as last year's location, please indicated this by checking the "Same site as last year?" box.

Please enter the depth of the lake at your monitoring location in the "Lake depth at sampling site" box.

This completes the Personal Data Section. You are now ready to enter data in the Secchi Data Section.

Filling out the Secchi Data Section

This is the section where you fill out your individual Secchi readings. The first thing you will need to do is enter the "Date". This is **not** today's date. It is the date on which your Secchi reading was taken and must be entered in the format: mm/dd/yy.

Now enter the time at which you took your Secchi reading. Please round this value to the nearest quarter hour (ex: 1:00, 1:15, 1:30, 1:45...etc.) and select whether your time was in the morning (a.m.) or evening (p.m.). **Please note that Secchi readings collected at 12:00 noon are considered 12:00 p.m.**

Next you need to enter your Secchi value in feet and inches. If you click on the "Feet" box, a long list of numbers from 0-100 will appear. Go through the list until you find the number that represents your reading. If your Secchi reading includes additional inches, click on the "Inches" box and a list of numbers from 0-11 will appear. Select the correct inches value for your reading from this list. For example: You measured a Secchi reading of 7 ft, 6 inches. You would enter 7 in the "Feet" box and 6 in the "Inches" box.

If your Secchi disk is sitting on the bottom of the lake where you are taking your reading, check the "Disk on Bottom?" box to the right of the "Feet" box.

Now enter your opinion of the physical condition of the lake water at your sampling location using the 1-5 rating scale provided in the listbox for "Physical Condition".

Then enter your opinion of how suitable the lake is for recreation and aesthetic enjoyment at your sampling location using the 1-5 rating scale provided in the listbox for "Recreational Suitability".

Record in the "Color of Lake Water" box your opinion of the color (clear, green, tea or bog stained.....etc.) that best describes the color of the lake water at your sampling location. This information will not be stored with the other data, but is used when examining trend information.

Record in the "Other Notes" box any other observations or additional information about that sampling day for your own use. This information is not stored like the other data, but is used when examining trend information. Examples of the type of information written here are:

- Saw three loons today
- Rained 1 inch yesterday
- Other weather conditions: air temp, cloud cover, wind speed and direction
- Lake treated with copper sulfate today

I've entered my data...NOW WHAT?

When you are all finished entering data, click the "Submit" button. This will let you review the data you have entered. If you would like to make any changes in the data you have previously entered, click on the "Back" button on the tool bar and make the necessary changes. After you have made sure that all the entered data is correct, submit the data for final entry.

I have more than one day's worth of data...what do I do?

If you have more than one day's worth of data to enter, simply click on the "Back" button on the tool bar to get back to the data entry form. Your Personal Data information should still be there and does not need to be re-entered. Simply make the changes you need to in the Secchi Data Section and re-submit the new data.

I am experiencing difficulty with the web page...what do I do?

As with any computer program, you may experience problems when entering your data on-line. Following are some tips to correct the common problems.

- Hit the "RELOAD" or "REFRESH" button on your browser toolbar.
- Shut down any other programs/applications you have running (such as games) to increase your RAM.
- You may need to update your browser if you are operating on an older version.
- Try shutting down your system and rebooting it.

If these do not work for you, then please let us know by calling or e-mailing the CLMP Program Coordinator with your specific problem.

Appendix of Supplemental Information

References

Carlson, R.E. 1977. A Trophic State Index for Lakes. Limnology and Oceanography 22:361-369.

Carlson, R.E. and Simpson, J. 1996. A Coordinators Guide to Volunteer Lake Monitoring Methods. North American Lake Management Society, Madison, Wisconsin.

Heiskary, S.A. and Lindbloom, J.L. 1993. Lake Water Quality Trends in Minnesota. MPCA. St. Paul, Minnesota.

Web Sites of Interest:

www.pca.state.mn.us
www.pca.state.mn.us/water/clmp.html
www.dnr.state.mn.us
www.mnlakesassn.org

Additional Information and Further Reading

You can find additional information on lakes from these publications. They cover information for both the beginner and advanced lake enthusiast from identifying lake and watershed characteristics to advanced monitoring practices.

1. *A Citizen's Guide to Lake Protection.* A free publication available from the Minnesota Pollution Control Agency at (651)296-6300 or toll-free at (800)-657-3864. Quantities are limited.
2. *Minnesota Lake and Watershed Data Collection Manual.* Available from the Minnesota Lakes Association at (800)-515-LAKE(5253) or www.mnlakesassn.org. Please check for current pricing and availability information.

Additional MPCA Monitoring Programs

Citizen Stream-Monitoring Program – Statewide volunteer stream monitoring program. Modeled after the Citizen Lake-Monitoring Program, this program focuses on monitoring streams and rivers throughout Minnesota. Contact: Laurie Sovell, Mankato MPCA at (800)-657-3864 or (507)389-1925 or laurie.sovell@pca.state.mn.us for further information.

Lake Assessment Program – A cooperative study of a lake involving MPCA staff and local citizens, such as a lake association or municipality and local resource managers. LAP studies serve to characterize a lake's condition and provide some basic information regarding the lake and its watershed. Contact: Steve Heiskary at (800)-657-3864 or (651)296-7217 or steven.heiskary@pca.state.mn.us.

Clean Water Partnerships - The Clean Water Partnership and Clean Lakes Programs provide matching grants to local units of government to protect and improve lakes, streams, and ground water that are affected by nonpoint source pollution. These programs provide a detailed characterization of in-lake water quality and information to develop a detailed nutrient and water budget for the lake. For more information about the Clean Lakes Program, contact Cathy Jensen at (800)-657-3864 or (651)297-8383 or cathy.jensen@pca.state.mn.us. For information about Clean Water Partnership, contact Gaylen Reetz at (800)-657-3864 or (651)296-8856 or gaylen.reetz@pca.state.mn.us.

Local Monitoring Data Coordinator Staff

For information or assistance with your monitoring projects, contact any of the MPCA staff listed below by dialing (800)-657-3864 or call them at their direct line listed below.

Jesse Anderson-Duluth Office: (218)529-6218 or jesse.anderson@pca.state.mn.us
Jennifer Klang – Metro/Central Office: (651)282-2618 or jennifer.klang@pca.state.mn.us
Mike Vavricka – Detroit Lakes Office: (218)846-0776 or michael.vavricka@pca.state.mn.us
Laurie Sovell – Mankato Office: (507)389-1925 or laurie.sovell@pca.state.mn.us

Glossary of Important Lake-Related Terms

Acid Rain: Rain with a higher than normal acid range (low pH). Caused when polluted air mixes with cloud moisture. Can damage fish populations.

Algal Bloom: An unusual or excessive abundance of algae.

Alkalinity: Capacity of a lake to neutralize acid.

Bioaccumulation: Build-up of toxic substances in fish flesh. Toxic effects may be passed on to humans eating the fish.

Biomanipulation: Adjusting the fish species composition in a lake as a restoration technique.

Dimictic: Lakes which thermally stratify and mix (turnover) once in spring and fall.

Ecoregion: Areas of relative homogeneity. EPA ecoregions have been defined for Minnesota based on land use, soils, landform, and potential natural vegetation.

Ecosystem: A community of interaction among animals, plants, and microorganisms, and the physical and chemical environment in which they live.

Epilimnion: Most lakes form three distinct layers of water during summertime weather. The epilimnion is the upper layer and is characterized by warmer and lighter water.

Eutrophication: The aging process by which lakes are fertilized with nutrients. *Natural eutrophication* will very gradually change the character of a lake. *Cultural eutrophication* is the accelerated aging of a lake as a result of human activities.

Eutrophic Lake: A nutrient-rich lake – usually shallow, "green" and with limited oxygen in the bottom layer of water.

Fall Turnover: Cooling surface waters, activated by wind action, sink to mix with lower levels of water. As in spring turnover, all water is now at the same temperature.

Hypolimnion: The bottom layer of lake water during the summer months. The water in the hypolimnion is denser and much colder than the water in the upper two layers.

Lake Management: A process that involves study, assessment of problems, and decisions on how to maintain a lake as a thriving ecosystem.

Lake Restoration: Actions directed toward improving the quality of a lake.

Lake Stewardship: An attitude that recognizes the vulnerability of lakes and the need for citizens, both individually and collectively, to assume responsibility for their care.

Limnetic Community: The area of open water in a lake providing the habitat for phytoplankton, zooplankton and fish.

Littoral Community: The shallow areas around a lake's shoreline, dominated by aquatic plants. The plants produce oxygen and provide food and shelter for animal life.

Mesotrophic Lake: Midway in nutrient levels between the eutrophic and oligotrophic lakes

Nonpoint Source: Polluted runoff – nutrients and pollution sources not discharged from a single point: e.g. runoff from agricultural fields or feedlots.

Oligotrophic Lake: A relatively nutrient- poor lake, it is clear and deep with bottom waters high in dissolved oxygen.

pH Scale: A measure of acidity.

Photosynthesis: The process by which green plants produce oxygen from sunlight, water and carbon dioxide.

Phytoplankton: Algae – the base of the lake's food chain, it also produces oxygen.

Point Sources: Specific sources of nutrient or polluted discharge to a lake: e.g. stormwater outlets.

Polymictic: A lake which does not thermally stratify in the summer. Tends to mix periodically throughout summer via wind and wave action.

Profundal Community: The area below the limnetic zone where light does not penetrate. This area roughly corresponds to the hypolimnion layer of water and is home to organisms that break down or consume organic matter.

Respiration: Oxygen consumption.

Secchi Disk: A device measuring the depth of light penetration in water.

Sedimentation: The addition of soils to lakes, a part of the natural aging process, makes lakes shallower. The process can be greatly accelerated by human activities.

Spring Turnover: After ice melts in spring, warming surface water sinks to mix with deeper water. At this time of year, all water is the same temperature.

Thermocline: During summertime, the middle layer of lake water. Lying below the epilimnion, this water rapidly loses warmth.

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

Turbidity: Particles in solution (e.g. soil or algae) which scatter light and reduce transparency.

Water Density: Water is most dense at 39 degrees F (4 degrees C) and expands (becomes less dense) at both higher and lower temperatures.

Watershed: The surrounding land area that drains into a lake, river or river system.

Zooplankton: Microscopic animals.

Chapter 3 HABITAT ASSESSMENT

Chapter 2 discussed how water quality is a reflection of the land use in the watershed. However, the condition of land within and along the stream channel is also critical to the health of the stream and its ability to support aquatic life.

What is a Healthy Stream Habitat?

A natural stream channel provides a variety of habitats for many species of plants and animals. Pools, riffles, undercut banks and snags (fallen limbs or small log piles) all provide different types of habitat. The more types of habitat present in a stream system, the greater the potential for aquatic plant and animal diversity.

A uniformly straight or deep channel provides less potential habitat than a stream with variable flows and depths. Examples of healthy and unhealthy stream habitats are shown in Figure 8 and 9.

