

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

**FALL 2004 REPORT**

**Submitted to**  
**The International Joint Commission**  
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## **1. Introduction**

This report presents a summary of activities for the International Rainy River Water Pollution Board (IRRWPB) and the International Rainy Lake Board of Control (IRLBC) for the current reporting period extending from January 2004 through September 2004.

The two Boards continued to work closely together holding monthly conference calls and hosting joint public meetings in the basin during the month of August. The meetings were held in Fort Frances, Ontario on August 24<sup>th</sup>, and in Baudette, Minnesota on August 25<sup>th</sup>. Thirty-five people attended the Fort Frances public meeting, while 19 were present at the Baudette meeting. Over the past year, the Boards have responded to requests from the IJC regarding updating dam safety and security information, as well as proposals for the International Watersheds Initiative. In July 2004, Colonel Michael Pfenning replaced Colonel Robert Ball as the U.S. Chair of the IRLBC.

Since last reported at the spring Semi-Annual Meeting in Washington, water levels on Rainy and Namakan Lakes have remained within their respective IJC operating bands. A detailed update on basin conditions will be provided in the spring 2005 joint report of the Boards.

## **2. Ambient Environmental Monitoring**

### **2.1 Water Quality Monitoring**

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, a program that 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. The MPCA Milestone sites are sampled monthly for ten months of two non-consecutive years in a five-year period. The next scheduled sampling years are 2005 and 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 2003, a total of 8 samples were collected at each site.

The following 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**

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

\* RA - 81 was not sampled during 2003

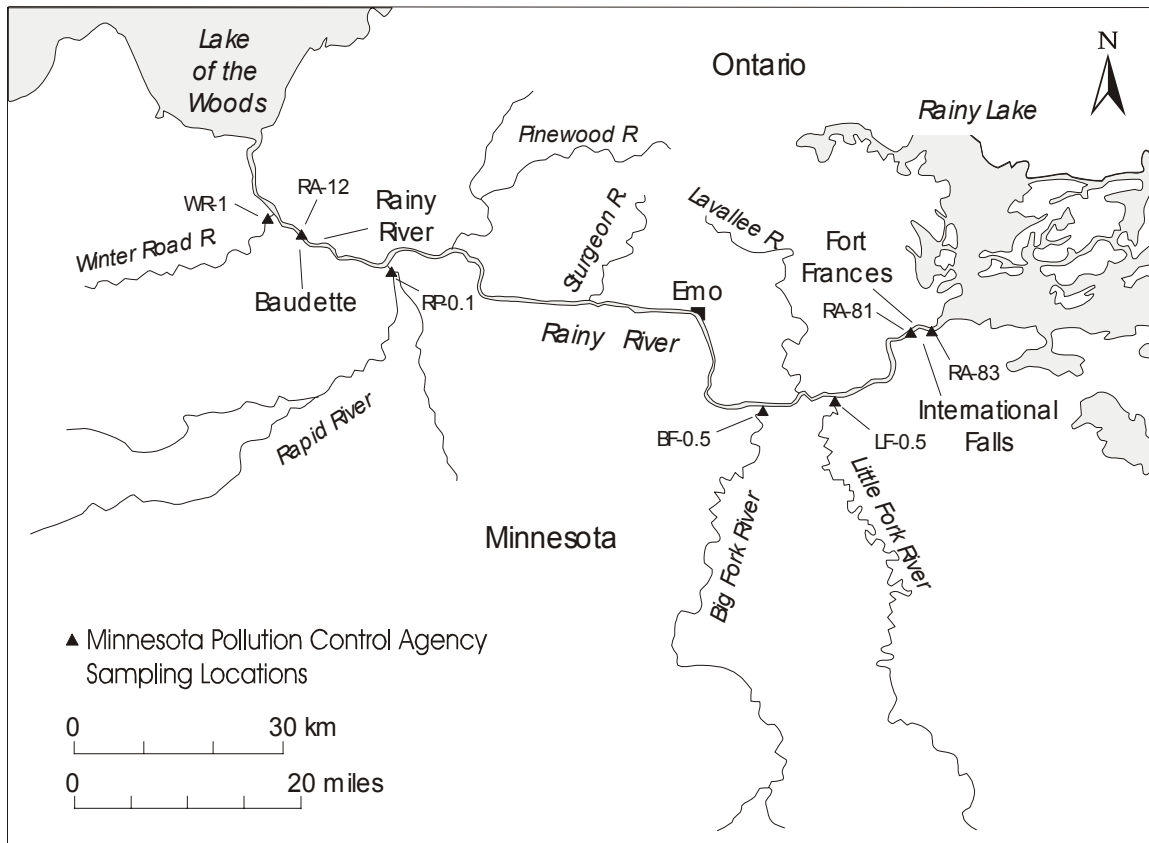


Figure 1. Rainy River Sampling Locations.

