

INTERNATIONAL RAINY LAKE BOARD OF CONTROL
INTERNATIONAL RAINY RIVER WATER POLLUTION BOARD

Fall 2010 REPORT

Submitted to

The International Joint Commission

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BOARD MEMBERS AND STAFF

	Canada	USA
IRLBC Members	Rick Walden P.Eng Glenn Witherspoon	Michael Price COL Leland Grim
IRRWPB Members	Melanie Neilson Gregory Chapman Kelli Saunders (Alternate)	Jeffrey Stoner PG Nolan Baratono
IRLBC Engineering Advisors	Rick Cousins P.Eng	Edward Eaton PE
Joint Board Secretary	Tana McDaniel	

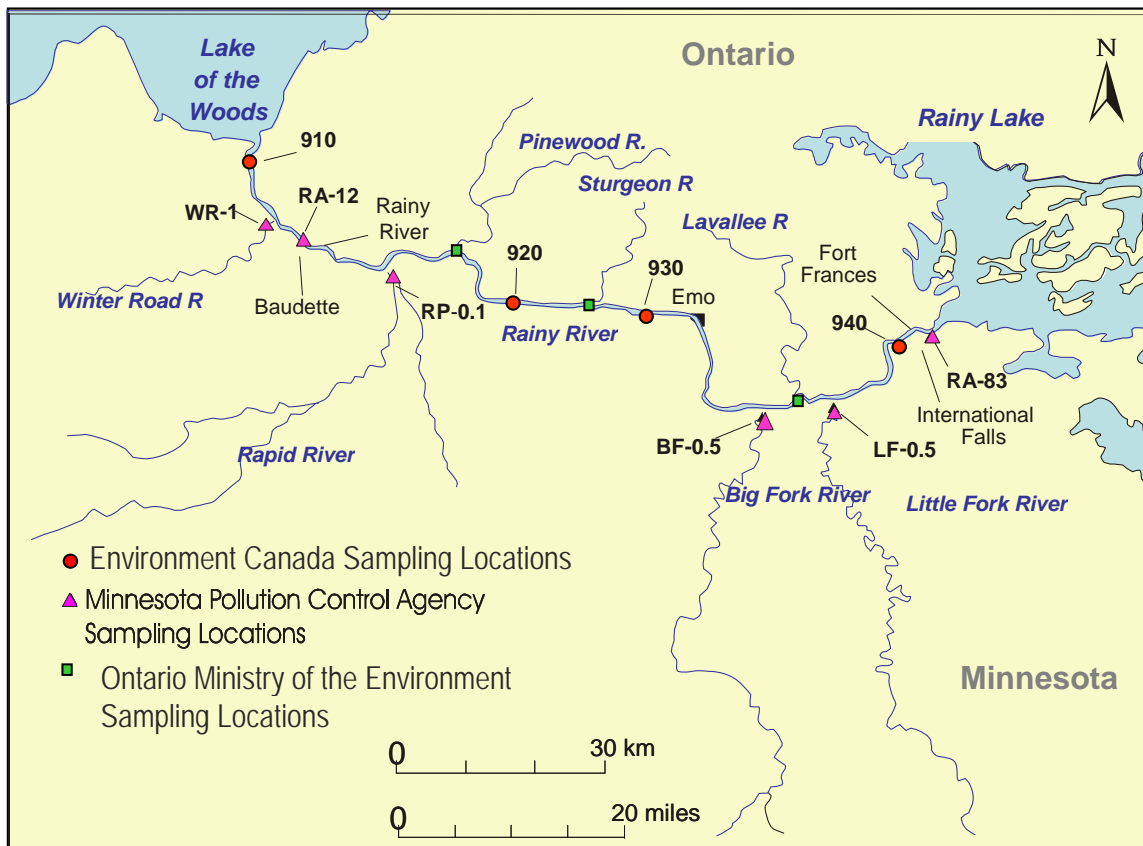
1 INTRODUCTION

The International Rainy Lake Board of Control (IRLBC) and the International Rainy River Water Pollution Board (IRRWPB) report jointly to the International Joint Commission (IJC) in the fall and spring of each year. Both reports address activities and basin issues of interest occurring since the previous report and may include sections on specific topics under review by the Boards. The fall reports focus on environmental quality and related issues, while the spring reports provide more detail on the regulation of Namakan and Rainy lakes over the previous calendar year.

The business of the two Boards continues to be conducted cooperatively, with joint conference calls throughout the year. Joint meetings were held in Fort Frances, Ontario in August. These included a public meeting held on August 17th, a meeting with the dam operators (ACH LP/AbitibiBowater and Boise Cascade), a meeting with resource agencies and a tour of the Seine River watershed hosted by the Seine River First Nation. In attendance from the IJC were Canadian Chair Joseph Comuzzi, Commissioner Pierre Trépanier, Commissioner Sam Speck, and engineering advisers Paul Pilon and Mark Colosimo. At the invitation of the Boards, members of the recently appointed International Lake of the Woods and Rainy River Watershed Task Force attended these meetings.

2 AMBIENT ENVIRONMENTAL MONITORING

Figure 1 Rainy River Sampling Locations for MPCA, OMOE, and Environment Canada



2.1 Water Quality Monitoring – MPCA

The Minnesota Pollution Control Agency (MPCA) monitors water quality on the Rainy River at two long term sampling stations and on four tributaries to the Rainy River (Figure 1). All of these monitoring stations are part of the Minnesota Milestone sampling program, a program that includes stationary stream monitoring sites throughout the state of Minnesota.

In keeping with the sampling schedule for the Minnesota Milestone program, these sites were last monitored in 2008 and were reported in the 2009 Fall Report. The MPCA Milestone sites are sampled monthly for ten months of two non-consecutive years in a five-year period. Milestone sampling is currently underway in the Rainy; the 2010 information is expected to be reported in the 2011 Fall Report. Previously collected data are available on the MPCA website at www.pca.state.mn.us.

Water samples collected from main stem Rainy River stations and tributaries are analyzed for temperature, dissolved oxygen (DO), turbidity, pH, conductivity, total phosphorus, biological oxygen demand (BOD), nitrate + nitrite, ammonia, chlorophyll a, total suspended solids, volatile solids, *E. coli*, and fecal coliform. The sites in Table 1 (Figure 1) are the current long-term water quality sampling stations on the main stem of the Rainy River and its tributaries. Data from this monitoring program can be seen on the MPCA website at <http://www.pca.state.mn.us/data/eda/index.cfm#monitoring>.

