

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

SPRING 2010 REPORT

Submitted to

The International Joint Commission

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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 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. In addition, the spring reports address regulation of Rainy and Namakan lakes over the past calendar year, while the fall reports address environmental quality and related issues.

Section 2 of this report addresses the regulation of Rainy and Namakan lakes during 2009. Section 3 of the report addresses other activities of the Boards and items of interest in the basin. A map of the basin ([Figure 1](#)) can be found in the Appendix.

2 LAKE LEVEL REGULATION

The year 2009 proved to be another wet year in the basin, continuing the trend for more variable and more extreme inflows (both high and low) since 2000 when compared with the 1980s and 90s. The impact of this wetness on lake inflow was in evidence more on Rainy than Namakan, as the level of Rainy Lake rose to just below the IJC “all-gates-open” level in early June and was later followed by a second minor excursion above the upper rule curve in August. On Namakan Lake, water levels remained essentially within the IJC rule curve band during the year, except for a minor deviation above the upper rule curve in the latter half of May

In spite of 2009 being wet overall, with annual inflows a rank 16 out of 98 years of record for Rainy Lake and somewhat less wet for Namakan Lake with a rank 17 out of 68 years, there were still periods of inflow during the year that were low enough that the outflow had to be reduced to near the IJC-specified minimum on Namakan in mid-September and on Rainy in late October. Since the new millennium began, the level of Rainy Lake has risen above its operating band in five years (2001, 2002, 2005, 2008 and 2009), fallen below its band in three years (2003, 2006 and 2007), and remained within its band in only two years (2000 and 2004). These events have all been due to either well-above or well-below normal precipitation and its resultant impact on inflows. The 2009 quarter-monthly precipitation for the Lac la Croix and Rainy-Namakan sub-basins is shown in [Figure 2](#). Water levels, net inflows and outflows are shown on [Figures 3](#) for Namakan Lake and [4](#) for Rainy Lake. [Figure 5](#) provides a legend for these figures.

The above-normal inflows that had occurred during the 4th quarter of 2008 persisted through the 1st quarter of 2009 for both Namakan and Rainy lakes. With above-normal outflows as well, Namakan Lake levels declined slowly, remaining very close to the middle of the rule curve band through to the end of the 3rd week in March. Rainy Lake’s winter outflows were high as well, with Rainy Lake levels dropping from about 80 percent of band in early January to mid-band by the end of January, and remaining close to mid-band until the last week of March.

The March 1, 2009 US Army Corps of Engineers snow survey indicated snowpack water content at almost 90th percentile. A severe winter storm early the second week of March dropped another half metre of snow in the International Falls – Fort Frances area. This was followed by a dramatic warm period the third week of March with temperatures exceeding 10°C (50°F) and a significant rainfall event at the end of that week. March precipitation was the 2nd highest in 104 years of record and the highest in the last 30 years. As a result, inflows in the Rainy-Namakan basin rose dramatically the last week of

March. Overall, March inflows to Namakan and Rainy were the highest in the last 30 years. Namakan Lake ended March at 77 percent of its rule curve band, while Rainy Lake rose to 93 percent of band.

Following the brief rise in inflow in late March, cool weather in early April delayed the onset of the full snowmelt freshet until nearly mid-April. Once the snowmelt freshet did start, it was quite strong, as expected, due to the high over-winter precipitation that had been received. The initial snowmelt runoff for Namakan Lake peaked the third week of April, but significant precipitation in late April sent inflows rising strongly again, peaking just after mid-May. With the high Namakan inflow, outflow was increased steadily, with the dams reaching wide-open on April 20. Despite this, Namakan Lake rose steadily through April and May, with lake levels exceeding the upper rule curve from May 17 to 26. The maximum deviation above the upper rule curve was 5 cm (2 in) on May 20 but the peak lake level was still 9 cm (4 in) below the peak summer upper rule curve level. Inflow declined quickly after mid-May and Namakan levels were at mid-band by June 6 and finished the month at 34 percent of band.

