

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

FALL 2006 REPORT

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1. Introduction

The International Rainy River Water Pollution Board (IRRWPB) and the International Rainy Lake Board of Control (IRLBC) report jointly to the International Joint Commission (IJC) in the spring and the fall 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 address environmental quality and related issues, while the spring reports address regulation of Rainy and Namakan lakes over the past calendar year.

The two Boards continued to work closely together holding joint conference calls throughout the year and hosting a joint public meeting in the basin. The public meeting was held during the month of August in Fort Frances. The Boards also took the opportunity to meet locally with the resource agencies and also with representatives from the two pulp and paper companies. Commissioners Jack Blaney and Allen Olson, with IJC staff members Paul Pilon and Mark Colosimo, attended the meetings along with Board members.

Since last reported upon at the spring Semi-Annual Meeting in Seattle, the basin has experienced a quite dry summer. In spite of this, the level of Namakan Lake has remained within its IJC operating band, while the level of Rainy Lake remained within its IJC operating band until August 29, 2006. As of September 27, Rainy Lake is about 16 cm below its lower rule curve, Namakan Lake is just slightly above its lower rule curve, and the outflows from both lakes are at their specified IJC minimums. A detailed update on basin conditions will be provided in the spring 2007 joint report of the Boards.

2. Ambient Environmental Monitoring

2.1 Water Quality Monitoring (MPCA)

The Minnesota Pollution Control Agency (MPCA) monitors water quality on the main stem of the Rainy River at three long term sampling stations and on five tributaries to the Rainy River (Figure 1). All of these monitoring stations are part of the Minnesota Milestone sampling program which includes fixed station 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 2003 and reported on in the Fall 2004 Report. The MPCA Milestone sites are sampled monthly for ten months of two non-consecutive years in a five-year period. The Milestone sites were sampled in 2005 and exceedances to ambient water quality standards are listed in Table 2 as a ratio to the number of samples collected at each site. Complete data are currently available on the MPCA website at www.pca.state.mn.us. The next scheduled sampling year is 2008.

Water samples collected from main stem Rainy River stations and tributaries are analyzed for temperature, dissolved oxygen, turbidity, pH, conductivity, total phosphorus, BOD, nitrate +

nitrite, ammonia, chlorophyll a, total suspended solids, volatile solids, *E. coli*, and fecal coliform. During 2005, a total of 8 samples were collected at each site.

The sites in Table 1 are the current long-term water quality sampling stations on the main stem of the Rainy River and its tributaries. Data results from the monitoring program can be viewed on the MPCA website at <http://www.pca.state.mn.us/data/eda/index.cfm#monitoring>.

Table 1. MPCA Sampling Locations

Sampling Agency	STORET Station #	STORET Description
MPCA	RA - 12	Rainy River @ Baudette, MN
MPCA	RA – 81*	Rainy River @ Int'l Falls, below dam
MPCA	RA - 83	Rainy River @ Int'l Falls, above dam
MPCA	BF - 0.5	Big Fork River @ bridge on MN 11 (4 mi. E of Loman, MN)
MPCA	LF - 0.5	Little Fork River @ bridge on MN 11 (0.5 mi. W of Pelland, MN)
MPCA	RP - 0.1	Rapid River @ Clementson, MN
MPCA	WR - 1	Winter Road River @ bridge on MN 11 (4 mi. W of Baudette, MN)

* RA – 81 was not sampled during 2005

Table 2. MPCA 2005 Exceedances by Station

Station	Parameter	Exceedance Ratio	Notes
RA-83	Turbidity	1/8	During spring peak flow
LF-0.5	Turbidity	4/8	MPCA use assessment has determined that the Little Fork is impaired for aquatic life due to Turbidity
BF-0.5	Turbidity	2/8	One during spring peak flow and one during August low flow
BF-0.5	E Coli	1/8	During August low flow
RP-0.1	Turbidity	1/8	During August low flow
RP-0.1	E Coli	1/8	During August low flow