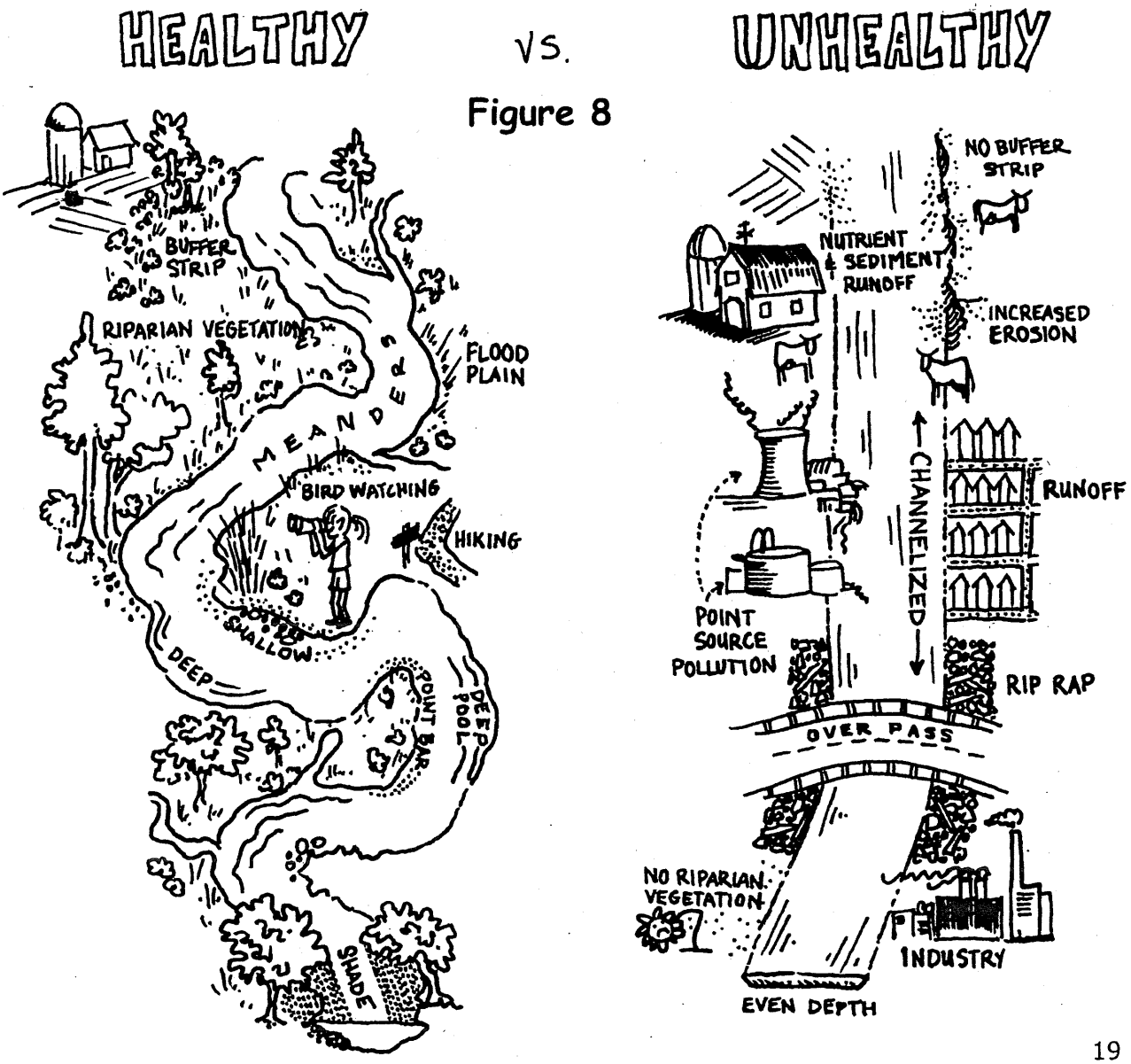


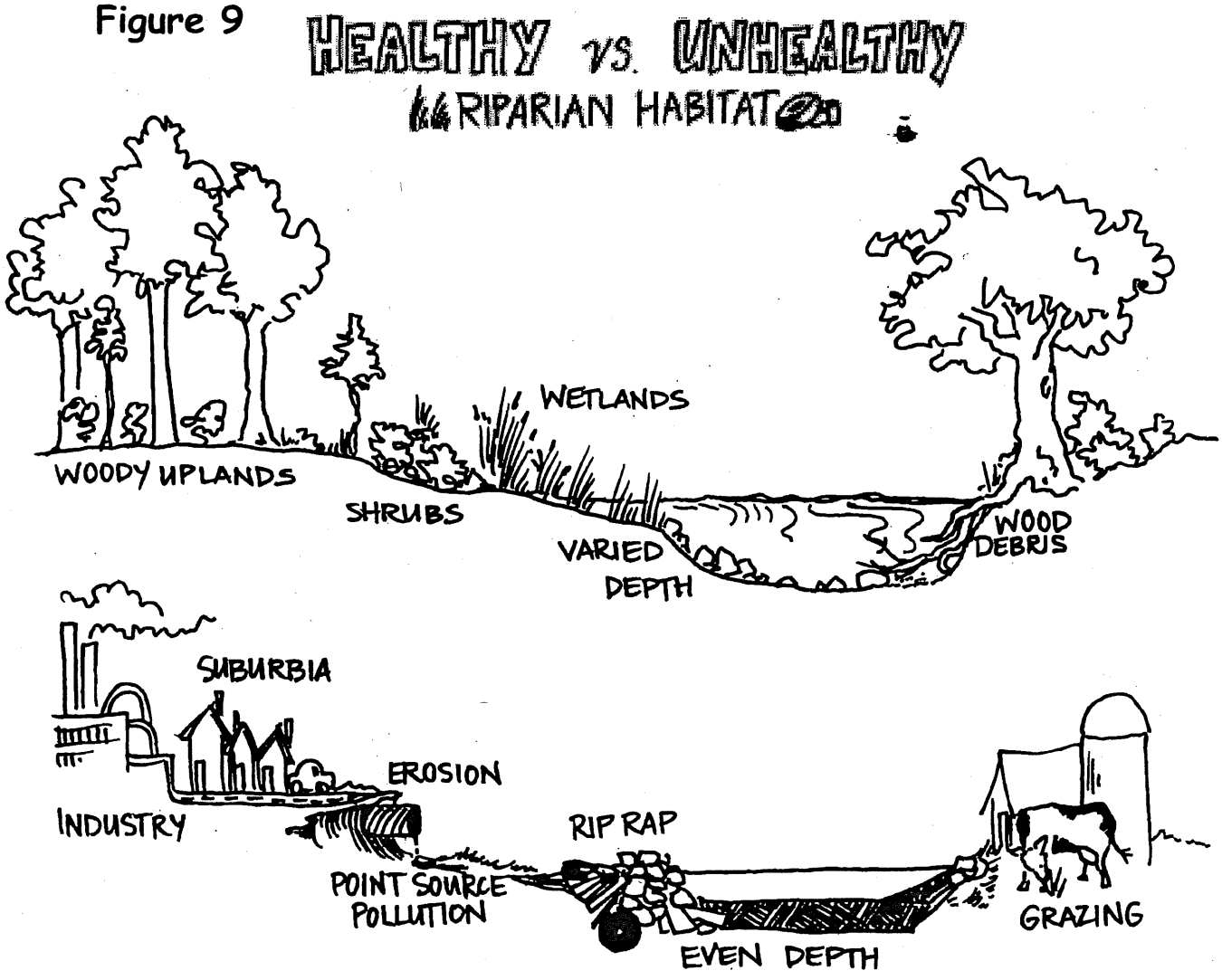
Figure 8

What is the riparian zone?

The term "riparian zone" refers to the areas adjacent to stream channels (see Figure 7). The riparian zone is the strip of land between the stream channel and upland hills. Stream riparian zones form an important transition zone between land and freshwater systems. Riparian vegetation refers to the plants that occur naturally on stream banks and along stream channels.

Streamside vegetation and wetlands are important components of a stream ecosystem because they provides streams with bank support and stabilization, erosion and flood control, water quality protection, fish and wildlife habitat, and scenic beauty. Plant roots bind soil to stream banks and reduce erosion, and deflect the cutting action of swift flowing stormwater, expanding surface ice, and strong winds. Streamside vegetation keeps the water cool by providing shade, and it provides habitat for aquatic and terrestrial creatures. In addition, plant litter that falls in upland streams is a major source of food for organisms in the stream. *(From the "Streamwalk Training Manual", Thames River Basin Partnership Initiative.)*

Figure 9



Example

Date: 04-16-03 | **Citizens Qualitative Habitat Evaluation Index** | 85.5 CQHEI Total

Vol ID: 0001 | Site ID: 0001 | River and Watershed: White River - upper white #05120201

I. Substrate (Bottom Type) — Score: 20

a) Size

- [ ] Mostly Large (Fist Size or Bigger) — 14 pt
- [ ] Mostly Small (Smaller Than Fingernail, but Still Coarse, or Bedrock) — 8 pt
- [x] Mostly Medium (Smaller than Fist, but Bigger than Fingernail) — 10 pt
- [ ] Mostly Very Fine (Not Coarse, Sometimes Greasy or Mucky) — 0 pt

b) "Smothering"

- [x] NO — Are Fist Size and Larger Pieces Smothered By Sands/Silts? — 5 pt
- [ ] YES — Symptoms: Hard to Move Large Pieces, Often Black on Bottom with Few Insects — 0 pt

c) "Silting"

- [x] NO — Are Silts and Clays Distributed Throughout Stream? — 5 pt
- [ ] YES — Symptoms: Light Kicking of Bottom Results in Substantial Clouding of Stream for More than a Minute or Two — 0 pt

II. Fish Cover (Hiding Places) - Add 2 Points For Each One Present — Score: 14

- [x] Underwater Tree Roots (Large) — 2 pt
- [ ] Boulders — 2 pt
- [x] Downed Trees, Logs, Branches — 2 pt
- [ ] Water Plants — 2 pt
- [ ] Undercut Banks — 2 pt
- [x] Underwater Tree Rootsels (Fine) — 2 pt
- [x] Backwaters, Oxbows or Side Channels — 2 pt
- [x] Shallow, Slow Areas for Small Fish — 2 pt
- [x] Deep Areas (Chest Deep) — 2 pt
- [x] Shrubs, Small Trees that Hang Close Over the Bank — 2 pt

III. Stream Shape and Human Alterations — Score: 15

a) "Curviness" or "Sinuousity" of Channel

- [ ] 2 or More Good Bends — 8 pt
- [x] 1 or 2 Good Bends — 6 pt

- [ ] Mostly Straight Some "Wiggle" — 3 pt
- [ ] Very Straight — 0 pt

b) How Natural Is The Site?

- [ ] Mostly Natural — 12 pt
- [ ] Many Man-made Changes, but still some natural conditions left (e.g., trees, meanders) — 6 pt
- [x] A Few Minor Man-made Changes (e.g., a bridge, some streambank changes) — 9 pt
- [ ] Heavy Man-made Changes (e.g., leveed or channelized) — 0 pt

IV. Stream Forests & Wetlands (Riparian Area) & Erosion — Score: 13.5

a) Width of Riparian Forest & Wetland - Mostly:

- [x] Wide (Can't Throw A Rock Through/ Across It) — 6 pt
- [ ] Narrow (Can Throw A Rock Through/ Across It) — 5 pt
- [ ] None — 0 pt

Avg 4 pts.

b) Land Use - Mostly:

- [x] Forest/Wetland — 5 pt
- [ ] Shrubs — 4 pt
- [ ] Overgrown Fields — 3 pt
- [ ] Fenced Pasture — 2 pt
- [x] Park (Grass) — 2 pt
- [ ] Conservation Tillage — 2 pt
- [ ] Suburban — 1 pt
- [ ] Row Crop — 1 pt
- [ ] Open Pasture — 0 pt
- [ ] Urban/ Industrial — 0 pt

Avg 3.5 pts

c) Bank Erosion - Typically:

- [x] Stable Hard or Well-Vegetated Banks — 4 pt
- [ ] Combination of Stable and Eroding Banks — 2 pt
- [ ] Raw, Collapsing Banks — 0 pt

d) How Much of Stream is Shaded?

- [ ] Mostly — 3 pt
- [x] Partly — 2 pt
- [ ] None — 0 pt

V. Depth & Velocity — Score: 13

a) Deepest Pool Is At Least:

- [x] Chest Deep — 8 pt
- [ ] Knee Deep — 4 pt
- [ ] Waist Deep — 6 pt
- [ ] Ankle Deep — 0 pt

b) Check ALL The Flow Types That You See (Add Points):

- [ ] Very Fast: Hard to Stand in the Current — 2 pt
- [x] Fast: Quickly Takes Objects Downstream — 3 pt
- [x] Moderate: Slowly Takes Objects Downstream — 1 pt
- [x] Slow: Flow Nearly Absent — 1 pt
- [x] None — 0 pt

IV. Riffles/Runs (Areas Where Current is Fast/Turbulent, Surface May Be Broken) — Score: 10

a) Riffles/Runs Are:

- [ ] Knee Deep or Deeper & Fast — 8 pt
- [x] Ankle/Calf Deep & Fast — 6 pt
- [ ] Ankle Deep or Less & Slow — 4 pt
- [ ] Do Not Exist — 0 pt

b) Riffle/Run Substrates Are:

- [ ] Fist Size or Larger — 7 pt
- [x] Smaller Than Fist Size, but Larger Than Fingernail — 4 pt
- [ ] Smaller Than Your Fingernails or Do Not Exist — 0 pt

Date: ____

Citizens Qualitative Habitat Evaluation Index

CQHEI Total: ____

Vol ID: ____ Site ID: ____ River and Watershed: ____

I. Substrate (Bottom Type) Score: ____

a) Size

- ☐ 14 pt — Mostly Large (Fist Size or Bigger)
- ☐ 10 pt — Mostly Medium (Smaller than Fist, but Bigger than Fingernail)
- ☐ 6 pt — Mostly Small (Smaller Than Fingernail, but Still Coarse, or Bedrock)
- ☐ 0 pt — Mostly Very Fine (Not Coarse, Sometimes Greasy or Mucky)

b) "Smothering"

- ☐ NO 5 pt — Are Fist Size and Larger Pieces Smothered By Sands/Silts?
- ☐ YES 0 pt — Symptoms: Hard to Move Large Pieces, Often Black on Bottom with Few Insects

c) "Silting"

- ☐ NO 5 pt — Are Silts and Clays Distributed Throughout Stream?
- ☐ YES 0 pt — Symptoms: Light Kicking of Bottom Results in Substantial Clouding of Stream for More than a Minute or Two

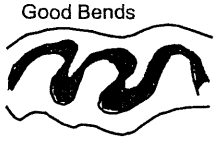
II. Fish Cover (Hiding Places) - Add 2 Points For Each One Present Score: ____

- ☐ 2 pt — Underwater Tree Roots (Large)
- ☐ 2 pt — Underwater Tree Rootlets (Fine)
- ☐ 2 pt — Boulders
- ☐ 2 pt — Backwaters, Oxbows or Side Channels
- ☐ 2 pt — Downed Trees, Logs, Branches
- ☐ 2 pt — Shallow, Slow Areas for Small Fish
- ☐ 2 pt — Water Plants
- ☐ 2 pt — Deep Areas (Chest Deep)
- ☐ 2 pt — Undercut Banks
- ☐ 2 pt — Shrubs, Small Trees that Hang Close Over the Bank

III. Stream Shape and Human Alterations Score: ____

a) "Curviness" or "Sinuousity" of Channel

- ☐ 8 pt — 2 or More Good Bends



- ☐ 6 pt — 1 or 2 Good Bends

- ☐ 3 pt — Mostly Straight Some "Wiggle"

- ☐ 0 pt — Very Straight

b) How Natural Is The Site?

