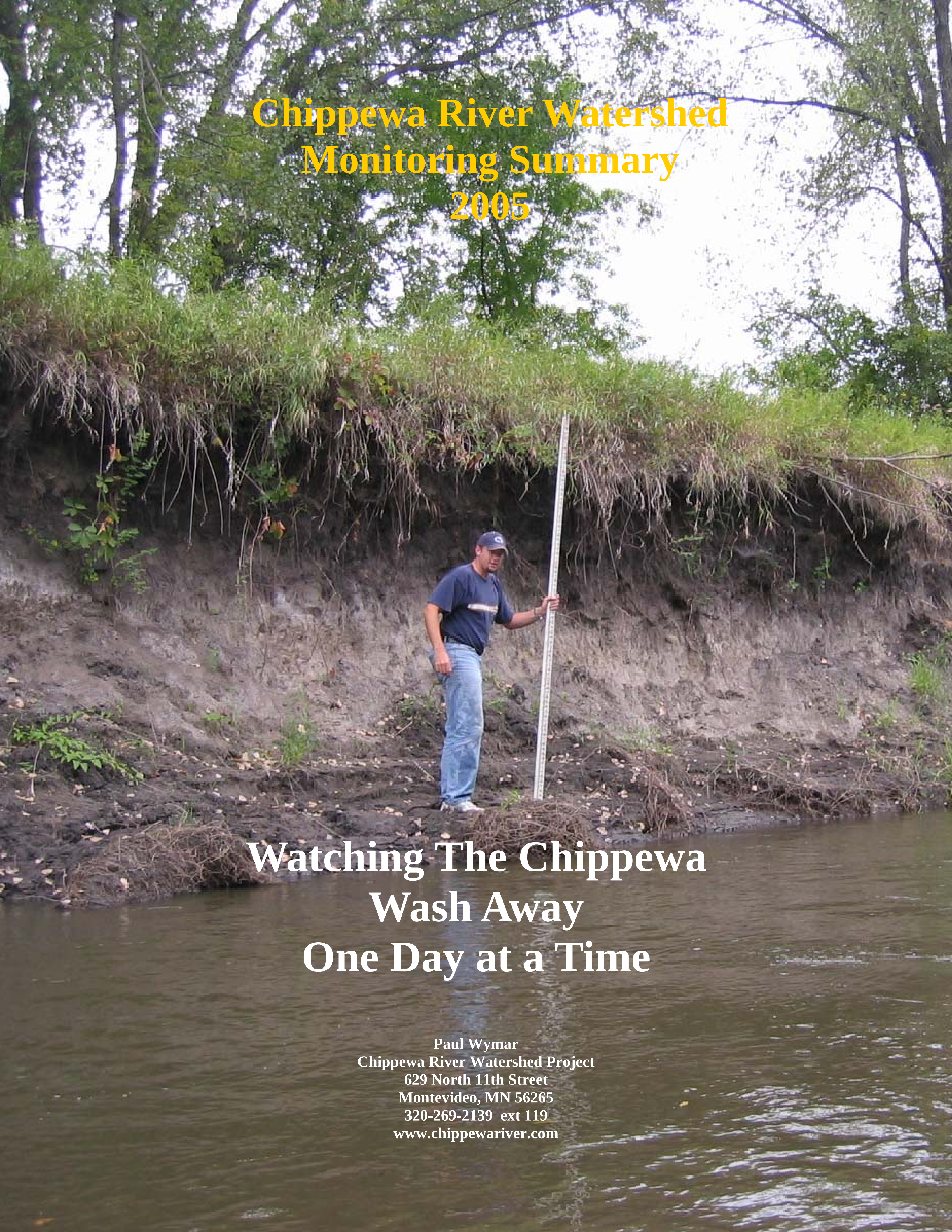
Chippewa River Watershed Monitoring Summary 2005



Watching The Chippewa Wash Away One Day at a Time

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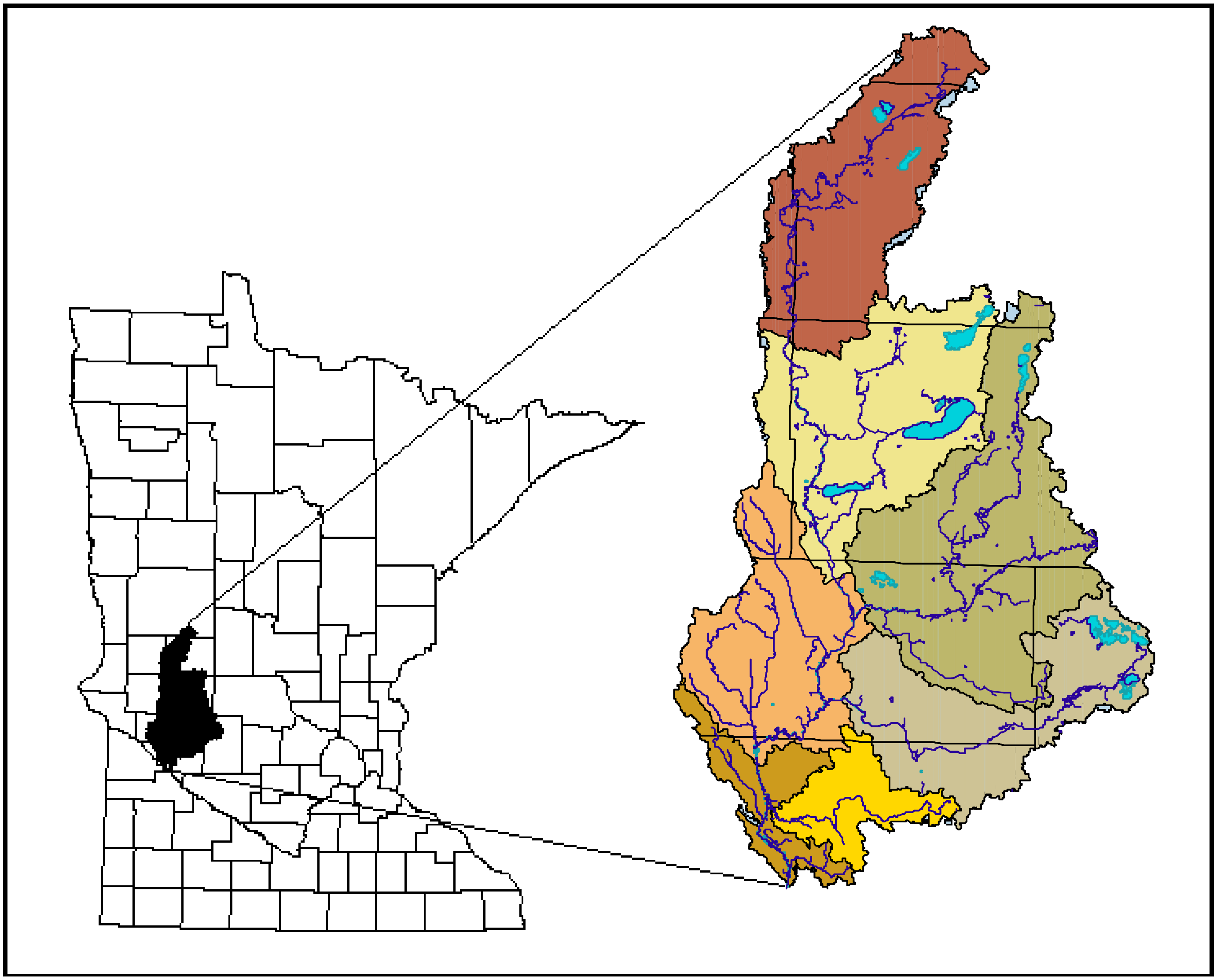
Chippewa River Watershed



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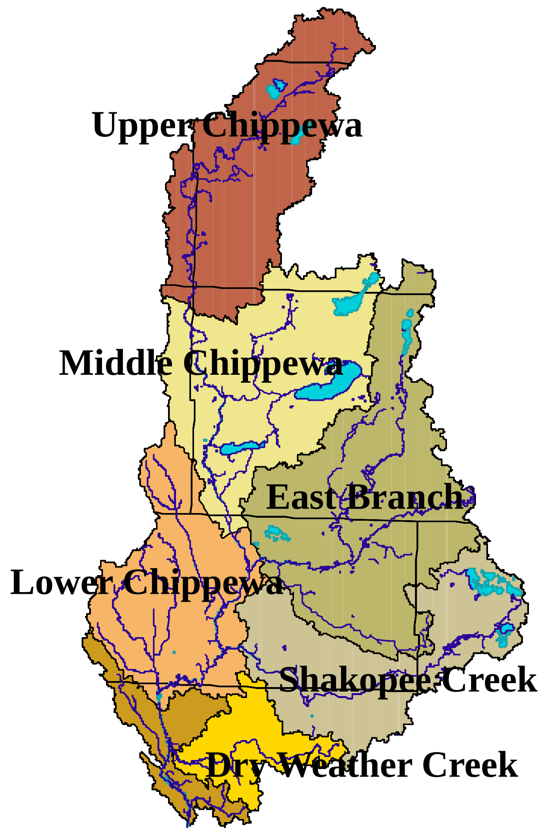
Chippewa River Watershed Project
Overall Goal

"The Chippewa River Watershed Project seeks to improve water quality and flooding problems within the Chippewa River watershed while promoting a healthy agricultural, industrial, and recreation-based economy for the region."