Inflow to Rainy Lake rose quickly during the middle part of April and then was flat until early May when rainfall caused it to increase again, peaking about mid-May. Outflow was increased sharply in mid-April, with seven of fifteen spill gates opened between April 16 and 18. Another 3 gates were opened by April 27 but attempts to open additional gates resulted in the headwater level falling below safe levels for AbitibiBowater's firewater intake. As the headwater rose, 11 gates were open on May 11, 12 on May 13, 13 on May 20 and 14 on May 26. Rainy Lake was above its IJC upper rule curve level from May 2 to June 22, with a maximum deviation of 26 cm (10 in) on June 2. At the peak level reached on June 5 at 337.87 m (1108.5 ft), the lake was 3 cm (1 in) below the IJC "all-gates-open" level and 12 cm (5 in) above the summer upper rule curve level. Inflow declined quickly after late May and the lake had recovered to 63 percent of band by the end of June, with only 2 spill gates remaining open.

The third quarter of 2009 provided yet another good example of the highly variable weather that the basin has experienced in recent years. Rainfall over the 30-day period starting on July 23rd, although not consistent through the period, was the third wettest for this time period in 104 years of record. Then, in contrast, the next 30-day period experienced persistent well below normal rainfall, such that this period (starting August 23rd) was the sixth driest for this time of year in 104 years of record.

Namakan Lake started July at 34 percent of its operating band and with outflow being reduced to counter the declining inflow. In response to the wet period starting in late July as noted above, the outflow was increased in mid-August such that the lake level was just contained below the Upper Rule Curve (URC), although the level on Crane Lake did marginally exceed this level briefly. During the subsequent dry period noted above, Namakan outflow was reduced from the August high of 258 m³/s down to a low of 56 m³/s. Even so, the lake level fell to 7 percent of its operating band before recovering to 44 percent of band at the end of September. Rainy Lake started July at 60 percent of its band and with its outflow also being reduced to counter the declining inflow. As a result of the wet period, Rainy Lake exceeded its URC for eight days in August, in spite of the outflow being increased from below 240 m³/s to just over 840 m³/s. The maximum deviation above the URC was 3 cm (1.2 in). During the subsequent dry period, Rainy outflow was reduced to less than 120 m³/s. Rainy Lake's level fell to 28 percent of its operating band before recovering to 48 percent of band at the end of September.

The final quarter of the year was unremarkable in terms of basin hydrology. The levels of both Namakan and Rainy lakes remained within their IJC-specified rule curve bands throughout this period.

The level of Namakan Lake started October at 46 percent of its IJC band, with inflow at 45 percentile and declining. Inflow declined to 30 percentile by late October but improved to 55 percentile by early

November, to 65 percentile by November 26 and then to 70 percentile from December 8 through year-end. In response, the lake level reached its lowest band position of 32 percent on October 23, recovered to median by November 4 and was at 80 percent of band at year-end. To keep the lake level from rising higher, outflow was increased in early and mid-November in response to the increasing inflow.

The level of Rainy Lake started October at 48 percent of its IJC band, with inflow at 60 percentile and declining. Inflow declined to 25 percentile by October 26 but had recovered to median by October 31 and then was mostly in the 60-65 percentile range through to year-end. In response, the lake outflow was reduced from 196 m³/s at the start of October to a low of 138 m³/s by October 26, then increased to 338 m³/s by November 24 and ended the year at a somewhat lower 296 m³/s. As a result of these changes in inflow and outflow, the lake level declined to as low as 32 percent of band and then rose as high as 63 percent of band before ending the year on a declining trend at 42 percent of band.

3 BASIN ISSUES AND OTHER BUSINESS

3.1 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.

The proponent will consider comments received through the public and agency consultation and, where it judges necessary, make revisions to its Environment Report. Subsequently, OPEG 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 are being 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. The Boards will continue to monitor developments related to this project, and keep the Commission advised.

3.2 Rainy River Peaking Work Group

The Peaking Work Group will be meeting April 1st, after the writing of this report, to set the start and tentative end dates for the 2010 spring spawning window. A detailed report on the Peaking Work Group's 2010 activities will be included in the Fall Report.