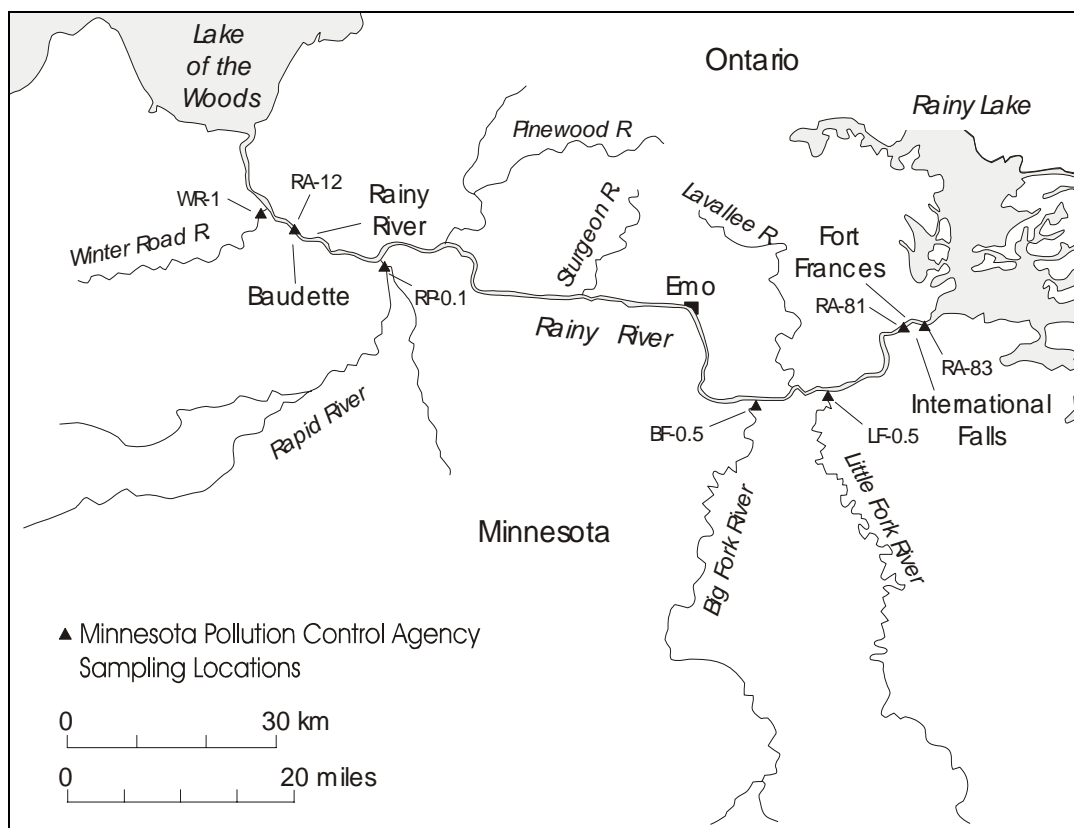


Figure 1. Rainy River Sampling Locations

2.2 Water Quality Monitoring (USGS)

The United States Geological Survey (USGS) sampled four small interior lakes in Voyageurs National Park for mercury, methylmercury, major ions, nutrients, and field parameters in water year 2005 (October 2004 through September 2005). Ryan, Brown, Shoepack and Peary Lakes were sampled for mercury three times (May, July, and September) and for major ions, including nutrients in May. The purpose of the sampling, in which the U.S. National Park Service provided funding, is to establish “ambient” conditions of mercury and nutrients in these high-quality headwaters. Results from Shoepack Lake will be used to assess effects of controlled burns or natural fires on lake quality. Results from water year 2005 substantiate the high-quality ambient conditions of these lakes. Specific conductance for all samples collected near the water surface was less than 31 micro Siemens per centimeter (@ 25 deg. C) and pH ranged from 6.1 to 7.3. Concentrations of major ions were low. Most of the detectable nitrogen was in the form of organic nitrogen and was less than 0.66 milligrams per liter (mg/L). Total mercury (unfiltered) ranged from 1.09 to 3.94 nanograms per liter (ng/L), which is less than Minnesota’s 6.9 ng/L water-quality standard, but slightly higher than the range measured last water year. Total methylmercury ranged from <0.04 to 0.24 ng/l.

As part of the USGS Benchmark Program, the Kawishiwi River near Ely, Minnesota was sampled 19 days in water year 2005 to evaluate natural loading conditions in a relatively pristine forested basin. Grab samples were conducted mostly by students at Vermilion Community College in Ely, Minnesota under USGS guidance. A few additional samples

collected by USGS hydrographers. Samples were analyzed for major inorganic ions, nutrients, and aluminum. Results from the 2005 water year indicated nothing unusual for this setting. Specific conductance was less than 33 micro Siemens per centimeter (@ 25 deg. C) and pH ranged from 6.5 to 7.0 for all samples. Concentrations of major ions were all less than 3.9 mg/L, dissolved (filtered) nitrate as nitrogen ranged from <0.03 to 0.10 mg/L, unfiltered ammonia as nitrogen ranged from <0.028 to 0.055 mg/L and dissolved aluminum ranged from <0.027 to 0.213 mg/L.

Water-quality data for the Voyageurs National Park lake sites are published in the USGS Water Resources Data in Minnesota, Water Year 2005 Annual Report, by G.B. Mitton, K.G. Guttormson, G.W. Stratton, and E.S. Wakeman, Water-Data Report MN-05-1 [<http://pubs.usgs.gov/wdr/2005/wdr-mn-05-1/>]. The Kawishiwi River data may be obtained from the USGS data base by contacting the Minnesota Water Science Center at (763) 783-3100.

An accepted paper, *Mercury in Soils, Lakes, and Fish in Voyageurs National Park (Minnesota): Importance of Atmospheric Deposition and Ecosystem Factors*, by J. G. Wiener et al., will be published soon in the journal Environmental Science and Technology. The authors report that concentrations of methylmercury in game fish from some of the 17 interior lakes they studied in Voyageurs National Park substantially exceed criteria for the protection of human health. The concentrations of total mercury in yellow perch and of methylmercury in lake water varied substantially among lakes, reflecting on how both lake watershed and lacustrine factors interact to exert important controls that affect the microbial production of methylmercury, abundance of methylmercury in the lakes, and the bioaccumulation in game fish. Wiener et al. conclude that nearly all of the mercury in fish was derived from atmospheric deposition and most of the bioaccumulated mercury was from anthropogenic sources.

2.3 Rainy Basin Condition Monitoring

Rainy River:

In 2005, as part of a nutrient study for Lake of the Woods, Lake of the Woods Soil and Water Conservation District sampled for total phosphorus at RA-12 in Baudette. Additional sampling of Lake of the Woods will be conducted in 2006.

Little Fork River Watershed (HUC #09030005):

In 2005, the MPCA began additional investigations to determine the causes of turbidity exceedances on the Little Fork River. This investigation also included comparisons with similar sites on the Big Fork River. This investigation will be continued in 2006.

Rainy River Headwaters Watershed (HUC #09030001):

In 2005 the White Iron Chain of Lakes Association, in cooperation with stakeholders, began a volunteer-based, long term, condition monitoring project for the Kawishiwi Watershed. The

Kawishiwi is a sub watershed of the Rainy River Headwaters Watershed. This will be continued and expanded in 2006.

2.4 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 Ministry of Natural Resources (MNR) and the 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 Tables 3 and 4.

Table 3. Consumption Advice - Mercury

Meal Advice	General Population (ug/g mercury)	Women of Child-bearing Age and children under 15 years (ug/g mercury)
Unlimited consumption	< 0.16	< 0.05
1 meal / week	0.16 - 0.65	0.06 - 0.2
1 meal / month	0.66 - 2.8	0.21 - 1.0
Do not eat	> 2.8	> 1.0

Table 4. Consumption Advice - PCBs

Meal Advice	(ug/g PCB)
Unlimited consumption	< 0.05
1 meal / week	0.06 - 0.2
1 meal / month	0.21 - 1.0
1 meal / two months	1.1 - 1.9
Do not eat	> 1.9

Currently MDH issues consumption advisories based on mercury for Rainy Lake, Rainy River, Little Fork River, Big Fork River, and Lake of the Woods. Consumption advice for the Vermillion River is based on levels of PCBs and mercury. There have been no changes to consumption guidelines included in the Fall 2005 report. 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 Ministry of the Environment in cooperation with the Ministry of Natural Resources. Skin-off fillets are analyzed for a variety of contaminants that can include mercury, DDT, PCBs, and dioxins/furans. Results are used to develop tables in the Guide, which give size-specific consumption advice for each species tested at each location. Consumption advice is based on health protection guidelines developed by Health Canada. The 2005-2006 Guide is substantially different from previous editions in that it contains important information on consumption of sport fish for both the general population and the more sensitive population of women of child-bearing age and children under 15. Chemical concentrations that trigger consumption restrictions are as follows:

Table 5. Ontario Consumption Advice Restrictions

Contaminant	Restrictions Begin	Total Restriction
Mercury (ug/g)	0.61	1.84
Mercury (ug/g) ¹	0.26	0.52
Total PCBs (ug/g)	0.153	1.22
Dioxin-like PCBs (pg/g) TEQ ²	1.62	12.96
Dioxins/Furans (pg/g) TEQ ²	1.62	12.96

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

Advisories restricting fish consumption remain in effect for Rainy Lake, Rainy River, and Lake of the Woods. The advisories in effect for Rainy Lake and Lake of the Woods are the result of mercury concentrations in fish tissue. Consumption restrictions in Rainy River below the dam in Fort Frances are based on PCB concentrations in sturgeon and mercury in the other fish species. There are more restrictive advisories for women of childbearing age and children under 15 years of age for Mercury. Fish consumers should consult the “*2005-2006 Guide to Eating Ontario Sport Fish*” for more detailed information. The Guide can be accessed at <http://www.ene.gov.on.ca/envision/guide/index.htm>.