- ☐ 12 pt — Mostly Natural
- ☐ 9 pt — A Few Minor Man-made Changes (e.g., a bridge, some streambank changes)
- ☐ 6 pt — Many Man-made Changes, but still some natural conditions left (e.g., trees, meanders)
- ☐ 0 pt — Heavy, Man-made Changes (e.g., leveed or channelized)

IV. Stream Forests & Wetlands (Riparian Area) & Erosion Score: ____

a) Width of Riparian Forest & Wetland - Mostly:

- ☐ 8 pt — Wide (Can't Throw A Rock Through/ Across It)
- ☐ 5 pt — Narrow (Can Throw A Rock Through/ Across It)
- ☐ 0 pt — None

b) Land Use - Mostly:

- ☐ 5 pt — Forest/Wetland
- ☐ 4 pt — Shrubs
- ☐ 3 pt — Overgrown Fields
- ☐ 2 pt — Fenced Pasture
- ☐ 2 pt — Park (Grass)
- ☐ 2 pt — Conservation Tillage
- ☐ 1 pt — Suburban
- ☐ 1 pt — Row Crop
- ☐ 0 pt — Open Pasture
- ☐ 0 pt — Urban/ Industrial

c) Bank Erosion - Typically:

- ☐ 4 pt — Stable Hard or Well-Vegetated Banks
- ☐ 2 pt — Combination of Stable and Eroding Banks
- ☐ 0 pt — Raw, Collapsing Banks

d) How Much of Stream is Shaded?

- ☐ 3 pt — Mostly
- ☐ 2 pt — Partly
- ☐ 0 pt — None

V. Depth & Velocity Score: ____

a) Deepest Pool is At Least:

- ☐ 8 pt — Chest Deep
- ☐ 6 pt — Waist Deep
- ☐ 4 pt — Knee Deep
- ☐ 0 pt — Ankle Deep

b) Check ALL The Flow Types That You See (Add Points):

- ☐ 2 pt — Very Fast: Hard to Stand in the Current
- ☐ 3 pt — Fast: Quickly Takes Objects Downstream
- ☐ 1 pt — Moderate: Slowly Takes Objects Downstream
- ☐ 1 pt — Slow: Flow Nearly Absent
- ☐ 0 pt — None

VI. Riffles/Runs (Areas Where Current is Fast/Turbulent, Surface May Be Broken) Score: ____

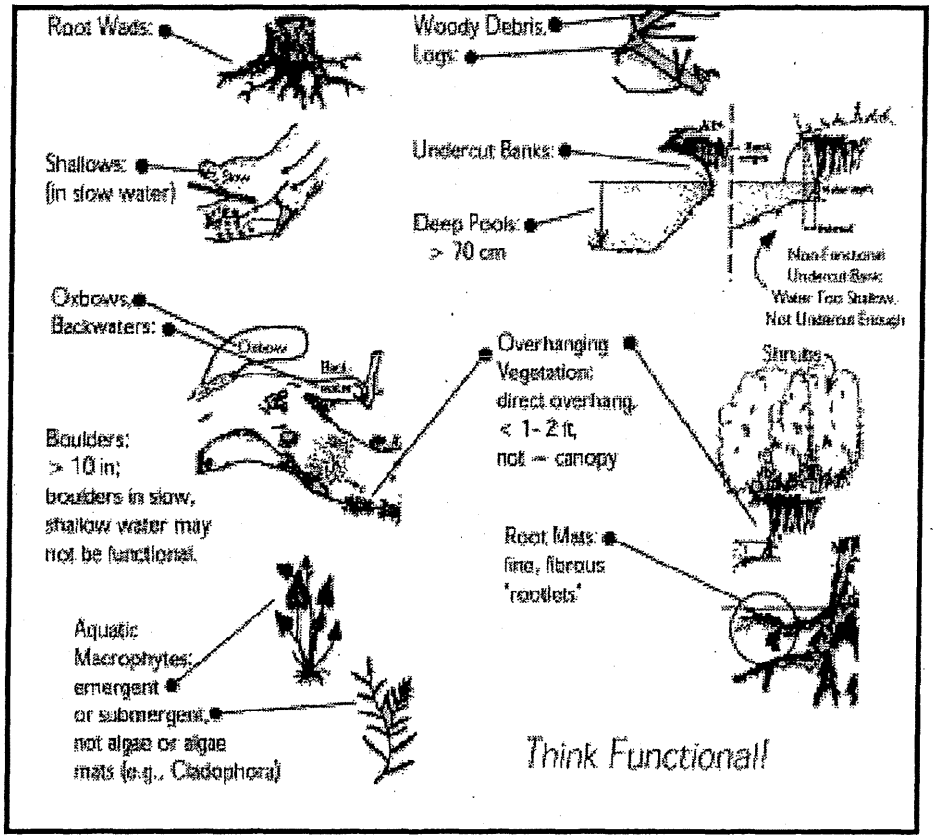
a) Riffles/Runs Are:

- ☐ 8 pt — Knee Deep or Deeper & Fast
- ☐ 6 pt — Ankle/Calf Deep & Fast
- ☐ 4 pt — Ankle Deep or Less & Slow
- ☐ 0 pt — Do Not Exist

b) Riffle/Run Substrates Are:

- ☐ 7 pt — Fist Size or Larger
- ☐ 4 pt — Smaller Than Fist Size, but Larger Than Fingernail
- ☐ 0 pt — Smaller Than Your Fingernails or Do Not Exist

CQHEI Section II: Fish Cover "Hiding Places"



Riffle and Run Habitats:

Riffle - areas of the stream with fast current velocity and shallow depth; the water surface is visibly broken.

Run - areas of the stream that have a rapid, non-turbulent flow; runs are deeper than riffles with a faster current velocity than pools and are generally located downstream from riffles where the stream narrows; the stream bed is often flat beneath a run and the water surface is not visibly broken.

CQHEI Sections V & VI: Depth and Velocity and Riffles and Runs

Pool and Glide Habitats:

Pool - an area of the stream with slow current velocity and a depth greater than riffle and run areas; the stream bed is often concave and stream width frequently is the greatest; the water surface slope is nearly zero.

Glide - this is an area common to most modified stream channels that do not have distinguishable pool, run, and riffle habitats; the current and flow is similar to that of a canal; the water surface gradient is nearly zero.

HINT: These habitat types typically grade into one another. For example a run gradually changes into a pool.

Citizens Qualitative Habitat Evaluation Index (CQHEI)

This index was developed by the Ohio Environmental Protection Agency as a "Citizens" companion to the Qualitative Habitat Evaluation Index (QHEI) used by the state's professional staff. The data sheet and diagrams on pages 22-23 were provided by the Ohio EPA. The purpose of the index is to provide a measure of the stream habitat and riparian health that generally corresponds to physical factors affecting fish and other aquatic life (i.e. macroinvertebrates). The CQHEI replaces the Site Survey used previously by the Hoosier Riverwatch program. One advantage of the CQHEI is that it produces a total score that can be used to compare changes at one site over time or compare two different sites.

NOTE: The CQHEI data sheet was designed to be used primarily in wadeable streams. The index scores do not necessarily reflect the conditions found in intermittent streams or large rivers.

When completing the CQHEI, evaluate your entire stream site (200' section).

In each category chose the most predominant answer. If sections of the stream or stream banks have completely different characteristics, you may check two boxes and average the points to obtain a score for the subsection (a), (b), or (c). An example is provided on page 24.

I. Substrate (Bottom Type) - Max 24 pts

II. Fish Cover (Hiding Places) - Max 20 pts

Select all the cover types that you see using the diagrams on page 22 as a guide. Add the points.

III. Stream Shape and Human Alterations - Max 20 pts

IV. Stream Forests and Wetlands (Riparian Areas) & Erosion - Max 20 pts

a) Width of the Riparian Forest or Wetland - **This is not the width of the stream!** Estimate the width of the area containing **trees** or **wetlands** on each side of the stream by answering: "Can you throw a rock to the other side?"

b) See Appendix C-2 for a description of conservation tillage.

V. Depth & Velocity - Max 15 pts

a) Deepest Pool - If your stream is a consistent depth, select the maximum depth.

b) Select all the flow types that you see and add the points.

VI. Riffles/Runs (where the current is turbulent) - Max 15

Using the lower diagrams on page 22 as a guide.

MAXIMUM TOTAL POINTS FOR THE CQHEI IS 114.

If the score is over 100, consider it "extra credit."
You have an exceptional high-quality stream.

A set of ranges for
Excellent, Medium, Poor, Very Poor
has not yet been developed for this index - but,

QHEI scores > 60 have been found to be
"generally conducive to the existence of warmwater fauna."

Site Map and Stream Flow

Two components of the original Site Survey Data Sheet are not included in the Citizens Qualitative Habitat Evaluation Index (CQHEI): the Stream Site Map and Stream Flow Calculations. These are completed at your site within the same 200 foot stream segment.

Site Map

Drawing a map of your site location is an excellent first step in getting to know your 200 foot stream segment. Looking at an aerial photograph before or during your visit may also help with familiarization. Continuing this tradition on an annual basis may also alert you to changes at your site that may not have been obvious during regular sampling visits. The data sheet is on Page 26 An example map is shown below in Figure 10. The stream map cannot be entered into the Volunteer Monitoring Internet Database.

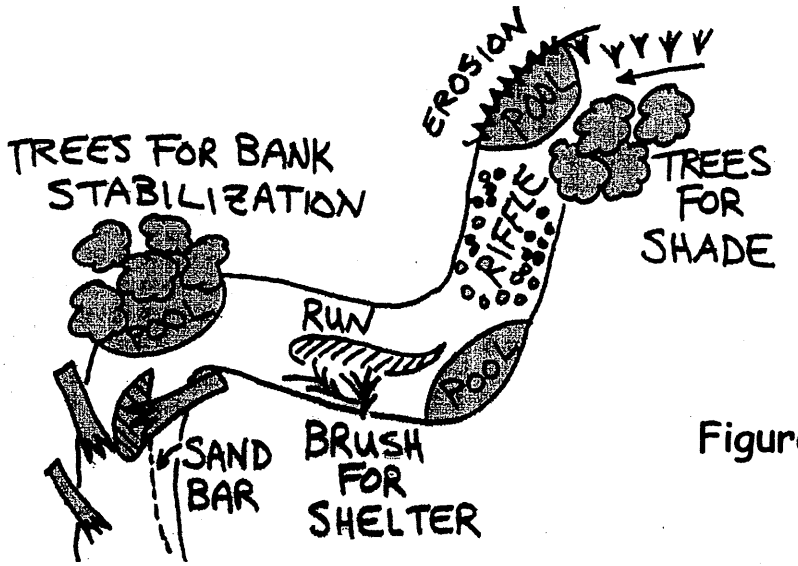


Figure 10

Stream Flow Calculations

A worksheet is provided on Page 27 to assist volunteers in determining the stream flow or discharge rate. (See page 28 for a completed example.) Discharge is the amount (volume) of water flowing in the stream per second. This measurement is important because it influences other physical, chemical, and biological factors in the stream (i.e., all of our other tests!). A high discharge rate may indicate recent rainfall or snowmelt events. When a large amount of rain runs off the land, it often carries sediments and nutrients to the stream. Very low discharge rates may indicate drought conditions, which also affect water quality and aquatic life. The discharge rate is obtained by multiplying the average width, depth, and velocity of the stream. All measurements are taken (or converted) into feet. The data sheet includes a diagram and instructions. Stream flow calculations can be entered into the Volunteer Monitoring Internet Database (See Chapter 7).