Ten-Year Goals

- To achieve the highest level of water quality attainable for ecoregion streams
- To increase the number of watershed residents taking an active role in enhancing and protecting the Chippewa River
- To continue to have the watershed community of agencies and organization bonded together as a group working toward the common goal of improved water quality
- To develop the Chippewa River as a major recreational resource within the Minnesota River Basin

Overview 2005 was a high flow year. Normally, the river at Hwy 40 drops down below 500 cubic feet per second (cfs) in the middle of May and then might shoot back up once or twice to levels much higher when a rainstorm blows through. In 2005, the river did not come down to 500 cfs till late July and then stayed there only for about a month before shooting back up above that for the rest of the season. Where the norm is that we see flows above 500 cfs for about one month, this year we saw flows below 500 cfs for one month.



Spring rainstorms drove the water levels up after a rather dry spring melt. Massive late summer rainstorms ended all hope for a quiet fall as the East Branch in particular grappled with its high flows.

Differences in land use and soil types were readily observed again this year as less row cropped regions released their water more slowly while those heavily farmed areas delivered their runoff all within a day or two of the rain storm that spawned them.

Pollution levels varied between tributary basins but were generally similar to those of the last several years. The upper Chippewa continued a frustrating trend of high sediment levels. Shakopee Creek and Dry Weather Creek also continued to generate high concentrations of Nitrates. Fecal Coliform levels were sky high with levels rocketing across the basin as the river water warmed in July and August. High readings were observed both in high flows and in low flows suggesting a variety of sources.

Chippewa Watershed Land Use Classification

Land use	*Acres*	*Percent of total*
Agriculture	980,021	73.50%
Grassland	148,575	11.14%
Forest	71,798	5.38%
Water	71,668	5.37%
Wetlands	37,042	2.78%
Urban or Residential	23,565	1.77%
Gravel pits or exposed	724	0.05%
Unclassified	47	0.00%
Total	1,333,440	100.00%

Concentration (Flow Weighted Mean)

A Flow Weighted Mean is a statistical way of expressing a monitoring seasons overall pollution concentration. It is expressed in milligrams per liter (mg/L). It statistically represents the concentration of pollutants in the water that one would measure if one was able to catch all the water that flows out of the river in a tank, mix it up and then take a sample from this tank.

A flow weighted mean is a useful way to compare pollution from one year to another because it removes some of the variation caused by weather differences from year to year.

All concentration values represented in this report are flow weighted means.

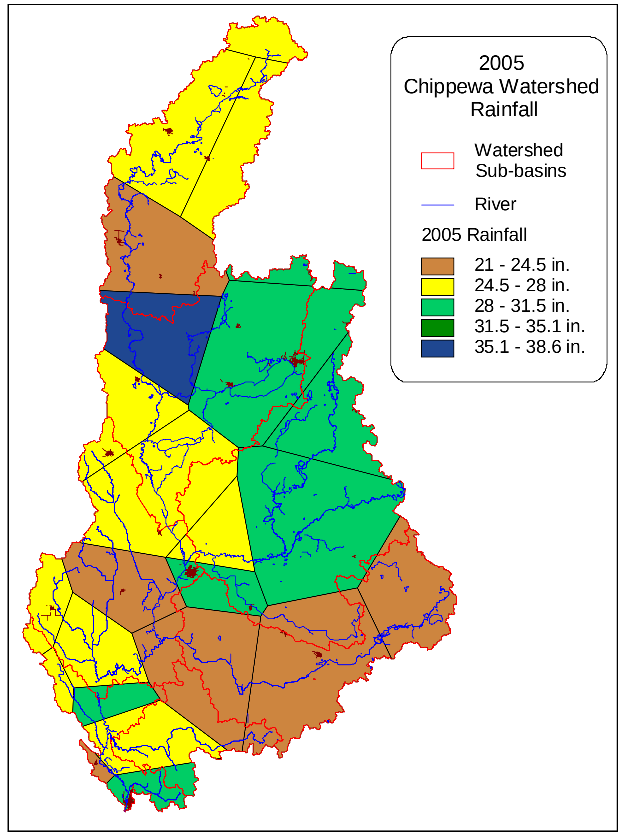
Chippewa River Tributaries / Sub-basins

Name	*Acres*	*Percent of whole*
1. East Branch	323,767	24.28%
2. Middle Chippewa River	257,712	19.33%
3. Upper Chippewa River	227,383	17.05%
4. Shakopee Creek	197,111	14.78%
5. Lower Chippewa River	195,443	14.66%
6. Dry Weather Creek	67,759	5.08%
7. Lower Unmonitored Region	64,300	4.82%
Chippewa River	**1,333,440**	**100.00%**

Precipitation and Flow

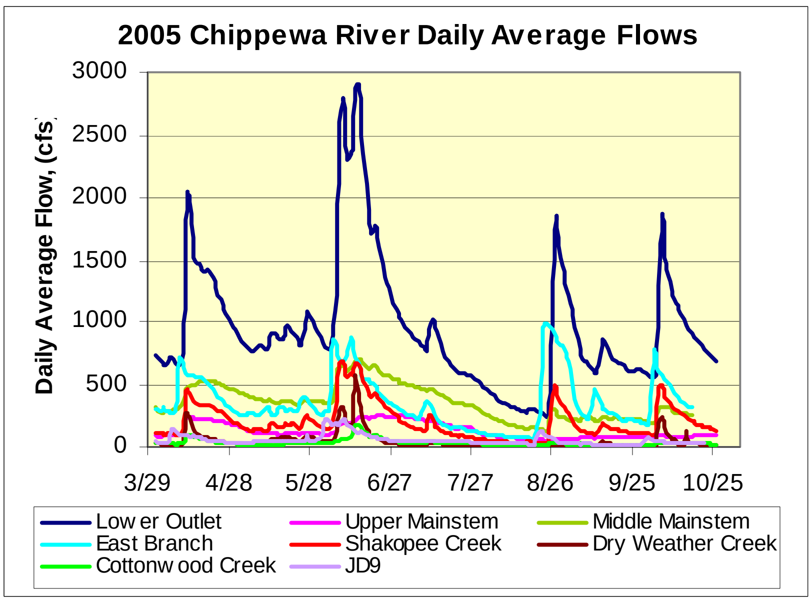
Precipitation

Precipitation varied across the watershed. June and July saw the most variation from one end of the watershed to the other. The chart to the right illustrates some of the variation in rainfall seen in areas around the Chippewa River Watershed. Note how less rainfall fell in the north and south while the East Branch and Middle Mainstem were hammered. Late summer and fall rains were unusually high this year. The swollen rivers can be seen in the chart depicting daily average flows below. Rainfall in April, May and June tends to cause the most runoff due to the limited amount of canopy cover in agricultural fields and the saturation of the soil from the spring melt. Later season rains carry less from the field but still cause gully washouts and stream bank erosion.



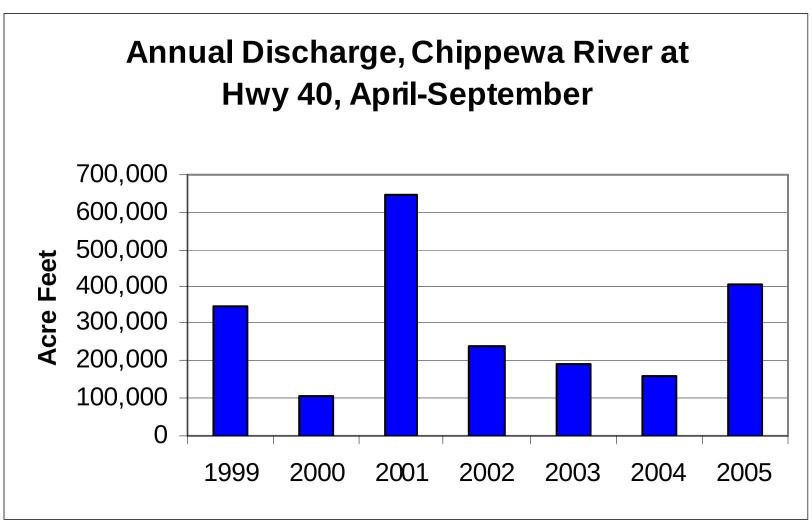
Flow

CRWP monitors flow as a rule at all of its major sites. The example hydrograph below (Chippewa River Daily Average Flows) documents the sub-basins' flow conditions for 2005. The Lower Mainstem is monitored at CRWP's Hwy 40 site. Hwy 40 is CRWP's most downstream site and therefore is considered the "outlet site". Note the four major peaks. Also note how the basins responded differently to these peaks. The upper and Middle basins have more water holding capacities and therefore release their water more slowly than the other basins. This is evidenced by the lower and broader peaks. Finally note how rains in September caused a much smaller change in flow while two months earlier equivalent rainstorms caused a three fold increase in flow.