2.5 Environmental Effects Monitoring (EEM)

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 series of monitoring and interpretation cycles that build on the findings from previous cycles. Since the regulations came into effect, the Fort Frances mill has completed 3 cycles of the program.

Abitibi-Consolidated, through its consultant, completed its pre-design and study design for Cycle 4. The study design has been approved by Environment Canada. Field work for Cycle 4 was scheduled to be completed in September 2006 with a final report in April 2007. The fish survey design was similar to Cycle 3 with the same reference and exposure sites sampled.

Both johnny darter and mottled sculpin were to be collected by electro-fishing and examined for age, length, body weight, liver weight, and gonad weight. Supporting environmental variables that were collected include habitat description, water depth, sampling coordinates, other fish species present, temperature, DO, conductivity, and pH.

For the benthic invertebrate survey, a total of 40 samples will be collected along a gradient of effluent concentrations along the Canadian shoreline that will not be influenced by the Boise discharge. Two sub-samples will be collected from each of 20 stations within the exposure gradient. For each sample, total abundance, taxa richness, diversity, evenness, and Bray-Curtis distance will be calculated. Other supporting environmental variables that will be collected include additional samples at each location for grain size, loss on ignition, and total organic carbon.

Sub-lethal toxicity testing of final effluent is undertaken semi annually on three test organisms including fish (*Pimephales promelas*), invertebrate (*Ceriodaphnia dubia*), and plant (*Selenastrum capricornutum*). Results over Cycle 4 will be reported in the April 2007 final report. Two endpoints are measured on *Pimephales promelas*, growth inhibition and mortality. Endpoints measured on *Ceriodaphnia dubia* include reproduction inhibition and mortality, while the *Selenastrum capricornutum* endpoint is growth inhibition.

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 and will probably remain fairly steady at current levels in the foreseeable future. The dramatic decreases in loading, for the conventional parameters such as BOD and TSS from the 1960's to the early 1980's are the direct result of remedial measures undertaken by industry and municipalities. Figure 2 documents this historical downtrend of BOD from municipal and industrial sources. With no other significant remedial measures planned, BOD loads to the Rainy River will likely continue at or around the current levels.

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 District reported no violations to its discharge permit for the calendar year 2005. Discharge data from this facility are shown in Table 6 for the years 1996 through 2005.

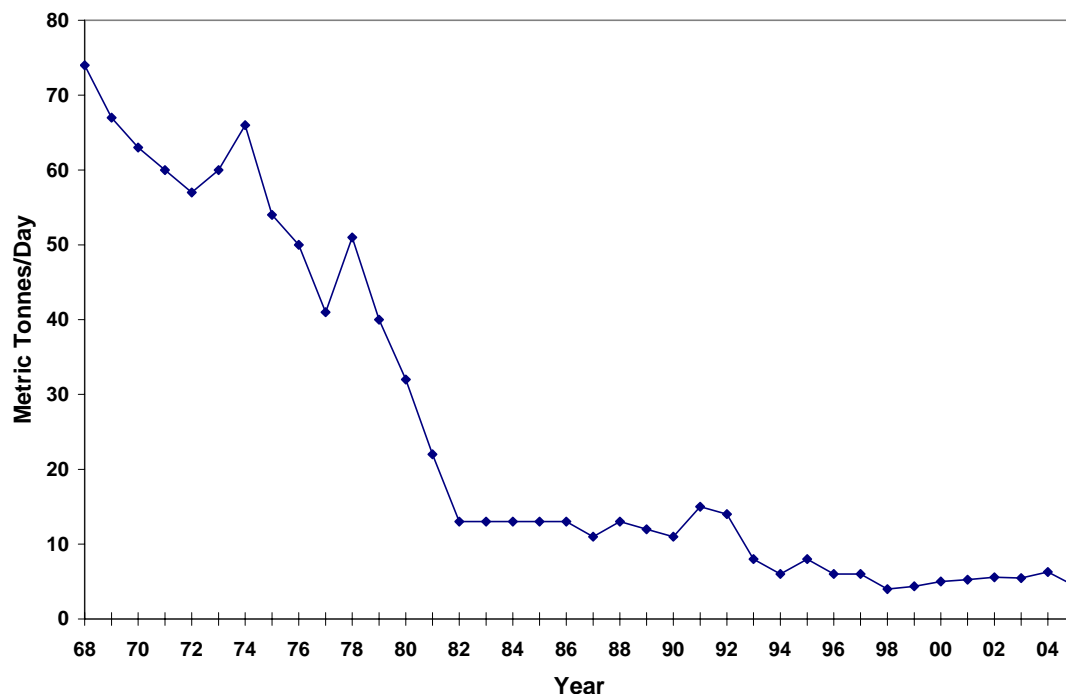


Figure 2. Total BOD Load from Continuous Discharges (mt/d) 1968-2005

Table 6. North Koochiching Sanitary Sewer Average Annual Discharge Summary

Year	Flow (m3/d)	BOD (kg/d)	TSS (kg/d)
1996	6813	89.7	50.4
1997	4921	77.4	38.6
1998	5349	77.1	32.4
1999	5149	89.5	51.7
2000	NA	54.6	26.6
2001	4920	64.3	35.4
2002	4538	70.9	35.2
2003	3191	47.1	20.2
2004	4397	53.7	24.7
2005	4781	51.6	36.7

Baudette

The Baudette wastewater treatment facility has a lagoon system that discharges seasonally to the Rainy River. The facility discharged during April, June, September, October and November of 2005. The total discharge during that period was 317,295 m³. Monthly discharges are shown below in Table 7. During discharge periods, BOD and TSS were within the National Pollutant Discharge Elimination System Permit (NPDES) limits of 25 mg/L and 45 mg/L, respectively. Average BOD and TSS concentrations during discharge were 11.2

mg/L and 18.9 mg/L. The NPDES Permit for the Baudette facility does not have a limit for total phosphorus. Average total phosphorus concentrations during discharge were 3.14 mg/L.