Average Width (W) - width of the stream (the water itself) taken from where it touches the stream bank on one side to where it touches the stream bank on the other side - take three width measurements; when possible measure areas that appear most representative of the entire 200 foot stream section

Average Depth (Z) - three depth measurements are taken (using a yardstick) across the stream on three transects - nine total measurements

Average Velocity (V) - how fast the water is moving - measure a distance and time how long it takes an apple or orange to float the distance - repeat three times

Roughness Coefficient (n) - select 0.8 for a gravel or rocky bottom; select 0.9 for sandy, muddy or bedrock

MPCA Citizen Lake-Monitoring Program Secchi Data Sheet

Lake # _____

Site # _____

Your Name: _____

Address: _____

_____

City/State/Zip: _____

- **Use a separate data sheet for EACH site.**
- **If you can see the disk on the lake bottom, mark a "B" in the column following the "Secchi" column.**
- **PC = Physical Condition; RC = Recreational Suitability**
- **Record all values carefully: 6 feet and 9 inches is 6.75 feet - NOT 6.9 ft.**
- **For NEW sites, also send in your marked lake map.**

Lake Name: _____ **County:** _____

Location of Lake: _____ **miles** _____ **of** _____.

Phone: (____)-_____-_____ = summer; (____)-_____-_____ = winter.

Is this the same sampling site YOU monitored last year? _____ **Lake depth at sampling site:** _____ **ft.**

Line #	Date	Time	Secchi (nearest 1/2 ft)	*B	PC	RC	Color of Water	Data Entered Online?	Other Notes
Ex.	5-20	2:00 a.m. (p.m.)	7.5 ft		2	2	clear	yes	Sunny, slight breeze
1		a.m. p.m.	ft						
2		a.m. p.m.	ft						
3		a.m. p.m.	ft						
4		a.m. p.m.	ft						
5		a.m. p.m.	ft						
6		a.m. p.m.	ft						
7		a.m. p.m.	ft						
8		a.m. p.m.	ft						
9		a.m. p.m.	ft						
10		a.m. p.m.	ft						
11		a.m. p.m.	ft						
12		a.m. p.m.	ft						
13		a.m. p.m.	ft						
14		a.m. p.m.	ft						
15		a.m. p.m.	ft						
16		a.m. p.m.	ft						
17		a.m. p.m.	ft						
18		a.m. p.m.	ft						
19		a.m. p.m.	ft						
20		a.m. p.m.	ft						
21		a.m. p.m.	ft						
22		a.m. p.m.	ft						
23		a.m. p.m.	ft						
24		a.m. p.m.	ft						
25		a.m. p.m.	ft						

At the end of your sampling season, please return the top page of this form to the MPCA.

Date: ____ **Citizens Qualitative Habitat Evaluation Index** ____ CQHEI Total

Vol ID: ____ Site ID: ____ River and Watershed: ____

I. Substrate (Bottom Type) Score: ____

a) Size

- ☐ 14 pt — Mostly Large (Fist Size or Bigger)
- ☐ 10 pt — Mostly Medium (Smaller than Fist, but Bigger than Fingernail)
- ☐ 6 pt — Mostly Small (Smaller Than Fingernail, but Still Coarse, or Bedrock)
- ☐ 0 pt — Mostly Very Fine (Not Coarse, Sometimes Greasy or Mucky)

b) "Smothering"

- ☐ NO 5 pt — Are Fist Size and Larger Pieces Smothered By Sands/Silts?
- ☐ YES 0 pt — Symptoms: Hard to Move Large Pieces, Often Black on Bottom with Few Insects

c) "Silting"

- ☐ NO 5 pt — Are Silts and Clays Distributed Throughout Stream?
- ☐ YES 0 pt — Symptoms: Light Kicking of Bottom Results in Substantial Clouding of Stream for More than a Minute or Two

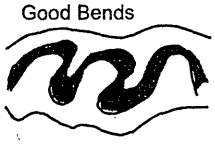
II. Fish Cover (Hiding Places) - Add 2 Points For Each One Present Score: ____

- ☐ 2 pt — Underwater Tree Roots (Large)
- ☐ 2 pt — Underwater Tree Rootlets (Fine)
- ☐ 2 pt — Boulders
- ☐ 2 pt — Backwaters, Oxbows or Side Channels
- ☐ 2 pt — Downed Trees, Logs, Branches
- ☐ 2 pt — Shallow, Slow Areas for Small Fish
- ☐ 2 pt — Water Plants
- ☐ 2 pt — Deep Areas (Chest Deep)
- ☐ 2 pt — Undercut Banks
- ☐ 2 pt — Shrubs, Small Trees that Hang Close Over the Bank

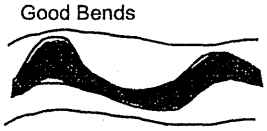
III. Stream Shape and Human Alterations Score: ____

a) "Curviness" or "Sinuousity" of Channel

- ☐ 8 pt — 2 or More Good Bends



- ☐ 6 pt — 1 or 2 Good Bends



- ☐ 3 pt — Mostly Straight Some "Wiggle"

- ☐ 0 pt — Very Straight

b) How Natural Is The Site?

- ☐ 12 pt — Mostly Natural
- ☐ 9 pt — A Few Minor Man-made Changes (e.g., a bridge, some streambank changes)
- ☐ 6 pt — Many Man-made Changes, but still some natural conditions left (e.g., trees, meanders)
- ☐ 0 pt — Heavy, Man-made Changes (e.g., leveed or channelized)

IV. Stream Forests & Wetlands (Riparian Area) & Erosion Score: ____

a) Width of Riparian Forest & Wetland - Mostly:

- ☐ 8 pt — Wide (Can't Throw A Rock Through/ Across It)
- ☐ 5 pt — Narrow (Can Throw A Rock Through/ Across It)
- ☐ 0 pt — None

b) Land Use - Mostly:

- ☐ 5 pt — Forest/Wetland
- ☐ 4 pt — Shrubs
- ☐ 3 pt — Overgrown Fields
- ☐ 2 pt — Fenced Pasture
- ☐ 2 pt — Park (Grass)
- ☐ 2 pt — Conservation Tillage
- ☐ 1 pt — Suburban
- ☐ 1 pt — Row Crop
- ☐ 0 pt — Open Pasture
- ☐ 0 pt — Urban/ Industrial

c) Bank Erosion - Typically:

- ☐ 4 pt — Stable Hard or Well-Vegetated Banks
- ☐ 2 pt — Combination of Stable and Eroding Banks
- ☐ 0 pt — Raw, Collapsing Banks

d) How Much of Stream is Shaded?

- ☐ 3 pt — Mostly
- ☐ 2 pt — Partly
- ☐ 0 pt — None

V. Depth & Velocity Score: ____

a) Deepest Pool is At Least:

- ☐ 8 pt — Chest Deep
- ☐ 6 pt — Waist Deep
- ☐ 4 pt — Knee Deep
- ☐ 0 pt — Ankle Deep

b) Check ALL The Flow Types That You See (Add Points):

- ☐ 2 pt — Very Fast: Hard to Stand in the Current
- ☐ 3 pt — Fast: Quickly Takes Objects Downstream
- ☐ 1 pt — Moderate: Slowly Takes Objects Downstream
- ☐ 1 pt — Slow: Flow Nearly Absent
- ☐ 0 pt — None

VI. Riffles/Runs (Areas Where Current is Fast/Turbulent, Surface May Be Broken) Score: ____

a) Riffles/Runs Are:

- ☐ 8 pt — Knee Deep or Deeper & Fast
- ☐ 6 pt — Ankle/Calf Deep & Fast
- ☐ 4 pt — Ankle Deep or Less & Slow
- ☐ 0 pt — Do Not Exist

b) Riffle/Run Substrates Are:

- ☐ 7 pt — Fist Size or Larger
- ☐ 4 pt — Smaller Than Fist Size, but Larger Than Fingernail
- ☐ 0 pt — Smaller Than Your Fingernails or Do Not Exist

Stream Macroinvertebrates: An Ultra-Rapid Assessment Exercise

This exercise is meant to provide a basic snapshot of stream life at your citizen monitoring site. While it would be beneficial to perform a more exhaustive analysis of macroinvertebrate populations in the near future, this worksheet will provide simple, yet telling information in the meantime. You can complete this exercise without a net, without a microscope, and without taking any bugs out of the stream—all you need are waders, your eyes, and the attached *Life in the Stream* fold-out.

PLACES TO LOOK FOR BUGS: Under rocks (in riffles or runs), in your Hester-Dendy sampler, or in stream vegetation ("weeds" in inside corners, etc.)
TO PRODUCE REPRESENTATIVE ESTIMATES: examine multiple rocks and/or weed beds (or Hester-Dendy); thoroughly assess your site.

order	common name	life stage in water	identifying characteristics	abundance ranking (0-3) (0 = none observed)	approx. % of all bugs observed	notes
Ephemeroptera	mayfly	egg & larvae	three, sometimes two hairlike tails gills on abdomen single claw at end of each leg			
Plecoptera	stonefly	egg & larvae	two tails—ALWAYS one pair legs on each thoraxic segment no gills on abdomen double claw on legs			
Trichoptera	caddisfly	egg & larvae	wormlike shape six legs hooks on last abdominal segment			
Odonata	dragonfly, damsel-fly	larvae	large eyes mandible & hinged mouthpart leaf-like tail			
Megaloptera	fishfly, alderfly, dobsenfly	larvae	spines on each abdominal segment six legs double claw mandible			
Diptera	midge, biting fly, crane fly, black fly	egg & larvae	wormlike no jointed legs; may have proleg			
Amphipoda	scuds, freshwater shrimp	all	look like little shrimp typically gray in color			
Coleoptera	water beetles		armored body no hooks two mouthparts/mandibles			
Hemiptera	true bugs, water striders, giant water-bug		wings overlap and are leathery tube-like, sucking mouthparts			

NOTES: (1) Follow all safety procedures outlined in your CSMP instructions! Never wade in high-water conditions, or when you cannot see the streambed.
(2) Ephemeroptera, Plecoptera, Trichoptera are most common orders found in Cannon River Watershed, followed by Diptera; Megaloptera are uncommon.
(3) First four columns of table adapted from Gary Schnobrich, Northfield Middle School Teacher; they outline the most common orders found in Minnesota.

Cannon River Watershed
Partnership 2004
Justin Watkins

Appendix C: Miscellaneous Information & Publications

Citizen Monitoring Program Budget 2005-2006

Revenues	*(unit price)*	*(number of units)*	*from LCMR grant*	*from CRWP general*	*total*
LCMR plan funding			**$ 3,000**		**$ 3,000**
CRWP CMP budget * 2 years				**$ 8,000**	**$ 8,000**
TOTAL REVENUES 2005-2006			**$ 3,000**	**$ 8,000**	**$ 11,000**

Expenses	*(unit price)*	*(number of units)*	*from RCM grant*	*from CRWP general*	*total*
EQUIPMENT					
CSMP kit from MPCA	$ 20	30	**$ 600**	**$ -**	**$ 600**
CLMP kit from MPCA	$ 10	13	**$ 130**	**$ -**	**$ 130**
Thermometer	$ 8	47	**$ 376**	**$ -**	**$ 376**
tape-down devices	$ 20	12	**$ 240**	**$ -**	**$ 240**
aquatic nets (for macro sampling)	$ 32	12	**$ 384**	**$ -**	**$ 384**
hand magnifying glasses	$ 15	12	**$ 180**	**$ -**	**$ 180**
misc accessories for macro samp.	$ 20	12	**$ 240**	**$ -**	**$ 240**
equipment subtotal			**$ 2,150**	**$ -**	**$ 2,150**
PRINTING					
Printing of plan	$ 20	10	**$ 200**		**$ 200**
Printing of macro guides & reference	$ 20	12	**$ 200**		**$ 200**
Printing & distribution of reports and miscellaneous mailings	$ 1	400	**$ -**	**$ 400**	**$ 400**
EVENTS					
Volunteer trainings	$ 300	2	**$ -**	**$ 600**	**$ 600**
Volunteer recognition events	$ 500	2	**$ -**	**$ 1,000**	**$ 1,000**
STAFF					
Coordinator salary	$ 3,000	2		**$ 6,000**	**$ 6,000**
Salary for new macro component	$ 225	2	**$ 450**		**$ 450**
TOTAL EXPENSES 2005-2006			**$ 3,000**	**$ 8,000**	**$ 11,000**

REVENUE LESS EXPENSES 2005-2006	**$0**	**$0**	**$0**

Hester-Dendy Sampler for macroinvertebrates

By Gary Wagenbach, June 2000

Artificial substrates are used in studying benthic organisms. When an artificial habitat is exposed in a given site for 2-3 weeks, it tends to become populated by all available species partial to that type of habitat. The sampler can then be collected and taken to the laboratory for evaluation. A number of substrates can be used including items such as cement plates and panels, wood, glass, microscope slides, the Hester-Dendy Sampler, baskets holding natural bottom material, ropes suspended in the water, and sticks thrust into the bottom. The Hester-Dendy Sampler is easily made and lends itself well to student use.