Table 1. MPCA Sampling Sites

Stations	Location	Parameters
RA - 12	Rainy River @ Baudette, MN	Turbidity, volatile solids, total suspended solids, pH, DO, BOD, chlorophyll a, total phosphorus, <i>E. coli</i> , fecal coliforms
RA - 83	Rainy River @ Int'l Falls, above dam	Turbidity, volatile solids, total suspended solids, pH, DO, BOD, chlorophyll a, total phosphorus, <i>E. coli</i> , fecal coliforms
BF - 0.5	Big Fork River @ bridge on MN 11 (4 mi. E of Loman, MN)	Turbidity, volatile solids, total suspended solids, pH, DO, BOD, chlorophyll a, total phosphorus, <i>E. coli</i> , fecal coliforms
LF - 0.5	Little Fork River @ bridge on MN 11 (0.5 mi. W of Pelland, MN)	Turbidity, volatile solids, total suspended solids, pH, DO, BOD, chlorophyll a, total phosphorus, <i>E. coli</i> , fecal coliforms
RP - 0.1	Rapid River @ Clementson, MN	Turbidity, volatile solids, total suspended solids, pH, DO, BOD, chlorophyll a, total phosphorus, <i>E. coli</i> , fecal coliforms
WR - 1	Winter Road River @ bridge on MN 11 (4 mi. W of Baudette, MN)	Turbidity, volatile solids, total suspended solids, pH, DO, BOD, chlorophyll a, total phosphorus, <i>E. coli</i> , fecal coliforms

The MPCA recently completed an assessment of the Milestones Monitoring Program and how it fits into its Intensive Watershed Approach begun in 2006. MPCA plans to eliminate the Milestone Monitoring Program effective November 1, 2010. All of the MPCA sites listed in Table 1 will be discontinued at this time.

While the Milestones network has for decades provided a mechanism for tracking long-term trends in stream water quality, the new watershed monitoring systems that MPCA has instituted are providing a much more complete picture of water quality conditions and trends. This new monitoring requires a significant investment to achieve the goals set forth by the agency and the Minnesota Legislature, and the agency continues to look for opportunities to increase efficiency to meet that staffing challenge. MPCA's future monitoring plans affecting Rainy River information:

- Complete trends analysis of this last decade of Milestones data and include it in the long-term trend information for these monitoring locations. This database will continue to provide information on stream water quality trends in the last half of the 20th century and the early 21st century.
- Major Watershed Load Monitoring Program began in 2007 provides extensive baseflow and storm event information for all major watersheds of the state. Baseline data from the first years of monitoring will be reported out this winter. The MPCA will continue to build the perpetual record at these sites over time. Advantages of the load monitoring network over Milestones include the watershed geographic coverage, annual year-round sampling, and the ability to calculate loads.
- The rotating 10-year cycle Intensive Watershed Monitoring approach includes chemistry monitoring and biological monitoring at many sites per watershed. Similar to Milestones, monitoring is conducted in each watershed on a decadal frequency, and subsequent decades will start to indicate trends. The amount and type of monitoring performed is significantly more extensive than of the Milestones Program.

Intensive Watershed Monitoring

In order to effectively sample streams throughout the state, the Minnesota Pollution Control Agency instituted the Intensive Watershed Monitoring Plan (IWM) in 2006. The main objectives of the IWM Strategy are to determine the condition of all watersheds throughout the state for a variety of indicators, to locate watersheds with impairments, to provide information for the stressor identification/Total Maximum Daily Load process, and to monitor conditions over time. This will be accomplished through intensive biological and water chemistry sampling.

The IWM utilizes a 'pour point' method of sampling; this systematic sampling near the mouth of watersheds of different size is used to measure the condition of the upstream watershed in an unbiased way. The intensive approach allows assessment of the watershed for aquatic life, aquatic recreation, and aquatic consumption of the state's lakes and streams in each of the state's 84 major watersheds on a rotating 10 year cycle. Stream uses are assessed to make sure that the goals of the Clean Water Act are being met; having "fishable, swimmable" waters.

Little Fork River Watershed

The lower reach of the Little Fork main stem was added to the United States Federal Impaired Waters List [303(d) Report to Congress] for turbidity in 2006. The Total Maximum Daily Load study and report development is scheduled to begin in 2012.

In 2006, the MPCA began the Little Fork/Big Fork Paired Watershed Study designed to provide resource managers with information that will explain why the Little Fork has high sediment concentrations causing the turbidity. 2006 field work included a sediment-loading study during spring runoff and gathering additional morphologic data from both watersheds. 2007 field work included a continuation of the spring runoff sediment loading study, as well as an on-the-ground reconnaissance and characterization of a 12-mile section of the river (with assistance from the MDNR).

In 2008, the MPCA also conducted the first phase of intensive watershed monitoring of the Little Fork River and tributaries. Sites were sampled to assess fish community structure, physical habitat, and water chemistry during the months of June - August. Invertebrate sampling at these sites was conducted in the month of September. Water quality sampling continued through 2009. A detailed assessment report is expected in 2010 or 2011. For more information on the MPCA's biological monitoring go to:

<http://www.pca.state.mn.us/water/biomonitoring/bio-about.html>

For a PDF map of monitoring locations on the Little Fork go to:

<http://www.pca.state.mn.us/publications/maps/biomonitoring-littleforkphase1.pdf>

In 2010, the MPCA will begin a Stressor Identification process as a follow up to the IWM and conduct a formal Use Assessment of all lakes and streams in the Little Fork Watershed.

Big Fork River Watershed

In 2010, the MPCA initiated the first phase of intensive watershed monitoring of the Big Fork River and tributaries.

Rainy River Headwaters Watershed

The White Iron Chain of Lakes Association (WICOLA), in cooperation with stakeholders and numerous state and federal agencies, is leading a volunteer-based, long term, condition monitoring project for the Kawishiwi River Watershed. The Kawishiwi is a sub-watershed of the Rainy River Headwaters Watershed. This effort was continued in 2009.

In 2008 WICOLA initiated a protection project for the Kawishiwi Watershed. The project is still under development, but it is expected to expand the ongoing monitoring effort and result in development of a watershed management plan.

Major Watershed Load Monitoring Program

Tied to the goals of the 1972 Clean Water Act (CWA) for restoring and protecting the multiple beneficial uses and ecological integrity of America's waters, the Minnesota Pollution Control Agency's (MPCA) Major Watershed Load Monitoring Program (MWLMP) is designed to measure and compare regional differences and long-term trends in water quality from Minnesota's major rivers and the outlets of major tributaries draining to these rivers. Data also will be used to aid in the development of "Total Maximum Daily Load" (TMDL) studies and implementation plans, assist watershed modeling efforts, and provide information to watershed research projects.

Initiated in 2007 and funded with appropriations from Minnesota's Clean Water Fund, the MWLMP's multi-agency monitoring approach combines site specific stream flow data from United States Geological Survey (USGS) and Minnesota Department of Natural Resources (DNR) flow gaging stations with water quality data collected by the Minnesota Pollution Control Agency, Metropolitan Council Environmental Services (MCES), and local monitoring organizations to compute annual nutrient and sediment pollutant loads.

MWLMP sites in the Rainy River Basin are located on the following rivers:

- Vermilion River
- Little Fork River
- Big Fork River
- Rainy River
- Rapid River

Lake of the Woods Study

In 2009, the MPCA implemented a loading study of tributaries to Lake of the Woods. This study included most of the U.S. direct tributaries to Lake of the Woods, including a Rainy River site at Manitou Rapids (currently an MWLMP site as described above). Data for 2009 are available at www.pca.state.mn.us. In 2010, the MPCA partnered with the USGS to establish a flow and stage gage and conduct a two year loading study at Wheeler's Point the terminus of the Rainy River. The Wheeler's Point site captures all of the Rainy River flow. Following completion of this two year study the MPCA will evaluate whether to continue operation of the gage. Following completion of the study data will be available on the MPCA website.

