

# Citizen Stream Monitoring

## 2004 Year in Review

Newsletter of the Faribault County Soil and Water Conservation District

### CSMP Refresher...

The Citizen Stream Monitoring Program (CSMP) works to combine the technical expertise of the Minnesota Pollution Control Agency (MPCA) and local agencies such as the Soil and Water Conservation District (SWCD) with local knowledge of interested citizens to develop a statewide network for monitoring the state's 92,000 miles of streams. The network works to increase understanding of how human activities, such as land use, affect water quality.

The goal of the CSMP is to help determine the condition of Minnesota streams, provide the opportunity for anyone interested to participate, facilitate awareness and understanding of water quality issues, and promote shared responsibility for protection of our water resources.

During rainfall events, stream transparency can decrease as sediments are delivered to streams in runoff. In addition, sediments may carry other pollut-

ants to streams. CSMP records of rainfall amount, stream stage estimates, and transparency readings can tell us where runoff may be contributing sediment and other pollutants to streams. Changes over time can also help to measure improvements or declines in water quality. Increased monitoring will help identify problems, develop strategies, prioritize activities for improving water quality, and track progress toward improvement.

### The Year in Review...

This was the second year of stream monitoring in Faribault County. From the end of March through October, 7 volunteers monitored the water quality of 8 sites on 5 major rivers and streams. Sites were located on the Blue Earth River, East Branch Blue Earth River, Elm Creek, County Ditch 3, and Judicial Ditch 13.

<b>NAME</b>	<b>LOCATION</b>	<b>RIVER/STREAM</b>
Pam Fuhrman	Verona, Sec 4 on 330th Ave W of Winnebago	Elm Creek
Barbara Baker	Rome, Sec 35 on County Road 17 near IA border	Judicial Ditch 13
Laurie Ristau	Blue Earth, Sec 20 near BE Swimming Pool	Blue Earth River
Laurie Ristau	Elmore, Sec 8 on County Road 4	Blue Earth River
Robert Worner	Blue Earth, Sec 7 on County Road 16	Blue Earth River
Kay Bogan	Blue Earth, Sec 17 on the East Street Bridge	East Branch BE River
Orville Goemann	Foster, Sec 8 on County Road 16	East Branch BE River
Bernie Stevermer	Lura, Sec 36 on State Hwy 109 near Easton	County Ditch 3

### Inside this issue:

Transparency Tube	2
How Is Your Data Being Used?	2
2004 Data Summary	3
2004 Rainfall	4
Rainfall's Effect on Transparency	5
Transparency and Stream Depth	6
Looking Ahead	6

*Special thanks to all of the Citizen Stream Monitors who took the time to monitor the rivers and streams of Faribault County. Your dedication and persistence makes this report possible and has helped to shape the direction of work done by resource managers throughout Faribault County.*

## The Transparency Tube—Why Should I Use It???



Transparency Tube

➔ **Determination of how streams react to rain events:** Consistent use of the tube, coupled with precipitation records, can reveal how a given stream reacts to rain events. Immediate influxes of great amounts of sediment would likely result in a low transparency tube reading. This effect would 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 and Trend Analysis:** Many streams in the county have had little or no attention with respect to water quality as-

essment. 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 an alarm:** After persistent monitoring and understanding of the data that has 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 reading of 40 cm. With that in mind you discover that after nine days of dry weather, the transparency at your site is only

10 cm. You may assume that something other than typical runoff has suspended matter in the water.

➔ **Tube can be the first in a series of triggers:** Consistently poor transparency could lead to increased attention from local water related groups.

➔ **Upstream and Downstream Monitoring:** The transparency tube is a simple, inexpensive means of monitoring “above and below” a suspect site near a river or stream.

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

## YOUR DATA: New Developments In How It Will Be Used



**From the Stream Reader Summer 2004 Edition:**

Kay Bogan's site on the East Branch of the Blue Earth River

There are many uses for Citizen Stream

Monitoring Program data. On the local level, a number of counties are using CSMP data as a baseline for understanding water quality. Watershed projects and lake associations have used transparency tube data collected by volunteers to identify sources of sediment to downstream waterbodies.