3.3 Environmental Monitoring for Future Rule Curve Evaluation

The Boards' fall 2008 and spring and fall 2009 reports provided status reports on 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. The Workgroup submitted its final Plan of Study (POS) and recommendations to the Commission on June 29, 2009 to address monitoring information gaps, to provide a basis for seeking required funds from governments and to recommend an

approach for conducting the Commission's anticipated 2015 review of its Order for Rainy and Namakan lakes. As reported in the Boards' fall 2009 Report, the Commission is considering the Workgroup's findings and recommendations. However, one of the core studies identified in the Workgroup's final POS has been conditionally approved by the Commission's IWI Review Committee and is discussed in more detail in Section 3.3 of this report. This study is focused on the effects of the 2000 Rule Curve change on aquatic vegetation.

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 to determine effects of implementation of the 2000 Rule Curves. The Boards reported in their fall 2009 report to the Commission that final reports had been generated for two of the five "best bet" indicators, benthic macro-invertebrates and wetland vegetation, and had been submitted to the Boards and that reports for the remaining three indicators (fish, common loons and furbearers) were nearing completion. Currently, the fish project is in the process of peer review and will be done within a few months, while the common loon and furbearer projects will not be completed until the end of this calendar year.

3.4 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

Lower Rainy River Modeling

Under the IWI, the U.S. Section of the IJC has been funding the work of the U.S. Army Corps of Engineers since 2006 to develop a computer-based steady and unsteady hydraulic model of the lower Rainy River (from the International Falls – Fort Frances dam to Lake of the Woods). This was first addressed in the Boards' fall 2006 report, with updates in the spring and fall reports of 2007, 2008 and 2009. While work on the model was essentially completed in late 2007, completion of an independent technical review (ITR) and completion of a final report have been delayed and still remain to be completed. The ITR was initiated at the end of September 2009 and is being conducted by the Boundary Water Issues Unit of MSC Operations, Environment Canada in Burlington, Ontario. Following completion of the ITR and the addressing of any review comments, the final modeling technical work and reports will be packaged and submitted to the Commission. Every effort is being made to finalize this work.

Upper Rainy River Modeling

Work is preceding on the development of a hydraulic model of the upper Rainy River, from Rainy Lake down to the International Falls – Fort Frances dam. It is intended that the model will permit the simulation of water levels along the river over a range of flows, both in the current state with the dam in place and also in a state of nature, as if the dam had never been built. It is hoped that the model will help to explain the limitations on the flow capacity of the channel. The model itself is being developed under contract by the National Research Council (NRC) of Canada, while bathymetric data in support of the model was collected by the Water Survey of Canada (WSC) last fall.

Temperature Gauges

In 2009, IWI funding was approved to support the installation, operation and maintenance of temperature gauges at three locations in the Rainy River. These gauges will provide useful information for the Peaking Workgroup to help define the spring spawning period for walleye and sturgeon to guide the prohibition period for peaking. Although near real-time data from the first water temperature probe at Manitou Rapids on the Rainy River is already reported by the United States Geological Survey(USGS) at <http://waterdata.usgs.gov/nwis/uv?05133500>, installation of two other probes has been delayed until later in 2010. Plans are for ACH to install a second temperature probe immediately below the dam at Fort Frances/International Falls with Water Survey of Canada (WSC) to install a third probe at the Town of Rainy River. The intent is that data from both probes will also be available on the internet in near real-time. State and provincial fishery biologists will prepare a report correlating water temperatures in Rainy River with fish spawning as part of this project.

2000 Rule Curve Indicator: Changes in Submerged Aquatic Vegetation

Conditional approval was received from the Commission's IWI Review Committee on July 24, 2009 for 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. This study will follow up on similar studies conducted in 1987 and from 2002 to 2005. It is proposed to use the same principal investigators (Meeker and Harris) that conducted the 2002-2005 studies for Voyageurs National Park to maintain methodological and taxonomic consistency in this ongoing assessment. This conditionally approved study was identified in the June 24, 2009 "Plan of Study for the Evaluation of the IJC 2000 Order for Rainy and Namakan Lakes and Rainy River" by the IJC's 2000 Rule Curve Assessment Workgroup. The Workgroup recommended the study as a core study for filling information gaps in data required to provide essential baseline information for the Commission's year 2015 review of its Order for Rainy and Namakan lakes. Board, IJC and Voyageurs National Park staff and the proposed principal investigators have made significant progress on satisfying the IJC conditions of approval to allow this work to proceed during this year's open-water season.