2.2 Water Quality Monitoring –EC

In 2009, Environment Canada (EC) initiated a program to monitor water quality on Lake of the Woods and, in 2009, added four sampling sites on the Rainy River in order to improve estimates of nutrient loadings to Lake of the Woods, and to measure mercury levels in the River for comparison to water quality guidelines. In cooperation with Rainy River First Nation, water samples are collected from four transects on the Rainy River (Table 2, Figure 1) on a bi-weekly basis to monitor nutrient and mercury concentrations. Each transect consisted of five equidistant stations running from the Canadian to the American shore. Water samples were sampled at each station at a depth of one meter and analyzed individually for nutrients and physical chemistry. A dip sample for mercury was taken from the central station of each transect. Sampling was initiated in June of 2009 at stations 920, 930 and 940, and continued through to October. Starting in October 2009 bi-weekly sampling was initiated near the outlet of the Rainy River (910) at Oak Groves Camp (Budreau's Oak Grove Camp); sampling at this location takes place year round. During winter months samples are also collected at the Fort Frances water treatment plant from their water intake pipe.

At the southern most station of transect 940 at Fort Frances total phosphorus concentrations exceeded Rainy River Alert Levels, designated by the IRRWPB as 0.30 mg/L on two out of five sampling events. Examination of water quality data along this transect indicated that elevated concentrations of nutrients and major ions were seen only at the southern most station and were likely influenced by its proximity to the outflow of the International Falls sewage treatment facility. This transect was subsequently moved to a location away from the sewage treatment facility so as to better represent river quality that generally

affects aquatic health. No other exceedances of Rainy River Alert Levels were noted at EC sampling transects in 2009.

Table 2 EC Sampling Sites in the Rainy River

Transect	Location	Parameters Measured
910	Rainy River outlet	Mercury, nitrate/nitrite, ammonia, phosphorus, major ions
920	Rainy River below Long Sault Rapids	Mercury, nitrate/nitrite, ammonia, phosphorus, major ions
930	Rainy River below Manitou Rapids	Mercury, nitrate/nitrite, ammonia, phosphorus, major ions
940	Rainy River below Fort Frances	Mercury, nitrate/nitrite, ammonia, phosphorus, major ions

2.3 Water Quality Monitoring –USGS

In water year 2009 (October 2008 through September 2009), the USGS did not sample the Rainy River. USGS did sample for contaminants of emerging concern in Shagawa Lake and near the outfall of the waste-water treatment plant (WWTP) of Ely, MN as part of a statewide study of WWTPs in cooperation with the Minnesota Pollution Control Agency. Most of the concentrations were below detection limits. These basic data can be found in the USGS National Water Information System data base.

Water-quality, sediment-quality, and streamflow data were collected from 22 sites affecting Kabetogama Lake in Voyageurs National Park in 2008 and 2009 in order to assess internal and external nutrient loading and algal community characteristics. Kabetogama Lake is the greatest concern for eutrophication among the lakes in Voyageurs National Park due to its shallow depth, which makes it more susceptible to internal loading, and development and other nutrient sources on the southern shore. The final USGS report has been drafted for technical review and is expected to be published in 2011. The major preliminary results of this study are:

- Water entering Kabetogama Lake (inflow sites) had greater secchi-disk transparencies than water in Kabetogama Lake.
- The water between Kabetogama and Namakan Lakes indicated a mixture of the waterbodies as indicated by specific conductance and alkalinity values of 65 microSiemens per centimeter and 23 milligrams per liter, respectively. Specific conductance and alkalinity are larger in Kabetogama Lake and smaller in Namakan Lake.
- Temperature and dissolved oxygen profiles show that, in general, Kabetogama Lake is well mixed except for occasional thermal and dissolved oxygen stratification in some areas, including Lost Bay.
- In general, nutrient concentrations were larger at the inflows than at lake sites and outflows.
- Bottom-water samples, Lost Bay in particular, had large nutrient concentrations that may be indicative of internal loading in Kabetogama Lake.
- Instantaneous phosphorus loads into Kabetogama Lake indicate that inputs (651 kilograms per day) may exceed outputs (408 kilograms per day), although the hydrologic system is complex and flow of water through the system is difficult to assess.
- Sediment nutrient concentrations were largest at the two deepest lake sites (near Grave Island and in Lost Bay) indicating that these may be important areas for internal loading.

- Internal loading also was indicated as a substantial source of phosphorus when core incubation samples were analyzed for phosphorus release from sediments—sites near Cemetery Island, near Grave Island, and in Lost Bay had the largest phosphorus release rates.
- Trophic state indices computed from chlorophyll-a concentrations ranged from 27 to 80 with mean values of 51 in 2008 and 44 in 2009, classifying Kabetogama Lake as mesotrophic.
- Cyanobacteria were present in every algal sample collected and generally were the taxa with the largest cell density and biovolume at lake sites with few exceptions.
- Seven of 14 samples analyzed for microcystin had concentrations that exceeded the World Health Organization’s guideline of 1.0 micrograms per liter for drinking water and two samples were in the World Health Organization’s moderate risk category for recreational exposure.

2.4 Tributary Monitoring Program – OMOE

In spring 2010, the Ontario Ministry of the Environment, in collaboration with Confederation College, continued their 2009 tributary monitoring program. The main objective of this work is to fill the previously identified data gap in the nutrient budgeting exercise for the Lake of the Woods undertaken this past year by Trent University. This work will also help to identify those tributaries with the highest nutrient loadings and help focus possible reduction strategies in the future. Sampling is occurring on three tributaries to the Rainy River: the Lavallee River, the Sturgeon River and the Pinewood River in addition to six other tributaries to Lake of the Woods and the outlet at the Winnipeg River.

As of September 27, sampling events have occurred on all the tributaries on minimum of a biweekly basis with additional sampling during storm events since the end of April and sampling will continue through fall until the water surface freezes. Samples have been analyzed for nutrients (phosphorus, nitrogen) and general chemistry parameters (pH, alkalinity, specific conductance, total and dissolved solids, dissolved organic and inorganic carbon, and reactive silicate). Selected samples have also been analyzed for metals to provide Regional Staff reference data. Wherever possible, stream flow measuring and water level logging has occurred and data are being compiled into a database. It is expected that results from 2010 will be used to refine the nutrient budget developed for the Rainy River and for Lake of the Woods, as the current budgets are based on only one year’s worth of tributary information. The sampling program is expected to continue in 2011 to further the knowledge being gained for the purpose of making meaningful management decisions.

2.5 Fish Consumption Advisories

Fish consumption advisories are issued based on fish tissue monitoring carried out by provincial and state agencies in Ontario and Minnesota. In Minnesota, it is a shared program between the Minnesota Department of Natural Resources (MDNR) and the Minnesota Department of Health (MDH), while in Ontario it is a shared program with the Ontario Ministry of Natural Resources (OMNR) and the Ontario Ministry of Environment (MOE).

Minnesota

Each year, the MDNR collects fish from lakes and rivers for testing. Fish fillets are tested for mercury and in some cases polychlorinated biphenyls (PCBs). The MDNR, the MPCA, and the MDH collaborate to select sites where fish are tested. The MPCA also screens fish for other chemical

contaminants that may be of concern. The MDH issues fish consumption advice based on the concentrations of chemicals measured in fish fillets. The concentrations that trigger fish consumption advice are listed in Appendix A.