Flow and pollution are directly related. The highest levels of pollution are observed during high water events. The higher the water the worse the pollution. This is a result of higher rates of upland erosion during the rainstorms that cause the high water and increased levels of bank and gully erosion that result when rising river waters destabilize the soils.

Seasonal Discharge or the total amount of water that flowed out of a watershed through the monitoring season was the second highest recorded in the last seven years. Annual Discharge for Hwy 40 is documented in the bottom chart. It is interesting to note that even though there was more discharge you will see on the following pages that pollution concentrations stayed relatively the same.



Transparency

CRWP has been monitoring transparency across the watershed for the last 7 years. Transparency is a measurement of the depth of a column of water through which the bottom may be seen. Measuring transparency is an effective method of monitoring water quality due to its low cost and widespread acceptance by water professionals.

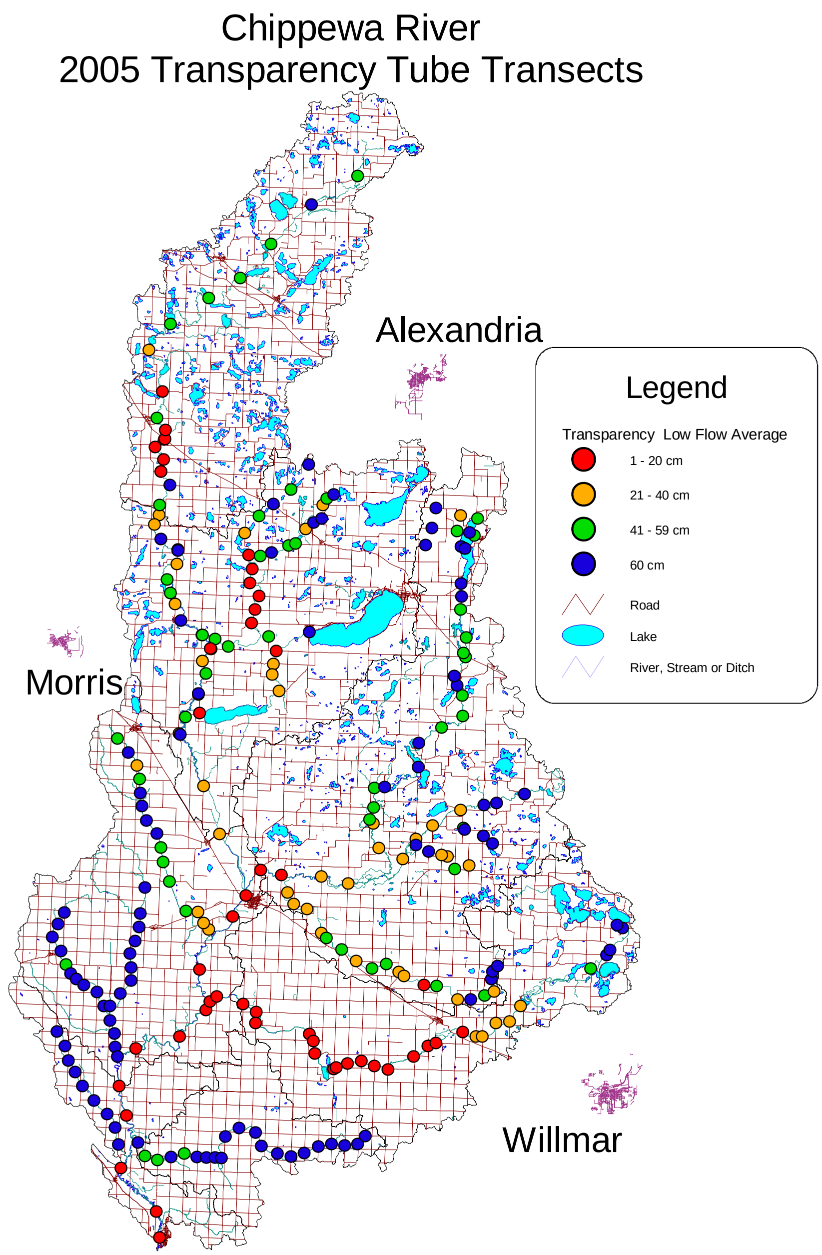
Generally, transparency is highest on the most upstream reaches of a tributary. As water flows downstream it has more opportunities to pick up pollutants, thus lower stream stretches tend to have more polluted water and lower transparency.

Sites where the transparency level drops below 20 cm more than 10% of the time can be listed as impaired by the US Environmental Protection Agency (given at least 20 sampling events). In 2005, most of the Chippewa's sub-basins experienced sites that exceeded the standard.

CRWP has more transparency sites actively monitored by both Volunteers and CRWP staff than any other kind of monitoring procedure. This extensive network of sites gives the observer a good feel for the pollution signature of the Chippewa River. One can see how transparency degrades and improves as the water flows downstream.

Over the last 7 years that transparency has been monitored, CRWP has observed that many of the tributaries have predictable transparency trends. Changes in these trends draw our attention and lead us to question why it is occurring.

Low Transparency during high flows is expected. The continuation of low transparency for long periods of time including during low flow periods is concerning. The constant low transparency levels suggest that sediment movement in the Chippewa is a serious issue throughout the watershed. Low transparency during low flows has serious negative consequences for aquatic life.



What is Transparency?

Transparency is a measurement of the clarity of stream water: how much sediment, algae, and other materials are suspended in the water. It is measured with a transparency tube a clear 60 cm-long tube with a colored disk at the bottom for measuring the depth at which the disk is visible.

<Taken from WOW. 2003. by Laurie Sovell Minnesota Pollution Control Agency (http://dipin.kent.edu/Transparency_Tube.htm)>

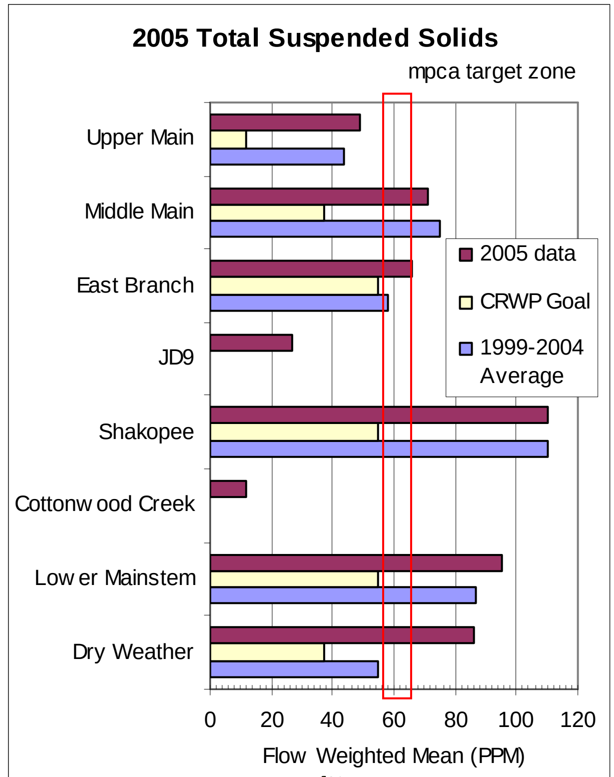
Total Suspended Solids

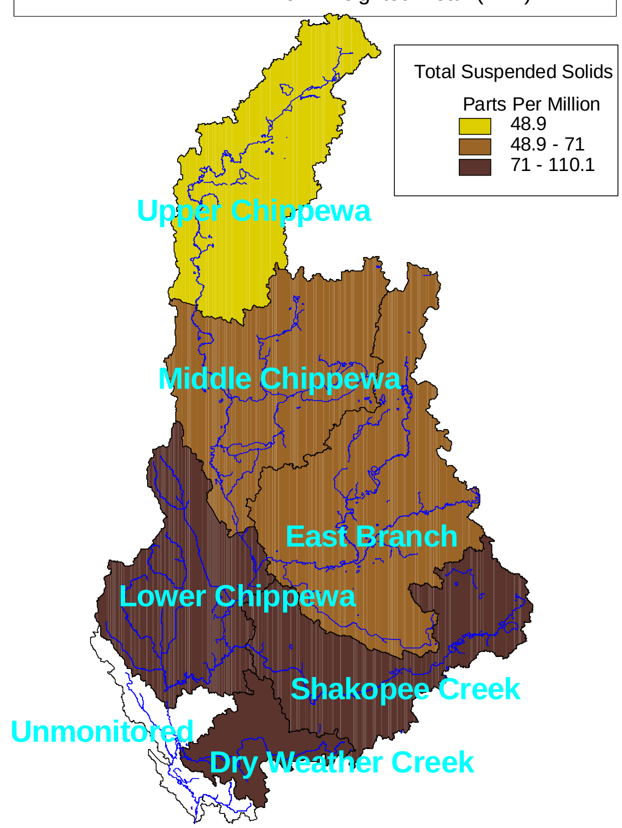
Total Suspended Solids concentrations for 2005 were fairly similar to the long term average. While concentrations remained similar to past years the actual amount of sediment was 2 to 3 times the normal. This was due to the increased amount of rainfall experienced in 2005. Dry Weather Creek and the East Branch did not maintain the lower levels seen over the last several years.