Data Harmonization in the Rainy River Basin

Many of the hydrographic datasets developed in the U.S. and Canada terminate at the International Border and are inconsistent with each other in terms of scale, classification and standards. For watersheds which straddle the Canada – U.S. border, such as the Rainy River watershed, this discontinuity presents considerable difficulty for hydrographic mapping and modeling. The Transboundary Hydrographic Data Harmonization Task Force is mandated, through the IJC and its IWI program, to help coordinate the harmonization of both hydrographic and drainage area data sets in trans-boundary water sheds. The goal of this program is to produce a detailed, standardized, hydrologically sound bi-national system of streams, rivers and watersheds.

In response to a request by the International Multi-Agency Technical Advisory Committee for Lake of the Woods the Task Force has offered to facilitate efforts to harmonize hydrographic data in the Rainy River watershed in conjunction with the Rainy Boards. The Task Force joined the Boards in their Dec 18, 2009 conference call and gave a short presentation on the hydrographic harmonization process and the respective roles of the Task Force and the Boards in this process. The Task Force has already begun, and is nearing completion of Phase 1 of the data harmonization process in the Rainy River and Lake of the Woods watershed. This involves the harmonization of Canada's National Hydro Network (NHN)

and the U.S. National Hydrographic Dataset (NHD) within 100 m of the border. Water features are aligned; re-digitizing lines if necessary to connect the water features and establish flow paths. Trans-boundary drainage areas are delineated on the 1:24,000 - 1:50,000 scale based on the 8 digit U.S. Watershed Boundary Dataset and the Canadian Fundamental Drainage Areas 4 digit codes.

Ultimately the goal is to achieve data harmonization at a more detailed local scale. Next steps include the creation of a panel made up of experts from local agencies which have a stake in hydrographic and drainage area GIS data sets. This process was initiated when the Task Force hosted a workshop on data harmonization with regional GIS experts from federal, provincial and state agencies at the Lake of the Woods Water Quality Forum on the 10th of March in International Falls, MN. The Task Force outlined the harmonization process and the progress to date. The Boards are currently seeking local GIS experts and stakeholders from regional, state and federal agencies who would be interested in participating in the data harmonization process. Part of the process includes the organization of a Technical Workshop where local GIS experts and stakeholders will gather to refine hierarchical drainage areas .

3.5 Development of a Renewed IRLBC/ IRRWPB Work Plan

In December 2003 both the IRLBC and the IRRWPB prepared a work plan for their respective Boards for presentation to the IJC. The work plans were coordinated between the Boards and outlined the goals and core activities of each, including an indication of which activities were supported financially. The work plans were subsequently published in the IRLBC/IRRWPB Spring 2004 Report. Since that time the work plan has undergone a number of improvements and modifications. In 2006 the work plans for the two Boards were merged into a single, joint document to better reflect the IJC's 2001 directive for the Boards to work in a more closely integrated fashion. In 2010 the work plan was subsequently modified to include tables of special projects being undertaken by the Boards outside of their core activities, including those funded through the International Watersheds Initiative. This includes a table outlining projects which have been approved or are active during the current two fiscal years with cost estimates and anticipated completion dates. A second table outlines proposed projects with projected expenditures and timelines while a third table documents completed projects. The purpose of these tables is to provide the Boards and the IJC with a more comprehensive list of active projects and proposed projects as well as their projected costs and timelines.

3.6 Meetings

International Joint Commission Fall Semi-Annual Meeting

IRLBC and IRRWPB members and staff attended the fall semi-annual meeting of the IJC in Ottawa Ontario on October 28. The Boards' presentation to the IJC addressed water quality and provided updates on basin and Board activities. The water quality component reported on water sampling, fish consumption advisories, municipal/industrial point source discharges and trends in BOD (biochemical oxygen demand) loads on the Rainy River. While the data was mostly positive, it was noted that turbidity in the Big and Little Fork rivers, and DO (dissolved oxygen) in the Big Fork, had exceeded ambient water quality guidelines. The Baudette municipal discharge had also exceeded average and maximum TSS (total suspended solids) concentrations four times in May 2008. The basin activities component provided an update on the proposed Namakan River hydropower development, environmental monitoring for future rule curve evaluation, spring hydropower peaking operations, and work under the IJC's International Watersheds Initiative (IWI).

