

## 6.0 WATER QUALITY SURVEILLANCE PROGRAMS

As noted in Chapter 5, data collected at Emerson, Manitoba, are used to determine compliance with established IJC water quality objectives at the international boundary. It is noted that in 1995, the IJC approved a revised Directive to the former International Red River Pollution Board broadening the focus of Board responsibilities from water chemistry to concepts of water quality and ecosystem health. The present IRRB Directive (Appendix A) embodies this broadened scope of responsibility.

Chapter 6 contains a synthesis of data and information contributed by IRRB member agencies to provide a more complete spatial representation of water quality and aquatic ecosystem health conditions in the Red River basin. The data and information, which does not necessarily coincide with any water year designation, was distributed to all IRRB members for review and discussion during the July 2005 IRRB annual meeting.

### U.S. Water Quality Standards Program

In the United States, the statutory basis for the current Water Quality Standards (WQS) program is the Clean Water Act. Under Section 303 of this Act, the Environmental Protection Agency (EPA) issued a Water Quality Standards Regulation (40 CFR Part 131). This regulation specifies the requirements and procedures for developing, reviewing, revising, and approving WQS by the States and Tribal Nations. EPA has approved WQS programs for the States of North Dakota, South Dakota, and Minnesota. No tribal programs in the Red River basin have yet been approved.

WQS define the water quality goals for a water body or portion thereof, by designating the use or uses to be made of the water, and implementation criteria for protecting each of those uses or areas. Additionally, a WQS program must include an anti-degradation policy to protect water quality that is already better than State standards. Designated uses for water bodies may include:

- Aquatic life - protection of fish and other aquatic organisms;
- Recreation - swimming, wading, boating, and incidental contact;
- Drinking water - protection for downstream public water supply intakes;
- Miscellaneous - industrial or agricultural uses, tribal religious use, etc.

Water quality standards are designed to protect the beneficial uses associated with the standards. Based on the assessment of the water quality data and other relevant information compared to the standards for a given pollutant or water quality characteristic, the use may be:

- Fully supported
- Partially supported
- Threatened
- Not supported

## 6.01 Minnesota

### Ambient Water Quality Monitoring Program

- *Minnesota Milestone Monitoring:*

To meet its obligations under the federal Clean Water Act, the Minnesota Pollution Control Agency (MPCA) monitors water quality twice every five years at 10 sites on the Red River of the North and at confluences with large tributaries. This monitoring is known as Minnesota Milestone Monitoring and was carried out in Spring 2005. The parameters measured at these sites are *ammonia*, *dissolved oxygen*, *turbidity*, *pH*, *fecal coliform*, *e-coliform*, *chloride* and *specific conductance*. In addition, where stream flow records are available, *chlorophyll-a*, *total suspended solids*, *total volatile solids*, *total phosphorus* and *BOD* are also sampled. Data from the sampling sites is entered into the US EPA's STORET database.

Under the Minnesota Milestone program, 1,508 stream miles of the 17,838 miles in the basin, were assessed in the current cycle. For the Red River basin, this equates to nearly 10 percent of the streams, which is slightly higher than the state-wide average of 5 percent of the streams assessed for water quality purposes. About 900 miles, or 60 percent, met water quality standards and were found to be supporting aquatic life. About 235 miles of streams, or 16 percent, were fair, or threatened for aquatic life. A remaining 370 miles of stream, or about 24 percent of streams assessed, were poor, or did not support aquatic life. At least 10 percent of the samples did not meet state or federal standards.

Following is a list of [numeric] standards compared to water quality objectives of the International Joint Commission:

**Table 3: Minnesota Water Quality Standards and IJC Water Quality Objectives**

Parameter	MN Standard	IJC Objective
Dissolved Oxygen	5 mg/L minimum	5 mg/L minimum
PH	6.5 – 8.5 allowable range	n/a
Conductivity	1,000 mg/l maximum	n/a
Chloride	100 mg/L maximum	100 mg/L
Total Suspended Solids	25 mg/L maximum	n/a
Total Dissolved Solids	500mg/L	500 mg/L
Sulfate	N/a	250 mg/L
Fecal Coliform	200 colonies/100 ml	200 colonies/100 ml

**Table 4. Minnesota Milestone Sites in the Red River Basin**

<u>SITE</u>	<u>DESCRIPTION</u>
OT-1	Otter Tail R bridge on 4th St. N at Breckenridge
OT-49	Otter Tail R bridge on CSAH-15 West Of Fergus Falls
RE-300	Red River at Almonte Ave S in Grand Forks, ND
RE-403	Red River at bridge on CsaH-39, 1 mi. W of Perley
RE-452	Red River bridge on Main Ave at 3rd St., In Moorhead
RE-536	Red River at bridge on CsaH-18 0.5 mi. W of Brushvale
RL-0.2	Red Lake R downstream of MN-220 bridge in E Grand Forks
RL-23	Red Lake River at bridge on CsaH-15 at Fisher
SK-1.8	Snake River at bridge on MN-220 N of Big Woods
TMB-19	Two Rivers middle bridge on US-75, 1 mi. N of Hallock

- *Red River Basin Monitoring Network:*

Minnesota Milestone water quality monitoring does not provide enough information to characterize water quality across a watershed or basin, or to establish trends in water quality over time. Therefore, the MPCA and the Minnesota Red River Watershed Management Board worked together to facilitate the establishment of the Red River Basin Water Monitoring Network to provide more comprehensive information about water quality. Members of the Red River Basin Monitoring Network are organizations and agencies interested in, or responsible for, managing water resources in the Minnesota portion of the Red River basin. This includes, but is not limited to, the following:

- Watershed Districts
- Red Lake Nation of Ojibwe
- Red River Basin Watershed Management Board
- Minnesota Pollution Control Agency
- Minnesota Department of Natural Resources
- Red River Basin Commission
- Red River Basin Institute
- University of Minnesota, Crookston
- Energy & Environment Research Center, University of North Dakota

The MPCA is the responsible party for the Network. Fiscal administration is provided by the Red River Basin Watershed Management Board (RRWMB). Day-to-day coordination is provided by two fulltime staff of the RRWMB. MPCA has assigned a monitoring coordinator to: provide training for participants; implement the monitoring plan, and; acquire, distribute and maintain equipment. Network members provide advice on the monitoring plan, data analysis and interpretation. Participating members also provide resources in support of monitoring, including equipment, staff and dollars, where feasible.

Chemical conditions are assessed up to 20 times over the high flow season (typically April through August); these measures include water *temperature, dissolved oxygen, pH, conductivity, turbidity*, nutrients and sediments. These parameters are collected at the mouth of the major tributaries (defined as contributing 100 ft<sup>3</sup>/s to the Red River of the North and draining at least 300 mi<sup>2</sup> in area). The monitoring sites have been established in coordination with the existing Minnesota Milestone sites and

U.S. Geological Survey staff gage sites. The Network employs scientifically recognized operating procedures and quality assurance measures to assure high quality information.

Data gathered by the Red River Basin Monitoring Network are used to:

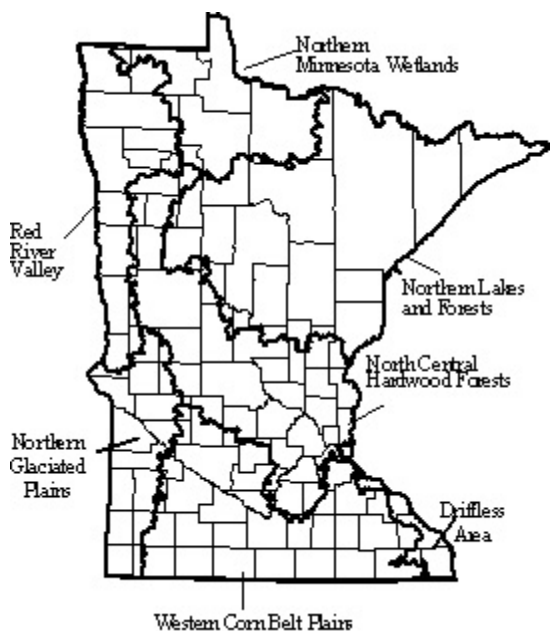
- assess loadings of sediments and nutrients to tributaries of the Red River;
- establish a baseline to measure trends in water quality over time;
- provide a basis for establishing goals for water quality improvement, and
- help managers assess performance of practices and projects in achieving water quality goals.