An 8-panel sampler consisting of 3-in. squares of masonite has about 1 sq. ft. of surface area exposed for colonization.

Materials list would include:

3/16 inch hardboard
threaded 1/4 inch steel rod
nut for the rod
nuts wi an internal diameter larger than the 1/4 inch rod (spacers)

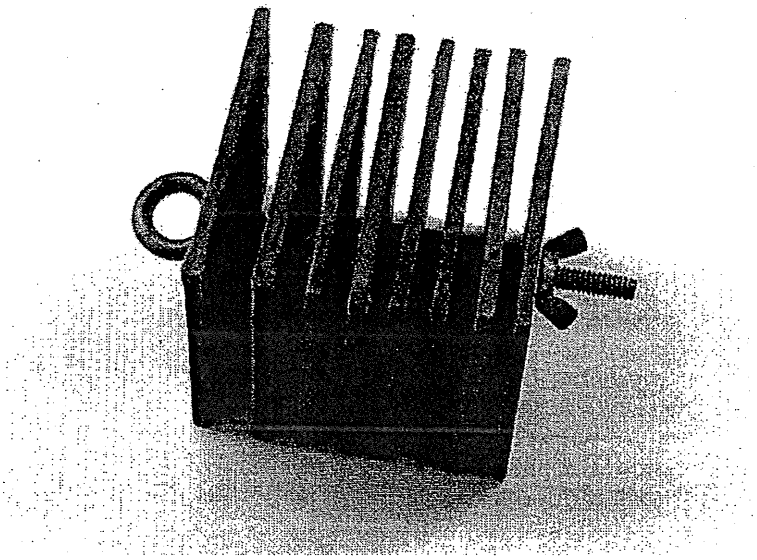
Cut hardboard into 3-inch squares and drill 3/8-inch holes in the centers.

Assemble as shown in Figure 1 with two larger nuts between the left most three pieces of hard board then one between the rest. Anchor by means of a brick or similar heavy object attached by means of a nylon cord. Total length of assembled unit need be no more than a meter.

A few additional pointers:

- if place in a muddy area suspend off the mud as the sampler will likely become clogged
- hide samples away from public view; loss can and does occur from the casual visitor curious about the sampler
- in very swift water samplers may need to be staked out

After two weeks or more collect and place in a plastic bag or bucket with as little disturbance as possible. Back in the lab disassemble and scrape off organisms. Place sample in a white enamel or similar pan so as to facilitates sorting. Organisms may be sorted and identified as live specimens, or preserved in alcohol. Short-term preservation in a refrigerator is also acceptable. If samples contain mud sieving will help concentrate the specimens. Flotation on a sugar solution can also be used to remove specimens from larger quantities of debris. A solution of 2.5 pounds of table sugar per gallon of water is considered to be suitable for most samples.



The Transparency Tube—Why Should I Use It?

Watershed residents frequently ask us 'Why are we monitoring the streams?' or 'How is the data used?' The following text is a partial response to those questions; among other reasons for monitoring, here are a few:

Determination of how streams react to rain events:
Consistent use of the tube, coupled with a precipitation record, will reveal how a given stream reacts to rain events of different magnitude. Immediate influxes of great amounts of sediment would likely result in a low transparency tube reading. This effect will be a direct reflection of the watershed's capacity for retaining and absorbing runoff, thus the information can determine which watersheds might require the most attention.

Baseline data & trend analysis:
Many streams in the Cannon River Watershed (and beyond) have had little or no attention with respect to water quality assessment. Creating the initial record is very important, and the sooner this is done, the more valuable the information will be. Continued data collection will allow for trend analysis—evaluation of the health of the water body over time.

Once data set is established and understood, tube can act as alarm:
After persistent monitoring and understanding of the data that have been collected, you will begin to expect specific tube readings according to corresponding circumstances; if you find a reading that disagrees with your expectation, you can interpret it as a potential alarm. For example, you may find that after one week of no rain, your stream always exhibits a tube reading of >60 cm. With that in mind, if you discover that after nine days of dry weather, the transparency at your site is only 24 cm, you may assume that something other than typical runoff has suspended matter in the water.

Tube can be first in a series of triggers:
Consistently poor transparency could (should, provided the resources are available) lead to increased attention from local water related groups. A more comprehensive suite of sampling could reveal the intricacies of a water quality problem, one or more of which could be a violation of a water quality standard. The situation could ultimately merit an EPA mandated study, or other extensive address of the issue.

Insights as to possible algae production in stream or river:
In addition to indicating the presence of sediment and other inorganic material, the tube can suggest the absence or presence of algae. For example, after a dry week, a tube reading of 35 centimeters and a simple observation of "green" in the water would likely confirm that your stretch of stream (or an upstream body of water) is experiencing significant primary production of plant matter. Thus you would be on the watch for related implications, such as anoxic (little or no oxygen) conditions during low-flow, warm weeks.

Upstream & downstream monitoring:
The transparency tube is a simple, inexpensive means of monitoring "above and below" a suspect site near a stream or river.

Supplement larger monitoring projects:
Tube data can be an integral addition to large scale projects. For example, citizen monitoring at CRWP project sites can potentially double or triple the number of records collected at those locations.

Puts you in the water:
The tube brings you to the water, where you interact firsthand with a stream. Such a relationship is conducive to genuine, sound stewardship.

Please contact us—we'll give you a tube and point you in the right direction!
Cannon River Watershed Partnership
1325 Armstrong Road Suite 118
Northfield MN 55057 507.645.7094 staff@crwp.net
CRWP 2001

COUNTIES

DAKOTA COUNTY

Administrator:
1590 Highway 55 West
Hastings, MN 55033
Phone: 651.438.4418
Website: http://www.co.dakota.mn.us

Dakota County Soil and
Water Conservation District (SWCD)*
4100 220th St. West, Ste 102
Farmington, MN 55024
Phone: 651.480.7777
Fax: 651.480.7775
Website: http://www.dakotaswcd.org/
Email: swcd@co.dakota.mn.us
**Includes Natural Resources Conservation Service Office (NRCS)*
The SWCD provides assistance for the management, conservation, and protection of soil and water resources. Includes the feedlot officer.

U of M Extension Service
4100 220th St W, Suite 101
Farmington, MN 55024-9539
Phone: 651.480.7700
Fax: 651.480.7794
Website: http://www.extension.umn.edu/
Email: dakota@extension.umn.edu
Includes Environmental Education

North Cannon Watershed Management Organization (WMO)*
Inquires contact SWCD, Laura Jester
Phone: 651.480.7784
Fax: 651.480.7775
Website: http://www.dakotacountyswcd.org/
Email: laura.jester@co.dakota.mn.us
**Note: In Dakota County, surface water planning is handled by WMO's and zoning is handled by townships.*

Environmental Management
Western Service Center, 14955 Galaxie Ave
Apple Valley, MN 55124
Phone: 952.891.7020
Email: environ@co.dakota.mn.us
Develops programs to manage solid wastes, such as recycling and composting. Also regulates sanitary landfills, well drilling, and septic system installation.

Recycling and Resource Recovery
Western Service Center, 14955 Galaxie Ave.
Apple Valley, MN 55124
Phone: 612.891.7020

Minnesota Technical Assistance Program (MnTAP)
McNamara Alumni Center
University of MN Gateway Center
200 Oak St SE, Suite 350
Minneapolis, MN 55455-2008
Phone: 612.624.1300 or 800.247.0015 (greater MN)
Fax: 612.624.3370
Website: http://mntap.umn.edu
Provides technology solutions for reducing industrial waste

Public Health Services
Western Service Center
14955 Galaxie Ave
Apple Valley, MN 55124-8579
or
Northern Service Center
1 Mendota Rd W 410
West St. Paul, MN 55118-4771
Phone: 651.554.6100 and 952.891.7500
Email: Public.Health@co.dakota.mn.us

Parks & Recreation
8500 127th St. East
Hastings, MN 55033
Phone: 651.438.4660
Email: parks@co.dakota.mn.us
Develops and maintains county and regional parks and trails for recreational use. The department is also responsible for the protection and preservation of land in its natural state, while providing for outdoor natural resource-oriented recreational activities.

Planning & Zoning
Western Service Center
14955 Galaxie Ave.
Apple Valley, MN 55124
Phone: 952.891.7030
Fax: 952.891.7031
Email: DC2020@co.dakota.mn.us
Part of the department's responsibilities include policy plans for parks and transportation, groundwater & natural resource protection, as well as shoreland zoning ordinances.

Survey and Land Information
Western Service Center
14955 Galaxie Ave.
Apple Valley, MN 55124

Phone: 612.891.7087
Email: survey@co.dakota.mn.us
Responsible for the enforcement of laws and ordinances governing land subdivision.

GOODHUE COUNTY

General Information
Courthouse
509 5th St. West
Red Wing, MN 55066
Phone: 651.385.3000
TTY/TDD: 1.800.627.3529
Fax: 651.385.3004
Adminstration: 651-385-3001
Website: http://www.co.goodhue.mn.us/

Goodhue County Soil and Water Conservation District (SWCD)*
104 E 3rd Ave, PO Box 335
Goodhue, MN 55027
Phone: 651.923.5300 x4
Fax: 651.923.5304
Website: http://www.goodhueswcd.org/
Water Planner: 651-923-5286
Email: beau.kennedy@mn.nacdnet.net
**Includes Natural Resources Conservation Service Office (NRCS)*
The SWCD provides assistance for the management, conservation, and protection of soil and water resources.

U of M Extension Service
509 5th Street West
Red Wing, MN 55066-2540
Phone: 651.385.3100
Fax: 651.385.3039
Website: http://www.extension.umn.edu/
Email: goodhue@extension.umn.edu

Environmental Health Services
509 W 5th St
Red Wing, MN 55066
Phone: 651.385.6130
Website: www.co.goodhue.mn.us/evnhealth/envhome.html
Email: EHD@co.goodhue.mn.us
Assistance with wells & septic systems

Recycling & Resource Recovery
Waste Management
Phone: 651.385.3105
Fax: 651.385.3258
Administers programs related to waste reduction, reuse, and recycling, and household hazardous waste disposal.

Recycling Center
3745 Highway 61
Red Wing, MN 55066
Phone: 651.385.3109

Minnesota Technical Assistance Program (MnTAP)
McNamara Alumni Center
University of MN Gateway Center
200 Oak St SE, Suite 350
Minneapolis, MN 55455-2008
Phone: 612.624.1300 or 800.247.0015 (greater MN)
Fax: 612.624.3370
Website: http://mntap.umn.edu
Provides technology solutions for reducing industrial waste

Goodhue-Wabasha Public Health Services
520 E Ave
Red Wing, MN 55066
Phone: 651.385.6100
Fax: 651.385.6472
Email: GCPHS@co.goodhue.mn.us
Provides environmental inspections.

Planning and Zoning
Phone: 651.385.3104
Surveyor: 651.385.3256
Land use planning, zoning and building permits.

Land Use Management
Phone: 651.385.3104
Fax: 651.385.3106
Responsibilities include building codes, land use planning, waste management, land application, and wetlands. Includes feedlot officer.