Currently (2010) MDH issues consumption advisories based on mercury for Rainy Lake, Rainy River, Little Fork River, Big Fork River, Vermilion River and Lake of the Woods. Detailed information can be found at <http://www.health.state.mn.us/divs/eh/fish/index.html>.

Ontario

The *Guide to Eating Ontario Sport Fish* is published every other year by the OMOE in cooperation with the OMNR. Skinless boneless dorsal fillets are analyzed for a variety of contaminants that may include mercury and other metals, DDT, PCBs, PCB congeners, mirex/photomirex, pesticides, chlorinated phenols, chlorinated benzenes, polycyclic aromatic hydrocarbons (PAHs), dioxins/furans and dioxin-like PCBs. Results are used to develop tables in the *Guide*, which give size-specific consumption advice for each species tested at each location. For Rainy River and Lake of the Woods where contaminant burdens vary within the water body, consumption advice is given for each area. The number of recommended meals per month ranges from 8, for fish with low contaminant concentrations, to zero, for fish with high contaminant concentrations. Consumption advice is based on health protection guidelines developed by Health Canada. The 2009-2010 *Guide* contains important information on consumption of sport fish for both the general population and the sensitive population of women of child-bearing age and children under 15. The concentrations that trigger fish consumption advice are listed in Appendix A.

Advisories restricting fish consumption remain in effect for Rainy Lake, Rainy River, and Lake of the Woods. Consumption guidelines also vary within these water bodies with consumption of northern pike and walleye being more restricted in Rainy Lake in fish from Redgut Bay compared to fish from the North and South arm of the lake. These advisories are mainly a result of mercury concentrations in fish tissue, but depending on the fish species are also the result of PCB body burdens in these three water bodies. Fish consumers should consult the “2009-2010 *Guide to Eating Ontario Sport Fish*” for more detailed information. The Guide can be accessed at <http://www.ontario.ca/fishguide>

2.6 Environmental Effects Monitoring

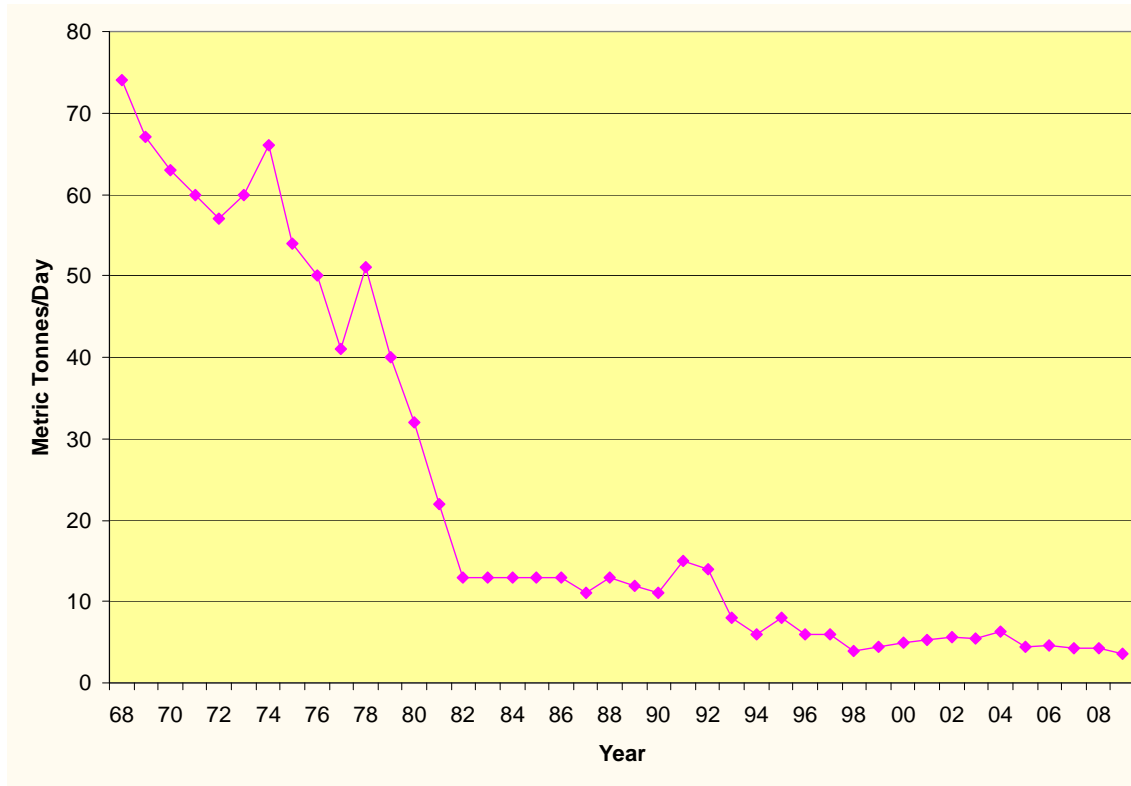
Through federal legislation, the Environmental Effects Monitoring program requires pulp and paper mills in Canada to monitor the effects of pulp and paper mill discharges in receiving waters. Study components include an adult fish survey, a benthic invertebrate survey, and toxicological testing of final effluent. The EEM program consists of a 3-year cycle of monitoring and interpretation that build on the findings from previous cycles. Cycle 5 for the Fort Frances Mill was conducted in spring 2009 and results are pending.

3 POINT SOURCE DISCHARGES

As indicated in the recent Board reports, point source discharges to the Rainy River from municipal and industrial sources have remained relatively constant from a loadings perspective. The dramatic decreases in loading for conventional parameters, such as biological oxygen demand (BOD) and total suspended solids (TSS), from the 1960's to the early 1980's are the direct result of remedial measures undertaken by industry and municipalities. Figure 2 shows this historical downtrend of BOD from municipal and industrial sources. With no other significant remedial measures planned, BOD loads to

the Rainy River likely will continue at or around the current levels. Given the nuisance algal bloom and elevated nutrient issues faced in water bodies downstream of Rainy River (Lake of the Woods, Lake Winnipeg), the Boards have decided to include information on point sources loadings of total phosphorus (where available) in this report, but historical data is limited.

Figure 2 Total BOD Load from Continuous Discharges 1968 - 2009



3.1 Minnesota Municipal Sources

North Koochiching Sanitary Sewer District:

The District, which includes International Falls, discharges to the Rainy River downstream of International Falls. The current NPDES Permit for the District expires in 2012. The District reported no violations to its discharge permit for the calendar year 2009. Discharge data from this facility are shown in Table 3 for the years 1996 through 2009. The National Pollutant Discharge Elimination System (NPDES) Permit for the District does not have a limit for total phosphorus.