The monitoring results are entered into a MS Access database by Red River Basin Monitoring Network staff. MS Access reports are provided to MPCA Environmental Outcomes staff for entry into STORET. MS Access reports are also provided to the International Water Institute, for entry into the Red River Basin Decision Information Network. The Red River Basin Monitoring Advisory Committee presents annual summaries of monitoring to the Red River basin watershed districts and other resource managers.

Following is a summary of 2004 water quality conditions as reported by the Red River Basin Monitoring Network for the identified watersheds:

**Bois de Sioux** This watershed has a relatively high median concentration of total phosphorus but total suspended sediment is low compared to other sites. The high phosphorus could be caused by algae from Lake Traverse or high phosphorus concentrations in the soils. The range of flow is modest; the flow does not peak as high during storms as in some watersheds. Three-quarters of the land is cultivated and most of it lies in the Red River Valley ecoregion which has erosive soils.

**Buffalo** The total phosphorus and total suspended sediment concentrations are about average compared to other watersheds in the Red River basin, and flow does not react as strongly to storm events, which may be due to the amount of storage available in the upper part of the basin. Two-thirds of the land is cultivated and the dominant ecoregion is the North Central Hardwoods.



**Otter Tail** This watershed has many lakes; it contributes very low concentrations of total phosphorus and total suspended sediment to the Red, but it contributes a very large amount of the Red's flow. About one-third of the land is cultivated and the watershed lies largely in the North Central Hardwoods ecoregion.

**Wild Rice/Marsh** The Wild Rice lies mostly in the North Central Hardwoods ecoregion; the Marsh lies mostly in the Red River Valley ecoregion. Slightly more than half the land of both watersheds is cultivated. Total phosphorus is high in the Marsh, which may be due to the influence of phosphorus in soils, and total suspended sediments is low. The Wild Rice has higher concentrations of total suspended sediments than total phosphorus.

**Sand Hill** This watershed is very similar in appearance and in water quality to the Wild Rice, with the exception that

there is an area of low dissolved oxygen issues at the transition point between the North Central Hardwoods ecoregion in the east and the Red River Valley ecoregion in the west.

**Red Lake/Clearwater/Thief** The Red Lake watershed contributes the most flow to the Red River of the North. Concentrations of total phosphorus and total suspended sediment are relatively low. Of its subwatersheds, the Grand Marais has the highest concentration of total phosphorus and its median level of total suspended sediment is well above that of most other watersheds. Moreover, this watershed has the largest range in flow, probably due to the extensive drainage in the watershed. The rate of flow is “flashy”, which means that water is drained very quickly from the land to the Red River of the North.

**Snake/Middle/Tamarac** These watersheds have relatively higher concentrations of total phosphorus and total suspended sediments for their size. About three-quarters of the area drained by these rivers is cultivated and much of it lies in the Red River Valley ecoregion.

**Two Rivers/Joe** These watersheds have relatively high concentrations of total phosphorus and total suspended sediment. More than half of the contributing land area is cultivated and lies largely in the Red River Valley ecoregion.

**Roseau** This watershed has many wetlands which moderate flows. Overall concentrations of total phosphorus and total suspended sediment are relatively low. This watershed lies in the Northern Minnesota Wetlands ecoregion.

#### Impaired Waters Program

A water body is considered to be ‘impaired’ if it does not meet one or more of the federal Clean Water Act standards for basic pollutants such as turbidity, bacteria, nutrients or mercury. The MPCA is required by federal law to identify and to restore these impaired waters.

The primary tool for addressing impaired waters is the total maximum daily load (TMDL). The TMDL process identifies all sources of the pollutant causing an impairment and allocates necessary reductions among them. A completed TMDL is followed by an implementation plan for restoring water quality so it once again meets standards.

In Minnesota, the Red River Basin Water Quality Team, an informal group of agencies, organizations and industry interested in water management, is coordinating the assessment. Local, state and federal government, and area academic institutions advise the Team.

Following is a list of impaired streams together with the parameters of primary concern and analysis.

- Clearwater River trout stream - fecal coliform: Delisted
- Walker Brook - dissolved oxygen: Reclassified as impaired due to natural conditions.
- Lower Otter Tail - fecal coliform: Delisted.
  - turbidity: Study complete, in review; recommends annual reduction of 7,000 tons of sediment at Breckenridge.
- Moorhead Red River Basin - fecal coliform (2): Study in progress.
  - turbidity: Draft complete, to be considered with upper watershed projects.

Under this assessment, the water quality of more than 300 miles of river and stream in the Red River basin in Minnesota is impaired with respect to turbidity.

## 6.02 North Dakota

### Ambient Water Quality Monitoring Program

During the reporting period October 1, 2003 to September 30, 2004, the North Dakota Department of Health conducted ambient chemical monitoring at 17 sites in the Red River basin (Table 5).

**Table 5. North Dakota Department of Health Ambient Water Quality Monitoring Sites in the Red River Basin.**

Station Number	Station Description
385055	Bois de Sioux near Doran, MN <sup>1</sup>
380083	Red River at Brushville, MN
380031	Wild Rice River near Abercrombie <sup>1</sup>
385040	Red River near Harwood
380010	Sheyenne River at Warwick <sup>1</sup>
380009	Sheyenne River 3 mi E of Cooperstown <sup>1</sup>
380153	Sheyenne River below Baldhill Dam <sup>1</sup>
380007	Sheyenne River at Lisbon
385001	Sheyenne River near Kindred <sup>1</sup>
384155	Maple River at Mapleton <sup>1</sup>
380156	Goose River at Hillsboro <sup>1</sup>
384156	Red River at Grand Forks <sup>1</sup>
380037	Turtle River at Manvel
380039	Forest River at Minto <sup>1</sup>
380157	Park River at Grafton <sup>1</sup>
380158	Pembina River at Neche <sup>1</sup>
384157	Red River at Pembina <sup>1</sup>

<sup>1</sup>Site co-located with USGS flow gauging station.

Sites were sampled during the open-water period at six-week intervals beginning in April and concluding in October. In addition, one sample was collected under ice in late February 2004. This schedule resulted in five to six samples collected at each site during the reporting period. Stations inaccessible due to flooding/road construction or sites with no flow were not sampled.

Samples collected by the department were analyzed for major cations, anions, trace elements (total recoverable), nutrients, total suspended solids (TSS) and pathogens (fecal coliform, e-coli and enterococcus sp.) (Table 6). In addition, field measurements for temperature, pH, dissolved oxygen and specific conductance were taken.

**Table 6. North Dakota Department of Health Water Quality Variables Analyzed.**

Field Measurements	Laboratory Analysis			
	General Chemistry	Trace Elements	Nutrients	Biological
Temperature	Sodium	Aluminum	Ammonia	Fecal coliform
pH	Magnesium	Antimony	Nitrate-nitrite	E. coli
Dissolved Oxygen	Potassium	Arsenic	Total Kjeldahl Nitrogen	Enterococcus sp.
Specific Conductance	Calcium	Barium	Total Nitrogen	
	Manganese	Beryllium	Total Phosphorus	
	Iron	Boron		
	Chloride	Cadmium		
	Sulfate	Chromium		
	Carbonate	Copper		
	Bicarbonate	Lead		
	Hydroxide	Nickel		
	Alkalinity	Silver		
	Hardness	Selenium		
	Total Dissolved Solids	Thallium		
	TSS	Zinc		

The department enters all of its water quality results in the Surface Water Quality Management Program's Sample Identification Database (SID). Each year, data are exported to the U.S. Environmental Protection Agency's (EPA) STORage and RETreival (STORET) database.