None of the Chippewa sub-basins achieved their limited target goals that CRWP partners set for them in 1999. Shakopee Creek, the Upper Mainstem and the Middle Mainstem were the main contributors to the TSS being over the target goal at Hwy 40. These concentrations will be hard to improve without reducing the upstream tributary concentrations and decreasing peak flood events i.e. holding water back.

According to the Minnesota Pollution Control Agency, TSS concentrations of 58 through 66 mg/L can be used to list a river as impaired (red line on chart). The Lower Mainstem, Middle Mainstem, Upper Mainstem and Shakopee Creek all had Flow Weighted mean concentrations exceeding this level.

Two basins deserve praise in 2005. Cottonwood Creek and the JD9 region of the Lower Mainstem were below the MPCA target level for TSS.





What are Total Suspended Solids? <Taken From "State of The Minnesota River 2002 Executive Summary>
The transport of sediment is a natural function of rivers. Modification of the landscape has accelerated the rate of soil into waterways. Increased runoff has resulted in stream bank erosion. Elevated sediment (suspended soil particles) has many impacts. It makes rivers look muddy, affecting aesthetics and swimming. Sediment carries nutrients, pesticides, and other chemicals into the river that may impact fish and wildlife species. Sedimentation can restrict the areas where fish spawn, limit biological diversity, and keep river water cloudy, reducing the potential for growth of beneficial plant species.

Total Phosphorous

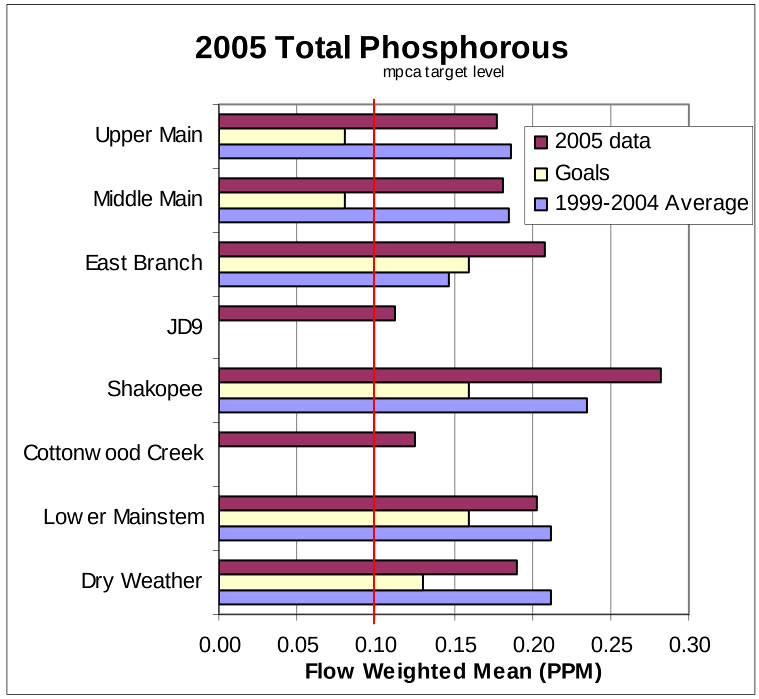
Total phosphorous (TP) concentrations were high across the watershed (see chart at right). No sub-basin achieved its goals. Neither were any sites below the 0.1 mg/L desired goal set by the Environmental Protection Agency for prevention of nuisance algal growth.

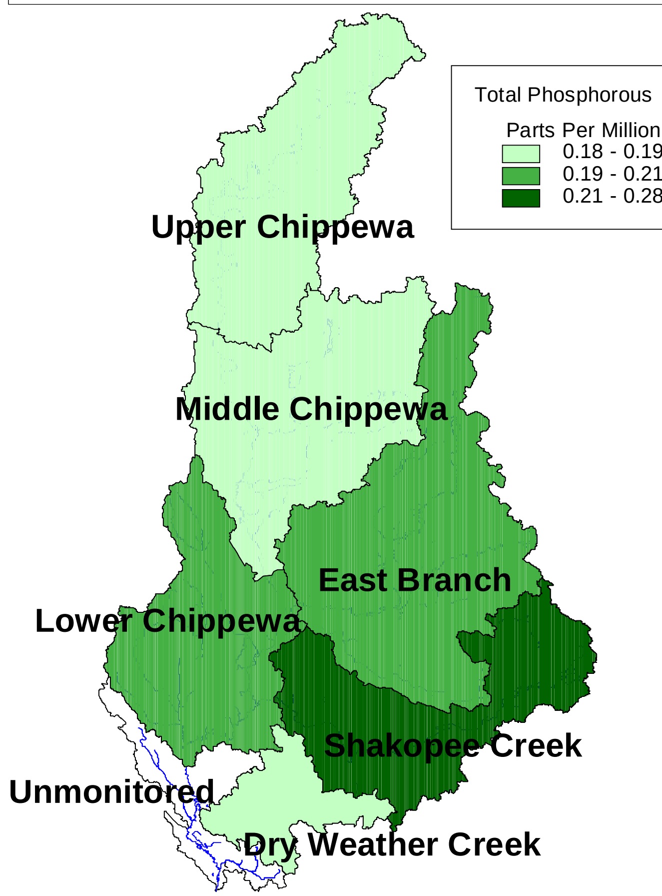
In comparison to previous years, there has been little change in phosphorous levels across the board. Many sites saw a slight decrease in TP concentrations compared to the 6 year average but theses increases are statistically insignificant.

Two basins, Shakopee Creek and the East Branch had flow weighted means considerably higher than their averages. The other basins did not show a similar increase. The higher concentrations for the two basins are of concern. If they continue in future years, they could represent a serious degradation of two major Chippewa sub-basins.

Given the higher quantity of water documented in 2005 the concentrations translated into more pollution. Even though the water contained slightly lower TP concentrations since there was more water the actual tons of TP was roughly 30% greater than previous years.

At the outlet (Lower Mainstem) the 0.20 parts per million translated to 111 tons of phosphorous. 111 tons would have fertilized 6,344 acres of corn at 35 pounds/ acre. It most certainly will lead to 111,000,000 pounds of algae in waterways downstream, enjoy.





What is Phosphorus? <Taken From "State of The Minnesota River 2002 Executive Summary>

Phosphorus is an important nutrient for plant growth. Total Phosphorous is the measure of the total concentration of phosphorous present in a water sample. Excess phosphorus in the river is a concern because it can stimulate the growth of algae. Excessive algae growth, death, and decay can severely deplete oxygen supply in the river, endangering fish and other forms of aquatic life. Low dissolved oxygen rates are of particular concern during low flow times or in slow moving areas such as reservoirs and the lower reaches of the river.

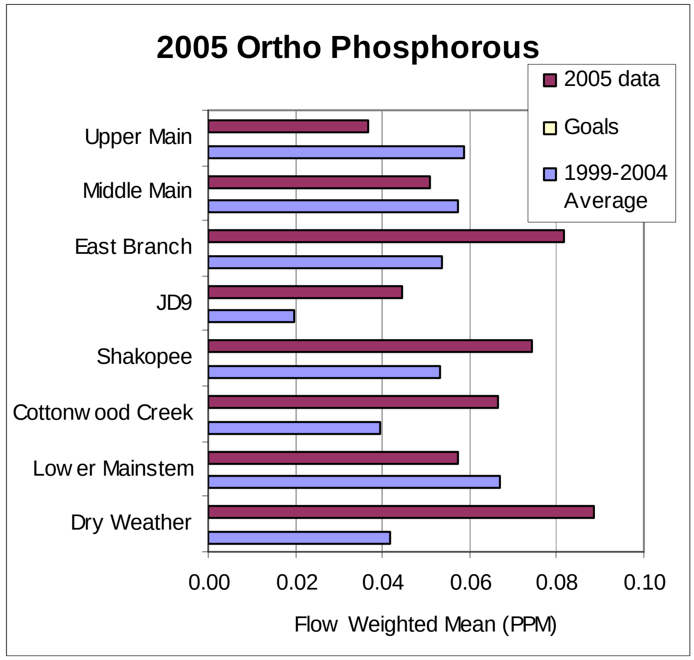
Point-source Phosphorous comes mainly from municipal and industrial discharges to surface waters. Non-point-source phosphorous comes from runoff from urban areas, construction sites, agricultural lands, manure transported in from feedlots and agricultural lands, and human waste from noncompliant septic systems.