Following the Boards' presentation to the IJC, two members of the Year 2000 Rule Curve Assessment Workgroup presented a summary of their final report "Plan of Study for the Evaluation of the IJC 2000 Order for Rainy and Namakan Lakes and Rainy River", which is available on the Board web sites.

Board Meetings and Conference Calls

In addition to meeting in Ottawa on Oct 28, 2009, both before and after their presentation to the IJC, the two Boards continued to maintain contact via email exchanges. The two Boards held joint conference calls on October 5 and December 18, 2009, and on February 11, 2010.

During the October 5 conference call the Health Professionals Task Force presented their final report on "[Water and Health in Lake of the Woods and Rainy River Basin](#)" to the Boards. This report was subsequently presented to the IJC during the Fall semi-annual meeting. Board amalgamation and mandate expansion were briefly discussed with IJC staff both during the October 5 conference call and prior to the Boards' appearance before the IJC. The Boards met on October 28th, prior to their presentation to the Commission, to finalize their presentation and discuss the status of several IWI projects, including temperature gauges, the submerged aquatic vegetation study, and the lower Rainy River hydraulic model. Immediately following, the Boards briefly met again to continue earlier discussion on the IWI projects and to follow-up on the meeting with the Commissioners. The decision was made to contact the IWI Data Harmonization Task Force regarding the potential for coordination of data harmonization in the Rainy River Basin. A Share Point site was developed and hosted by the IJC to facilitate data sharing by the Boards. During the December 18 conference call the Data Harmonization Task Force gave a presentation to the Boards briefing them on data harmonization in the Rainy River Basin. The Boards also discussed the possibility of migrating to a single joint annual report to the IJC. This discussion was subsequently deferred pending potential changes to the Rainy Boards' mandate. The Boards held a conference call on February 11 specifically to discuss and edit their Work Plan.

International Lake of the Woods Water Quality Forum

The International Lake of the Woods Water Quality Forum, sponsored by the Lake of the Woods Water Sustainability Foundation, was held March 10th and 11th in International Falls, MN. Forum attendance was down from previous years with only 90 people attending. The organizing committee attributes the decline in attendance to the poor economy and budget cuts at agencies and institutions. The focus of this year's Forum was paleolimnology with Dr. John Smol and Dr. Dan Engstrom as keynote speakers. In addition to several paleolimnology presentations, other presentations covered results of nutrient modeling for the lake, monitoring updates and an overview of the IJC's Binational Hydrographic Data Harmonization Effort.

At the Foundation's Reception the evening of March 20th, IJC Canadian co-chair [Joseph Comuzzi](#) provided an update on IJC activities and his thoughts on the future for the International Rainy River Basin.

The Forum Organizing Committee also provided meeting rooms and refreshments for the International Multi-Agency Work Group and its Technical Advisory Committee for Lake of the Woods and the IJC staff's Binational Hydrographic Data Harmonization focus group.

3.7 Board Merger and Mandate Expansion

No formal response has been received to date from the IJC regarding the Boards' letter of October 20, 2008 wherein the Boards recommended their merger and expansion of mandate to include water quality issues in Lake of the Woods, subject to prior public consultations. The Boards have been made aware, however, that consultations are continuing between Canada and the US, the various agencies with interests in Lake of the Woods, and the IJC.