### 6.03 Manitoba

#### Ambient Water Quality Monitoring Program

Water quality continues to be monitored monthly at two sites on the Red River within Manitoba by Manitoba Water Stewardship. These sites are located upstream and downstream of the City of Winnipeg (Floodway control structure and Selkirk, respectively). Variables measured include physical, general chemistry, suspended sediment, bacteria, industrial organics, trace elements, plant nutrients, and agricultural chemicals. The City of Winnipeg normally monitors six sites on a bi-weekly basis. These sites are located upstream, within, and downstream of the City of Winnipeg. Variables monitored by the City of Winnipeg include general chemistry, plant nutrients, suspended sediment, bacteria, and chlorophyll *a*. Variables and frequency are shown in Table 7.

Routine monitoring is also conducted on five tributary streams to the Red River by Manitoba Water Stewardship. Samples are collected four times per year and analyzed for a wide range of variables including physical, general chemistry, suspended sediment, bacteria, industrial organics, trace elements, plant nutrients, and agricultural chemicals. Locations and variables monitored are shown in Table 8. In addition, beginning in 1995, benthic macroinvertebrates have been collected at each routine monitoring site on the tributary streams once each year. Macroinvertebrate data have been assessed as indicators of ecosystem health. Results have been reported by Hughes (2004). In 2004, macroinvertebrate samples were also collected from the Red River at Emerson.

#### Water Quality Status of Red River in Manitoba

During this reporting period, water quality in the Manitoba reach of the Red River main stem remained relatively comparable to past years. Dissolved oxygen concentrations were relatively good with the average concentration being 8.5 mg/L both upstream and downstream of the City of Winnipeg. Average dissolved oxygen concentrations were slightly below previous water years due in part to the relatively low concentrations observed both upstream of the City of Winnipeg in March 2004 (4.1 mg/L) and downstream of the City of Winnipeg in April 2004 (4.9 mg/L). However, minimum dissolved oxygen concentrations observed in March and April were above the instantaneous dissolved oxygen objective of 3.0 mg/L.

Densities of *Escherichia coli* bacteria continued to remain elevated downstream of the City of Winnipeg. Average density downstream of the City of Winnipeg was 268 organisms /100 mL, similar to the previous reporting period (293 organisms /100 mL), while the average density in the upstream reach was 15 organisms /100 mL. The exceedance rate of the Manitoba Water Quality Standards, Objectives, and Guidelines for the protection of recreation was 55 % downstream of the City of Winnipeg, while no exceedances were observed immediately upstream of Winnipeg.

During this reporting period, no pesticides were detected upstream of the City of Winnipeg. In contrast, eight pesticides out of the 54 monitored were detected downstream of the City of Winnipeg. However, pesticide samples were only collected upstream of the City of Winnipeg in April and July 2004. During these two months (April and July), pesticides were also not detected downstream of the City of Winnipeg. The herbicide bromoxynil was detected in samples collected downstream of the City of Winnipeg in December 2003, and February and March 2004. The herbicide 2,4-D was detected in October through December 2003, and in August and September 2004. The herbicide dicamba was detected in October and November 2003, and in June and September 2004. Downstream of the City of



Winnipeg, MCPA was detected in December 2003 and June 2004 while MCPP was detected in October and November 2003, and September 2004. Atrazine was detected once in August 2003. Pentachlorophenol was detected during December 2003 and March 2004. Fenoxaprop was detected once in November 2003.

None of the detections for 2,4-D, pentachlorophenol, or atrazine exceeded water quality guidelines for the protection of surface water used as sources of drinking water supply, habitat for aquatic life and wildlife, or agricultural uses. However, each detection of dicamba and MCPA exceeded the guideline developed by the Canadian Council of Ministers of the Environment (CCME) for protection of irrigation uses. Bromoxynil concentrations measured in December 2003 and February 2004 were below the guidelines for the protection of surface water used as sources of drinking water supply, habitat for aquatic life and wildlife, or agricultural uses.

In accordance with recommendations of the IJC to governments following the 1997 flood in the Red River basin, Manitoba Water Stewardship in partnership with Fisheries and Oceans Canada have been monitoring toxaphene concentrations in Lake Winnipeg fish. Data collected for 2004 have not yet been analyzed.

#### Assessment of Red River Basin Tributary Streams

During this reporting period, water quality in the tributaries to the Red River main stem remained relatively comparable to past years. Dissolved oxygen concentrations were relatively high with the average concentrations ranging between 5.75 and 8.68 mg/L. However, dissolved oxygen concentrations in October in the Boyne River and in January in the Seine River dropped below the minimum instantaneous dissolved oxygen objective. Except for in June 2004 in the La Salle River, densities of *Escherichia coli* bacteria were below the Manitoba objective for the protection of recreation at all five Red River basin tributaries. Only two pesticides were detected in the Red River basin tributary streams. Simazine was detected in the La Salle River in April 2004. The herbicide 2,4-D was detected in the Seine River in April 2004.

The CCME Canadian water quality index (CWQI), calculated for five tributaries to the Red River and the two stations on the Red River between 2002 and 2004 (Hughes unpublished) indicated a range of “good” to “marginal” rankings across the basin (Table 9). The CWQI categories range from excellent (95-100), good (80-94), fair (60-79), marginal (45-59), and poor (44-0). Generally, water quality was ranked “good” on the Rat and Seine Rivers. Water quality was on average ranked “fair” on the Boyne, La Salle, and Roseau Rivers. Water quality in the Red River ranged from “marginal” at the site upstream of the City of Winnipeg to “fair” at the site downstream of the City of Winnipeg.

**Table 7. Surface water quality monitoring activities on the Red River (main stem) within Manitoba, during the period October 1, 2003 to September 30, 2004.**

Variables	Floodway Control (Manitoba Water Stewardship)	Floodway Control (City of Winnipeg)	Fort Garry Bridge (City of Winnipeg)	Norwood Bridge (City of Winnipeg)	Redwood Bridge (City of Winnipeg)	Chief Peguis Bridge (City of Winnipeg)	Lockport (City of Winnipeg)	Selkirk (Manitoba Water Stewardship)
Temperature	Monthly	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	Monthly
Turbidity	Monthly	2 times / month				2 times / month	2 times / month	11 times / annum
Colour	Monthly							Monthly
Dissolved Solids	Monthly							Monthly
Suspended Solids	Monthly	2 times / month				2 times / month	2 times / month	Monthly
Total Solids	Monthly	2 times / month				2 times / month	2 times / month	Monthly
Total Coliform		2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	
<i>Escherichia coli</i>	Monthly	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	11 times/ annum
Enterococcus		2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	
pH	Monthly	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	Monthly
Conductivity	Monthly	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	Monthly
Dissolved Oxygen	Monthly	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	Monthly
Alkalinity	Monthly							Monthly
Calcium	4 times / annum							Monthly
Magnesium	4 times / annum							Monthly
Hardness	4 times / annum							Monthly
Sodium	4 times / annum							Monthly
Potassium	4 times / annum							Monthly
Chloride	4 times / annum							Monthly
Sulphate	4 times / annum							Monthly
Total Phosphorus	Monthly	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	Monthly
Dissolved Phosphorus	Monthly							Monthly
Suspended Phosphorus	Monthly							Monthly
Nitrate – Nitrite	Monthly	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	Monthly
Nitrogen								
Total Kjeldahl Nitrogen	Monthly	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	Monthly
Ammonia Nitrogen	Monthly	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	Monthly
Chlorophyll – <i>a</i>	1 time / annum	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	11 times / annum
Total Organic Carbon	Monthly	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	Monthly
Total Inorganic Carbon	Monthly	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	2 times / month	Monthly
Boron	4 times / annum							Monthly
Arsenic	4 times / annum							Monthly
Aluminum	4 times / annum							Monthly