Table 3 North Koochiching Sanitary Sewer Average Annual Discharge Summary

[BOD, Biological Oxygen Demand; TSS, Total Suspended Slids; and TP, Total Phosphorus]

Year	Flow (m3/d)	BOD (kg/d)	TSS (kg/d)	TP (kg/d)
1996	6813	89.7	50.4	-
1997	4921	77.4	38.6	-
1998	5349	77.1	32.4	-
1999	5149	70.0	35.0	-
2000	4245	54.6	26.7	-
2001	4920	64.3	35.4	-
2002	4538	71.0	35.2	11.4
2003	3191	47.1	20.2	10.2
2004	4397	43.4	19.0	10.6
2005	4781	51.6	24.6	12.0
2006	3794	46.2	18.6	12.5
2007	3780	41.1	24.6	11.7
2008	4391	39.1	35.7	10.8
2009	4634	52.3	34.1	10.5

“-” = Data unavailable at the time this report was generated

Baudette

The Baudette wastewater treatment facility has a lagoon system that discharges seasonally to the Rainy River. The facility discharged during May, June and November of 2009. The total discharge during that period was 201,912 m³. Monthly discharge volumes are shown below in Table 4. During discharge periods, BOD levels were well within the NPDES Permit limits of 25 mg/L and TSS levels were below 45 mg/L. Average BOD and TSS concentrations during discharge were 6.16 mg/L and 23.33 mg/L, respectively. The NPDES Permit for the Baudette facility does not have a limit for total phosphorus. Average total phosphorus concentration during discharge was 2.64 mg/L. The facility reported no violations to its discharge permit for the calendar year 2009. The NPDES Permit for the Baudette facility expired in May 2009. Minnesota is in the process of developing a General Permit for Stabilization Pond Facilities (MNG58). This general permit is on public notice through September 24th. The Baudette permit renewal is an MPCA and an EPA priority permit and will be the first one issued when the General Permit is signed. There are no planned changes to the facility’s effluent limits at this time. The city is not planning any changes to their system at this time.

Table 4 Baudette Waste Water Treatment Facility Monthly Discharge in m3

Year	April	May	June	July	Aug	Sept	Oct	Nov
2004	none	144,235	28,847	none	none	96,157	67,310	38,463
2005	57,690	none	96,150	none	none	38,460	57,690	67,305
2006	none	69,150	67,305	none	none	none	48,075	none
2007	none	76,920	none	none	none	none	96,149	38,460
2008	none	96,149	none	none	none	none	67,305	67,305
2009	none	67,304	67,304	none	none	none	None	67,304

3.2 Ontario Municipal Sources

Fort Frances

A rebuild and upgrade of the Fort Frances wastewater treatment plant was completed in January 1998 to include secondary treatment and phosphorus removal. The result of improved treatment is indicated in the 1998 discharge data in Table 5 which includes two years of pre-secondary treatment and ten years of secondary treatment. The plant operated throughout 2009 within the Ministry of Environment guidelines of 25 mg/L for both BOD and TSS. Average concentrations in 2009 were 3.02 mg/L BOD and 6.3 mg/L TSS, both well within the 25 mg/L limit. There were no bypass events in 2009. The average total phosphorus concentration in the discharge was 0.21 mg/L, resulting in an average loading of 1.55 kg/day.

Table 5 Fort Frances Wastewater Treatment Plant Average Annual Discharge Summary

Year	Flow (m ³ /d)	BOD (kg/d)	TSS (kg/d)	TP (kg/d)
1996	8940	211	449	-
1997	7240	323	447	-
1998	6500	52	76	-
1999	8280	48	56	-
2000	6973	48	55	-
2001	8144	46	90	-
2002	7549	52	88	-
2003	6281	44	71	-
2004	7791	59	89	-
2005	8684	30	80	2.37
2006	7249	27	74	1.86
2007	6724	21	67	1.75
2008	7355	27	74	2.00
2009	7540	23	46	1.55

“-” = Data unavailable at the time this report was generated

Emo

The Town of Emo has a seasonal discharge from its sewage lagoon to the Rainy River. During 2009, a total of 131,562 m³ was discharged to the river in the spring and fall. BOD and TSS were within the provincial discharge guidelines of 40 mg/L and 30 mg/L, respectively, during discharge periods. Average BOD and TSS concentrations during discharge were 6.0 mg/L and 4.8 mg/L. Total phosphorus concentrations averaged 0.78 mg/L resulting in a total loading of 99 kg of Total P throughout the year. There were no bypass events at the Emo sewage lagoon in 2009 nor were there any lagoon overflows.

Manitou Rapids

The sewage lagoon operated by Rainy River First Nations at Manitou Rapids is monitored by Health Canada. In May of 2009 the sewage lagoon was monitored until concentrations of phosphorus, biochemical oxygen demand were within guideline concentrations for release. During the May discharge BOD was 19.9 mg/L, TSS was 22.2 mg/L and TP was 1.0 mg/L. Sewage was also discharged in October 2009; concentrations of BOD were less than 3 mg/L, TSS was 3 mg/L and TP was 0.52 mg/L. The volume of effluent discharged cannot currently be measured at this facility.

Barwick

The lagoon in Barwick discharged 7848 m³ effluent to the Rainy River in October of 2009 during a 25 hour period. During this discharge period, BOD averaged 9.1 mg/L and TSS averaged 20.6 mg/L for a total of 71.4 kgs and 161.7 kgs respectively. There were no bypasses or lagoon/ lift station overflows at this facility in 2009.

Rainy River

The Town of Rainy River discharged a total of 140,733 m³ from its lagoon to the Rainy River during the spring and fall of 2009 with average flows of 5,026 m³ per day during discharge periods. During the discharge period, BOD averaged 6.6 mg/L and TSS averaged 16.5 mg/L, both below the provincial guidelines of 40 mg/L and 30 mg/L, respectively. Total phosphorus concentrations averaged 0.23 mg/L in the discharge for a total loading of 32.4 kg during the year.

There were three lift station overflow events which released a total of 803 m³ of untreated sewage into the Rainy River.

3.3 Minnesota Industrial Sources

Boise Cascade - International Falls

Discharge data from 1996 to 2009, including effluent flow, BOD, TSS, absorbable organic halogens (AOX), and total phosphorus (TP) for the Boise Cascade mill in International Falls, is provided below in Table 6. There were no National Pollutant Discharge Elimination System permit violations in calendar year 2009. Dioxins and furans in bleach plant effluent samples were below the regulatory threshold (pursuant to 40 CFR Sec. 430.01) of 10 parts per quadrillion (ppq) in 2009. The NPDES Permit for the Boise Cascade facility expired in August 2009, was renewed in 2010. The current permit will expire in 2015.

Table 6 Boise Cascade Annual Average Discharge Data

	Flow (m3/d)	BOD (kg/d)	TSS (kg/d)	AOX (kg/d)	TP (kg/d)
Permit Limit	N/A	4,720	7,935	567	N/A
1996	120,363	1,500	3,750	762	-
1997	114,686	1,150	2,230	615	-
1998	158,242	1,129	2,156	611	-
1999	149,368	1,537	2,105	506	-
2000	158,837	789	1,183	805	125.5
2001	135,768	645	1,079	N/A	72.0
2002	160,484	747	1,584	N/A	133.2
2003	143,164	956	2,094	N/A	153.2
2004	150,496	1,884	3,978	N/A	102.3
2005	150,325	1,134	1,810	267	78.2
2006	151,358	561	1,161	232	221.0
2007	148,076	695	1,191	225	131.8
2008	147,536	526	785	224	124.4
2009	151,897	744	1,219	273	108.9

“-” = Data unavailable at the time this report was generated

“N/A” = Not analyzed

3.4 Ontario Industrial Sources

AbitibiBowater -Fort Frances

Data on flow, BOD, TSS, AOX and TP are provided in Table 7 for the years 1996 through 2009. The average annual daily loads for BOD, TSS and AOX in 2009 continue to be well below compliance levels. The mill was shut down during the spring of April 1 – 13 during poor market conditions, during Sept 14 for a power outage, during the period of Sept. 12 – 28 for maintenance and during Dec 24 – 26 for holidays.