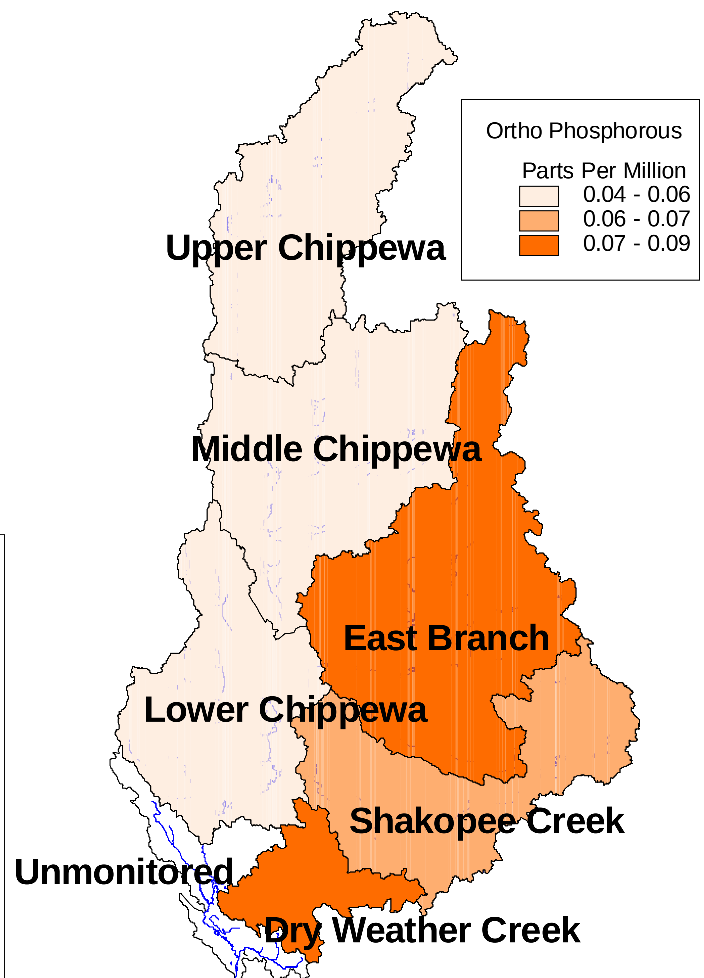
Orthophosphorous

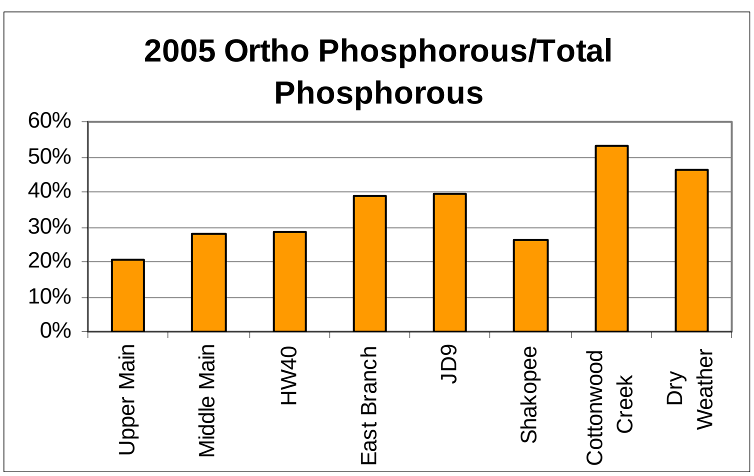
Orthophosphorous (OP) concentrations varied across the watershed (see red bars on the chart, at right). Concentrations did appear to follow a logical pattern as water flowed downstream and tributaries contributed waters with different concentrations.

The Upper Mainstem and Middle Mainstem maintained fairly low concentrations. Areas where agricultural land use dominates the landscape tended to have higher levels of OP.

Another way of looking at OP levels is to see how much of the Total Phosphorous (TP) concentration was accountable to OP. High portions of OP suggest either high levels of natural sources such as wetlands or high levels of chemical fertilization. The levels of OP were 20-30% of the TP level for the Upper and Middle Mainstem sub-basins. Whereas for the lower basins OP made up a much more sizable portion of TP, OP ran from 30-55% of TP. The highest OP concentration and portion was found in Cottonwood Creek which has very few wetlands and is over 95% farmed.







What is Orthophosphorous? <Taken From "State of The Minnesota River 2002 Executive Summary>

Ortho phosphorus is soluble reactive phosphorous and is readily available for biological uptake. A particular concern with Orthophosphorous is that it is readily available to algae and under certain conditions can stimulate excess algae growth leading to subsequent depletion of dissolved oxygen. Primary sources of Orthophosphorous are wastewater treatment plants, feedlot runoff, and failing septic systems.

Nitrate Nitrite Nitrogen

High Nitrate Nitrite Nitrogen (NO2-3) concentrations dominated the Lower Mainstem, East Branch, Shakopee Creek and Dry Weather Creek (see chart at right). Concentrations appeared to follow an increasing pattern as water flowed downstream and tributaries contributed waters with more and more Nitrogen.

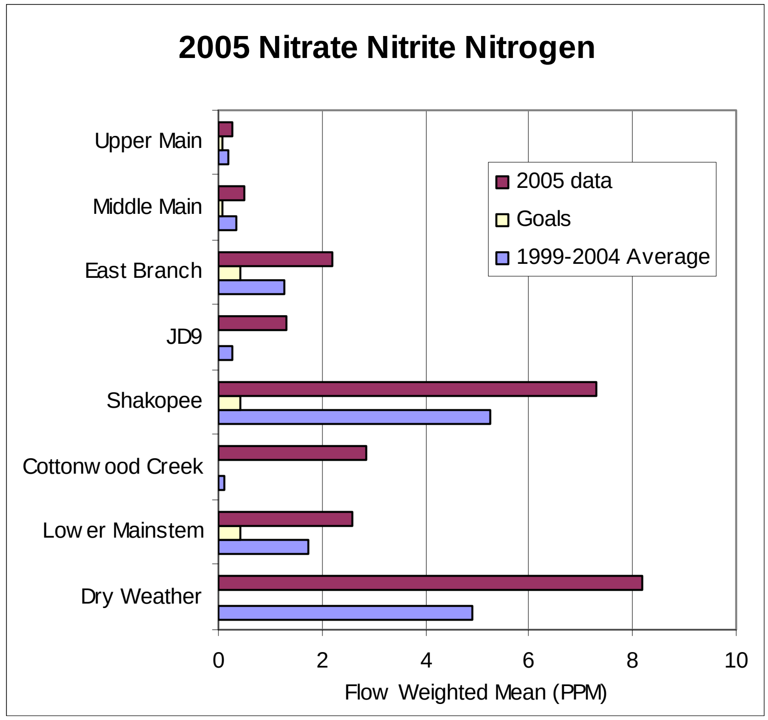
The Upper Mainstem and Middle Mainstem maintained fairly low concentrations. These low concentrations managed to keep the mainstem level at Hwy 40 (Lower Mainstem site) at a relatively low level even against the relative mountain of nitrogen coming out of Shakopee Creek.

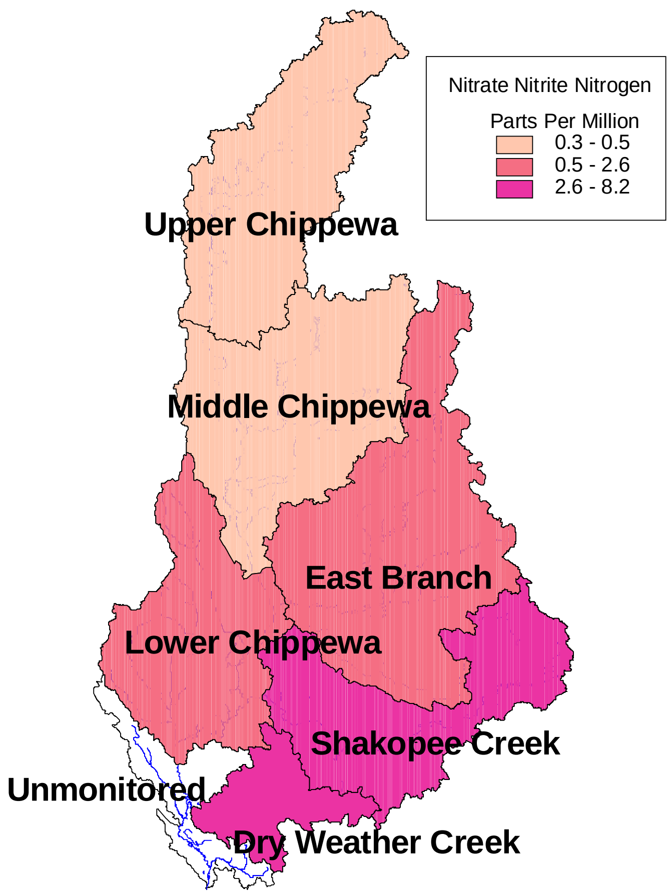
Dry Weather Creek saw the highest flow weighted mean of the sites monitored. Shakopee Creek and Dry weather Creek have the highest portion of their land under agricultural production and have very few land use types that typically retain or remove nitrogen from the landscape (wetlands, grasslands, forests).