**Table 7. Continued.**

Variables	Floodway Control (Manitoba Water Stewardship)	Floodway Control City of Winnipeg)	Fort Garry Bridge (City of Winnipeg)	Norwood Bridge (City of Winnipeg)	Redwood Bridge (City of Winnipeg)	North Perimeter (City of Winnipeg)	Lockport (City of Winnipeg)	Selkirk (Manitoba Water Stewardship)
Manganese	4 times / annum							Monthly
Iron	4 times / annum							Monthly
Hexavalent Chromium	4 times / annum							Monthly
Nickel	4 times / annum							Monthly
Copper	4 times / annum							Monthly
Zinc	4 times / annum							Monthly
Lead	4 times / annum							Monthly
Cadmium	4 times / annum							Monthly
Antimony	4 times / annum							Monthly
Barium	4 times / annum							Monthly
Beryllium	4 times / annum							Monthly
Bismuth	4 times / annum							Monthly
Cobalt	4 times / annum							Monthly
Cesium	4 times / annum							Monthly
Lithium	4 times / annum							Monthly
Molybdenum	4 times / annum							Monthly
Rubidium	4 times / annum							Monthly
Selenium	4 times / annum							Monthly
Strontium	4 times / annum							Monthly
Thallium	4 times / annum							Monthly
Tin	4 times / annum							Monthly
Tellurium	4 times / annum							Monthly
Titanium	4 times / annum							Monthly
Uranium	4 times / annum							Monthly
Vanadium	4 times / annum							Monthly
Tungsten	4 times / annum							Monthly
Zirconium	4 times / annum							Monthly
Pentachlorophenol	2 times / annum							Monthly
2,4-D	2 times / annum							Monthly
2,4-DB	2 times / annum							Monthly
2,4-DP	2 times / annum							Monthly
2,4,5-TP	2 times / annum							Monthly
Bromoxynil	2 times / annum							Monthly
Dicamba	2 times / annum							Monthly
Dinoseb	2 times / annum							Monthly
Fenoxaprop	2 times / annum							Monthly
MCPA	2 times / annum							Monthly
MCPP	2 times / annum							Monthly
Picloram	2 times / annum							Monthly
Quizalofop	2 times / annum							Monthly
Trichlopyr	2 times / annum							Monthly

**Table 7. Continued.**

Variables	Floodway Control (Manitoba Water Stewardship)	Floodway Control (City of Winnipeg)	Fort Garry Bridge (City of Winnipeg)	Norwood Bridge (City of Winnipeg)	Redwood Bridge (City of Winnipeg)	North Perimeter (City of Winnipeg)	Lockport (City of Winnipeg)	Selkirk (Manitoba Water Stewardship)
Azinphosmethyl	2 times / annum							Monthly
Chlorpyrifos	2 times / annum							Monthly
Diazinon	2 times / annum							Monthly
Dimethoate	2 times / annum							Monthly
Malathion	2 times / annum							Monthly
Methyl Parathion	2 times / annum							Monthly
Parathion	2 times / annum							Monthly
Terbufos	2 times / annum							Monthly
Deltamethrin	2 times / annum							Monthly
Diclofop-methyl	2 times / annum							Monthly
Eptam	2 times / annum							Monthly
Ethafuralin	2 times / annum							Monthly
Propachlor	2 times / annum							Monthly
Propanil	2 times / annum							Monthly
Triallate	2 times / annum							Monthly
Trifluralin	2 times / annum							Monthly
Chlorthalonil	2 times / annum							Monthly
gamma-BHC (Lindane)	2 times / annum							Monthly
alpha-Chlordane	2 times / annum							Monthly
gamma-Chlordane	2 times / annum							Monthly
Methoxychlor	2 times / annum							Monthly
Carbofuran	2 times / annum							Monthly
Propoxur	2 times / annum							Monthly
Alachlor	2 times / annum							Monthly
Atrazine	2 times / annum							Monthly
Bromacil	2 times / annum							Monthly
Metribuzin	2 times / annum							Monthly
Simazine	2 times / annum							Monthly
Glyphosate	2 times / annum							8 time / annum
Imazethabenz								3 times / annum
Metsulfuron-me								3 times / annum
Thifensulfuron								3 times / annum
Tribenuron								3 times / annum
Methoprene								1 time / annum
Atrazine desethyl	2 times / annum							Monthly
Cyanazine	2 times / annum							Monthly
Captan	2 times / annum							Monthly
Tebuthiuron	2 times / annum							Monthly
Chloropyrifos	2 times / annum							Monthly

**Table 8. Surface water quality monitoring activities on tributaries to the Red River within Manitoba, during the period October 1, 2003 to September 30, 2004.**

Variables	Boyne River PTH 13, Carman	La Salle River St. Norbert, PTH 75	Rat River PR 303 near Otterborne	Roseau River PR 200, near Dominion City	Seine River PTH 100 (Perimeter Highway)
Macroinvertebrate community structure	1 time / annum	1 time / annum	1 time / annum	1 time / annum	1 time / annum
Temperature	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Turbidity	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Colour	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Dissolved Solids	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Suspended Solids	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Total Solids	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
<i>Escherichia coli</i>	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
pH	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Conductivity	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Dissolved Oxygen	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Alkalinity	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Calcium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Magnesium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Hardness	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Sodium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Potassium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Chloride	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Sulphate	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Total Phosphorus	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Dissolved Phosphorus	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Suspended Phosphorus	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Nitrate – Nitrite Nitrogen	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Total Kjeldahl Nitrogen	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Ammonia Nitrogen	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Chlorophyll – <i>a</i>	1 time / annum	1 time / annum	1 time / annum	1 time / annum	1 time / annum
Total Organic Carbon	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Total Inorganic Carbon	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Boron	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Arsenic	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Aluminum	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Manganese	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Iron	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Hexavalent Chromium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Nickel	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Copper	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Zinc	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Lead	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Cadmium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Antimony	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Barium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum

**Table 8. Continued.**

Variables	Boyne River PTH 13, Carman	La Salle River St. Norbert, PTH 75	Rat River PR 303 near Otterborne	Roseau River PR 200, near Dominion City	Seine River PTH 100 (Perimeter Highway)
Beryllium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Bismuth	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Cobalt	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Cesium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Lithium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Molybdenum	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Rubidium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Selenium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Strontium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Thallium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Tin	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Tellurium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Titanium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Uranium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Vanadium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Tungsten	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Zirconium	4 times / annum	4 times / annum	4 times / annum	4 times / annum	4 times / annum
Pentachlorophenol	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
2,4-D	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
2,4-DB	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
2,4-DP	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
2,4,5-TP	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Bromoxynil	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Dicamba	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Dinoseb	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Fenoxaprop	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
MCPA	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
MCPP	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Picloram	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Quizalofop	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Trichlopyr	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Azinphosmethyl	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Chlorpyrifos	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Diazinon	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Dimethoate	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Malathion	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Methyl Parathion	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Parathion	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Terbufos	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Deltamethrin	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Diclofop-methyl	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Eptam	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum

**Table 8. Continued.**

Variables	Boyne River PTH 13, Carman	La Salle River St. Norbert, PTH 75	Rat River PR 303 near Otterborne	Roseau River PR 200, near Dominion City	Seine River PTH 100 (Perimeter Highway)
Ethafuralin	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Propachlor	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Propanil	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Triallate	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Trifluralin	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Chlorthalonil	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
gamma-BHC (Lindane)	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
alpha-Chlordane	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
gamma-Chlordane	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Methoxychlor	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Carbofuran	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Propoxur	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Alachlor	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Atrazine	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Bromacil	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Metribuzin	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Simazine	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Atrazine desethyl	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Cyanazine	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Captan	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Chlorpyrifos	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum
Tebuthiuron	2 times / annum	2 times / annum	2 times / annum	2 times / annum	2 times / annum

**Table 9. CCME Water Quality Index for the Red River and Tributary Streams during 2002 to 2004.**

Stream	Year	CCME Water Quality Index Rank
Boyne River at Carman	2002	Good
Boyne River at Carman	2003	Fair
Boyne River at Carman	2004	Fair
La Salle River	2002	Fair
La Salle River	2003	Marginal to Fair
La Salle River	2004	Fair
Rat River at Otterborne	2002	Good
Rat River at Otterborne	2003	Fair
Rat River at Otterborne	2004	Good
Roseau River near Dominion City	2002	Fair to Good
Roseau River near Dominion City	2003	Fair to Moderate
Roseau River near Dominion City	2004	Fair to Good
Seine River south of Winnipeg	2002	Good
Seine River south of Winnipeg	2003	Good
Seine River south of Winnipeg	2004	Fair
Red River Floodway Control Structure	2002	Fair
Red River Floodway Control Structure	2003	Marginal
Red River Floodway Control Structure	2004	Marginal
Red River at Selkirk	2002	Fair
Red River at Selkirk	2003	Fair
Red River at Selkirk	2004	Marginal to Fair

#### **6.04 Environment Canada**

##### Auto-Monitor at Emerson, Manitoba

A total of 16 grab samples were collected from the Red River at Emerson between October 1, 2003 and September 30, 2004. These were comprised of 12 monthly grab samples which included two sets of triplicate samples. The triplicates were collected in March and April of 2004. An analysis of the data was presented in Chapter 5.