3.8 Board Membership

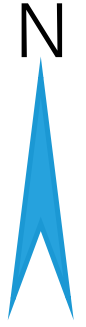
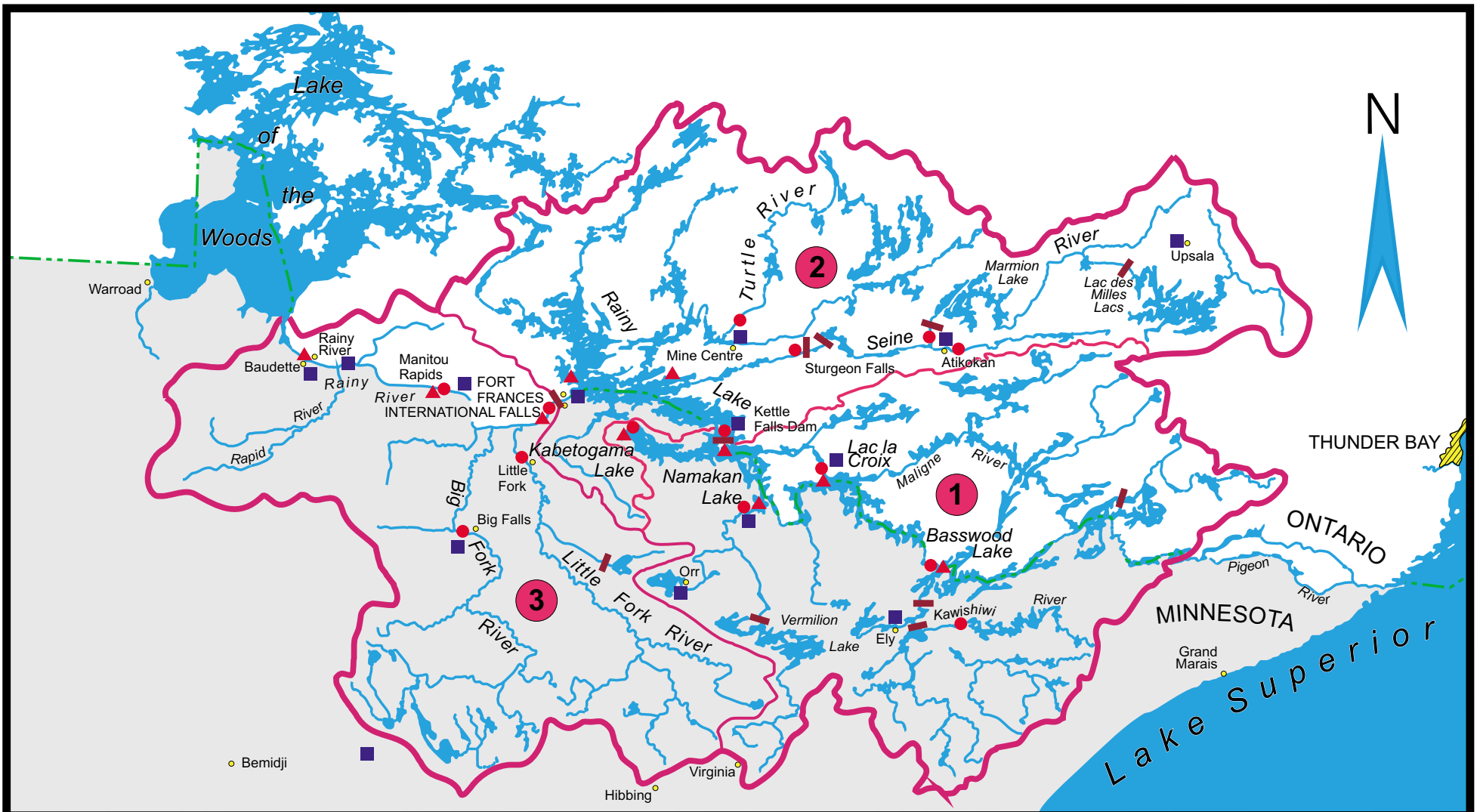
Greg Chapman, the new District Manager of the Ontario Ministry of Natural Resources in Fort Frances, was appointed by the IJC as a member on the IRRWPB, replacing Bill Darby who had resigned in late July 2009. Kelli Saunders, with the Ontario Ministry of the Environment in Kenora, was appointed as Greg's Alternate. Both appointments are for a three year term, from December 8, 2009 to December 12, 2012.

APPENDIX

Figure 1	Rainy River Drainage Basin Map
Figure 2	Rainy Basin Precipitation
Figure 3	Namakan Lake Elevation, Net Inflow and Outflow
Figure 4	Rainy Lake Elevation, Net Inflow and Outflow
Figure 5	Legend for Lakes and River Graphs

NOTE

All precipitation, water level and flow data used in the text and figures of this report were taken from the database of the Secretariat of the Lake of the Woods Control Board. At the time of preparation of this report, this data was still provisional and subject to revision.