## 2.2 Fish Consumption Advisories

Fish tissue monitoring is carried out by provincial and state agencies in Ontario and Minnesota that result in issuing of fish consumption advisories. 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). There have been no changes to either the Minnesota or Ontario fish consumption advisories since the spring report.

### 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 a 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 as follows:

**Table 2. Consumption Advice - Mercury**

<b>Meal Advice</b>	<b>General Population (ug/g mercury)</b>	<b>Women of Child-bearing Age and children under 15 years (ug/g mercury)</b>
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 3. Consumption Advice - PCBs**

<b>Meal Advice</b>	<b>(ug/g PCB)</b>
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 that were reported in last year's report.

## Ontario

The Ministry of Natural Resources and Ministry of Environment are responsible for the collection of fish while the Ministry of Environment has the responsibility of carrying out the contaminant analysis on fish tissue and issuing the “Guide to Eating Sport Fish”. Skin-off fillets are analyzed for a variety of contaminants that can include mercury, PCBs, and dioxins/furans. Consumption advisories are based on health protection guidelines developed by Health Canada. Chemical concentrations that trigger consumption restrictions are as follows:

**Table 4. Ontario Consumption Advice Restrictions**

Contaminant	Restrictions Begin	Total Restriction
Mercury (ug/g)	0.45	1.57
PCBs (ug/g)	0.5	4.0
Dioxins/Furans (pg/g) TEQ <sup>1</sup>	10	81

1. 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. These advisories are the result of mercury concentrations in fish tissue. No consumption restrictions are in effect for PCBs or Dioxins/Furans. There are more restrictive advisories for women of childbearing age and children under 15 years of age. Fish consumers should consult the “2003-2004 Guide to Eating Ontario Sport Fish” for more detailed information.

### 2.3 Environmental Effects Monitoring (EEM)

The Environmental Effects Monitoring program requires pulp and paper mills in Canada through federal legislation 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. They carried out their Cycle 3 EEM study in September 2002. The study design as approved by Environment Canada includes a fish survey, a benthic invertebrate survey, and toxicological testing of final effluent. The following summary of Cycle 3 results is based on the report submitted to Environment Canada by Abitibi-Consolidated and their consultants C. Portt and Associates, and Jacques Whitford Environment Inc.

#### Adult Fish Survey

Both johnny darter and mottled sculpin were chosen as sentinel species for the Cycle 3 adult fish survey. Fish were collected at two reference locations above the mill effluent discharge and at three exposure sites downstream. Age, length, weight, body weight, liver weight and gonad weight were measured for each fish. Comparisons were made on fish of the same gender from the exposed and reference areas. There were some minor

differences found between the closest reference and exposure sites. Condition factor (log weight versus log length) of female mottled sculpin was found to be higher at the exposed site. There was a difference in the slope of regression for the weight versus length relationship for johnny darter, and also for the slopes of regression of ovary weight versus adjusted body weight for both species. No differences were found in liver and gonad weight. Results from the survey suggest that the effluent from Abitibi Consolidated is not having a significant impact on the species studied.

### Benthic Invertebrate Survey

Benthic samples were collected at 20 stations downstream of the mill outfall, generally following those sites sampled in 1999. Two benthic samples were collected from each station along with sediment samples for grain size, loss on ignition and total organic carbon. Water measurements were made for pH, conductivity, temperature and dissolved oxygen, depth, and flow velocity.

In summary the benthic community found in 2002 was indicative of fair water/habitat quality. There was diversity throughout the study area with both tolerant and sensitive groups found. *Hydra* was the most abundant group found and is indicative of good to fair water quality. Some species with intermediate tolerance to degraded water quality were found closer to the mill's discharge compared to the two previous surveys, indicating a continuing recovery of the river habitat.