Water levels at Emerson were fairly low at the beginning of the 2004 water year. This low water condition contributed to ingestion of silt into the intake lines reducing the volume of water reaching the pump. The pump was lowered on September 18, 2003, after the lines were flushed, in an effort to increase the volume of water being cycled through the pump. The pump was turned off from October 5, 2003 to October 21, 2003 when the water levels became too low to ensure a sufficient supply to the pump. There was a further disruption from November 5-18, 2003 when the pump screen became clogged. Thereafter the pump functioned well until August 8, 2004 when the intake lines again became clogged.

A new pump was installed on August 11, 2004, however, attempts to clear the clogged lines were unsuccessful. Because of very wet site conditions a commercial flusher could not be brought in until November 2, 2004. Therefore, no auto-monitor data were collected from August 5 to November 2, 2004.

During the spring and summer of 2004 new industrial grade meters and probes were installed, which are expected to be less prone to fouling and drift. Because of the disruptive nature of installation and testing, there is a gap in the auto-monitor pH data from May 14, 2004 to June 22, 2004. The reliability and accuracy of the chloride probe is still in question and other equipment options are being investigated.



To augment the monthly grab sampling program being carried out at the international boundary, a weekly sampling program for nutrients and major ions was initiated on June 14, 2005. The weekly sampling program will continue until the end of November 2005.

## **7.0 WATER POLLUTION CONTROL**

### **7.01 Contingency Plan**

In January 1981 a contingency plan was developed by the former International Red River Pollution Board. The purpose of the plan, which has been adopted by the IRRB, is to ensure that positive coordinated action is taken to minimize public health hazards and environmental damage in the event of a spill. This plan does not supersede any local or national contingency plans in existence but rather serves to coordinate these activities. The plan becomes effective whenever the discharge of a pollutant within the Red River basin has the potential to adversely impact the Red River. The plan also becomes effective at any time when exceedances of either water quality objectives or alert levels as described in Chapter 5 are observed at the international boundary. A current list of contacts and telephone numbers associated with the contingency plan is included in Appendix C.

The contingency plan, presently under review, is available from the IRRB Secretariat.

### **7.02 Spills and Releases**

#### **Minnesota**

The Minnesota National Pollutant Discharge Elimination System (NPDES) permit program regulates the release of wastewater and stormwater from point sources into waters of the state. All point source dischargers, both municipal and industrial, are required to obtain a permit. These permits outline technology and water quality based limits for wastewater discharges.

Municipal and industrial facilities in Minnesota discharging directly to the Red River were generally in compliance with their NPDES permits during this reporting period. Compliance with technical review criteria in water quality permits is monitored monthly by permittees and reviewed by Minnesota Pollution Control Agency (MPCA) staff. In the 2004 water year, 16 bypasses occurred at several facilities due to storm events. Except for one occurrence, all were less than one million gallons per day. The locations are noted below:

- Bagley, Clearwater River
- Warren, Snake River
- Grygla, Mud River
- Argyle (2), Tamarack River
- Roseau, Roseau River
- Hendrum, Marsh River
- Barnesville (2), Buffalo River
- Crookston, Red Lake River (more than one million gallons/day)
- Wheaton (4), Mustinka River
- Hallock, Two Rivers

In the 2004 water year, MPCA enforcement staff issued five formal enforcement actions. Of these, four were at industrial sites and one at a municipal site.

## **North Dakota**

The North Dakota Pollutant Discharge Elimination System (NDPDES) Program requires all permitted facilities, both industrial and municipal, to report spills and releases of wastewater. During this reporting period, there were 11 bypasses reported to the Department in the Red River Valley drainage. These releases were related to mechanical failure and/or excessive precipitation events. Most of the State experienced near normal to dry conditions; however, select areas (mainly in the eastern part of the State) remained above normal in precipitation.

## **Manitoba**

Three municipalities with populations greater than 1000 discharge treated effluents directly to the Red River within Manitoba. The Town of Morris discharges for a short period of time each spring and fall, while the City of Winnipeg's South End Water Pollution Control Centre, the North End Water Pollution Control Centre, and the Town of Selkirk discharge continuously. Volumes and quality of effluent has not changed significantly from previous years. In addition to the two major wastewater treatment facilities within the City of Winnipeg, discharges also occur from 21 private wastewater treatment plants, 79 combined sewer outfalls, and 90 major land drainage outfalls.

Most tributary streams also receive treated wastewater effluents from nearby communities.

### **7.03 Pollution Abatement and Advisories**

## **Minnesota**

### **Point Source Control Program**

The MPCA has permitted 109 facilities to discharge wastewater into the Red River or its tributaries. Of these facilities, 85 are municipal permits, and 22 are industrial permits. There are 14 facilities designed for more than 1 million gallons per day in the Minnesota portion of the Red River basin. Of these, six facilities treat municipal wastewater and seven treat industrial wastewater.

In the 2004 water year, 15 facilities were issued or were reissued permits to discharge wastewater to the tributaries of the Red River of the North, as follows:

<b>Name</b>	<b>Watershed Name</b>	<b>Action Type</b>	<b>Waste</b>	<b>Ownership</b>
Ames Sand & Gravel - B-B Felton Site	Wild Rice River (MN)	General Permit Reissuance	Industrial	Private
Arctic Cat Inc	Thief River	General Permit Issuance	Industrial	Private
Beltrami County Highway Dep	Clearwater River	General Permit Issuance	Industrial	Private
KPLOP - Moorhead Products Terminal	Red River of the North (Upper)	Permit Reissuance	Industrial	Private
Minn Dak Asphalt	Red Lake River	General Permit Issuance	Industrial	Private
Northern Improvement Co - Benedict Pit	Buffalo River	General Permit Reissuance	Industrial	Private
Wilkin County Highway Dept	Red River of the North (Upper)	General Permit Issuance	Industrial	Private

<b>Name</b>	<b>Watershed Name</b>	<b>Action Type</b>	<b>Waste</b>	<b>Ownership</b>
Alvarado WWTP	Snake River	Permit Reissuance	Domestic	Municipal
Herman WWTP	Mustinka River	Minor Permit Modification	Domestic	Municipal
Hitterdal WWTP	Buffalo River	Permit Reissuance	Domestic	Municipal
Mahnomen WWTP	Wild Rice River (MN)	Permit Reissuance	Domestic	Municipal
Thief River Falls Regional Airport	Red Lake River	Permit Reissuance	Domestic	Municipal
Waubun WWTP	Wild Rice River (MN)	Permit Reissuance	Domestic	Municipal

### Stormwater Permits

Construction projects disturbing one acre or more of land require a General NPDES Storm Water Permit. The objective of this permitting program, which is a part of the NPDES, is to reduce the amount of sediment/pollution entering surface waters both during and after construction projects. Construction activities requiring a permit include landscape clearing, grading, excavation, road building, and construction of homes, office buildings, industrial parks, landfills and airports.

During this reporting period, 340 construction stormwater permits were issued in the Red River basin.