Table 7. Baudette Waste Water Treatment Facility Monthly Discharge in m³

Year	April	May	June	July	Aug	Sept	Oct	Nov
2004	0	144,235	28,847	0	0	96,157	67,310	38,463
2005	57,690	0	96,150	0	0	38,460	57,690	67,305

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 8 which includes two years of pre-secondary treatment and eight years of secondary treatment. The plant operated throughout 2005 within the Ministry of Environment guidelines of 25 mg/L for both BOD and TSS. Average concentrations in 2005 were 3.62 mg/L BOD and 9.20 mg/L TSS, both well within the 25 mg/L limit. There was one bypass event of 3830 m³ which occurred between May 25th and 26th. This event was due to excessive precipitation.

Table 8. Fort Frances Wastewater Treatment Plant Average Annual Discharge Summary

Year	Flow (m ³ /d)	BOD (kg/d)	TSS (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	30.3	80

Emo

The Town of Emo has a seasonal discharge from its sewage lagoon to the Rainy River. During 2005, a total of 199,167 m³ was discharged to the river over 50 discharge days for the year. 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 8.11 mg/L and 17.97 mg/L.

Manitou Rapids

The sewage lagoon operated by Rainy River First Nations at Manitou Rapids was sampled by Health Canada on three occasions during 2005. Table 9 indicates that there were exceedances

of federal guidelines for total phosphorus in April and June and for TSS in April. There were no exceedances in September. Unfortunately, the IRRWPB was not able to obtain lagoon discharge information in time for the release of this report.

Table 9. Manitou Rapids Lagoon Test Results 2005 (mg/L)

Parameter	April 26, 2005	June 9, 2005	Sept 28, 2005	Federal Guidelines
Total Phosphorus	1.04	1.18	0.209	1.0
BOD	20	4	<2	20
Phenols	0.002	0.003	0.003	20
TKN	8.45	6.85	4.46	None
TSS	50	6	6	25

Barwick

There were 5 discharge days from the sewage lagoon at Barwick during 2005, with 26,954.1 m³ of effluent discharged to the Rainy River. During this discharge period BOD averaged <2.0 mg/L and TSS averaged 6.0 mg/L.

Rainy River

The Town of Rainy River discharged a total of 151,134 m³ over 43 days from its lagoon to the Rainy River during 2005. During the discharge period, BOD averaged 4.4 mg/L and TSS averaged 7.3 mg/L, both below the provincial guidelines of 40 mg/L and 30 mg/L respectively.

3.3 Minnesota Industrial Sources

Boise Paper Solutions - International Falls

Discharge data from 1996 to 2005 including effluent flow, BOD, TSS, and AOX for the Boise Paper Solutions mill in International Falls is provided below in Table 10. There were no National Pollutant Discharge Elimination System permit violations in calendar year 2005. Dioxins and furans in mill effluent samples were below the detection limit of 10 parts per quadrillion (ppq) in 2005.

The current National Pollutant Discharge Permits for the Boise Paper Solutions facility will expire in 2009.

Table 10. Boise Paper Solutions Annual Average Discharge Data

	Flow (m3/d)	BOD (kg/d)	TSS (kg/d)	AOX (kg/d)
Permit Limit	N/A	4,720	7,940	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
2001	135,768	645	1,079	NA
2002	160,484	747	1,584	NA
2003	143,164	956	2,094	NA
2004	150,496	1,884	3,978	NA
2005	150,325	1,134	1,810	267

3.4 Ontario Industrial Sources

Abitibi-Consolidated Inc. -Fort Frances

Data on flow, BOD, TSS, and AOX are provided in Table 11 for the years 1996 through 2005. The average annual daily loads for BOD, TSS and AOX in 2005 continue to be well below compliance levels. Abitibi had no reported spills for 2005.

Table 11. Abitibi-Consolidated Inc. Average Annual Discharge Data

	Flow (m3/d)	BOD (kg/d)	TSS (kg/d)	AOX (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

4. Basin Activity Update

Background information on other activities occurring in the basin is summarized below. Some of the activities involve members of the IRRWPB and IRLBC in their agency roles, while others are summarized to provide an overview of the types of initiatives that are currently taking place by other agencies and or interest groups.

4.1 Rainy River Basin Planning and Management (MPCA)

The Rainy River Basin Committee is responsible for coordination of the implementation of the Strategies and Projects of the Rainy River Basin Plan. While there are several implementation activities underway, the two priorities are basin wide condition monitoring (described in Section 2.3 above) and development of the Rainy River Basin Water Resources Center.

Rainy River Community College, the lead agency for development of the water resources center, established a work group to develop a detailed plan of action for formation of this international center and to begin implementation of center programs.

The work group is focusing on the International Lake of the Woods Water Quality Forum, training and coordination for volunteer monitors, the Rainy River Basin Water Resources Center Website (<http://rainybasinwater.org>) and fund raising in order to address needs identified by partners in the U.S. and Canada.

4.2 Basin Issues Update

Minntac (US Steel) Discharge

Minntac initially proposed a surface water discharge to the Vermilion Watershed and/or the Little Fork Watershed. The primary concern was total dissolved solids, primarily sulfate.

Following the environmental assessment, Minntac determined that it would be better to discharge to the St. Louis River Watershed flowing to Lake Superior. This option will not result in a new surface water discharge to waters of the Rainy River Basin. The two existing seeps from the tailings basin (one to the Vermilion Watershed and one to the Little Fork Watershed) will continue; however, Minntac anticipates that TDS concentrations in the tailings basin will improve due to the introduction of fresh water into the process water stream.

If the alternative selected by Minntac is implemented (i.e. a surface water discharge to the Lake Superior Basin), the IRRWPB has determined that it is highly unlikely that there will be any transboundary pollution resulting from a Minntac discharge into the Rainy River Basin.

Pine Island

In February 2006 the IRRWPB received a request from the Manitoba Eco-Network in Winnipeg, Manitoba for a board review of the potential for an increase in mercury concentrations in the Rainy River due to a National Pollutant Discharge Elimination System Permit issued by the MPCA for the Pine Island Bog Horticultural Peat Facility operated by Berger Horticultural Products, Ltd. The request for review noted that the discharge had the potential to increase mercury concentrations in the Black River, which was already on the 2006 Minnesota Report to Congress (303d List) as exceeding the Minnesota standard of 6.9 ng/L for mercury in the water column. The IRRWPB has adopted 6.9 ng/L as the target management level for surface waters in the basin. The Board sent an initial response back to the Manitoba

Eco-Network in April 2006 acknowledging receipt of the request and providing an interim update on the status of the project.