On the state level, a new use for CSMP data is in the works. Since the inception of the program, the MPCA has envisioned using CSMP data in

the agency's report to Congress on water quality. The MPCA will use CSMP transparency tube data to help determine surface water impairments starting in 2006. Transparency tube readings are good predictors of turbidity, or the murkiness of stream water. The relationship between t-tube data and turbidity readings is being developed specific to Minnesota streams. In general low transparency indicates high turbidity.

Why turbidity? Minnesota generally has a water quality standard for turbidity. If a certain number of turbidity readings exceed this standard, the stream is listed as impaired.

Using both t-tube and turbidity data, we can determine if a river is impaired and needs to undergo improvement via land management changes such as buffer strips, upland erosion control, wetland restorations, or native

plant restoration.

An MPCA workgroup is currently fine tuning the details of how to use t-tube data to assess rivers for turbidity impairments. How much data should be required to conduct an assessment, and for how long must a river have been monitored? How low does the transparency have to get for a river to be considered in violation of the turbidity standard? Can we say a river is impaired for turbidity based on t-tube data alone, or do we need some turbidity data as well? These are some of the questions being addressed by the work group.

Minnesota has 92,000 river miles. Currently only 8 percent or about 7,000 miles have been assessed for water quality impairments. Using CSMP data in this way will greatly increase the percentage of river miles assessed for turbidity impairments in



## 2004 Data Summary...

The mean stream transparency and total rainfall are listed in the table below for each site. The mean transparency from 2003 is listed in red.

The stream with the highest average transparency (42) was **County Ditch 3** near the City of Easton. The next highest site was **Judicial Ditch 13** near the Iowa border with an average reading of 37. These sites are located near the headwaters of smaller watersheds. The site with the lowest mean transparency (16) reported was the **East Branch of the Blue Earth River** in the City of Blue Earth.

Most sites that monitored in 2003 had similar mean transparencies in 2004. However, keep in mind that in 2003 volunteers did not begin monitoring until June. In 2004, Orville Goemann's site had consistently high readings in April and May, resulting in a higher average this year.

<i>Citizen Monitor/ Monitored Water Body</i>	<i># of Samples</i>	<i>2004 Mean cm</i> <i>2003</i>	<i>Min cm</i>	<i>Max cm</i>	<i># &gt; 60</i>	<i>Total Rain Inches</i>	<i>Collection Dates</i>
Kay Bogan / <b>East Branch Blue Earth River</b>	27	16 17	5	33	0	28.94"	4/7/04-10/6/04
Orville Goemann / <b>East Branch Blue Earth River</b>	35	25 15	4	60+	4	35.76"	4/1/04-9/30/04
Robert Worner / <b>Blue Earth River</b>	66	27 28	4	60		34.19"	3/25/04-10/14/04
Bernie Stevermer <b>County Ditch #3</b>	57	42	7	60+	21	32.33"	3/30/04-9/30/04
Laurie Ristau <b>Blue Earth River</b>	23	27	2	60+	2	27.80"	4/15/04-10/8/04
Laurie Ristau <b>Blue Earth River</b>	23	26	4	60+	1	27.80"	4/15/04-10/8/04
Barbara Baker <b>Judicial Ditch 13</b>	40	37	2	60		33.98"	3/25/04-9/25/04
Pam Fuhrman <b>Elm Creek</b>	12	19 18	2	42		21.44"	3/24/04-8/18/04

**Mean:** Mean of recorded stream transparencies (centimeters)

**Min:** Minimum transparency reading recorded (centimeters)

**Max:** Maximum transparency reading recorded (centimeters)

**# > 60:** Total number of recorded stream transparencies > 60 centimeters

**Total Rain:** Total amount of rain recorded (inches)

**Collection Dates:** Length of time that either rainfall or transparency was recorded

## Understanding the Transparency Reading...

The transparency tube has become a common tool used to understand and measure stream conditions. The greater the reading in centimeters, the greater the water clarity. A reading of less than 20 cm is poor transparency and often occurs in ditches and streams after rainfall events. If poor transparency is the norm rather than the exception, this may indicate a more serious, long term problem. Readings between 20 and 40 cm are considered moderate transparency and consistent readings of 40 cm and

above during both high and low flow conditions indicate very good water quality.