### Feed Lots

The MPCA is the principal agency for regulating feedlots in Minnesota. In addition, 55 counties (as of February 2003) administer the program for feedlots under 1,000 animal units. A revised feedlot rule went into effect in October 2000. MPCA has dedicated considerable resources to identifying, managing and regulating feedlots since then. There are 1,570 registered feedlots in thirteen Red River basin counties in Minnesota. MPCA staff have worked with landowners to provide permits in a timely fashion, inspect feedlots as necessary and to implement measures to reduce water quality impacts of feedlots. In the current water year, 86 farmers registered or updated feedlots in the Red River basin. Most of these (61) had fewer than 300 animal units. Twenty of the newly registered facilities reported between 300 and 999 animal units and seven report more than 1,000 animal units. Most of the new facilities were in Traverse County, in the southeast portion of the watershed.

### Toxics - Mercury

Atmospheric deposition of mercury is uniform across the state and supplies more than 99.5% of the mercury getting into fish. Agency research has demonstrated that 70% of current mercury deposition in Minnesota comes from anthropogenic sources and 30% from natural sources, such as volcanoes. There are no known natural sources in the state that emit mercury directly to the atmosphere. About 90% of the mercury deposition originates from outside the state

Minnesota is completing a statewide TMDL for mercury. The long-term goal of the TMDL is for fish to meet water quality standards. The TMDL establishes the need for a 93% reduction in State emissions from 1990 levels. Water point sources will be required to stay below one percent of the total load to the State and all but the smallest dischargers will be required to develop mercury minimization plans. Air

sources of mercury will have a 93% emission reduction goal from 1990 levels. Air sources will be divided into three sectors: products, energy, and mining.

The full report can be accessed at the MPCA's web site:

<http://www.pca.state.mn.us/water/tmdl/tmdl-mercuryplan.html#statewideplan>

### Basin Planning Update

Lake Winnipeg, the ecological endpoint for a vast watershed, serves as the context for various water quality and monitoring and research activities in the Red River basin. In 2004 the IRRB Aquatic Ecosystem Committee provided three recommendations and commitments from participating agencies with respect to nutrient management in the basin. One of these was a commitment from the three jurisdictions to reduce nutrient loading into Lake Winnipeg by 10% over the next five years. This commitment will assist Manitoba to deliver on its Lake Winnipeg Action Plan. (The Action Plan is described in greater detail in a subsequent 'Manitoba' section.)

The Minnesota Red River Basin Water Quality Team has adopted three broad strategies to help achieve these water quality goals:

1. Conserve soil by buffering riparian areas, especially lands used for row crop agriculture,
2. Keep water where it falls, by wetland restoration, streambank restoration or off-channel impoundments, and
3. Reduce peak flows.

Further, the MPCA has developed a comprehensive phosphorus strategy with seven action steps for phosphorus reduction and control. These action steps apply to both point and nonpoint sources of phosphorus and are in various stages of implementation.

- Develop education/outreach information on environmental impacts of phosphorus.
- Co-sponsor basin-wide phosphorus forums.
- Use basin management as the main policy context for implementing the phosphorus strategy.
- Broadly implement Minnesota's point-source phosphorus controls.
- Broadly promote lake protection activities.
- Address phosphorus impacts on rivers.
- Modify water-quality standards if necessary.

### North Dakota

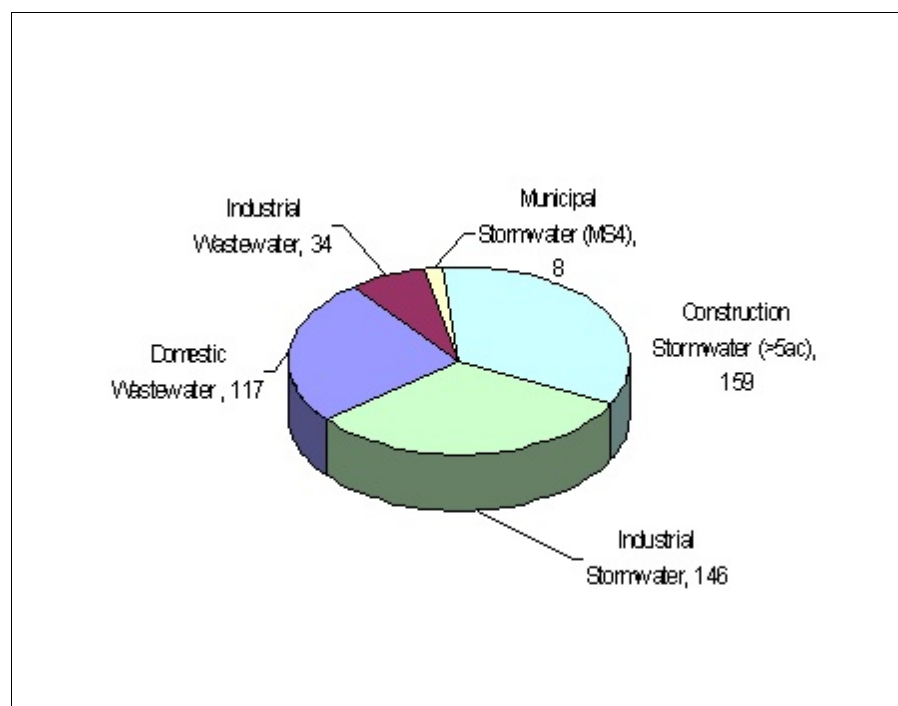
#### Point Source Control Program

The North Dakota Pollutant Discharge Elimination System (NDPDES) Program regulates the release of wastewater and storm water from point sources into waters of the State. Permitted municipal and industrial point source dischargers must meet technology and water quality-based limits.

Toxic pollutants in wastewater discharges are an important concern, particularly for the larger cities and industries in North Dakota. They are regulated through the Industrial Pretreatment Program which is administered by EPA Region VIII. The cities of Grand Forks, Fargo and West Fargo have approved pretreatment programs in the eastern part of the state. The ND Health Department continues to work with EPA on seeking delegation for the Pretreatment Program.

All waters of the State shall be free from substances attributable to municipal, industrial or other discharges in concentrations or combinations which are toxic or harmful to humans, animals, plants or resident biota. This standard is enforced in part through appropriate Whole Effluent Toxicity (WET) requirements. All major municipal and industrial permittees must monitor their discharge for WET on a regular basis.

The Department presently has 151 facilities with NDPDES permits in the Red River basin (Figure 2). Of these, there are 34 industrial wastewater permits and 117 domestic/municipal wastewater permits. Most of the domestic/municipal wastewater permits are for small lagoon systems which discharge a couple of times a year. Wastewater discharge data for the 11 largest permitted facilities during the reporting period October 1, 2003 to September 30, 2004 are presented in Table 10. In addition, the average BOD-5 day and TSS values from permitted facilities for the years 1985 to 2003 are presented in Figure 3.