Surprisingly, Cottonwood Creek and JD9, both minor tributaries within the Lower Mainstem had moderate levels of Nitrogen. Both of these tributaries are heavily farmed and have relatively few other land covers (wetlands, lakes, grass, forest). A notable difference between these basins and the Shakopee Creek and Dry Weather Creek basins is that they have much less tiling due to their sandier soils.

No Chippewa sub-basin achieved the goals set for them by CRWP partners in 1999.

At the outlet (Lower Mainstem) the 2.58 parts per million translated to 1,414 tons of Nitrogen. 1,141 tons would have fertilized 23,571 acres of corn at 120 pounds/acre. At 30 cents a pound this would cost $684,600.





What are Nitrates? <Taken From "State of The Minnesota River 2002 Executive Summary>

Nitrogen exists in the environment in many forms. In recent decades, there has been a substantial increase in nitrogen fertilizer use. Elevated nitrate-N in the Chippewa River can pollute aquifers it recharges. Therefore nitrogen can affect drinking water. At high enough concentrations, nitrate-N can cause infants who drink the water to become sick and die (methemoglbinemia). Downstream, nitrate-N from the Chippewa River contributes to hypoxia (low levels of dissolved oxygen) in the Gulf of Mexico by stimulating the growth of algae which, through death and decay, consume large amounts of dissolved oxygen and thereby threaten aquatic life.

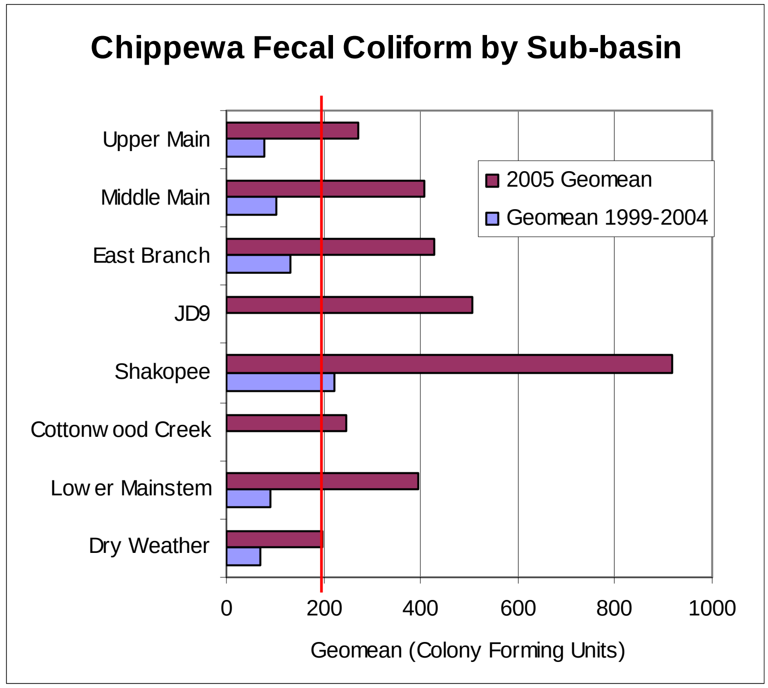
Fecal Coliform

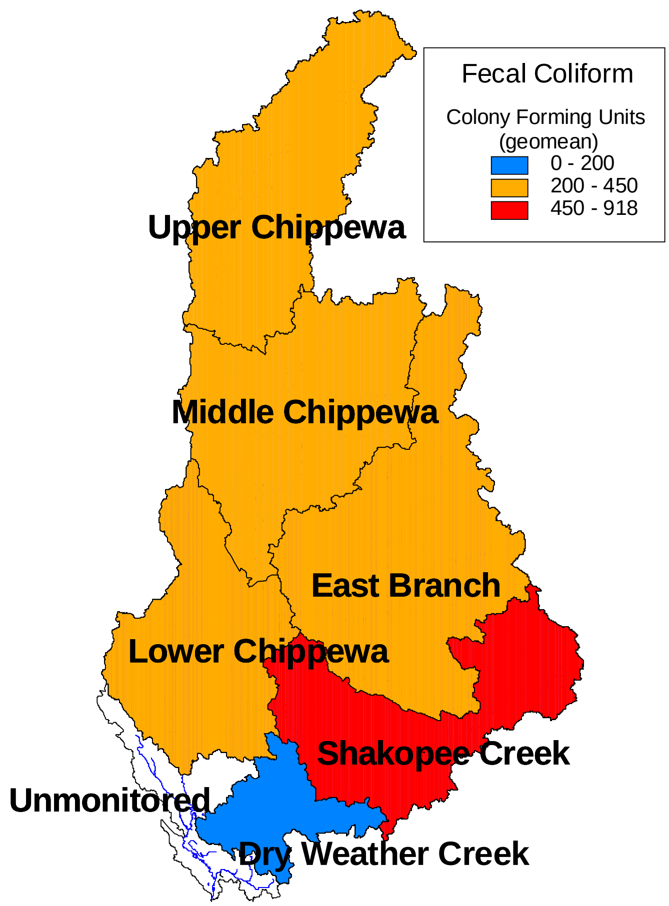
2005 Fecal Coliform levels were very high during the months that residents of the Chippewa Watershed use the river for swimming. In the months of June through September the majority of the samples tested above the 200 Colony Forming Units (CFU) per 100 ml standard acceptable for swimming.

While some of the higher incidents of fecal coliform were after rain events indicating a field runoff event, many were during low flows suggesting that failed human septic systems are also a source.

Considering the evidence **swimming is not recommended from June through September** in the Chippewa River. If you do decide to swim, keep your head above the water, do not get river water into your mouth and shower off after swimming.

The total number of events above 200 CFU was up in 2005. 66% of all tests came in above 200 CFU for 2005. That is more than the 42% for 1999-2004.





What is Fecal Coliform?

Fecal coliform are a broad group of bacteria found in the feces of warm-blood animals. They are easy to test for and are therefore a useful indicator of biological contamination. The presence of fecal coliform bacteria in aquatic environments indicates that the water has been recently (hours to a few days) contaminated by feces. This fecal matter may be contaminated by pathogens, disease producing bacteria or viruses. The presence of fecal contamination is an indicator that a potential health risk exists for individuals exposed to this water. Fecal coliform bacteria may occur in ambient water as a result of the overflow of domestic sewage or nonpoint sources of human and animal waste.

Turbidity

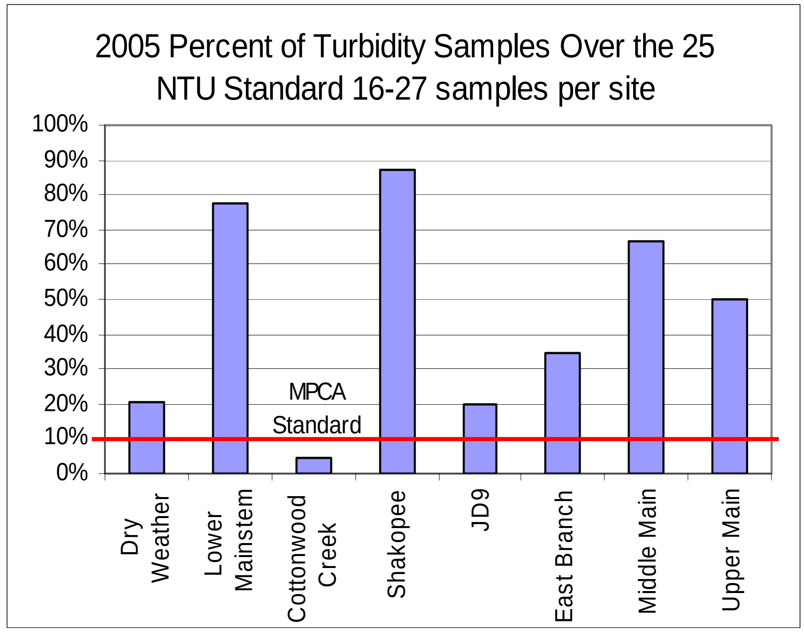
High turbidity was a prominent feature of almost every stretch of the Chippewa River in 2005. At all sites except Cottonwood Creek, Turbidity levels regularly were observed above the MN State Standard of 25 NTUs.