In the spring of 2006, MPCA provided the Boards with copies of the water quality section of the Environmental Impact Statement and the permit for the Pine Island facility.

The MPCA engineer for the facility met with the Boards on August 24th during the Boards' semiannual meeting in the basin. The MPCA engineer, Jeff Udd, described the facility, its location (approximately 30 miles from the confluence with the Rainy River), design and peat processing. Udd noted that mercury was a major focus of the EIS including extensive sampling in and around the bog. He said that Black River mercury data was used even though the river was not listed at the time of the permit issuance. The permit treated the facility as if it was discharging to mercury impaired water. A Nondegradation Review was completed in June 2002 and the NPDES Permit was issued in April 2003.

The permit required additional treatment to remove carbon solids (which tend to absorb mercury), limited mercury discharge concentrations to a 10 ng/L monthly average and required expanded effluent monitoring for mercury concentrations (2 per month).

Udd concluded saying that mercury issues were treated as if the Black River was already listed for mercury; that the treatment system is expected to comply with effluent limits and that the NPDES Permit adequately addresses concerns about mercury in the Black River and the Rainy River.

Boards' conclusions and recommendations:

1. The MPCA followed statute and adequately addressed the NPDES requirements for mercury discharge to the Black River.
2. The only way to definitively determine if mercury loading from the peat mining facility is impacting mercury concentrations in the Rainy River is through a long term monitoring effort. The IRRWPB recommends that the MPCA, at a minimum, institute the following mercury monitoring effort:
 - a. Duration - beginning with the 2007 water year and continuing for a minimum of 10 years following commencement of mining and processing operations at Pine Island or as necessary to determine mercury concentration trends,
 - b. Site Locations - monitor two sites, the South Fork of the Black River at Pelland (Hwy 11 crossing) and the Rainy River (International Bridge at Baudette),
 - c. Sampling Parameters and Frequency - sample each site for total mercury and methylmercury three times per year (once in the spring during runoff and twice during the summer, except during times when the Rainy flows are less than 10% of average daily flows or when there is no flow in the Black River),
 - d. Reporting - annual data reports to the IRRWPB with a final report due within 15 years or when data are sufficient to determine mercury concentration trends, whichever occurs first.

Namakan River Hydropower

On January 4, 2006, the Ontario Government announced an expansion of the province's supply of renewable energy through new development of waterpower sites on Crown land. Three potential development sites were announced on the Namakan River. Ojibway Power and Energy Group Ltd. will be the proponents.

The company can now pursue approvals to build waterpower facilities, along with the opportunity to bid their electricity production into the Ministry of Energy's request for proposals. The proposed projects must also undergo environmental assessments and public review in Ontario before construction of the waterpower facilities can begin.

The three potential sites on the Namakan River are downstream from and do not include the waterfall at the outlet of Lac La Croix to Namakan River. There is no proposal to change water levels on the international boundary waters.

Rainy River Facilities Tour

In the fall of 2005 IRLBC and IRRWPB members toured three permitted facilities in Canada discharging into the Rainy River: Abitibi Consolidated, the Town of Fort Frances, and Rainy River First Nations at Manitou Rapids. Staff from each facility provided an overview of the facility's process and operation, and tours of the facility along with a discussion of reoccurring problems that each facility encounters.

In the spring of 2006 IRLBC and IRRWPB members, along with IJC staff and representatives from the MPCA and OME, toured permitted facilities on the U.S. side, namely Boise Paper, North Koochiching Sanitary Sewer District, and the Town of Baudette. As during the fall tour, facilities staff were knowledgeable, informed and very helpful.

The spring tour also included a boating tour of the Rainy River in the vicinity of the Little Fork River and Big Fork River confluences to view the magnitude of the sediment loading from the Little Fork River. Boats and drivers were provided by the Water Resources Center, Ontario Ministry of Natural Resources and the Minnesota Pollution Control Agency.

The Boards identified two issues during the facilities tours that they wanted to bring to the Commission's attention. The first is that wastewater sometimes bypasses the Fort Frances and North Koochiching facilities during storm events due to storm water inflow and infiltration. In general, storm events greater than 2.5 inches in 24 hours (recurrence frequency 2 years) overwhelm the treatment system resulting in a bypass of wastewater directly to the Rainy River. Both facilities add chlorine to the bypass water, but the bypass receives no further treatment.

Fort Frances and North Koochiching have programs in place to correct the inflow and infiltration, but both lack funding to address the problem in a timely fashion.

The second issue is the discharge of lagoon systems (Barwick, Baudette, Emo, Rainy River and Rainy River First Nations) during periods of low flow in the Rainy River. The Boards will take a closer look at discharges from lagoons during periods of low river flow to determine if there is any cause for concern.

4.3 Hydropower Peaking

Hydropower facilities often vary their daytime and night-time outflows to maximize efficiency when responding to fluctuating demand for electricity. This diurnal fluctuation in flow is called 'peaking'.

Concerns about water levels and flow rates on the Rainy River were raised at public meetings of the IRLBC and IJC on March 6 and November 28, 2001. The concerns were about the effects of peaking on navigation, ice conditions and aquatic ecosystem health. In a news release dated December 6, 2001, the IJC directed its Rainy Boards to "jointly examine the other issues raised during the public hearing related to the use of water in Rainy River and Rainy Lake, including peaking operations, and report to the Commission by September 2002".

In examining the issue, the Boards determined it would be appropriate to wait for the results of evaluations of peaking effects on the aquatic environment that had been started by two groups. The first group was the "Committee on the Environmental Effects of Peaking on the Rainy River", comprised of representatives from: Boise Paper, Abitibi- Consolidated Company of Canada, Canadian Department of Fisheries and Oceans, Ontario Ministry of Natural Resources, Rainy River First Nations, Minnesota Pollution Control Agency, Koochiching County Environmental Services and the Minnesota Department of Natural Resources. This Committee examined the environmental effects of peaking on the aquatic resources and habitat of Rainy River during the period 2002 through 2004 and produced a final report on January 26, 2005.

The second group was comprised of Minnesota Department of Natural Resources staff led by Mr. Daniel O'Shea. This group mapped the bathymetry and aquatic habitat of the Manitou and Long Sault Rapids on Rainy River, and used a computer model to evaluate possible impacts of peaking on fish and benthic invertebrates. Mr. O'Shea produced a final report on August 4, 2005, and his preliminary findings were referenced in the Peaking Committee report.