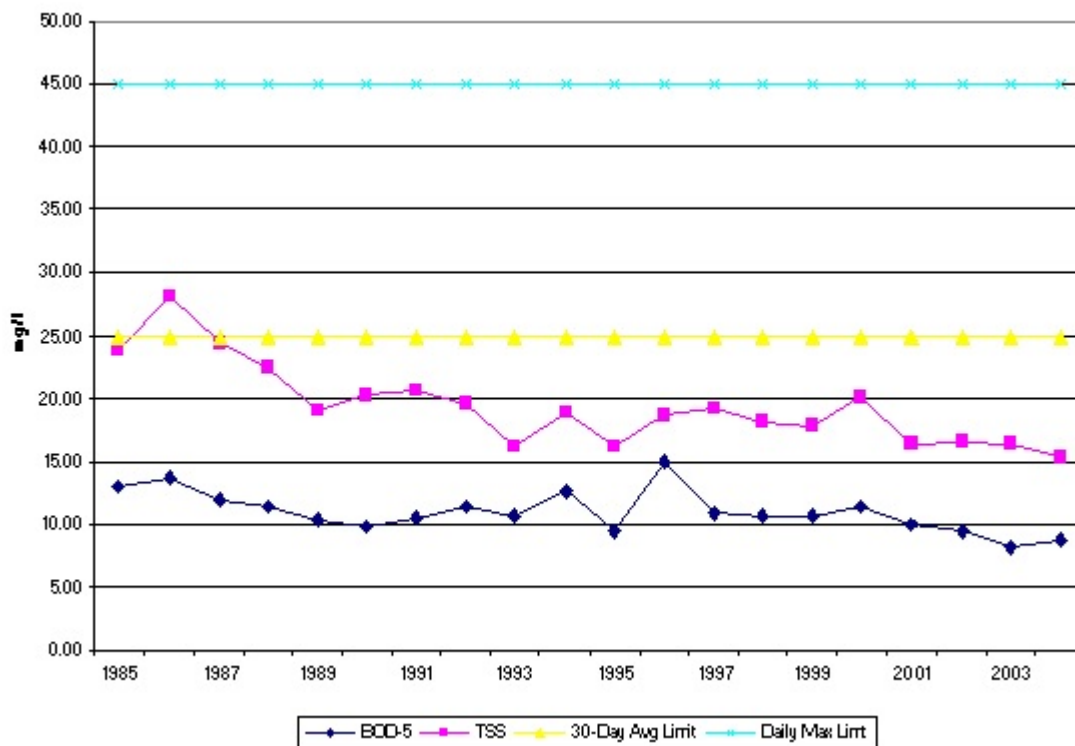


**Figure 2. Number of Facilities in the North Dakota Portion of the Red River Basin with an NDPDES Permit.**

**Table 10: Waste Discharge Data for North Dakota During the Reporting Period October 1, 2003 to September 30, 2004.**

Source*	Length of Discharge  Days	Total Flow  m³	Discharge Quality - mg/L						Discharge Rate Average  m³/day	BOD-5 day Loading Average  kg/day	TSS Loading Average  kg/day	Time in Permit Compliance  Percent
			BOD-5 day			TSS						
			High	Low	Avg.	High	Low	Avg.				
Drayton	10	111,290	15.0	6.0	10.5	7.0	7.0	7.0	11,129.0	116.9	77.9	100.0
Fargo	360	15,152,014	23.6	2.0	9.0	23.6	6.9	12.1	42,088.9	379.5	510.3	100.0
Grafton	21	638,908	13.6	6.0	8.5	33.5	5.0	19.3	30,424.2	259.6	588.2	100.0
Grand Forks	138	8,270,232	19.9	5.4	9.5	35.0	5.0	16.4	59,929.2	567.1	981.9	98.4
Grand Forks AFB	21	671,270	12.0	6.0	7.7	25.8	5.0	10.4	31,965.2	246.1	332.2	100.0
Wahpeton	47	1,782,356	23.3	3.6	9.8	95.5	6.0	29.7	37,922.5	373.4	1124.4	95.6
West Fargo	52	1,913,658	15.2	4.7	9.0	26.0	4.8	17.6	36,801.1	332.1	646.4	100.0
ACS-Drayton	171	946,628	14.0	5.0	6.7	23.0	7.0	10.9	5,535.8	37.1	60.3	100.0
ACS-Hillsboro	147	383,761	6.0	3.0	3.3	23.4	6.0	10.5	2,610.6	8.7	27.5	100.0
Minn Dak	94	1,556,013	24.6	3.9	13.9	34.1	3.8	18.9	16,553.3	229.8	312.2	100.0
Cargill Inc.	366	1,949,918	32.5	2.0	6.7	42.0	1.0	12.6	5,327.6	35.7	67.3	98.1

\* Source -- Population greater than 1,000 or population equivalent greater than 1,000.



**Figure 3. Average BOD-5 day and TSS Concentrations in the North Dakota Portion of the Red River Basin (1985-2003).**

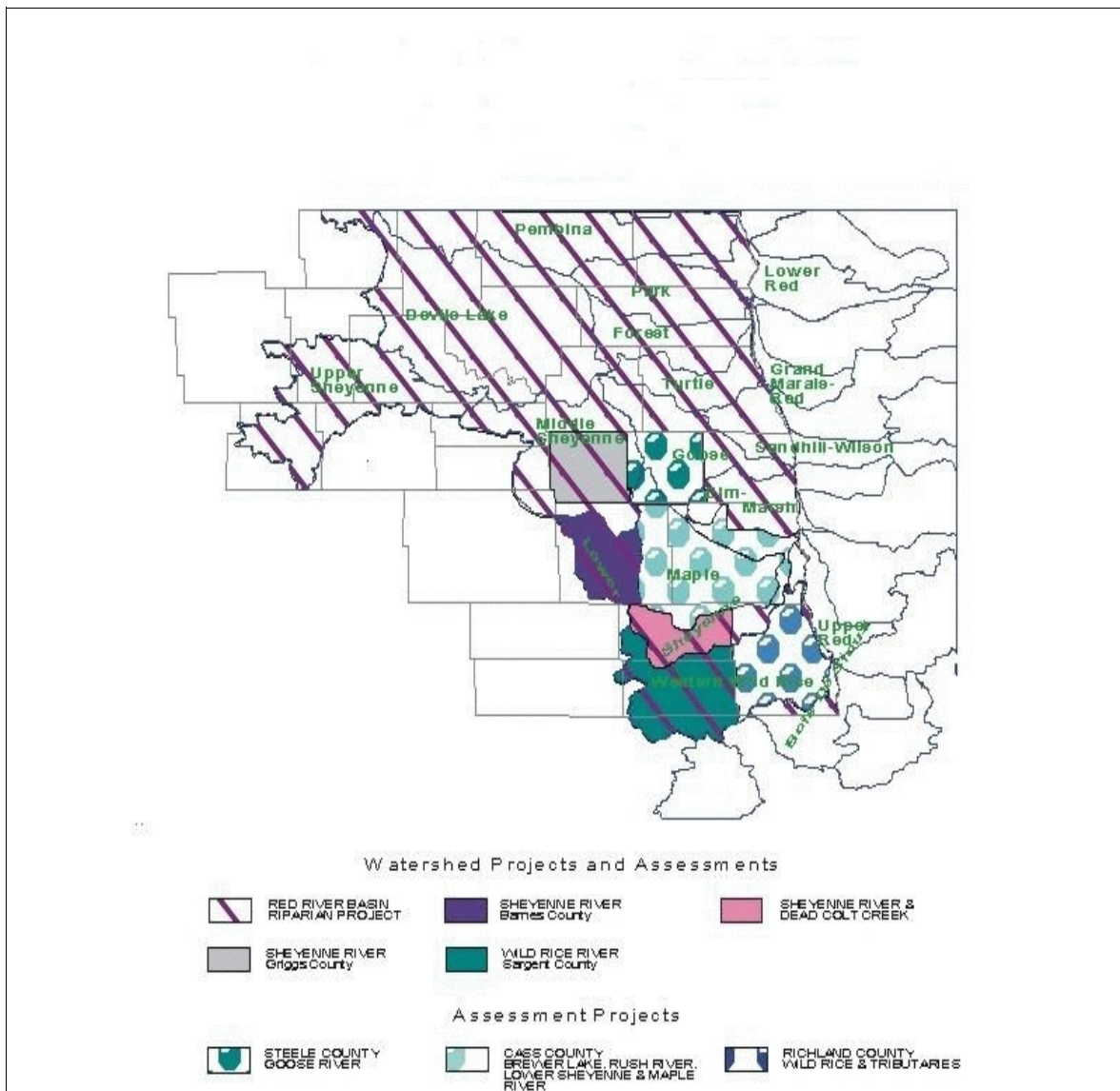
#### Nonpoint Source Pollution Management Program

The ND Health Department's Division of Water Quality is responsible for administering the Clean Water Act Section 319 Nonpoint Source Pollution Management Program (NPS Program) in North Dakota. Section 319 of the Clean Water Act and guidance provided by EPA defines the scope of the NPS Program, while the Department administers the program with input from the North Dakota Nonpoint Source Pollution Task Force. The Task Force is comprised of representatives from State and federal natural resource agencies, commodity/producer groups, tribal councils and private wildlife/natural resource organizations.