Table 7 AbitibiBowater Average Annual Discharge Data

Year	Flow (m3/d)	BOD (kg/d)	TSS (kg/d)	AOX (kg/d)	TP (kg/d)
Compliance Limit	N/A	5990	9420	956	
1996	84800	3330	4790	271	-
1997	84900	3350	5320	284	-
1998	59700	2290	3150	140	-
1999	86469	2700	5300	272	-
2000	91129	4139	6563	274	-
2001	88184	4484	6216	234	-
2002	87954	4701	6635	233	-
2003	88899	4429	5362	212	-
2004	80068	4279	5152	221	-
2005	79966	3199	4204	187	116.3
2006	78470	3936	4435	179	136.4
2007	78098	3492	4311	164	140.9
2008	67063	3107	4686	152	123.4
2009	63885	2839	3845	176	78.67

“-” = Data unavailable at the time this report was generated

4 BASIN ISSUES AND OTHER BUSINESS

4.1 Namakan and Rainy Lakes Regulation

The marked variability in basin climate and the incidence of extreme climatic conditions observed over the last decade continued in 2010. Following the 4th driest winter in 101 years of record, a small, early freshet led to low inflows on Namakan and Rainy lakes through the spring. Each lake was below its respective lower rule curve from mid-May until early July, despite minimum outflows as specified by the IJC’s 2001 Consolidated Order. In April, the Boards responded to concerns raised with the Boards by the Kabetogema Lake Association about low lake levels in advance of the Minnesota Governor’s Fishing Opener in mid-May. Lake levels rose sufficiently however, to allow for favorable conditions without directing regulation outside of the requirements of the Consolidated Order.

Conditions changed quickly in July, with two large storm events resulting in new local 5-day rainfall records. This drove a sharp recovery in levels on both lakes, with Namakan Lake level exceeding its upper rule curve for 7 days as a result. Conditions remained wet in July, with the average basin precipitation for the month being the 4th highest in 106 years of record. The lakes have remained within

the respective rule curves since that time with a steady decline in inflows through August and more normal inflows in early September.

A detailed review of basin regulation for 2010 will be provided in the 2011 Spring Report.

4.2 Proposed Hydropower Developments on the Namakan River in Ontario

The Ojibway Power and Energy Group (OPEG), a partnership between the Lac La Croix First Nation and Chant construction, is the proponent of a 6.4 Megawatt (previously 6.9 MW) run of the river hydroelectric generating station at High Falls on the Namakan River. OPEG released its draft Environmental Report on December 23, 2009 for a 65 day public and agency review.

OPEG is considering comments received through the public and agency consultation and, where it judges necessary, will make revisions to its Environment Report. Subsequently, the proponent will release its Final Environmental Report along with a Notice of Completion of the Class Environmental Assessment process. The Final Environmental Report will be available for public and agency review for a minimum of 30 days.

Reports on the movement of Lake Sturgeon within the Namakan River and Namakan Reservoir river system continue to be updated as studies by the Ontario Ministry of Natural Resources (OMNR) and Voyageur National Park progress. The American and Canadian public continues to show an interest regarding potential impacts on the movement of Lake Sturgeon and other fish species in the transboundary waters. This project was on the agenda at the IJC Semi-Annual Meeting held in Washington in August, 2010. The Boards will continue to monitor developments related to this project, and keep the Commission advised.

4.3 Rainy River Peaking Work Group

As discussed in previous reports, hydropower peaking, the process of varying flow to coincide with peak times in electricity demand, on the Rainy River was an issue of major concern for MDNR and OMNR fisheries managers. The Rainy Boards formed the Peaking Work Group in 2006 to deal with these issues.

At its April 1, 2010 meeting the Peaking Work Group, after reviewing data indicating that the Walleye spawn had already started, set the 2010 spring spawning window to commence immediately with a tentative end date of June 15th. The Work Group scheduled a mid-window review for June 1st.

At the June 1st meeting the Work Group resource managers reported that the second sturgeon spawn was underway and larval drift was expected within ten days. The Work Group affirmed the June 15th window end date.

4.4 Environmental Monitoring for Future Rule Curve Evaluation

Since the Boards' fall report to the Commission in 2008, the Boards' fall and spring reports have provided the status of the work of the Commission's 2000 Rule Curve Assessment Workgroup and some details of the environmental monitoring work currently underway by the resource agencies. In response to the recommendations submitted to the Commission on June 29, 2009 in the Workgroup's final Plan of Study (POS), the Commission has undertaken implementation of the recommended studies, as funds become available. It is anticipated that many of these studies will be funded through the IJC's

International Watersheds Initiative and the boards have been working closely with the IJC on budgeting, scheduling and management of these studies. As mentioned in the Boards' spring 2010 report, a core study on the effects of the 2000 Rule Curve change on aquatic vegetation, identified in the Workgroup's final POS, was conditionally approved by the Commission's IWI Review Committee. Subsequently, this study was approved and work is proceeding, as discussed in Section 4.5.3

Regarding some of the current resource agency monitoring, Voyageurs National Park is conducting research and monitoring projects, including a project that uses five "best bet" ecological indicators (benthic macro-invertebrates, wetland vegetation, fish, common loon and furbearers) to determine effects of implementation of the 2000 Rule Curves. As reported in the Boards fall 2009 and 2010 spring reports to the Commission, final reports have been generated and submitted to the Boards for two of the five "best bet" indicators, benthic macro-invertebrates and wetland vegetation. Currently, the fish indicator project remains in the process of peer review, the common loon indicator project report is drafted, but with some minor revisions needed and the furbearer indicator project has more work to be done including the project report.

4.5 IJC International Watersheds Initiative Projects

The International Watersheds Initiative (IWI) promotes an integrated, ecosystem approach to issues arising in transboundary waters through enhanced local participation and strengthened local capacity. Since the Rainy basin was identified by the IJC as a potential IWI watershed, the Boards have been involved in a number of IWI-related activities. The public can read more about the IWI at:

http://www.ijc.org/en/activities/bassins_watersheds.htm

Upper Rainy River Modeling

The Boards contracted the Canadian Hydraulic Centre of the National Research Centre in Ottawa (CHC) to simulate the complex hydraulic conditions of flows in the Upper Rainy River from Rainy Lake to the dam at International Falls/Fort Frances. The two-dimensional models simulate the flows under current bathymetry as well as under a state of nature, i.e., before the construction of the bridge and the dam works, based on survey drawings from over a hundred years ago. The next steps are to use the model to investigate various gate scenarios and graphically animate the water levels, to simulate the 1950 flood, to investigate turbine performance and to determine the sensitivity of the water levels to the bathymetry at the Ranier Rapids, the outlet control for Rainy Lake. These next steps are also proposed as a contract for CHC as part of the IWI projects.