### Toxicological Testing of Effluent

Eight samples of final effluent were collected between June 2000 and October 2003 and tested for toxicity as part of the EEM program. Test species and endpoints included a 7 day fathead minnow survival and growth test, a test for *Ceriodaphnia dubia* survival and reproduction, and finally a test for *Selenastrum capricornutum* growth inhibition. Test results (Table 5) indicate no impacts on fathead survival, but 2 of 8 samples showed growth inhibition. Final effluent was not lethal to *Ceriodaphnia dubia* but 5 out of 8 samples indicated reproduction inhibition. There was very little if any growth inhibition of *Selenastrum capricornutum*.

**Table 5. EEM Toxicity Results**

<b>Fathead minnow</b>	<b><i>Ceriodaphnia dubia</i></b>	<b><i>Selenastrum</i></b>
Survival LC 50	Survival LC 50	Growth IC 25
Growth IC 25	Reproduction IC 25	
0/8	0/8	5/8
2/8		1/8

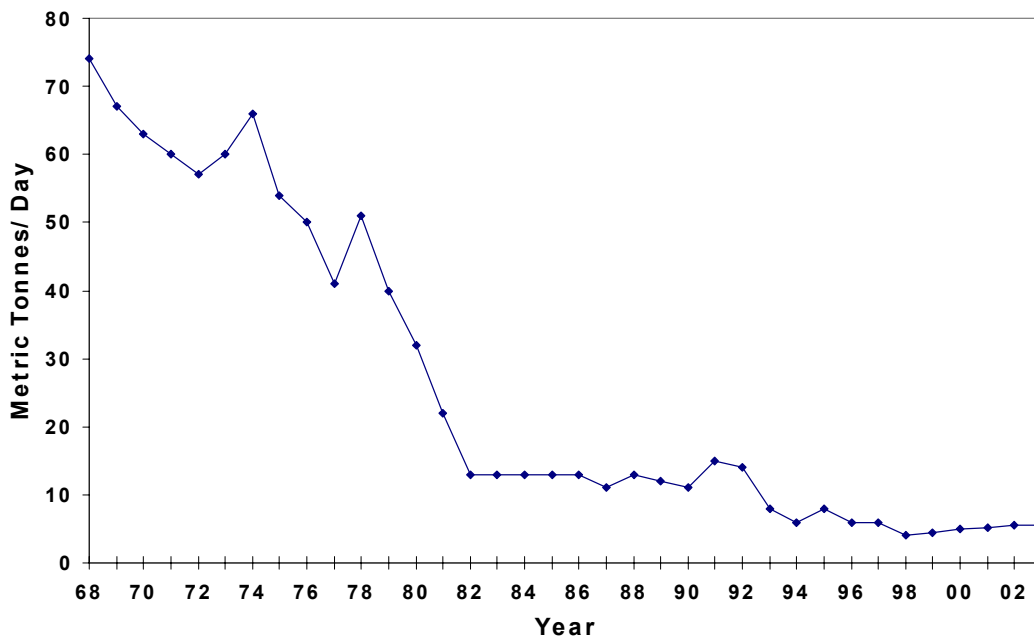
**LC 50** - concentration that causes mortality in 50% of test organisms

**IC 25** – concentration at which response is impaired by 25%

The estimated potential receiving zone of effect based on a 1% plume length of 4,888 m and river flow of 255 m<sup>3</sup>/s was 59.3 m for fathead minnow growth, 116.9 m for *Ceriodaphnia dubia* reproduction, and 49 m for *Selenastrum capricornutum* growth.

### 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. The following graph 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.



**Figure 2. Total BOD Load from Continuous Discharges (mt/d) 1968-2003**

#### 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 2003. Discharge data from this facility are shown below for the years 1996 through 2003.



**Table 6. North Koochiching Sanitary Sewer Discharge Summary**

<b>Year</b>	<b>Flow (m<sup>3</sup>/d)</b>	<b>BOD (kg/d)</b>	<b>TSS (kg/d)</b>
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

### **Baudette**

The Baudette wastewater treatment facility has a pond system that discharges seasonally to the Rainy River. There were no exceedences of the permit limits (128 kg/d for BOD and 230.3 kg/d for TSS ) for discharges from this facility during calendar year 2003. The facility discharged during May and September. The total discharge during that period was 202,367 m<sup>3</sup> with a daily average of 10,599 m<sup>3</sup>/d.