Each year, federal funds are appropriated by the U.S. Congress to EPA for NPS pollution management. These "Section 319 funds" are then made available to individual states based on an allocation formula. In North Dakota, funds are awarded to project sponsors (e.g., soil conservation districts, water resource boards, cities, resource conservation and development councils, nonprofit organizations) to implement a variety of NPS pollution education, assessment and NPS pollution abatement projects. Approved local projects receive 60 percent federal funds with a 40 percent local match requirement.



Through the NPS Program, the Department is currently cost-sharing a variety of NPS watershed assessment and NPS pollution abatement projects in the Red River basin (Figure 4).



**Figure 4. North Dakota Section 319 Nonpoint Source Pollution Management Program-Supported Projects in the Red River Basin.**

The following is a short summary of these projects.

- The Barnes County Soil Conservation District (SCD) has recently completed a water quality assessment for Bald Hill Creek, a tributary of the Sheyenne River. The Barnes County SCD is also implementing an NPS pollution abatement project on the Sheyenne River below Baldhill Dam (Lake

Ashtabula). This project is providing technical and financial assistance to install best management practices (BMPs) necessary to reduce NPS pollution and improve water quality throughout the Sheyenne River's contributing watershed in Barnes County.

- The Cass County SCD is currently conducting a two-year water quality assessment project on the Maple, Lower Sheyenne and Rush Rivers in Cass County. The purpose of the assessment project is to: (1) conduct chemical and biological monitoring to assess beneficial use attainment; (2) determine causes and sources of pollution impairing beneficial uses; and (3) determine nonpoint source pollution reductions necessary to restore documented impaired uses. The project sponsors plan to use the results of the watershed assessment project to develop a watershed restoration project implementation plan.
- The Griggs County SCD and Water Resource Board (WRB) are in the last year of a watershed restoration implementation project for the Sheyenne River in Griggs County. The project has focused on providing financial and technical assistance to landowners for the implementation of BMPs to control agricultural NPS pollution in the watershed. The Griggs County WRB is the primary sponsor of the project with the support of the Griggs County SCD.
- The Ransom County SCD is in the first year of a watershed restoration and NPS pollution abatement project for Dead Colt Creek Dam and for the Sheyenne River in Ransom County. A Total Maximum Daily Load (TMDL), addressing nutrient and sediment loading and low dissolved oxygen, has also been developed for Dead Colt Creek Dam. Through both watershed projects, the Ransom County SCD will provide financial and technical assistance to landowners to implement BMPs required to reduce sediment and nutrient loadings and improve water quality.
- The Richland County SCD is currently in the third year of a three-year water quality assessment project focusing on the lower mainstem Wild Rice River and two tributaries to the lower Wild Rice River, Antelope Creek and Elk Creek. The purpose of the assessment project is to: (1) conduct chemical and biological monitoring to assess beneficial use attainment; (2) determine causes and sources of pollution impairing beneficial uses; and (3) determine nonpoint source pollution reductions necessary to restore documented impaired uses. The project sponsors plan to use the results of the watershed assessment project to develop a watershed restoration project implementation plan.
- The Wild Rice SCD in Sargent County continues to implement its Section 319 Watershed Restoration project on the Upper Wild Rice River and its tributaries. The goal of this project is to work with landowners to provide technical and financial assistance to install BMPs necessary to reduce NPS pollution and improve water quality in the upper Wild Rice River watershed.
- The Steele County SCD has recently started a two-year water quality assessment project focusing on the Goose River and Beaver Creek in Steele County. The purpose of the assessment project is to: (1) conduct chemical and biological monitoring to assess beneficial use attainment; (2) determine causes and sources of pollution impairing beneficial uses; and (3) determine nonpoint source pollution reductions necessary to restore documented impaired uses. The project sponsors plan to use the results of the watershed assessment project to develop a watershed restoration project implementation plan.
- The Red River Riparian Project continues its multi-year project aimed at stream and riparian area

protection and restoration in the Red River Basin. The project's goals are to offer financial and technical assistance for stream restoration and for the installation of riparian area BMPs. The Red River Regional Council is the lead agency for this project.

- The Pembina River Watershed Restoration Action Strategy is a multi-county and international water quality assessment project aimed toward NPS pollution identification and beneficial use assessment for the entire Pembina River, including portions in Manitoba, Canada. The Red River Regional Council sponsors the project, but implementation of the assessment project has been delegated to each SCD and WRB in Pembina, Cavalier and Towner Counties and to several soil and water conservation districts in Manitoba. Results will be included in the Pembina River Basin Plan. Based on the water quality assessment data, watersheds will be prioritized for restoration activities.

## **Manitoba**

### **Pollution Abatement**

Manitoba Water Quality Standards, Objectives, and Guidelines are applicable to streams within the Red River basin. In addition, site-specific water quality objectives have been established for the Red River within and downstream of the City of Winnipeg. Water uses protected in the Red River include domestic water supply source, habitat for aquatic life and wildlife, industrial uses, irrigation, livestock watering, and water-related recreation. Manitoba intends to enshrine the Manitoba Water Quality Standards, Objectives, and Guidelines into legislation under *The Water Protection Act*.

All treated municipal effluents discharged to tributary streams within the Red River basin in Manitoba are licenced under Manitoba's Environment Act. Six private facilities located within the immediate proximity of the City of Winnipeg boundary are not yet licenced (out of the original 21 facilities un-licenced when the Environment Act came into effect in 1988). The six facilities will receive licences within the next couple of years. Disinfection with ultra-violet light technology has been installed and is operational at the City of Winnipeg's South End Water Pollution Control Centre. In June 2005, construction began on disinfection works for the City of Winnipeg's North End Water Pollution Control Centre. In August 2004, the City of Winnipeg introduced a web-based system to inform the public whenever there is likely to be a sewer overflow into the Red or Assiniboine Rivers. Environment Act licenses were issued to the City of Winnipeg for the West End and North End Water Pollution Control Centres in 2005. An Environment Act license is under development for the South End Water Pollution Control Centre.

Manitoba continues to work to achieve the targets of the Lake Winnipeg Action Plan announced on February 18, 2003. The Lake Winnipeg Action Plan is a commitment to reduce nitrogen and phosphorus loads to Lake Winnipeg to pre-1970s levels. The Lake Winnipeg Action Plan recognizes that nutrients are contributed by most activities occurring within the drainage basin and that reductions will need to occur across all sectors. Progress under the Action Plan this year includes:

- Manitoba received an interim report from the Lake Winnipeg Stewardship Board, established to help government identify further actions necessary to reduce nitrogen and phosphorous. The Board's report contains 32 comprehensive and significant recommendations on short, medium, and long-term actions to protect Lake Winnipeg. The majority of the recommendations were accepted in principal and Manitoba is moving promptly to put into action those recommendations that are quickly attainable. Action is already underway on 10 of the recommendations. Four of

the recommendations were referred back to the Lake Winnipeg Stewardship Board for public discussion. A report on the public discussion is expected in June 2005.

- An agreement was recently reached in which jurisdictions in the United States and Canada agreed to support Manitoba's goals on Lake Winnipeg and in turn, agreed to reduce nutrient loadings by 10 % within a five-year period of time.
- The riparian tax credit program was expanded to include not only the Red and Assiniboine rivers but also Lake Winnipeg, and to increase benefits to farm operators over a longer benefit period thereby preventing erosion and reducing nutrient run-off;
- Regulation changes designed to promote sustainable agricultural practices through amendments to the storage, management, and spreading of manure, and the storage and disposal of dead animals, and;
- Development of Environment Act licenses for the City of Winnipeg's wastewater treatment facilities that require removal of both nitrogen and phosphorus.

As part of further action to protect water quality, Manitoba introduced *The Water Protection Act* in March 2004. *The Water Protection Act* will enable regulations to be developed for stricter water quality standards, will allow water quality management zones to be developed for nutrients, and will provide the tools necessary to undertake and implement watershed planning on a comprehensive and integrated basis. This legislation is the first of its kind in Canada. *The Water Protection Act* will provide a strong legislative framework to improve and protect not only the Red River and Lake Winnipeg but other aquatic ecosystems in Manitoba as well.