Temperature Gauges

Temperature monitoring on the Rainy River was begun in an effort to better understand potential relations to fish spawning events. The USGS, in partnership with IJC-IWI, continues to monitor temperature at the stream gage located on the Rainy River at Manitou Rapids, Minn (station 05133500). These data have been collected since spring 2009 and can be viewed via the Internet at:

<http://waterdata.usgs.gov/nwis/uv?05133500>

As part of a relocation of its monitoring gauge, 05PC021 on the Rainy River at the Town of Rainy River, the Water Survey of Canada installed a water temperature gauge. The hourly water temperatures have been available on the web,

http://www.wateroffice.ec.gc.ca/graph/graph_e.html?stn=05PC021&prm1=5&prm2=-

[1&mode=graph&smo=8&sday=8&syr=2010&emo=9&eday=25&eyr=2010&y1min=&y1max=&y2min=&y2max=](#) since mid-August 2010.

The river water temperature will be correlated with fish spawning habits, to verify the benefits of restricting peaking and ponding at the International/Fort Frances dam during the walleye and sturgeon spawn. A report is expected in a couple of years as part of the IWI projects.

2000 Rule Curve Indicator: Changes in Submerged Aquatic Vegetation

As reported in the Boards' 2010 spring report, the Boards, IJC and Voyageurs National Park staff had made significant progress on satisfying the IJC conditions of approval to allow work on an IWI proposal submitted by the Rainy Boards to fund a study to assess changes in near shore submerged aquatic vegetation communities in Rainy Lake and Namakan Reservoir (using Lac la Croix as the reference), and how these changes relate to effects of the 2000 Rule Curves. The conditions for approval were satisfied and a contract to perform the study was negotiated between the U.S. Section of the Commission and Northland College in Ashland Wisconsin to proceed during this year's open-water season. The contract performance period is from July 1, 2010 through June 30, 2011. The first task under the contract deliverables, collection of field data, was completed this summer in accordance with contract requirements by the principal investigators (Meeker and Harris). This study will follow up on similar studies conducted by Meeker and Harris in 1987 and from 2002 to 2005, allowing for methodological and taxonomic consistency with the earlier studies.

Modeling Workshop

The IJC sponsored a modeling workshop in June 2010 in Winnipeg for a number of Boards. The Rainy Boards were represented by Nolan Baratono, Gail Faveri, and Matthew deWolfe. Hydrologic, hydraulic and water quality models were discussed at the June workshop, where the Rainy Boards discussed the existing hydraulic models, the model used to assist in outflow regulation, and the proposed models for the Chain of Namakan Lakes and Rainy Lake. The IJC promised to establish a list of preferred models for the use of Boards. Two more workshops are expected by the spring of 2011.

4.6 ILWRRW Task Force

The Governments of Canada and the United States, in letters to the International Joint Commission (IJC) dated June 17, 2010, requested that the IJC review and make recommendations regarding the bi-national management of the Lake of the Woods and Rainy River Basin and the IJC's potential role in this management. Recommendations are to address potential structures and mechanisms for governance as well as priority issues or activities to be addressed by or through such mechanisms. The International Lake of the Woods and Rainy River Watershed Task Force has been established by the IJC to assist it in responding to the governments' request. The IJC held public meetings in the Lake of the Woods and Rainy River Basin in early September 2010 to announce the reference and introduce the new ILWRRW Task Force. The Task Force is establishing a Citizen Advisory Committee (CAG) and is preparing a work plan to be reviewed by the CAG and the public in October 2010.

4.7 Meetings

This section contains brief summaries of key meetings and tours attended by the Boards and their staff during the reporting period.

Board Conference Calls and Meetings

The Boards held a conference call on May 13. The main purpose of the call was to discuss project planning and budgeting for the 2015 rule curve review for Namakan and Rainy lakes. This discussion was continued at the Boards next conference call on July 9 which focused on specific projects needed to complete the review and on project management.

IJC Spring Semi-Annual Meeting – April 21, 2010

On April 21 members and staff of the Boards appeared before the IJC at their semi-annual hearing in Washington to present the Boards' spring report. A combined meeting of the Boards was held in Washington, D.C. on April 21 in advance of their appearance before the Commission. In addition to finalizing preparations for their presentation, the Boards also discussed the concerns over the dry basin conditions, finalized a 2010-2011 Boards work plan, made preliminary plans for basin meetings in August and discussed the 2015 rule curve review process.

IRLBC/IRRWPB Joint Annual Basin Meetings – August 17-19, 2010

The Boards met with IJC commissioners and staff at La Place Rendez Vous in Fort Frances, Ontario from Aug. 17 to 19th for their tenth annual joint meetings to discuss water issues in the Rainy Namakan Lake and Rainy River basins. The meetings consisted of an afternoon joint Board meeting on the 17th, followed by a meeting with the dam operators (ACH and Boise). A public meeting was held in the evening of the 17th in Fort Frances, Ontario.

Dam Operators Meeting

At the meeting with the dam operators on the afternoon of August 17th, Boise Paper Solutions and ACH/AbitibiBowater representatives presented a summary of their regulation activities and dam operations during the preceding twelve months as well as an update on dam maintenance and safety activities, data collection and public information efforts. The Boards asked that the dam operators provide an assessment of the financial costs of the 2001 Rule Curves to the companies. Both companies suggested that the 2001 Rule Curves are too rigid particularly in regards to the need to target the mid-band of the curves. The Boards encouraged the companies to use some latitude and emphasized the necessity of maintaining communication between the dam operators and the Boards.

ACH reported that the transition towards automation is complete and as of June 2009 all water management activities have been directed from the Oshawa Control Center. The relocation of the fire water intake was also discussed. Currently, if a large number of dam waste gates are opened when the Rainy Lake levels are below the IJC "all-gates-open" criteria, the pumps may not be able to operate. Preparations are taking place to install an additional fire pump in the kraft mill facility to provide additional fire water intake when the waste gates are fully open. ACH hopes to have the additional fire water intake in place by 2011 providing they are able to obtain the proper permits. The Rainy Lake toll-free information line operated by ACH continues to be updated daily. Very few individuals are making use of this service. Several ACH facilities, including the power generation facility in Fort Frances, are potentially to be sold as part of the restructuring of AbitibiBowater. ACH will keep the Boards informed as this process unfolds. Boise discussed their communications strategy. They are continuing to operate a website and also publish water level graphs in the International Falls Journal on a weekly basis.

Public Meeting

The Boards held their public meeting in Fort Frances on the 17th of August from approximately 7:00 pm to 9:00 pm. In addition to the Boards, three IJC commissioners were in attendance, Canadian Co-Chair Joseph Comuzzi, and commissioners Samuel Speck and Pierre Trépanier. The meeting was well attended by residents of the basin from Canada and the US, members of resource agencies, NGOs and local media representatives. The Boards made a brief presentation which included an update on water quantity and quality issues in the Rainy basin over the past year in addition to the new reference for Lake of the Woods. Following the presentation the Boards solicited questions and comments from audience members.

A resident of the North Arm of Rain Lake stated that the water levels in the North Arm rose very quickly to high levels after a rain event, while water levels in the rest of Rainy Lake were normal. The Boards noted that there is not a water level gage in the North Arm and that levels in this area can be quite different than the rest of the lakes due to restrictions in water flow from the arm if a rain event is isolated in this area. The Boards would consider placing a gage in this area; meanwhile residents were invited to report water levels to the Boards using a staff gage.