GIS Office
Phone: 651.385.3193
Fax: 651.385.3119
Email: Sarah.midler@co.goodhue.mn.us
Develops, implements, and maintains GIS database

Engineering/Highway
2140 Pioneer Road
PO Box 404
Red Wing, MN 55066
Phone: 651.385.3025
Fax: 651.388.8437
Email: GCPW@co.goodhue.mn.us

LE SUEUR COUNTY

General Information
Courthouse
88 South Park Ave.
Le Center, MN 56057
Phone: 507.357.2251
Fax: 507.357.2251
Website: http://www.co.le-sueur.mn.us/

Le Sueur County Soil and Water Conservation District (SWCD)*
145 Minnesota St E
Le Center, MN 56057
Phone: 507.357.4908
Fax: 507.357.6982
**Includes Natural Resources Conservation Service Office (NRCS)*
The SWCD provides assistance for the management, conservation, and protection of soil and water resources.

U of M Extension Service
88 South Park
Le Center, MN 56057-1620
Phone: 507.357.8230
Fax: 507.357.6375
Website: http://www.extension.umn.edu/
Email: lesueur@extension.umn.edu

Environmental Services
Phone: 507.357.8538
Mankato: 507.388.5302
St. Peter: 507.931.5751
Metro: 952.445.7543
Fax: 507.357.8541
Email: kbrockway@co.le-sueur.mn.us
Develops, implements, and maintains laws pertaining to zoning, shoreline development, feedlots, solid waste ,and agriculture.

Ditch Inspector
72 W MN St
Le Center, MN 56057
Phone: 507.357.4922

Public Health & Nursing
Phone: 507.357.8246
Email: cshaughnessy@co.le-sueur.mn.us

Highway Department (Solid Waste)
88 South Park Avenue
Le Center, MN 56057
Phone: 507.357.2251

Email: dpettis@co.le-sueur.mn.us

Minnesota Technical Assistance Program (MnTAP)
McNamara Alumni Center
University of MN Gateway Center
200 Oak St SE, Suite 350
Minneapolis, MN 55455-2008
Phone: 612.624.1300 or 800.247.0015 (greater MN)
Fax: 612.624.3370
Website: http://mntap.umn.edu
Provides technology solutions for reducing industrial waste

Planning and Zoning
Phone: 507.357.2251 x209
Land use planning, zoning, building permits.

RICE COUNTY

Government Services Building
320 3rd St. Northwest
Faribault, MN 55021
Phone: 507.332.6100
Fax: 507.332.5999

Administration
Website: http://www.co.rice.mn.us/
Email: Rcadmin@co.rice.mn.us
Faribault: 507.332.6101
Lonsdale: 507.744.5185
Northfield: 507.645.9576

Rice County Soil and Water Conservation District (SWCD)*
1810 N.W. 30th St.
Faribault, MN 55021
Phone: 507.332.5408
Fax: 507.332.9892
Website: http://1rl.com/rswcd.htm
**Includes Natural Resources Conservation Service Office (NRCS)*
The SWCD provides assistance for the management, conservation, and protection of soil and water resources.

U of M Extension Service
320 3rd Street Ste 7
Faribault, MN 55021-6143
Faribault: 507.332.6109
Lonsdale: 507.744.5185
Northfield: 507.645.9576
Farm Information Line: 800-232-9077

Yard & Garden: 800-525-8636 x250
Fax: 507.333.3838
Website: http://www.extension.umn.edu/
Email: rice@extension.umn.edu

Environmental Services
Faribault: 507.332.6113
Lonsdale: 507.744.5185
Northfield: 507.645.9576
Protect public health and the environment

Solid Waste & Recycling
3800 145th St. East
Dundas, MN 55019
Fairbault: 507.332.6833
Lonsdale: 507.744.5185
Northfield: 507.645.9576
Email: Rcsolidwaste@co.rice.mn.us
Responsible for recycling and landfills in Rice County. Also deals with household hazardous wastes, tires, appliances, and other non-radioactive waste.

Minnesota Technical Assistance Program (MnTAP)
McNamara Alumni Center
University of MN Gateway Center
200 Oak St SE, Suite 350
Minneapolis, MN 55455-2008
Phone: 612.624.1300 or 800.247.0015 (greater MN)
Fax: 612.624.3370
Website: http://mntap.umn.edu
Provides technology solutions for reducing industrial waste

Public Health Services
Fairbault: 507.332.6111
Lonsdale: 507.744.5185
Northfield: 507.645.9576
Email: RCPublicHealth@co.rice.mn.us

Parks and Building Maintenance
PO Box 40
Faribault, MN 55021
Fairbault: 507.332.6105
Lonsdale: 507.744.5185
Northfield: 507.645.9576
Email: RCmaintenance@co.rice.mn.us

Planning and Zoning
Faribault: 507.332.6113
Lonsdale: 507.744.5185

Northfield: 507.645.9576
Fax: 507.332.6277
Email: RCplanningzoning@co.rice.mn.us
Land use planning, zoning issues, building permits. Includes water planner and feedlot officer.

Highway Department
610 NW 20th Street
Faribault, MN 55021
Phone: 507.332.6110
Fax: 507.332.8335
Email: RCHighway@co.rice.mn.us

STEELE COUNTY

Administration
630 Florence Ave
PO Box 890
Owatonna, MN 55060
Phone: 507.444.7490
Fax: 507.444.7470
Website: http://www.co.steele.mn.us/
Email: Infodesk@co.steele.mn.us

Steele County Soil and Water Conservation District (SWCD)*
235 Cedardale Drive
Owatonna, MN 55060
Phone: 507.451.6730
Fax: 507.444.2421
**Includes Natural Resources Conservation Service Office (NRCS)*
The SWCD provides assistance for the management, conservation, and protection of soil and water resources.

U of M Extension Service
Steele County Annex
635 Florence Avenue
PO Box 890
Owatonna, MN 55060
Owatonna: 507.444.7685
Blooming Prairie: 507.583.2283
Ellendale: 507.684.2211
Fax: 507.444.7682
Website: http://www.extension.umn.edu/
Email: steele@extension.umn.edu

Environmental Planning and Building
Owatonna: 507.444.7475
Blooming Prairie: 507.583.2283
Ellendale: 507.684.2211
Fax: 507.444.7479

Email: Environmental@co.steele.mn.us
Responsible for recycling, waste management, well water testing, and abandoned wells. Also administers and enforces county land use policy and ordinances, including those involving feedlots and wastewater.

Waste Management
Phone: 507.583.2287
Waste Management Recycling Center
1171 Brady Blvd
Owatonna, MN
Phone: 507.455.3953
Steele County Landfill
9420 SE 64th Avenue
Blooming Prairie, MN
Phone: 507.583.7766
Recycling Hotline: 507.451.5443

Minnesota Technical Assistance Program (MnTAP)
McNamara Alumni Center
University of MN Gateway Center
200 Oak St SE, Suite 350
Minneapolis, MN 55455-2008
Phone: 612.624.1300 or 800.247.0015 (greater MN)
Fax: 612.624.3370
Website: http://mntap.umn.edu
Provides technology solutions for reducing industrial waste

Public Health
Steele County Annex
635 Florence Ave
PO Box 890
Owatonna, MN 55060
Owatonna: 507.444.7650
Blooming Prairie: 507.583.2283
Ellendale: 507.684.2211
Fax: 507-444-7668
Email: PHNursing@co.steele.mn.us

Parks and Recreation
Phone: 507.451.1093
Fax: 507.451.5078
Email: fourseasons@ll.net

Planning and Zoning
Phone: 507.444.7475
Email: P+Zdirector@co.steele.mn.us

Water Planner and Feedlot Officer

Phone: 507.444.7482

Engineering/Highway Department
Steele County Annex
635 Florence Avenue
PO Box 890
Owatonna, MN 55060
Owatonna: 507.444.7670
Blooming Prairie: 507.583.2283
Ellendale: 507.684.2211
Fax: 507.444.7684
Includes ditch inspector.

Public Works Director
Phone: 507.444.7670
Email: Highway@co.steele.mn.us

WASECA COUNTY

General Information
Courthouse
307 N State Street
Waseca, MN 56093
Phone: 507.835.0630
Fax: 507.835.0633
Website: http://www.co.waseca.mn.us/

Waseca County Soil and Water Conservation District (SWCD)
212 15th Ave. Northeast, Box 5
Waseca, MN 56093
Phone: 507.835.4831
Fax: 507.835.7895
*Includes Natural Resources Conservation Service Office (NRCS)
The SWCD provides assistance for the management, conservation, and protection of soil and water resources.

Waseca County Soil and Water Conservation
Larry Hagen
42390 120th St
Phone: 507.835.1564

U of M Extension Service
300 N State St Suite 1
Waseca, MN 56093-2933
Phone: 507.835.0600
Fax: 507.837.5310
Website: http://www.extension.umn.edu/
Email: waseca@extension.umn.edu

Solid Waste
Phone: 507.835.0662
Fax: 507.835.0633
Email: lee.williams@co.waseca.mn.us
Businesss Hazardous Waste
Phone: 507.332.6833
Agricultural Waste
Phone: 651.297.1062
Email: stan.kaminski@state.mn.us

Minnesota Technical Assistance Program (MnTAP)
McNamara Alumni Center
University of MN Gateway Center
200 Oak St SE, Suite 350
Minneapolis; MN 55455-2008
Phone: 612.624.1300 or 800.247.0015 (greater MN)
Fax: 612.624.3370
Website: http://mntap.umn.edu
Provides technology solutions for reducing industrial waste

Public Health Services
900 3rd St NE
Waseca, MN 56093
Phone: 507.835.0655
Fax: 507.835.0687
Email: cheri.lewer@co.waseca.mn.us

County Engineer and County Parks
1495 5th St SE, Box 487
Waseca, MN 56093
Phone: 507.835.0660
Parks Caretaker: 507.835.0590
Fax: 507.835.0669
Email: jeff.blue@co.waseca.mn.us

Planning and Zoning
Phone: 507.835.0650
Fax: 507.837.5310
Email: angie.knish@co.waseca.mn.us
Land use planning, zoning, building permits. Includes feedlot officer.

CITIES:

Cannon Falls
City Hall: 306 W Mill St, Cannon Falls, MN 55009

Phone: 507.263.3954
Fax: 507.263.5843
Websites: http://www.cfalls.net/ http://www.cannonfalls.org/
Email: cfalls@cannon.net

Dennison
City Hall: 57 376th St, PO Box 57, Dennison, MN 55018
Phone: 507.645.7732

Dundas
City Hall: 216 Railway Street N, PO Box 70, Dundas, MN 55019
Phone: 507.645.2852
Fax: 507.645.1629
Email: dundascityhall@earthlink.net

Ellendale
City Hall: 505 2nd Street, PO Box 385, Ellendale, MN 56026
Phone: 507.684.2681
Fax: 507.684.9467
Email: cityellendale@citlink.net

Elysian
City Hall: PO Box 246, Elysian, MN 56028
Phone: 507.267.4708
Fax: 507.267.4750
Websites: http://www.elysian.govoffice.com/ http://www.elysianmn.com
Email: pnusbaum@frontiernet.net

Faribault
City Hall: 208 NW First Ave., Faribault, MN 55021
Phone: 507.334-2222
Fax: 507.333-0399
TDD: 507.333-0398
Website: http://www.ci.faribault.mn.us/
Email: lsmith@ci.faribault.mn.us

Kilkenny
City Hall: PO Box 122, Kilkenny, MN 56052
Phone: 507.334.2520
Fax: 507.362.4265
Email: rmgmjg@frontiernet.net

Lonsdale
City Hall: 415 Central Street W, PO Box 357, Lonsdale, MN 55046
Phone: 507.744.2327

Fax: 507.744.5554
Website: http://www.lonsdale.govoffice.com/
Email: neiljen@means.net

Medford
City Hall: 408 2nd Ave SE, PO Box 127, Medford, MN 55049
Phone: 507.455.2866
Fax: 507.455.2088

Miesville
City Hall: 14221 240th St E, Cannon Falls, MN 55009
Phone: 651.437.6228
Fax: 651.437.6228

Morristown
City Hall: 402 Division St S, PO Box 362, Morristown, MN 55052
Phone: 507.685.2302
Fax: 507.685-2632
Website: http://ci.morristown.mn.us/
Email: motown@cvtel.net

Nerstrand
City Hall: 221 Main St, PO Box 161, Nerstrand, MN 55053
Phone: 507.332.8000
Fax: 507.332.2383

New Trier
City Hall: 8540 240th St E, Hampton, MN 55031
Phone: 651.437.8262

Northfield
City Hall: 801 Washington St., Northfield, MN 55057
Phone: 507.645.8832
Fax: 507.645.3055
Website: http://www.ci.northfield.mn.us/
Email: info@ci.northfield.mn.us

Owatonna
City Hall: 540 West Hills Circle, Owatonna, MN 55060
Phone: 507.444-4300
Fax: 507.444.4394
TDD: 507.444.4318
Website: http://www.ci.owatonna.mn.us/
Email: info@ci.owatonna.mn.us

Randolph
City Hall: 4365 292nd St E, PO Box 68, Randolph, MN 55065
651-263-3797

Red Wing
City Hall: 315 W 4th St, PO Box 34, Red Wing, MN 55066
Phone: 651.385.3600
Fax: 651.388-9608
Website: http://www.red-wing.org/
Email: kay.kuhlmann@ci.red-wing.mn.us

Waseca
City Hall: 508 S State St, Waseca, MN 56093
Phone: 507.835.9700
Fax: 507.835.8871
Website: http://www.ci.waseca.mn.us/
Email: krisb@city.waseca.com

Waterville
City Hall: 200 S 3rd St, PO Box 9, Waterville, MN 56096
Phone: 507.362.8300
Fax: 507.362.8835

STATE AGENCIES & ORGANIZATIONS

Agriculture, Department of
90 W Plato Blvd
St. Paul, MN 55107
Phone: 651.297.2200
Toll Free: 800.967.2474
TTY: 800.627.3529
Website: http://www.mda.state.mn.us/
Email: webinfo@mda.state.mn.us
Enforces laws promoting human health, including the regulation of food, animal feeds, fertilizers, pesticides and seeds.