The Rainy Boards assessed the Peaking Committee report and the O'Shea report on behalf of the Commission. The Commission subsequently asked the Companies to voluntarily refrain from peaking during the spring fish spawning period. In response, the Companies re-iterated the economic importance to them of peaking. In August, 2006, the Boards commenced a dialogue with the Companies to further explore spring spawning impacts and mitigation of them.

4.4 Rainy Lake and Namakan Reservoir Environmental Monitoring Work Group

An IJC Supplementary Order of January 6, 2000, implemented new "rule curves" for regulating water levels on Rainy Lake and Namakan Reservoir. In response to recommendations of the IRLBC, resource management agencies on both sides of the border

began a cooperative monitoring program in 2002 to identify impacts of the new rule curves on the biological and aquatic communities, and to provide an adequate source of information for future reviews. The monitoring program is intended to span a 10-15 year period, so that a range of events and adaptations of the biological community can be identified.

In 2002, a Monitoring Working Group was established to coordinate these efforts. The Working Group consists of representatives from the U.S. National Park Service (NPS), U. S. Geological Survey (USGS), Ontario Ministry of Natural Resources (OMNR), Canada Department of Fisheries and Oceans, Minnesota Department of Natural Resources (MDNR), Minnesota Pollution Control Agency, and First Nations.

Monitoring work to date has included:

- Workshops and meetings to identify the "best bets" for investigation.
- Coordination of routine agency (OMNR, MDNR, VNP, USGS) fisheries inventories and assessments (routine monitoring of fish populations was continued for the 24rd consecutive year in 2006).
- Studies of the effects of water level fluctuations on aquatic vegetation, trophic-state indicators and mercury uptake in prey fish. The NPS and USGS are supporting these studies. Two of these studies have already been completed and published (wetland monitoring, and water quality/trophic-state indicators), and a manuscript covering the mercury uptake study is in review. Additional studies are underway or planned.
- NPS/USGS-funded studies from 2004 to 2006 to assess effects of the 2000 rule curves on loons, muskrats, wetland vegetation, fish and benthos. Teams for each of these subjects have been developed, with members coming from academia, government agencies, and Non-Government Organizations. The teams developed study plans in 2003 and commenced field work in 2004. Data collection for wetland vegetation and sample collection for benthic invertebrates has been completed (collections were made during three summers 2004, 2005 and 2006). The summer of 2006 is the third and final field season of data collection for the loon, furbearer, and fish research under current funding.
- A USGS/MDNR-funded study on the effects of rule curve changes on limitations to fish habitat has commenced. Fish sampling continued on Rainy Lake and the Namakan Reservoir, and two additional lakes in north central Minnesota were sampled for comparison.
- The USGS, NPS, MDNR and OMNR, in conjunction with North Dakota State University, are engaged in a three-year radio-tracking project in Rainy Lake to assess the population characteristics and movements of lake sturgeon. Sturgeon were captured, marked and equipped with transmitters in 2003 and 2004. Study results were written up in a Master's Degree thesis and in two subsequent journal articles.
- A paleolimnological study was initiated on Rainy, Namakan, and Kabetogama lakes and Lac la Croix. Collected sediment cores will provide information on lake trophic state going back at least 200 years, or well prior to the construction of the local dams.
- A USGS/MDNR-funded study on the effects of rule curve changes on limitations to fish habitat has commenced.
- OMNR acquired Ikonos satellite imagery of reservoir wetlands in 2003.

Provincial, state and federal agencies will continue their attempts to apply financial and personnel resources to the need for monitoring. However, it is clear from discussions with representatives of the resource management agencies that competing priorities may interfere with fulfillment of the IRLBC recommendations over the long term.

In addition, the agencies have made it clear to the Boards that they do not have the fiscal resources to undertake monitoring of socio-economic impacts, or of downstream impacts on Rainy River and Lake of the Woods. The Boards referenced this need in their List of Expanded Activities submitted to the Commission in the fall of 2004. If the Commission wishes, the Boards could develop a scope of work for these downstream monitoring activities.

4.5 IJC International Watersheds Initiative - Rainy River Modeling

In a September 23, 2004 letter to the Commission, the Boards' responded to a request from the IJC for assistance in identifying specific projects/initiatives that the Boards would like to undertake in support of the Commission's International Watersheds Initiative. The Boards recommended several projects/initiatives and provided estimated funding requirements to the IJC. These projects/initiatives included work in the areas of : 1) floodplain/hazard-land management and public education for Namakan and Rainy lakes and along the Rainy River; 2) increased level of participation by the Boards in relevant basin issues and increased interaction with basin interests to foster development of collaborative initiatives and synergistic solutions to the management of basin water resources; and 3) development of hydraulic/hydrologic models for the Rainy River to provide assessment tools for use in determining flood levels on the Rainy River and for use in assessments of existing or future issues affecting Rainy River levels, flows, water quality, fish and wildlife and other environmental issues and for the Namakan Chain of Lakes to allow the Boards to assess the potential for the new 2000 rule curves to cause more frequent high water events and/or higher peak levels on Crane Lake.

Subsequently in 2006, with \$115,000 US in funding support from the U.S. Section of the International Joint Commission under Amendment 11 of the 1998 Memorandum of Agreement (MOA) between the U.S. Section of the IJC and the U.S. Department of the Army (DOA), the U.S. Army Corps of Engineers partnered with the U.S. Geological Survey to collect data on river-bottom depths and instantaneous velocities along about 290 cross sections of the Rainy River from the dam at International Falls and Fort Frances to the mouth near Baudette, Minnesota. These data were collected using global-positioning technology and Acoustic Doppler soundings from May 15 through May 26, 2006 for the purpose of constructing hydraulic models of the Rainy River, subject to the availability of future funding. The Minnesota Pollution Control Agency provided a student employee for part of this effort, which made it possible to complete the surveys in a timely manner. A brief report summarizing the work was provided to the IJC at the end of August.

Currently, the U.S. Section IJC and U.S. Department of the Army have reached agreement on the funding by the IJC of additional work to further development of the Rainy River hydraulic models. This work will be accomplished under Amendment 15 of the 1998 IJC/DOA MOA. The St. Paul District Corps of Engineers will develop steady and unsteady flow hydraulic models of the Rainy River downstream from the International dam at Fort Frances and

International Falls to its mouth at Lake of the Woods at a cost of \$140,000 US, using the U.S. Army Corps of Engineers HECRAS River Analysis System. This work will be accomplished using a merger of river cross-section data developed from a high-resolution digital terrain model (DTM) and cross-section data developed from Acoustic Doppler sounding surveys accomplished under Amendment 11 of the MOA. The DTM will be developed from an airborne Lidar survey of the Rainy River from the International dam to the mouth. The Lidar survey will cost \$124,000 US.