Water transparency can be affected by a number of factors. For the majority of water bodies, the amount of suspended solids is the most important factor. In rivers and streams, soil particles are the primary sources of suspended solids. Transparency is a good indicator for some key water pollutants and a low transparency is generally the result of excessive sedi-

ment. Excessive soil material is a pollutant in itself as it can degrade the habitat of fish and other stream life and reduce light penetration necessary for aquatic life. In addition, soil particles may carry pollutants such as phosphorus attached to them. The pollutants may impact the flowing river or stream directly, but often times are carried downstream to a lake. Excess phosphorus is the trigger for large algae blooms.



## 2004 Rainfall Summary...

NAME	Township	Sec.	April	May	June	July	Aug.	Sept.	TOTAL	% N
Goemann, Orville	Foster	10	2.02	6.71	2.84	6.87	4.97	12.35	35.76	167.1
Worner, Robert	Blue Earth	7	1.56	8.40	2.75	6.53	3.71	8.14	31.09	145.3
Bogan, Kay	Blue Earth	17	1.43	7.93	2.52	5.92	3.36	7.78	28.94	135.2
Stevermer, Bernie	Lura	36	1.80	6.59	2.26	6.53	6.49	8.66	32.33	151.1
Ristau, Laurie	Blue Earth	31	1.35*	7.75	2.22	5.18	3.37	6.41	26.28 *	122.8
Pam Fuhrman	Verona	4	1.49	7.98	2.16	6.76	3.05*	—	21.44*	100.2
Barbara Baker	Rome	35	1.64	9.25	4.23	5.13	2.81	10.06	33.12	154.8
*** Note some monthly totals do not include the entire month (depending on start and end date of monitoring)										
Monthly Ave			1.66	7.80	2.71	6.13	4.12	8.90	32.25	150.7
<b>NORMAL Faribault Co</b>			<b>2.80</b>	<b>3.48</b>	<b>4.01</b>	<b>4.08</b>	<b>3.79</b>	<b>3.24</b>	<b>21.40</b>	

## September Rainfall...



Kay Bogan's site on the East Branch of the Blue Earth River  
August 23, 2004



Kay Bogan's site on the East Branch of the Blue Earth River  
September 16, 2004

2004 brought considerably higher than normal rainfall amounts across the county. NORMAL rainfall for Faribault County April—September is 21.40". May and September were well above average with Orville Goemann reporting **12.02"** on September 15. A complete summary of rainfall amounts can be found on the above table.



Orville Goemann's site on the East Branch of  
the Blue Earth River—  
May 31, 2004



September 15, 2004 8:30 AM  
Road completely under water and closed by noon



# Rainfall's Effect on Transparency...

Transparency will vary over the length of the monitoring season for a variety of reasons, but often times this change is the result of precipitation. To get a better understanding of this relationship,