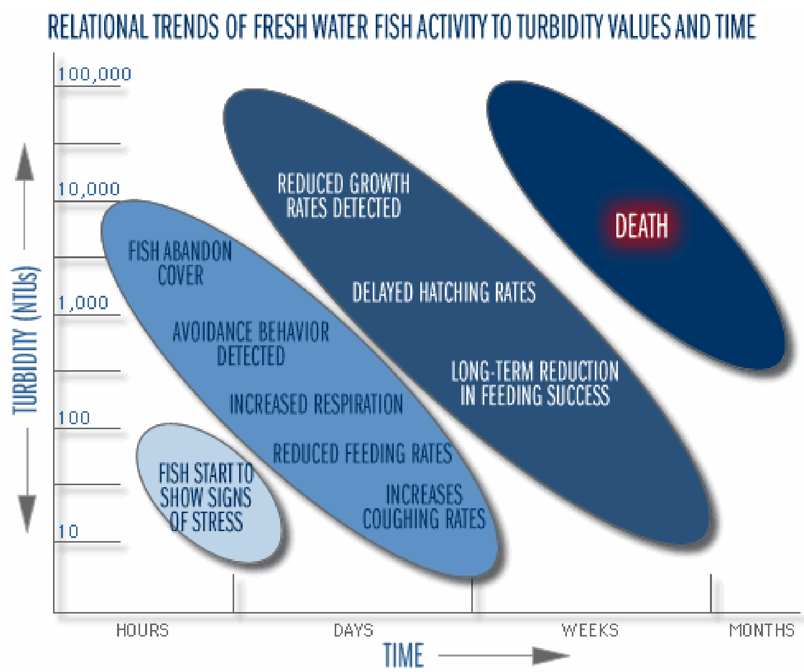
Sites where the turbidity level exceeds the standard (25 NTU) more than 10% of the time can be listed as impaired by the US Environmental Protection Agency. In 2005, only one of the Chippewa's sub-basins did not exceed the standard.

High turbidity during high flows is expected. The continuation of high turbidity for long periods of time including during low flow periods is concerning. The constant high turbidity levels suggest that aquatic habitat on the Chippewa is seriously degraded.

It should be noted that Cottonwood Creek, the one basin that did not exceed the standard, has an abundance of aquatic life, quite in excess of the other tributaries.

As a result of monitoring over the past 7 years most sites monitored by CRWP have been listed as impaired for turbidity in the 2006 303d list to the EPA. This data shows that the impairment goes all the way up the Chippewa River. It is a watershed wide problem that needs to be addressed throughout the Chippewa Basin.





What is Turbidity?

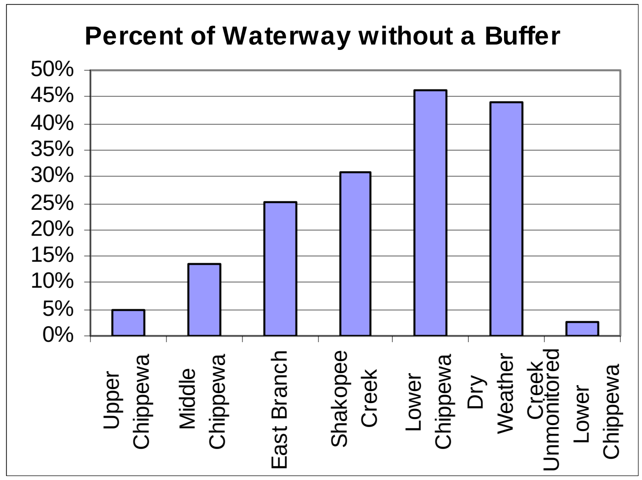
Turbidity refers to how clear the water is. The greater the amount of total suspended solids (TSS) in the water, the murkier it appears and the higher the measured turbidity. Dredging operations, channelization, increased flow rates, floods, or even too many bottom-feeding fish (such as carp) may stir up bottom sediments and increase the cloudiness of the water.

High concentrations of particulate matter can modify light penetration, cause shallow lakes and bays to fill in faster, and smother benthic habitats - impacting both organisms and eggs. As particles of silt, clay, and other organic materials settle to the bottom, they can suffocate newly hatched larvae and fill in spaces between rocks which could have been used by aquatic organisms as habitat. Fine particulate material also can clog or damage sensitive gill structures, decrease their resistance to disease, prevent proper egg and larval development, and potentially interfere with particle feeding activities. If light penetration is reduced significantly, macrophyte growth may be decreased which would in turn impact the organisms dependent upon them for food and cover. Reduced photosynthesis can also result in a lower daytime release of oxygen into the water. Effects on phytoplankton growth are complex depending on too many factors to generalize.

Very high levels of turbidity for a short period of time may not be significant and may even be less of a problem than a lower level that persists longer. The figure above shows how aquatic organisms are generally affected.

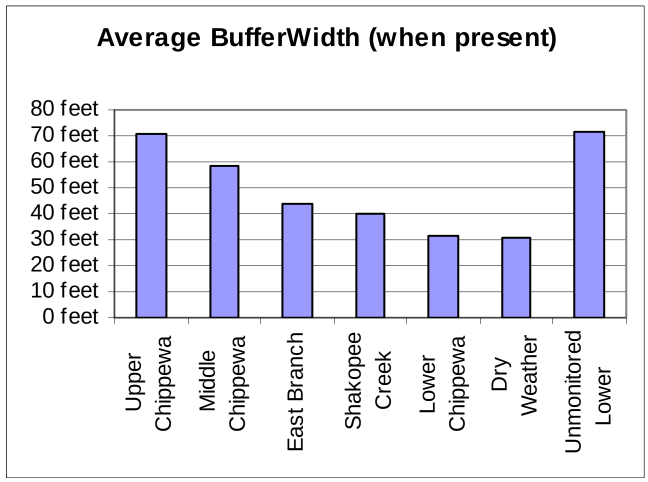
<Taken from WOW. 2003. Water on the Web - Monitoring Minnesota Lakes on the Internet and Training Water Science Technicians for the Future - A National On-line Curriculum using Advanced Technologies and Real-Time Data .(http://wow.nrri.umn.edu). University of Minnesota-Duluth, Duluth, MN 55812.>

Buffer Survey



Over the last several years CRWP has been documenting the buffers along approximately 775 miles of the Chippewa and its tributaries.

The presence or absence and width of the buffers tells us a lot about the health and resistance of the Chippewa. Buffers play a vital role in shielding the Chippewa River from pollution immediately along the waterways. A stream or ditch without a buffer has few defenses against runoff pollution and bank erosion.



Buffer extent and width tend to decrease as the river progresses downstream. Agricultural areas tend to have fewer and smaller buffers.

The Lower Mainstem, Dry Weather Creek, East Branch, and Shakopee Creek have over a quarter of their lengths Not protected by buffers. This need to be improved. These basins are prone to higher rates of erosion due to agricultural land use and bank erosion due to drainage modifications. Protecting the streams banks here is vital to the river health and to protecting adjacent fields from being lost to the river.

What is a Stream or Ditch Buffer?

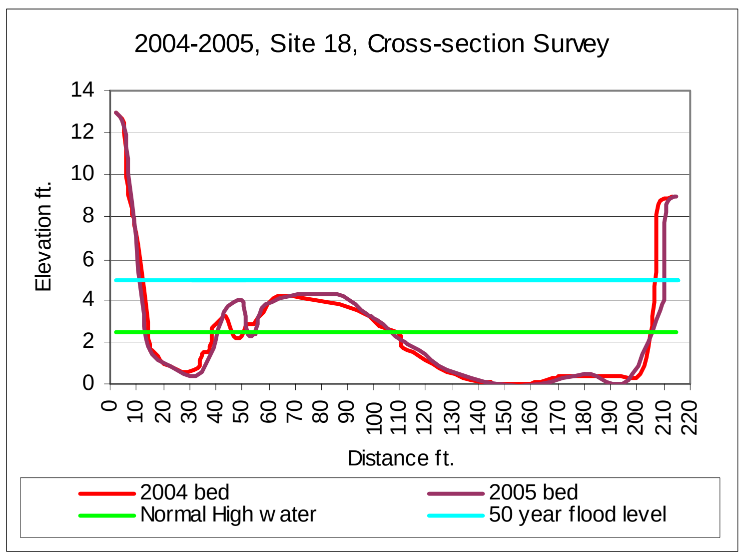
The aquatic corridor, where land and water meet, deserves special protection in the form of buffers. A buffer can be placed along a stream, shoreline, or around a natural wetland. A buffer has many uses and benefits. Its primary use is to physically protect and separate a stream, lake, or wetland from future disturbance or encroachment. For streams, a network of buffers act as a right-of-way during floods and sustains the integrity of stream ecosystems and habitats.