Prior to commencing the Lidar Survey work for the DTM and subsequent development of the HECRAS hydraulic models, the St. Paul District will coordinate the proposed work with the International Rainy Lake Board of Control, International Rainy River Water Pollution Board, Minnesota Department of Natural Resources, the Ontario Ministry of Natural Resources and representatives of the affected First Nations in the Rainy River District through the Fort Frances Chiefs Secretariat. Two brief progress reports in electronic format will be provided to the U.S. Section by 26 January 2007 and 25 May 2007. The deliverables will be DTM data from the Lidar surveys, HECRAS steady and unsteady hydraulic flow models and a brief final report in an electronic format that will be delivered to the U.S. Section by 31 August 2007. The final report will include a summary describing methods and results.

4.6 Emerging Issues

Rainy River Turbidity

During the Boards meeting with agencies in August 2006, the Ontario Ministry of Natural Resources (OMNR) presented preliminary data from water treatment facilities using water from the Rainy River. These data suggest that turbidity (a measure of the resistance of light penetration through the water column) is increasing over time. The MPCA indicated that they will work with OMNR and local partners to determine if there is enough data to confirm this trend and, if there is a problem, begin a study to determine the cause of the increase in turbidity.

Nutrient Loads

The IRRWPB has started to obtain phosphorus data from a number of sources to determine potential impacts of loads to the Rainy River and ultimately to Lake of the Woods. To date, there is data from most of the point sources to the river including industrial and municipal discharges. Annual estimated loads of total phosphorus from the four continuous discharges to Rainy River were approximately 70.2 metric tonnes in 2005, compared to approximately 1195 kg from the towns of Emo, Rainy River and Baudette. MPCA is currently planning to undertake a nutrient study of the Rainy River and its tributaries in the coming year.

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 six joint conference calls and four joint meetings during this reporting period. IJC Advisors participated in most of the calls and meetings. The conference calls were conducted on April 13, April 28, May 26, June 23, August 1 and September 21. Key topics of discussion on the calls included:

- Rainy River hydropower peaking and moving forward on dialogue with the Companies to find compromise on peaking limits during the spring spawn.
- Preliminary investigations into measurable spawning triggers, compiling of a list of scientific papers that illustrate/discuss the negative impacts of hydropower peaking.
- Gaining a greater appreciation for the economic benefits to the paper mills of peaking and ponding.
- Funding and work progress on IJC Watersheds Initiative projects in the Rainy-Namakan basin including hydraulic modeling of the Rainy River.
- Preparing for the fall semi-annual meeting of the IJC in Ottawa, ON and work on the Boards' Fall 2006 Report to the Commission.
- Identification of information gaps and funding concerns related to ongoing resource agency monitoring of the impacts of the 2000 IJC Rule Curves for Rainy and Namakan lakes to meet the year 2015 review requirements for the 2000 IJC Order. Currently, there is no monitoring of the social and economic affects of the 2000 IJC Rule Curves in either of the lake basins or on the Rainy River.
- Emerging issues including the Minntac Tailings Basin Discharge, Pine Island Peat Mining Project, and Namakan River Hydropower Development.
- Updating joint Board work plan and Board Directives.
- Preparations for the August 22-24 joint annual basin meetings and fall semi-annual meeting of the IJC in Ottawa.

Joint board meetings were held on April 5 and April 6 in Seattle, Washington in connection with the Boards' presentation to the IJC at the Commission's spring semi-annual meeting and on August 22 and 24 in Fort Frances, Ontario in connection with the Boards' joint annual basin meetings. The April 5 meeting focused on finalizing the Boards' presentation to the Commission, while the April 6 meeting, immediately following the boards' appearance before the Commission, focused on further discussions on hydropower peaking based upon feedback received from the Commission during the appearance. Key topics of discussion at the August 22 meeting included hydropower peaking, finalization of preparations for the annual basin meetings, an update on Rainy River cross-section surveys, an update on the status and issues related to the ongoing monitoring of the impacts of the 2000 IJC Rule Curve by the resource agencies and a presentation to the Boards by Vincent Tidwell of Sandia National Laboratory on application of Integrated Decision Support Modeling (IDSM) and Shared Vision Planning (SVP) to bring basin interests together to explore balanced solutions to water resources issues. Key topics of the August 24 joint board meeting focused on general board housekeeping and action items in areas of Board work plans, IJC Watersheds Initiative funding, Board newsletters and websites, preparation of the Fall 2006 Joint Board Report to the IJC and emerging issues including the Pine Island peat mine, the Minntac tailings basin discharge, transboundary notifications, Namakan River hydropower development, periodic inspections of

the Prairie Portage Dam, municipal sewage discharges to the Rainy River during storm events, lack of regulations related to discharge from sewage lagoons versus stage/flow in receiving rivers during low flow and source water protection related to chemical spills. With regard to the Pine Island peat mine and Minntac tailings basin discharge, the Boards received a presentation by MPCA staff on the status of permits for these projects.

IJC Spring Semi-Annual Meeting – April 6, 2006

Board members and staff attended the spring semi-annual meeting of the IJC in Seattle, Washington on April 6. The boards presented their Spring 2006 Report to the Commission along with an update on basin hydrologic conditions. It was noted that 2005 basin hydrologic conditions and lake levels in the Rainy-Namakan basin, especially for Rainy Lake, proved to be highly variable. Although Rainy Lake levels were not as high as 2001 or 2002 and not as low as 2003, the level of Rainy Lake exceeded its All-Gates-Open requirement level (341.1 m or 1119.1 ft) for 17 days in June. However, by late August, Rainy Lake outflow had been reduced to its IJC minimum of 100 m³/s. Other topics of discussion included emerging issues (Pine Island peat mine, Minntac tailings basin discharge, Namakan River hydropower development), funding for IJC Watersheds Initiative projects in the basin, and a planned basin tour (see Section 4.2, “Rainy River Facilities Tour”) by the Boards aimed at gaining greater understanding of Rainy River water quality issues. The discussions with Commissioners focused on hydropower peaking operations on the Rainy River. This topic is discussed more fully in Section 4.3 of this report.

IRLBC/IRRWPB Joint Annual Basin Meetings – August 23, 2006

The Boards held their sixth joint annual meetings in the Rainy-Namakan basin on August 23 to discuss water issues in the Rainy-Namakan and Rainy River basins. The meetings consisted of a morning meeting with resource agencies in the basin, an afternoon meeting with the dam operators (Boise and ACI), followed by an evening public meeting. In a departure from recent years, the boards decided to have only one public meeting to maximize Board availability for other meetings. All of the meetings were held in Fort Frances, Ontario at the LaPlace Rendez-Vous Hotel. IJC Commissioners Allen Olson (United States) and Jack Blaney (Canada) along with several IJC staff were in attendance at all of the aforementioned meetings.