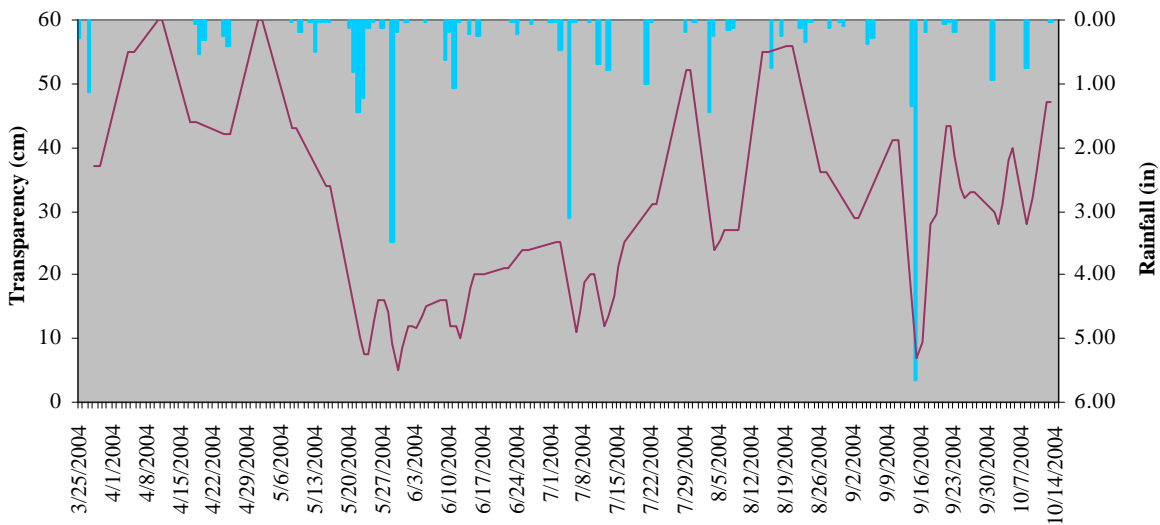


transparency readings must be looked at together with rainfall amounts. Often when this data is looked at together, a decline in

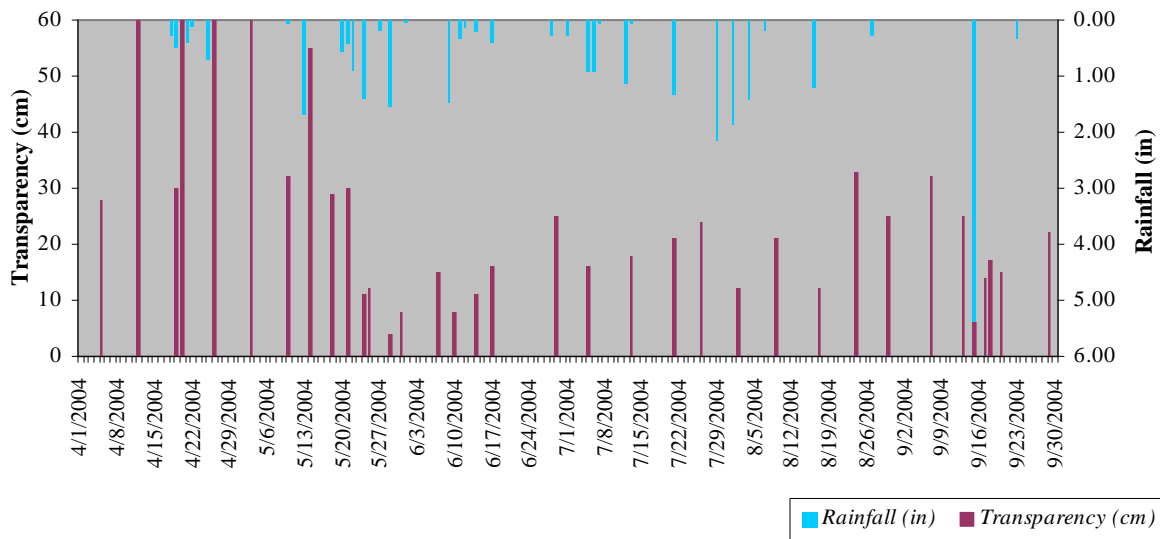
transparency after a rainfall event can be observed. The following graphs help to show this relationship between precipitation and transparency. When a peak in rainfall is observed, a fall in transparency is often also observed. This appears truer during the spring of the year until mid summer. Rainfall tends to pro-

duce more runoff during this time because there is less ground cover (crops, grass). During later summer and into fall, there tends to be more ground cover and crop canopy that slows and filters rainfall, producing less rapid runoff and therefore less noticeable transparency changes. Although generalizations can be made, site specific conditions also largely contribute to transparency tube readings.