(Taken from the Center for Watershed Protection, <www.cwp.org/aquatic_buffers.htm>)

Bank Erosion Survey

2005 marked the initiation of a new monitoring endeavor for the Chippewa River Watershed Project. Permanent cross section surveys were set up at each monitoring site. These surveys document the cross sectional profile of the river channel. By documenting the cross sectional profiles from year to year CRWP will be able to document changes to the channel dimensions caused by stream flow forces. In addition to the cross sectional profile CRWP paid special attention to the banks on each side of the channels surveyed. CRWP carefully documented the profile of the banks noting overhangs, undercuts and their magnitude.

Site 18 Hwy 40 was the only site documented in 2004. Surveying in 2005 revealed alarming results. The banks receded by at least 2.42 feet. Bank pins, placed in 2003, corroborated the survey evidence. In 2004, only 18.6% of days had flows that were over the "normal high water level" and bank pins indicated only 3 inches of bank loss. In 2005, 87.4% of days had flows over the "normal high water level". Therein lies the issue, flows above the "normal high water level" are the most responsible for shaping the river. If flows get above this level and their energy is not dissipated appropriately they start to work against the banks and the river bottom. This is particularly true in entrenched channels which describes the Chippewa River at Hwy 40.



Site 16, Shakopee Creek has only one year of data but historical records exist. Conversion of the creek to a drainage ditch concluded in 1956. The ditch that was originally designed at a width of 34 feet. In response to the change in drainage hydrology over the last 49 years the Ditch has lost 20 feet of bank. Drainage hydrology has been altered in the Shakopee Watershed through intensive row cropping, ditch construction and tiling.

What is Bank Erosion?

There has been a recent conceptual leap in understanding stream and river erosion. Previously, riverbank and streambank erosion - the removal of river banks by flowing water - was targeted as the major erosional problem to be addressed. However, we now understand that streambank erosion is an obvious symptom of a more fundamental problem within the drainage feature, the lowering of the streambed. This phenomenon may be much less obvious, but can be identified through the active sites, nick points, and their resultant renewed instability of the streambanks.

Modifications to a river have long-reaching consequences, if the modifications are not compatible with the natural scale of energy-dissipating processes of the river, they will ultimately fail. Because the condition of a river is a dynamic balance between all forces impinging on it, every modification made to it has an ensuing reaction. Rivers are not always in equilibrium with the dynamic balance where they should be, and there can be a considerable lag in time until the appropriate 'event' provides the readjustment of levels or sediment supply or change in the channel. (Taken from :New South Wales Department of Land and Water Conservation, <www.ozestuaries.org/indicators/Def_streambank_erosion.html>)

Citizen Monitor Data

Citizen Monitors voluntarily monitor water transparency and stage on stream sites of their choosing. Data gathered by Citizen Monitors adds depth and scope to the monitoring undertaken by CRWP staff. Currently, the Citizen Monitor data is being used by the Minnesota Pollution Control Agency in determining stream impairment listings through the Clean Water Act of 1972. CRWP uses Citizen Data in its efforts to focus in on areas for implementation work and to get a better understanding of how the river is responding to climate, land use and other factors.

Two factors of interest are the number of readings below 20 cm and the number of readings at or above 60 cm. Readings below 20cm are bad, and CRWP tracks how often a site dips below 20 cm since it correlates to the standard for turbidity. Transparencies at or above 60 cm are very good and maintaining high transparencies suggests good water quality for aquatic life.

Overall, 2005 transparency was very similar to 2004 levels. On a good note there were 43% less readings below 20 cm from 2004 to 2005.

2005 Summary		# of times	Mean	Stage Weighted Means			Stage Weighted Mean	# of readings	# of readings
Citizen Monitor	**Monitoring Site**	**Sampled**	**Transparency**	**Low**	**Medium**	**High**		**at 60cm**	**below 20cm**
Orvin Gronseth	Spring Creek	10	52cm	60cm	60cm	18cm	**46**	8	1
Orvin Gronseth	Mud Creek	10	48cm	60cm	49cm	35cm	**48**	3	0
Barney Lily	Hwy 12 & Shakopee Creek	36	25cm	8cm	29cm	25cm	**20**	0	9
Glen Matejka	CR 108, Little Chip Lake Dam	16	52cm	56cm	53cm	40cm	**50**	0	0
Nancy Messner	Pope CR2 & Chippewa Mainstem	19	22cm	30cm	17cm	none	**23**	0	10
Judy Morton	205th Street Bridge, Pope Co.	17	74cm	57cm	72cm	79cm	**69**	15	0
Bruce & Barb Mulvaney	SE 1/4 sec R38 TWP 123 Pope Co.	7	93cm	83cm	100cm	96cm	**93**	7	0
Bruce & Barb Mulvaney	Chippewa @ Cnty 19	8	85cm	no lows	100cm	80cm	**90**	7	0
Deb Nelson	Shakopee Creek & CR 29	20	88cm	100cm	99cm	77cm	**92**	17	0
Edgar Persons	Chippewa River @ sec. 36 Land Twp. Grant Co.	11	28cm	12cm	48cm	28cm	**29**	0	3
Bob Reynolds	#1 Chippewa Lake to Devils Lake at CR 7	41	100cm	none	100cm	100cm	**100**	41	0
Bob Reynolds	#2 Devils to Little Chippewa Lake	41	100cm	none	100cm	100cm	**100**	41	0
Bob Reynolds	#3 Little Chippewa Lake to Hoplin Creek	41	100cm	none	100cm	100cm	**100**	41	0
Leon Sawyer	270 Ave. Culvert	26	52cm	60cm	55cm	47cm	**54**	20	0
Leon Sawyer	Pelican Lake Outlet	26	56cm	60cm	56cm	53cm	**56**	20	0
Leon Sawyer	Lake Ann Outlet	24	39cm	29cm	28cm	53cm	**36**	12	8
Paul Wymar	CD 21	18	56cm	60cm	64cm	41cm	**55**	8	3
	Average = .	22	64cm	52cm	66cm	61cm	**60**	14	2
	Median = .	19	56cm	60cm	60cm	53cm	**58**	8	0
	(CRWP requires at least 6 tests to report data)								
	CM not on lake outlets		57cm	53cm	63cm	53cm	**56**		
	CM on lake outlets		74cm	48cm	73cm	74cm	**65**		

Conclusion

Overall, monitoring indicated that pollution continues to be an issue for the Chippewa River. No site achieved the goals set for them by project partners.

The South Eastern agriculturally dominated tributaries all had problems with Nitrogen. Levels there have continued to rise over the last several years and 2005 was no exception.

All of the sites monitored had issues with high concentrations of total phosphorous. Shakopee Creek and East Branch were considerably worse this year than the other sub-basins.

All basins experienced abnormally high levels of fecal coliform above the standard during the summer swimming months. No basin was found to be fully supportive of swimming.

Turbidity exceeded the standard in all but one basin in 2005. Many sites exceeded the standard 20-80% of the times sampled. This can have a dramatically negative impact on aquatic life. It should be noted that Cottonwood Creek the one basin that did not exceed the standard has an abundance of aquatic life, quite in excess of the other tributaries.

Poor Transparency and a lack of stream/ ditch buffers were observed across the Chippewa Watershed.

2005 marked the initiation of a new monitoring endeavor for the Chippewa River Watershed Project. Permanent cross section surveys were set up at each monitoring site. These surveys document the cross sectional profile of the river channel. By documenting the cross sectional profiles from year to year CRWP will be able to document changes to the channel dimensions caused by stream flow forces.

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CRWP Cooperating Partners:

Montevideo Wastewater Treatment Plant, Benson Wastewater Treatment Plant, Chippewa County Commissioners, Chippewa County Land and Resource Management, Chippewa Soil & Water Conservation District, Douglas County Commissioners, Douglas County Land and Resource Management, Douglas Soil & Water Conservation District, Grant County Commissioners, Grant County Environmental Services, Grant Soil & Water Conservation District, Kandiyohi County Commissioners, Kandiyohi County Water Plan, Kandiyohi Soil & Water Conservation District, Land Stewardship Project, Minnesota Department of Natural Resources-Divisions of Forestry, Fisheries, and Water, Natural Resources Conservation Service, Prairie Country RC&D, Pope County Commissioners, Pope County Environmental Services, Pope Soil & Water Conservation District, Stevens Soil & Water Conservation District, Swift County Commissioners, Swift County Environmental Services, Swift Soil & Water Conservation District, WesMin RC&D