Resource Agencies Meeting

At the invitation of the boards, a meeting was held on the morning of August 23 with representatives of local resource agencies and others with interests in water resources management within the Rainy River basin. In attendance were representatives from the U.S. Senate Subcommittee on National Parks, Voyageurs National Park, U.S. Geological Survey, Department of Fisheries and Oceans Canada, Ontario Ministry of Natural Resources, Rainy River First Nation’s Rainy River Watershed Program, Minnesota Department of Natural Resources, Lake of the Woods County, and Koochiching County Environmental Services.

The National Park Service’s (NPS) Midwest Region Director, Ernie Quintana, gave some opening remarks. He expressed his concerns about the effect of unnatural fluctuations in water

levels and the effect on aquatic and terrestrial animals and habitat. He pointed out that competing interests are a big factor in decisions involving water resources and that it is important to work together to gain synergy.

Linda Wall (Ontario Ministry of Natural Resources) and Kate Miller (Superintendent, Voyageurs National Park), co-chairs of the “Rainy Lake and Namakan Reservoir Environmental Monitoring Work Group”, provided some comments on the status of the ongoing efforts of resource management agencies in the basin to identify impacts of the 2000 rule curves on the biological and aquatic communities, and to provide an adequate source of information for future reviews. Background information on this work group and their work can be found in Section 4.4 of this report. On August 15, 2006 a memo signed by both co-chairs was forwarded via email to the board members with the subject: “Study and Report on Effects of Water Level Changes for Rainy Lake and Namakan”. The memo expressed concern about the available funding for continued rule curve monitoring by the resource agencies. The email also included a spreadsheet listing monitoring activities, a time line and funding status.

Larry Kallemeyn (U.S. Geological Survey, International Falls, MN) expanded on the information in the aforementioned memo/documents during a slide presentation which discussed the actions taken so far, the proposed work between now and 2015 and unfunded activities. The presentation made clear that there are many unfunded tasks after 2006 and that a number of challenges remain including:

- Is it realistic to expect measurable effects within a 15-year (2000-2015) time window?
- How do we fill in information/data gaps?
- Who will look at downstream and socio-economic impacts? It will be difficult to draw conclusions without this information.
- Other challenges include climate change, reduced budgets/staff, staff turn over etc.
- What information should be included in the 2010 assessment report?

After some discussion of expectations, the work group members stated that their presentation at the meeting was in fact, the 2010 assessment of the rule curve monitoring process. In order for the committee to provide a meaningful report in 2015, the board members and IJC staff were informed of the following:

- Funding is drying up; additional funding is needed soon in order to stay on track.
- Downstream and socio-economic impacts must be addressed. The present course will not provide answers for either of these by 2015 and thus an assessment of the rule curves will be difficult.
- The MDNR has a river assessment team that could look at downstream impacts if funding becomes available.

Board staff pointed out that the Boards have no power to act on the above request/concerns. They can only report the need to the IJC.

Rainy River hydropower peaking was discussed briefly. The boards noted that efforts are continuing to determine the gauging needs (water temperature and level gauges) on the Rainy

River for monitoring peaking during spawning periods. It was also noted that water level fluctuations are greatest near the dam and that fluctuations can occur due to peaking or operations related to the rule curves/hydrology. John Van Den Broeck of the Ontario Ministry of Natural Resources gave a presentation showing exposed fish eggs in June 2006 in the tailwater below the dams due to flow changes related to rule curve operation.

Jesse Anderson, Minnesota Pollution Control Agency gave a presentation on turbidity and suspended solids in the Little Fork River, which is impaired for both parameters. The effects of logging and changes in the landscape are being studied as it relates to the impaired water. Some loading samples will be collected in 2007-08.

Other issues discussed briefly at the meeting included, the Rainy River cross-section surveys, Pine Island and Minntac mining issues, a Lake of the Woods County Letter of Support to the IJC and turbidity on the Rainy River.

Overall, the meeting with the resource agencies and others was well received by all and fits well with the IJC's Watersheds Initiative objective of facilitating and improving transboundary information awareness and sharing. The Boards intend to make this meeting a regular part of their annual basin meetings.

Dam Operators Meetings

At the meeting with the dam operators on the afternoon of August 23, Boise and ACI representatives presented a summary of their regulation activities and dam operations during the preceding twelve months as well as an update on dam maintenance activities, data collection and public information efforts. No significant issues were identified and no comments were received from the public on regulation. The Boards reported no public comments were received on water levels on either Rainy Lake or the Namakan Chain of lakes. A primary goal of this year's meeting with the Companies was to begin a dialogue on achieving a compromise on limits on peaking during spring spawning periods on the Rainy River. Commissioner Olson commented at the beginning of the peaking discussion that the IJC is influenced by a 5-year effort on Lake Ontario to balance competing interests on the St. Lawrence River. It is clear that public expectations have changed over the last 20 years on how water resources are used along the border.

A summary of key points of agreement from the meeting concerning peaking include:

- All parties are willing to work together toward a common goal of limiting hydropower peaking during the spring spawning periods on the Rainy River.
- The paper companies do not want rigid rules or to lose all rights to peaking.
- The dialogue will start this year and continue into the spring of 2007.
- Any guidelines that are adopted will be on an experimental basis (e.g. 2 yrs.).
- The dialogue group must be small (approx. 6 members) with equal representation from both sides of the Border with suggested participants including one representative from the following: IRLBC, IRRWPB, Abitibi, Boise, a Canadian resource agency and a U.S. resource agency.

- An agreement cannot be reached in one meeting. The dialogue group will need to meet numerous times before the 2007 spring spawn.

Public Meeting

The public meeting began at approximately 7:00 PM on August 23 and was attended by 37 persons including 12 from the public and one media person. Following a brief introduction of Board members and staff and IJC commissioners and staff, the Boards gave a brief presentation that included an updated on some of the water quality issues discussed earlier in this report, a review of basin conditions (both lakes were in their respective rule curve bands, but with conditions becoming dry in August), and an update on Rainy River cross-section survey work being accomplished for the IJC by the USGS through the U.S. Army Corps of Engineers (see Section 4.5).

Following the presentation, the boards opened the meeting to answer questions from the public. Inasmuch as attendance by the public at the meeting was relatively light in comparison with recent years and 2005 lake regulation through August had stirred little controversy, there were only a few minor questions raised by the public.