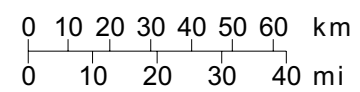
LEGEND

- International Boundary - - - - -
- Drainage Basin - - - - -
- Sub-Basins - - - - -
- ① Namakan Lake
- ② Rainy Lake
- ③ Rainy River

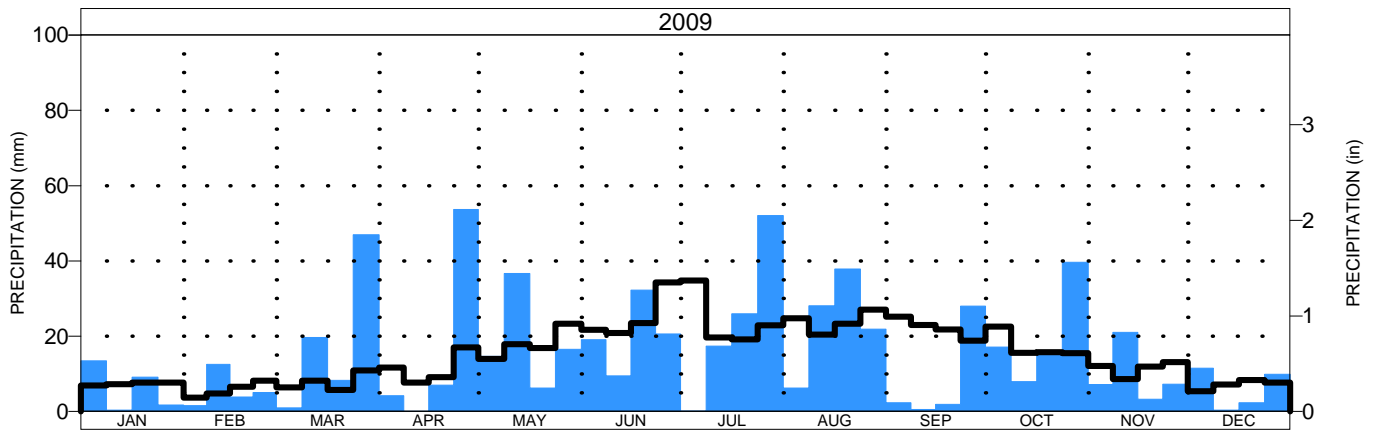
- Control Dams - - - - -
- Data Gauges (Near Real Time)
- Stream Flow - - - - - ●
- Water Level - - - - - ▲
- Precipitation - - - - - ■