*CSMP Data - Blue Earth River, Blue Earth Section 7*



*CSMP Data - East Branch Blue Earth River, Foster Section 8*



■ Rainfall (in) ■ Transparency (cm)



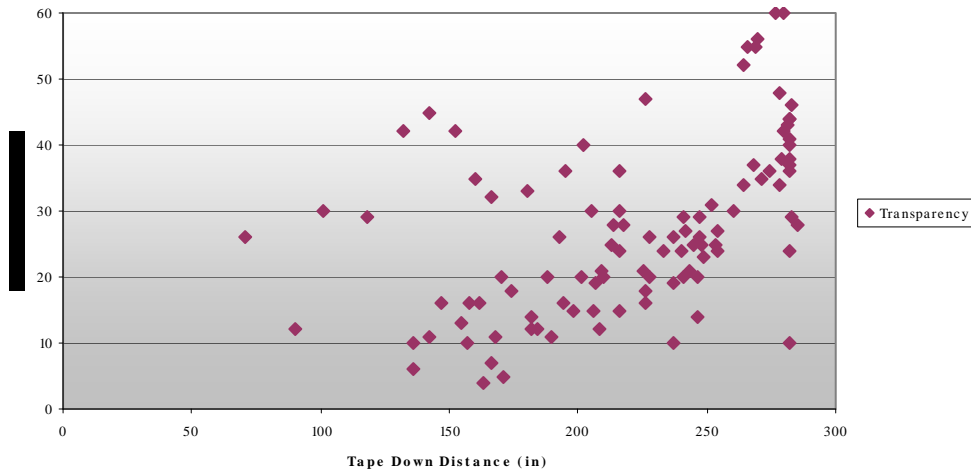
# Transparency and Stream Depth

Sites may also show a correlation between transparency and stream depth. First of all an increase in water level is normally the result of rainfall. In an area where erosion is likely there will be a drop in transparency. In areas where erosion is not likely, the rainwater that enters the stream could actually dilute the pollutants and cause transparency to improve. However, local relationships can be complicated and may

take observation over several years to understand the data at any one site.

The graph below compares transparency to stream stage using the tape down distance. Note that a smaller number reflects a higher stream stage, and a larger number a lower stage. At the higher stream stage, a lower transparency is typically observed.

*Transparency vs. Stream Depth-Blue Earth River, Blue Earth Section 7  
2003 & 2004*



**The Faribault County SWCD has recently developed a website.**

**CHECK IT OUT AT...**

[www.faribaultcountyswcd.com](http://www.faribaultcountyswcd.com)

You can utilize this site to look at the **2003 & 2004 Citizen Stream Monitoring Year End Reports, maps,** and links to MPCA's site which includes more information on the monitoring program.

The **2004 Rain Gauge Co-operator Report**, including **1992-2004 monthly reports**, are also available on the site.

For CSMP information, go to **Programs & Services / CSMP**. Rainfall data can be found under the **Rain Gauge Network** link.

**E-MAIL ME YOUR PICTURES AT [fcswcd@bevcomm.net](mailto:fcswcd@bevcomm.net) AND I CAN INCLUDE THEM ON THE WEBSITE!!!**

## LOOKING AHEAD...

Once again, we would like to thank all of the Faribault County Citizen Stream Monitors. We look forward to many more years of interesting river watching with you. We hope that you will once again choose to be a monitor and begin to make comparisons of your stream from year to year, and see relationships begin to develop between your streams transparency and precipitation and depth. As more monitoring is

done, more conclusions can start to be made about the condition of your stream.

If you know of anyone who might be interested in participating in the Citizen Stream Monitoring Program or if you have any questions yourself, contact the Faribault County Soil and Water Conservation District at (507) 526-2388.

Additional information on the CSMP, including last year's County report can be found at [www.faribaultcountyswcd.com](http://www.faribaultcountyswcd.com)

For more information on the Citizen Stream Monitoring Program, to search CSMP results, look up newsletters and publications, or find uses for CSMP data go to

<http://www.pca.state.mn.us/water/csmp.html>