## **3.2 Ontario Municipal Sources**

### **Fort Frances**

The Fort Frances wastewater treatment plant was rebuilt and upgraded in January 1998 to include secondary treatment and phosphorus removal. The result of improved treatment is indicated in the discharge data in the table below which includes two years of pre-secondary treatment and five years of post secondary treatment. The plant operated throughout 2003 within the Ministry of Environment guidelines of 25 mg/L for both BOD and TSS. Average concentrations in 2003 were 6.7 mg/L BOD and 11.8 mg/L TSS, both well within the 25 mg/L limit.

**Table 7. Fort Frances Wastewater Treatment Plant Discharge Summary**

<b>Year</b>	<b>Flow (m<sup>3</sup>/d)</b>	<b>BOD (kg/d)</b>	<b>TSS (kg/d)</b>
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

## Emo

The Town of Emo has a seasonal discharge from its sewage lagoon to the Rainy River. During 2003, a total of 148,063 m<sup>3</sup> was discharged to the river over 38 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 6.93 mg/L and 10.73 mg/L.

## Manitou Rapids

The sewage lagoon operated by Rainy River First Nations at Manitou Rapids was discharged over two periods, May 21 through June 5, and October 22 through November 4, 2003, for a total of 30 discharge days over the two periods. Prior to discharge, Health Canada collected samples on May 6 and October 14, 2003 to confirm that the effluent was within federal guidelines. The results were as follows, all within the allowable discharge limits:

**Table 8. Manitou Rapids Lagoon Test Results 2003 (mg/L)**

Parameter	May 6, 2003	October 14, 2003	Federal Guidelines
Total Phosphorus	0.345	0.484	1.0
BOD	12	2	20
Phenols	<0.002	0.004	20
TKN	2.52	1.26	None
TSS	8	3	25

## Barwick

There were 3 discharge days from the sewage lagoon at Barwick during 2003, with 15,000 m<sup>3</sup> of effluent discharge to the Rainy River. During this discharge period BOD averaged 28 mg/L and TSS averaged 2.0 mg/L.

## Rainy River

The Town of Rainy River discharged a total of 159,470 m<sup>3</sup> from its lagoon to the Rainy River during 2003 over 37 days. During the discharge period, BOD averaged 10.0 mg/L and TSS averaged 14.5 mg/L, both below the provincial guidelines of 40 mg/L and 30 mg/L respectively.

During 2003, there were 3 overflow events at the 6<sup>th</sup> Street lift station in Rainy River, resulting in an estimated 3160 m<sup>3</sup> of raw sewage entering the Rainy River.

### 3.3 Minnesota Industrial Sources

#### Boise Cascade Corporation - International Falls

Discharge data from 1996 to 2003 including effluent flow, BOD, TSS, and AOX for the Boise Cascade Mill in International Falls is provided below. There were no permit violations in calendar year 2003. Dioxins and furans in mill effluent samples were below the detection limit of 10 parts per quadrillion (ppq) in 2003.

The permit for this facility expired in 1996. As indicated in previous reports, the company has submitted an application for a new permit, and the MPCA has recently issued a draft permit for review and comment. The permit will also be placed on formal public notice before it is issued.

**Table 9. Boise Cascade Discharge Data**

	<b>Flow (m3/d)</b>	<b>BOD (kg/d)</b>	<b>TSS (kg/d)</b>	<b>AOX (kg/d)</b>
<b>Compliance Limit</b>	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

### 3.4 Ontario Industrial Sources

#### Abitibi-Consolidated Inc. -Fort Frances

Data on flow, BOD, TSS, and AOX are provided below for the years 1996 through 2003. The decreased levels indicated for 1998 are the result of a labour dispute that shut down mill operations for approximately 5 months. The average annual daily loads for BOD, TSS and AOX in 2003 continue to be below compliance levels.