- **Agricultural Land Preservation**
  Phone: 651.296.7673
- **Agronomy and Plant Protection Division**
  Phone: 651.296.6121
  Fax: 651.297.2271
  Email: Greg.Buzicky@state.mn.us
  Regulates pesticide, fertilizer, agricultural lime, seed, weed, and feed for public and environmental health.
- **Energy and Sustainable Agriculture**
  Phone: 651.297.1075
  Enhances the self-sufficiency of MN farmers through energy-efficient, environmentally sound, and profitable practices

- **Instant Response Unit**
  Phone: 651.296.7686
  Responds to chemical emergencies involving pesticides and fertilizers.
- **Marketing and Development Division**
  Phone: 651.296.5226

Attorney General
Public Resources & Human Resources Section
900 NCO Tower, 445 MN St
St. Paul, MN 55101
Phone: 651.297.1075
Fax: 651.297.4139
Website: http://www.ag.state.mn.us/
Email: attorney.general@state.mn.us
Includes Environmental Protection and Natural Resources divisions.

Board of Water and Soil Resources (BWSR)
Central Office
1 West Water St, Suite 200
St. Paul, MN 55107
Phone: 651.296.3767
Fax: 651.297.5615
TTY: 800.627.3529
Website: http://www.bwsr.state.mn.us/
Develops and coordinates state policies governing soil and water management at the local level, providing grants and training. Administers the Watershed Act, Metropolitan Surface Water Management Act, Wetland Conservation Act, and Comprehensive Local Water Management Act.

- **Southeast Region Office** (Goodhue, Rice and Steele)
  40 SE 16th St, Ste A
  Rochester, MN 55904
  Phone: 507.280.2874
  Fax: 507.280.2875
- **South Central Region Office** (Le Sueur and Waseca)
  261 Highway 15 S
  New Ulm, MN 56073
  Phone: 507.359.6074
  Fax: 507.359.6018

Environmental Quality Board (EQB)
658 Cedar St
St. Paul, MN 55155
Phone: 651.296.2603
Website: http://www.eqb.state.mn.us/
Oversees environmental assessments & impact statements.

Geological Survey
2280 Woodale Drive

Mounds View, MN 55112
Phone: 763.783.3100
Fax: 763.783.3103
Website: http://mn.usgs.gov/
Investigates the hydrology and hydrogeology of MN and publishes reports and maps of findings.

Health, Department of
717 Delaware St SE, PO Box 9441
Minneapolis, MN 55440
Phone: 612.676.5000
Fax: 612.676.5043
Website: http://www.health.state.mn.us/
Develops and maintains a system of programs and services for protecting and improving citizen health.

- **Environmental Health, Division of**
  Website: http://www.health.state.mn.us/divs/eh/
  Email: ehweb@health.state.mn.us
  Responsiblities include public water supplies, water wells, and safe fish consumption.

Metropolitan Council
230 E 5th St
St. Paul, MN 55101
Phone: 651.602.1140
Fax: 651.602.1464
Website: http://www.metrocouncil.org/
Email: data.center@metc.state.mn.us
Coordinates planning and development for Twin Cities area. Plans for quality transportation, sewers, parks, airports, air, water, waste management, land use, health, housing, arts and aging.

- **Metropolitan Parks and Open Space Commission**
  230 E 5th St
  St. Paul, MN 55106
  Phone: 651.602.1360
  Fax: 651.602.1464
  Website: http://www.metrocouncil.org
  Email: data.center@metc.state.mn.us
  Advises Metropolitan Council on park planning and funding.

Minnesota Farm Bureau
3080 Eagandale Place
Eagan, MN 55121
Mailing Address:
PO Box 64370
St. Paul, MN 55164
Phone: 651.905.2100
Fax: 651.905.2159
Website: http://minnesotafarmbureau.org.preview.agtown.com/controller/index
Email: info@fbmn.org
Strengthens American agriculture by providing government assistance at the grassroots level.

MN Pollution Control Agency (MPCA)
520 Lafayette Road
St. Paul, MN 55155-4194
Phone: 651-296-6300, 800-657-3864;
24-hour emergency number: 651-649-5451 or 800-422-0798;
TTY: 651-282-5332,
TTY 24-hour emergency number: 651-297-5353 or 800-627-3529
Website: http://www.pca.state.mn.us/
Improves the condition of the environment by monitoring environmental quality and implementing regulations.

Natural Resources, Department of (DNR)
500 Lafayette Road
St. Paul, MN 55155-4040
Phone: 651.296.6157 or 888.MINNDNR
TTY: 651.296-5484 or 800.657.3929
Website: http://www.dnr.state.mn.us/index.html
Email: info@dnr.state.mn.us
Practice sustainability while promoting commercial and recreational use of natural resources.

Natural Resources Conservation Service, of MN (NRCS)
375 Jackson Street, Suite 600
St. Paul, MN 55101-
Phone: 651.602.7900
Fax: 651.602.7914
Website: http://www.mn.nrcs.usda.gov/
Conserves the natural resources of MN via local, state, and federal governments and organizations.

Parks and Trails Council of Minnesota
275 E 4th St #642
St. Paul, MN 55101-1651
Phone: 651.726.2457
Outstate: 800.944.0707
Fax: 651.726.2458
Website: www.parksandtrails.org
Email: info@parksandtrails.org
Establishes and improves parks and trails through partnerships between landowners, citizens, local government, and the state.

CITIZEN GROUPS

Organize by Category
Community and Environment
Hunting
Parks and Recreation
Water Resources

Audubon Minnesota (of the National Audubon Society)
2357 Ventura Drive, Suite 106
St. Paul, MN 55125
Phone: 651.739.9332
Fax: 651.731.1330
Website: www.audubon.org
Email: mnaudubon@audubon.org
Enhances the ecological diversity through protection of habitat for birds, wildlife, and plants.

Friends of the Mississippi River
46 E 4th St, Ste 606
St. Paul, MN 55101
Phone: 651.222.2193
Fax: 651.222.6005
Website: www.fmr.org
Email: info@fmr.org
A citizen organization that serves to protect the river and its waterhsed in the Twin Cities area via improved water quality, habitat, education, and recreation.

Cannon River Watershed Partnership
8997 Eaves Ave
Northfield, MN 55057
Phone: 507.646.8400
Fax: 507.646.8039
Website: http://www.crwp.net/
Email: staff@crwp.net
Protects and improves surface and groundwater resources of the Cannon River Watershed by coordinating government and citizen resources in implementation of local water plans, instilling a sense of watershed pride through education, information and special events, and providing for cooperative management and protection of the watershed.

Cannon Valley Trail
825 Cannon River Avenue
Cannon Falls, MN 55009
Phone: 507.263.0508
Website: http://www.cannonvalleytrail.com/home.htm
Email: info@cannonvalleytrail.com
The Cannon Valley trail offers the experience of witnessing unique flora and fauna on a scenic pathway along the Cannon River.

Cedar Lake Park Association
200 Aldrich Ave S
Minneapolis, MN 55405
Phone: 612.377.9522
Website: http://www.cedarlakepark.org/
Email: info@cedarlakepark.org
A non-profit organization that restores the lands and waters surrounding Cedar Lake Park through a coordination of government and citizen efforts.

Clean Up the River Environment (CURE)

114 S 1st St W
Montevideo, MN 56265
Phone: 320.269.2984 or Toll-Free 877.269.2873
Fax: 320.269.5624
Website: http://www.curemnriver.org/index.html
Email: marta-at-cure@info-link.net
Improves the water quality, biology, and beauty of the Upper Minnesota River Watershed via public awareness and action initiatives.

Clean Water Action Alliance of Minnesota (CWAA)
326 Hennepin Ave E
Minneapolis, MN 55414
Phone: 612.623.3666
Fax: 612.623.3354
Website: http://www.cleanwateraction.org/mn/
Email: mncwa@cleanwater.org
A state chapter of the national organization, the CWA protects public health and the environment by bringing communities together and influencing politics.

Clean Water Fund
328 E Hennepin Ave
Minneapolis, MN 55414
Phone: 612.623.1855
Website: www.cleanwaterfund.org
Email: cwf@cleanwater.org
A nationwide non-profit organization that functions locally to protect water resources in MN at the grassroots level.

Coalition for a Clean Minnesota River (CCMR)
PO Box 488
New Ulm, MN 56073
Phone: 507.359.2346
Website: http://www.newulmweb.com/ccmr/
Email: yasure@lycos.com
Connects river supporters together, improving the quality of the MN River and its environment.

Dakota County Gun Club
PO Box 53
Rosemount, MN 55068-0053
Phone: 952.985.3248
Fax: 612.827.2473

Ducks Unlimited, MN Chapter
4570 W 77th St #179
Edina, MN 55435
Phone: 952.820.8174
Website: http://www.mnducks.org/index.html
Email: mndu@mtn.org or information@mnducks.org
Protects wetlands and associated environment for waterfowl, wildlife and people.

Environmental Fund, of MN
475 Cleveland Ave N Suite 220
St. Paul, MN 55104
Phone: 651.917.1876
Fax: 651.917.1890
Website: http://www.mnenvirofund.org/
Email: campaign@mnenvirofund.org
Protects MN's environment via education and payroll funds for corporations.

The Greater Jefferson-German Lake Association
Scott Hass
45872 Summer Breeze Lane
Cleveland MN, 56017
Website: http://www.jeffersongermanlakes.org/index.htm
Email: dougj@doug-johnson.com
Organizes water management, water quality, and water control while building and reinforcing bonds between parties affecting the Jefferson-German water basin.

HuntTheNorth.com
1955 75th Ave
Dresser, WI 54009
Phone: 715.755.4842
Website: http://www.huntthenorth.com/
Email: Sales@HuntTheNorth.com
HuntTheNorth.com is an online hunting guide for all types of hunters across the Midwest.

Isaac Walton League of America (MN chapter)
555 Park Street #140
St. Paul, MN 55103-2110
Phone: 651.221.0215
Website: www.mtn.org/~mn-ikes
Email: mn-ikes@mtn.org
A grassroots level organization that strives towards sustainability via recreation and conservation, the IWLA is committed to defending the soil, water, air, woods, and wildlife of our nation.

Leopold Education Project

Lake Byllesby Improvement Association
6710 296th St.
Cannon Falls, MN 55009
Website: http://www.mnlakes.org/byllesby/
A member of the MLA, the LBIA facilitates communication between members and citizens while improving the water quality and recreational value of Lake Byllesby and surrounding area.

Lake Francis Area Recreation and Conservation Club
P.O. Box 81
South Haven, MN, 55382
Phone: 763.479.3119
Website: http://www.mnlakes.org/lakefrancis/

Email: lakefrancisarcc@hotmail.com
A member of the MLA, the Lake Francis Area Recreation and Conservatin Club conserves and restores the natural resources of Lake Francis while promoting recreation.