**International Rainy Lake Board of Control
IRLBC**

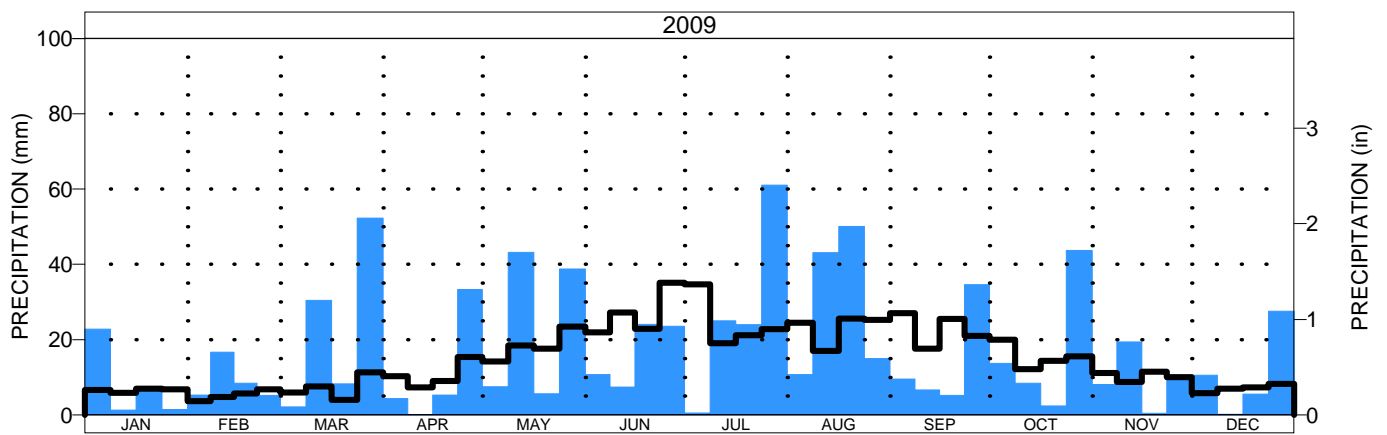
**Rainy River
Drainage Basin**



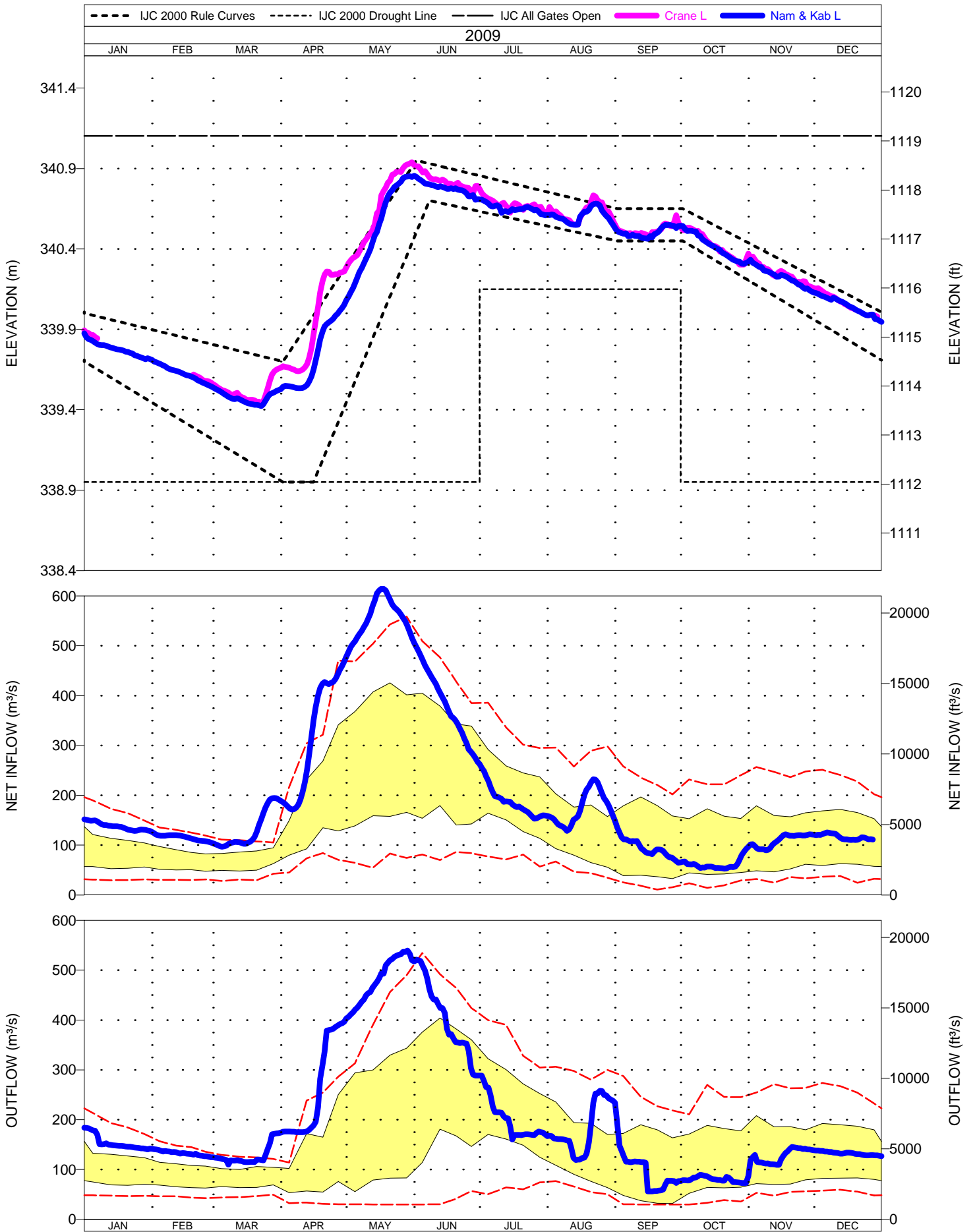
LAC LA CROIX PRECIPITATION



RAINY-NAMAKAN PRECIPITATION



NAMAKAN LAKE



RAINY LAKE