There were 2 spills reported to the river during 2003. On July 26, 100 ml of hydraulic oil was released into the river, and on October 3, 675 litres of white water was released into the Rainy River. Environment Canada has laid charges under the Fisheries Act as a result of investigations surrounding the May 2001 spill. A pre-trial hearing is scheduled to be held in Fort Frances on October 25, 2004.

**Table 10. Abitibi-Consolidated Discharge Data**

	<b>Flow (m3/d)</b>	<b>BOD (kg/d)</b>	<b>TSS (kg/d)</b>	<b>AOX (kg/d)</b>
<b>Compliance Limit</b>	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

#### **4. Basin Activity Update**

This section of the report is intended to provide background information on other activities occurring in the basin. 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 Basin Planning and Management (MPCA)**

The complete Rainy River Basin Water Plan consists of two volumes. The first, the Rainy River Basin Information Document (BID) contains summary water management information for the Rainy River Basin. The BID concentrates on information that describes water quality, quantity and the aquatic and riparian environment. Whenever possible, the information is presented by major watershed. For those individuals needing additional information, specific websites are cited throughout the BID.

The Rainy River Basin Water Management Plan includes goals, objectives, strategies and indicators designed to maintain or improve the waters of the Rainy River Basin. The plan was developed by residents, stakeholders, local elected officials and representatives from local, state and federal agencies. The plan consists of seven sections. Five watershed plans, a combined basin-wide section and a basin project list.

Copies of the BID and Plan may be accessed at libraries throughout the Rainy River Basin or on the internet at <http://www.pca.state.mn.us/water/basins/rainy/index.html>.

The Rainy River Basin Committee is responsible for coordination of the implementation of the plan's Strategies and Projects. Current projects include:

- Development of the Rainy River Basin Water Resources Center
- Development of the Rainy River Basin Condition Monitoring Program
- The SE Lake of the Woods TMDL Study

- The Lake of the Woods Erosion Reduction Project
- Little Fork River Turbidity and Sediment Study

The Basin Committee also supports the following activities:

- The Committee on the Environmental Effects of Peaking on the Rainy River
- The Rainy Lake and Namakan Reservoir Environmental Monitoring Working Group

The next meeting of the Rainy River Basin Committee is scheduled for February 2, 2005 at Rainy River Community College in International Falls, Minnesota.

#### **4.2 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 the spring of 2002, the Ontario/Minnesota Fisheries Committee established a work group to examine the peaking issue. This Group, officially known as the "Committee on the Environmental Effects of Peaking on the Rainy River" is comprised of representatives from: Boise Cascade Corporation, 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.

Terms of Reference developed by the Work Group describe the Group's purpose as being "to examine the environmental effects of peaking on the aquatic resources and habitat of Rainy River". If harmful effects are found, the Group will explore strategies and make recommendations to minimize environmental impacts. If favorable effects are found, the Group will promote these findings in their final report.

A progress report on activities of the Peaking Work Group was provided to the IJC by the IRLBC in October 2002.

Subsequently, the IRLBC requested the Work Group to also look at the non-environmental impacts of peaking on Rainy River, but the Group declined, stating it did not have the expertise to undertake a broader mandate. The IRLBC then developed a draft scope of work for a "full assessment" of the effects of peaking on Rainy River,

which the Work Group commented on in January 2003. In their comments the Group encouraged the development of a hydraulic model to assist in evaluating the effects of peaking.

At the January 2003 meeting of the Work Group, Boise Cascade announced it was no longer peaking but was reserving the right to do in the future. Abitibi-Consolidated has since stated its need to continue peaking, with reduced flow differentials and duration, in order to manage economic pressures associated with fluctuating hydro prices in Ontario.

To date, the Work Group has not been able to reach consensus in evaluating the effects of peaking and in making recommendations. The Co-Chairs have informed the IRLBC of their intention to submit a final report to the Board by October 1, 2004. They have also forewarned the Board that the report shall likely present two differing perspectives on the issue of peaking.

### **4.3 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-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;
- Studies of the effects of water level fluctuations on aquatic vegetation, trophic-state indicators and mercury uptake in prey fish. These studies are being supported by the NPS and USGS. Two of these studies have already been completed and published (wetland monitoring, and water quality/trophic-state indicators). 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, wetlands, 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.

- 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.
- the USGS, NPS, MDNR and OMNR, in conjunction with Michigan 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.

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.