Land Stewardship Project
2200 4th St
White Bear Lake, MN 55110
Phone: 651.653.0618
Fax: 651.653.0589
Website: www.landstewardshipproject.org
Email: lspwbl@landstewardshipproject.org
Promotes sustainable communities and family-farm agriculture that is economically viable. The LSP believes that all humans have a responsibility to care for the land.

Minnesota Association of Watershed Districts (MAWD)
540 Diffley Road
St. Paul, MN 55123
Phone: 651.452.8506
Fax: 651.686.8679
Website: http://www.mnwatershed.org/
Email: raybohnmga@aol.com
Administers education, training, meetings, and newsletters to watershed districts to increase environmental quality and cooperation.

Minnesota Canoe Association
PO Box 13567 Dinkytown Station
Minneapolis, Minnesota 55414
Website: http://www.canoe-kayak.org/
Email: mca@canoe-kayak.org
The MCA brings people together through events, events, and newsletters while promoting enjoyment and respect for the outdoors.

Minnesota Center for Environmental Advocacy
26 E Exchange Street, Suite 206
St. Paul, MN 55101
Phone: 651.223.5969
Fax: 651.223.5967
Website: http://www.mncenter.org/
Email: mteneyck@mncenter.org
Works with scientific, legal, and policy specialists to protect natural resources, wildlife, and public health of MN.

Minnesota Conservation Federation
551 S Snelling Ave, Suite B
St. Paul, MN 55116
Phone: 651.690.3077
Fax: 651.690.3077
Website: www.mncf.org
Email: mncf@mtn.org
The MCF is the state associate of the National Wildlife Federation, serving to educate, legislate, and publish agendas to save the natural resources of MN.

Minnesota Deer Hunters Association
460 Peterson Road
Grand Rapids, MN 55744
Phone: 218.327.1103 or 800.450.DEER (3337)
Website: http://www.mndeerhunters.com/
A non-profit corporation, the MDHA promotes the best quality deer herd and excellent deer hunting in MN.

Minnesota Horse and Hunt Club
2920 220th St
Prior Lake, MN 55372
Phone: 612.447.2272
Fax: 952.447.2278
Website: http://www.horseandhunt.com/
Email: info@horseandhunt.com
Provides managed hunting and shooting grounds for members.

Minnesota Environmental Action Network
Website: http://www.mnaction.org/
Email: info@mnaction.org
The MN Environmental Action Network is a coalition of environmental non-profits that promotes citizen participation in environmental politics.

Minnesota Environmental Partnership (MEP)
2356 University Ave W, Suite 244
St. Paul, MN 55114
Phone: 651.290.0154
Fax: 651.290.0167
Website: http://www.mepartnership.org/
Email: info@MEPartnership.org
MEP is an association of non-profit environmental groups that unite to restore, protect, and take pleasure in MN natural resources.

Minnesota Food Association
14220 Ostlund Trail N
Marine on St. Croix, MN 55047
Phone: 651.788.4342
Fax: 612.788.4344
Website: www.mnfoodassociation.org
Email: cbconsulting@msn.com
Brings together urban and rural communities, building a more sustainable food network that benefits family farms and the land.

Minnesota Lakes Association (MLA)
19519 Hwy 371 N
Brainerd, MN 56401
Phone: 218.824.5565 or 800.515.5253
Fax: 218-824-5566
Webpage: http://mnlakes.org/
Email: lakes@mnlakes.org
A coalition of lake users, lakeshore property owners, lake associations, businesses, and governments that protect MN lakes via citizen stewardship and public policy support.

Minnesota Land Trust (St. Paul Office)
2356 University Ave W, Suite 240
St. Paul, MN 55114
Phone: 651.647.9590
Fax: 651.647.9769
Website: http://www.mnland.org/
Email: mnland@mnland.org
Promotes the protection and enhancement of open space such as farmland, wetlands, woodlands, bluff lands, wildlife habitat and scenic areas in MN.

Minnesota Office of Environmental Assistance
520 Lafayette Rd N Floor 2
St. Paul, MN 55155-4100
Phone: 651.296.3417
Fax: 651.215.0246
Website: http://www.moea.state.mn.us/
MnOEA is an institute that boosts the economy and protects the environment. It provides non-regulatory services such as education, research, matching grants, partnerships, technology transfer, and technical assistance while saving energy and reducing pollution.

Minnesota Project
1885 University Ave Suite 315
St. Paul, Minnesota 55104
Phone: 651.645.6159
Fax: 651.645.1262
Website: www.mnproject.org
Email: mnproject@mnproject.org
Supports sustainable communities by promoting citizens to be involved in development and environmental issues.

Minnesota Sustainable Communities Network (MnSCN)
520 Lafayette Rd N, 2nd Floor
St. Paul, MN 55155-4100
Phone: 651.296.3417
Fax: 800.657.3843
Website: http://www.nextstep.state.mn.us/
Email: nextstep@moea.state.mn.us
A program of the MnOEA, the MnSCN connects non-profits, businesses, educational institutions, and local governments with the common goal of sustainability.

Minnesota Trout Unlimited- Twin Cities Chapter
Website: http://www.mntu.org/index.shtml
Email: info@twincitiestu.org
Trout Unlimited conserves, protects, and restores the waterways and watersheds of trout and salmon in North America via publications, involvement in legal and political procedures, and comprehensive volunteer networking.

Minnesota Waterfowl Association
3750 Annapolis Lane, Suite 135
Plymouth, MN 55447

Phone: 763.553.2977
Fax: 763.559.2532
Website: http://www.mnwaterfowlassociation.org/
Email: info@mnwaterfowlassociation.org
The MWA protects wetlands and surrounding habitats through education and legislative programs to increase the quality of MN's environment and the wildlife that lives in it.

The Nature Conservancy of Minnesota
1101 W River Parkway, Suite 200
Minneapolis, MN 55415-1291
Phone: 612.331.0700
Fax: 612.331.0770
Website: www.nature.org
Email: minnesota@tnc.org
Exclusively committed to the preservation biological diversity, the Nature Conservancy has more than 60,000 preserve acres in MN available for recreation and education.

Pheasants Forever, Inc.
1783 Buerkle Cir
St. Paul, MN 55110
Phone: 651.773.5500 or 877.773.2070
Fax: 651.773.550
Website: http://www.pheasantsforever.org/index.php
A non-profit organization, Pheasants Forever manages land, enhances habitat, and educates the public in efforts to safeguard pheasant and other wildlife populations.

River Bend Nature Center
PO Box 186
1000 Rustad Road
Faribault MN 55021
Phone: 507.332.7151
Website: http://www.rbnc.org/
Email: mccutchn@rbnc.org
Provides the community with environmental education while conserving nature.

Sharing Environmental Education Knowledge (SEEK)
525 S Lake Ave, Ste 400
Duluth, MN 55802
Phone: 218.529.6258
Toll Free: 888.668.3224
Website: http://www.seek.state.mn.us/
Email: seek@moea.state.mn.us
Provides a directory of environmental education resources.

Shooting Ranges and Hunting Clubs in MN
Website: http://www.dnr.state.mn.us/shooting_ranges/list_ranges.html
An online list provided by the DNR of shooting and hunting clubs in MN.

Sierra Club Foundation (North Star Chapter)

2327 E Franklin Ave, Suite 1
Minneapolis, MN 55406-1024
Phone: 612.659.9124
Fax: 612.659.9129
Website: www.northstar.sierraclub.org
Email: north.star.chapter@sierraclub.org
Protects MN air, water, soil, wildlife, and ecosystems for future generations via public education and research.

Tree Trust
2350 Wycliff St, Suite 200
St. Paul, MN 55114
Phone: 651.644.5800
Fax: 651.644.1469
Website: www.treetrust.org
Email: info@treetrust.org
Performs landscaping with at-risk youth, adults and communities, improving individual responsibility and environmental stewardship.

Trust for Public Land (Central Region Office)
2610 University Ave, Suite 300
St. Paul, MN 55114
Phone: 651.917.2240
Fax: 651.917.2248
Website: www.tpl.org
Email: central@tpl.org
Improves community health and safeguards historic resources for future generations through the protection of 21,000 acres of natural areas and open spaces.

WhereToShoot.org: The most comprehensive listing of shooting and hunting facilities.
National Shooting Sports Foundation
Flintlock Ridge Office Center
11 Mile Hill Road
Newtown, CT 06470-2359
Phone: 203.426.1320
Fax: 203.426.1087
Website: http://www.wheretoshoot.org/
Email: rpatterson@nssf.org
Find gun clubs and ranges in MN and throughout the US at this National Association of Shooting Ranges website, a division of the National Shooting Sports Foundation that supports shooting ranges through leadership information, consultation, and alliances between ranges, community and industry.

Wilderness Inquiry
808 14th Ave SE
Minneapolis, MN 55414-1516
Phone: 612.676.9400
Toll Free: 800.728.0719
TTY: 612.676.9475
Fax: 612.676.9401
Website: www.wildernessinquiry.org
Email: info@wildernessinquiry.org

Provides outdoor explorations that join together people of all ages, backgrounds, and abilities with the common goal of respect for the self, others, and the natural environment.

III. Budget Request Form

A. Group Name: Cannon River Watershed Partnership

B. Fiscal Agent: (Name/Address/Phone of Person responsible to receive/handle funds: Cannon River Watershed Partnership
8997 Eaves Avenue
Northfield MN 55057

C. Name that should appear on the check Cannon River Watershed Partnership

D. Amount requested $3000

E. Budget from Step 11:

- Please copy your budget from worksheet 11.4 and paste into this form. Attach worksheet 11.5, if used. Then, finish filling out the columns to the right and email back to RCM/MLA as your budget request.
- The expense table below also asks you to identify those items of the budget that will be paid for with these funds (which part of your plan will be implemented) and specific estimates of what specific items will cost.
- The expense table also asks the time frame that funds will be used in – which will determine when you will receive them. We will distribute funds up to three times different times, depending on when you expect to spend them. Before we can distribute additional funds, we must receive all receipts back from the current spending period. This is because RCM/MLA are not reimbursed until we have all receipts. (All funds must be used by December 1, 2005.)

Citizen Monitoring Program Budget 2005-2006

Revenues	*(unit price)*	*(number of units)*	*from LCMR grant*	*from CRWP general*	*total*	*jan 1 to mar 20 period*	*apr 1 to sep 30 period*	*oct 1 to dec 1 period*
LCMR plan funding			$ 3,000		$ 3,000		$3,000	
CRWP CMP budget * 2 years				$ 8,000	$ 8,000			
TOTAL REVENUES 2005-2006			$ 3,000	$ 8,000	$ 11,000			

Expenses	*(unit price)*	*(number of units)*	*from LCMR grant*	*from CRWP general*	*total*			
EQUIPMENT								
CSMP kit from MPCA	$ 20	30	$ 600	$ -	$ 600		$600	
CLMP kit from MPCA	$ 10	13	$ 130	$ -	$ 130		$130	
Thermometer	$ 8	47	$ 376	$ -	$ 376		$376	
tape-down devices	$ 20	12	$ 240	$ -	$ 240		$240	
aquatic nets (for macro sampling)	$ 32	12	$ 384	$ -	$ 384		$384	
hand magnifying glasses	$ 15	12	$ 180	$ -	$ 180		$180	
misc accessories for macro samp.	$ 20	12	$ 240	$ -	$ 240		$240	
(trays, tweezers, etc.)								
equipment subtotal			$ 2,150	$ -	$ 2,150		$2,150	
PRINTING								
Printing of plan	$ 20	10	$ 200		$ 200		$200	
Printing of macro guides & reference	$ 20	12	$ 200		$ 200		$200	
Printing & distribution of reports and miscellaneous mailings	$ 1	400	$ -	$ 400	$ 400		$0	
EVENTS								
Volunteer trainings	$ 300	2	$ -	$ 600	$ 600		$0	
Volunteer recognition events	$ 500	2	$ -	$ 1,000	$ 1,000		$0	
			-					
STAFF								
Coordinator salary	$ 3,000	2		$ 6,000	$ 6,000			
Salary for new macro component	$ 225	2	$ 450		$ 450		$450	
TOTAL EXPENSES 2005-2006			$ 3,000	$ 8,000	$ 11,000		$3,000	

REVENUE LESS EXPENSES 2005-2006	$0	$0	$0		$0		

In-Kind Contributions	*Description*	*Value*			
CRWP staff	coordination of program; analysis	$4,000			
CSMP volunteers	40 people * 40 hours *$10	$16,000			
CLMP volunteers	20 people * 25 hours *$10	$5,000			
TOTAL IN-KIND VALUE 2005-2006		$25,000			