Residents noted that the companies and Boards did a good job of regulating water levels this spring, however they questioned why, given the early and moderate spring freshet in March, more water wasn't held in the basin. The Boards explained that anticipated levels were predicted to exceed the upper rule curves so that some water was released. The Rainy Lake Conservancy and the Voyageur National Park Association expressed their concern regarding the proposed Namakan hydro development project, particularly in regards to impacts on bi-national sturgeon stocks. The Boards provided an update on the Namakan Environmental Impact assessment, as did a staff member of a local resource agency. Boards reminded the audience that they must remain impartial in order to be in a position this project if so requested.

Tour and Meeting with the Seine River First Nation

On the 18th of August, the Boards were invited by the Seine River First Nation to visit a number of sites within the Seine River basin and discuss some of their concerns regarding water quality and quantity issues. The Boards visited Turtle Lake to discuss the potential impact of water level changes on rice harvests and the possibility of creating new rice growing areas in areas where the water levels are not subject to extreme fluctuations. The Boards then visited the Crilly dam facility currently operated by ACH, to discuss potential impacts of hydro peaking on sturgeon and walleye spawning. The Boards and Seine River Council discussed the possibility of monitoring sturgeon spawning in relation to water temperature and flows with the goal of identifying spawning windows during which peaking might be reduced to protect the spawning beds. After a shore lunch with the council and elders of the Seine River First Nations and a tour of the health facilities the Boards continued to Rat River to view a wild rice growing area where there is concern that wild rice beds are being replaced by invasive cattails.

Resource Agencies Meeting

At the invitation of the boards, a meeting was held on the morning of August 19 with representatives of local resource agencies and other governmental organizations that have responsibility for water resources information and management within the Rainy River basin. In attendance were representatives from the U.S. Voyageurs National Park, Ontario Ministry of

Natural Resources, Ontario Ministry of the Environment, Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, Lake of the Woods Soil Water Conservation District, the Red Lake Band, and Rainy River First Nation.

Ryan Maki and Steve Windels presented an update on projects being conducted by Voyageurs National Park (VNP), particularly those studies which are designed to monitor the impacts of changes in water regulation associated with the 2000 Rule Curves. Five 'best bet' ecological indicators were chosen to evaluate the impacts of the curves; reports on two have been completed and a third is in review. Statistical analyses are being conducted to synthesize the results from these studies using analytical models. A second study on changes in wetland vegetation is being conducted to parse out the impacts of water level changes and changes in climate. Other projects being pursued by VNP in regards to water regulation include a study to determine the historical impact of water level management on lakes in VNP using paleolimnology. A further study is being conducted to determine the impacts of water level changes on nutrient cycling in Kabetogama Lake, estimate nutrient loading and measure microcystin production from algal blooms. Sturgeon research continues in the park with a study in population demographic, movements and habitat characteristics of lake sturgeon in the Namakan Reservoir and a study on habitat use and growth rates in juvenile sturgeon in the Namakan River and Namakan Reservoir.

The Minnesota Pollution Control Agency, the Ontario Ministry of the Environment (OMOE) and the Red Lake Band each presented an update of water monitoring efforts in the Lake of the Woods and Rainy River basin focused on developing a nutrient budget for this watershed. Nolan Baraton and Patrick Baskfield provided an overview of Minnesota's major watershed load management program designed to monitor and compare geographic and temporal trends in water quality from Minnesota's major rivers and tributaries. Both water quality and flows are quantified to determine maximum daily loadings of nutrients and priority pollutants. Bryce Barker presented an update on the MOE's tributary monitoring study in the Lake of the Woods and Rainy River watershed. Water quality monitoring was initiated in 2009 in tributaries entering Lake of the Woods and the Rainy River and includes measurements of flows. Kayla Bowe and Joel Rohde presented an update on water quality monitoring being conducted in the Lake of the Woods watershed by the Red Lake Band which owns 87% of the North west angle of Lake of the Woods. Monitoring is being conducted in seven tributaries which drain into the North west angle as well as two sites within Lake of the Woods and will contribute towards a nutrient budget for Lake of the Woods.

The Minnesota Department of Natural Resources (MDNR) and the Ontario Ministry of Natural Resources (OMNR) updated the Boards on fisheries monitoring in the basin. Kevin Peterson presented an update of MDNR's fisheries monitoring activities in Kabetogama and Namakan Lakes and the Rat Root River. Fisheries monitoring activities in 2009 included spring and fall electro fishing, fall gill netting, shoreline seines, creel surveys, fish community index netting and contaminant monitoring. In addition there are two projects monitoring larval fish; one on marked walleye fry and sampling of larval northern pike. Darryl McLeod provided an update of OMNR's fisheries monitoring activities tracking changes in fish stocks in relation to the implementation of the 2000 rule curves. In 2009 monitoring was completed on all bays of Rainy Lake. In addition, a masters student from Lakehead University conducted a study on foraging habitat of adult lake sturgeon.

Jeff Wieme of OMNR briefed the Boards on the provincial review for the proposed Namakan hydro power development including concerns regarding restrictions to sturgeon movements and the potential for the genetic isolation of sturgeon populations above and below the proposed dam site. Kelli Saunders

presented a brief overview of the reference for Lake of the Woods and the formation of the International Lake of the Woods and Rainy River Watershed Task Force to advise the IJC.

Overall, the meeting with the resource agencies and others was deemed successful. In keeping with the IJCs' IWI objective of facilitating and improving transboundary information awareness and sharing, the Boards will continue holding this type of meeting as a regular part of their annual basin meetings.

4.8 Board Membership

Colonel Jon Christensen stepped down as the U.S. Co-Chair of the International Rainy Lake Board of Control to accept a mission overseas. Colonel Michael J. Price of the US Army Corps of Engineers was appointed as the U.S. Co-Chair of the International Rainy Lake Board of Control in July of 2010.

5 **APPENDIX A. FISH CONSUMPTION ADVISORIES FOR MINNESOTA AND ONTARIO**

Table A1. Consumption Advice – Mercury 2010

Meal Advice	Women not planning to become pregnant and men (ppm mercury)	Pregnant women, women who may become pregnant, and children under age 15 (ppm mercury)
Unlimited consumption	< = 0.16	< = 0.05
1 meal / week	> 0.16 - 0.65	> 0.05 - 0.2
1 meal / month	> 0.65 - 2.8	> 0.2 - 0.95
Do not eat	> 2.8	> 0.95

Table A2. Consumption Advice – PCBs 2010

Meal Advice	(ppm PCB)
Unlimited consumption	< = 0.05
1 meal / week	> 0.05 - 0.22
1 meal / month	> 0.22 - 0.95
1 meal / two months	> 0.95 - 1.89
Do not eat	> 1.89

Table A3. Examples of Ontario Consumption Advice Restrictions 2009/2010

Contaminant	Restrictions Begin	Total Restriction
Mercury (ug/g)	0.61	1.84
Mercury (ug/g) ¹	0.26	0.52
Total PCBs (ug/g)	0.105	0.844
Total PCBs (ug/g) ¹	0.105	0.211
Dioxins, Furans, Dioxin like PCBs (ng/g) TEQ ²	0.0027	0.0216
Dioxins, Furans, Dioxin like PCBs (ng/g) TEQ ¹	0.0027	0.0054

¹ Concentrations for women of child-bearing age and children under 15 years of age

² TEQ is the toxic equivalent of 2,3,7,8-TCDD