

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

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**Spring 2012 REPORT**

**Submitted to**

**The International Joint Commission**

**March 30, 2012**

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## **BOARD MEMBERS AND STAFF**

	<b>Canada</b>	<b>USA</b>
<b>IRLBC Members</b>	Gail Faveri, P.Eng  Vacant	Michael Price, COL  Leland Grim
<b>IRRWPB Members</b>	Vacant  Gregory Chapman Kelli Saunders (Alternate)	Jeffrey Stoner, PG  Nolan Baratono
<b>IRLBC Engineering Advisors</b>	Rick Cousins, P.Eng Matt DeWolfe, P. Eng	Edward Eaton, PE
<b>Joint Board Secretary</b>	Tana McDaniel	

## **1 INTRODUCTION**

The International Rainy Lake Board of Control (IRLBC) and the International Rainy River Water Pollution Board (IRRWPB) report jointly to the International Joint Commission (IJC) in the spring and 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 2011. Section 3 of this report addresses other activities of the Boards and items of interest in the basin. A map of the Rainy River basin showing the locations of the lakes is shown in Figure 1.

## **2 LAKE LEVEL REGULATION**

### **2.1 Overview**

Conditions in the Rainy-Namakan basin for 2011 overall were dry, for the second year in a row. Average inflows to Lac la Croix, Namakan Lake and Rainy Lake were 14 percentile, 26 percentile and 21 percentile, respectively. (50 percentile represents a median condition while 10 percentile would represent a 1-in-10 year low condition). Inflows were near normal for the first half of the year, but conditions became progressively drier through the second half. 2011 precipitation for the Rainy-Namakan basin was 7<sup>th</sup> lowest in 102 years of record (5 percentile), while temperatures for the year were above normal at 73 percentile. The 2011 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 Figure 3 for Namakan Lake and Figure 4 for Rainy Lake. Figure 5 provides a legend for these figures.

Both Namakan and Rainy Lake levels declined near mid-band through the winter of 2011. Strong inflows developed very quickly the second week of April due to combined warm temperatures and rainfall. Outflows from both Namakan and Rainy Lakes were increased dramatically in response. On April 14, the IRLBC was informed of concern by residents and the county sheriff at Little Fork, MN about flooding, as the Little Fork River stage had risen 4.9 m (16.1 ft) since April 1. By this time, however, the Fork Rivers and Rainy River had peaked so no action was taken by the Board to direct changes in Rainy Lake outflow.

The water levels of both lakes approached the IJC upper rule curves in mid-April, with Rainy Lake exceeding the upper rule curve by about 1 cm (0.5 in) for three days. The main level of Namakan Lake reached 93% of band but Crane Lake water levels were above the upper rule curve from April 13 to 27 with a maximum deviation of 42 cm

(16.5 in) on April 16. (Crane Lake is part of the Namakan chain of lakes but this deviation is not considered to be a violation of the IJC rule curves.) Inflows began declining in May and except for a brief rise at the end of June, due to above normal rainfall the last half of the month, continued declining into September and then remained low for the remainder of the year.

With the dry conditions, the levels of both lakes continued to decline. Namakan Lake fell below the lower rule curve by a maximum of 1 cm (0.4 in) for 5 days between September 28 and October 2. Namakan Lake outflows, at 37 m<sup>3</sup>/s (1,310 f<sup>3</sup>/s) were slightly above the IJC specified minimum of 30 m<sup>3</sup>/s (1,060 f<sup>3</sup>/s) due to technical difficulties in completing sluice closures. Rainy Lake outflows were reduced to the IJC minimum in early September and remained at minimum through year-end. Despite the minimum outflows, the level of Rainy Lake fell below its lower rule curve on September 25 and remained outside the rule curve band through year-end, a total of 98 days. The maximum deviation below the lower rule curve was 19 cm (8 in). Namakan Lake ended 2011 at mid-band while Rainy Lake was still 15 cm (6 in) below its lower rule curve.

The level of Rainy Lake was back within the rule curve band on February 22, 2012. An early freshet began in the basin the middle of March with well above normal temperatures. As of March 20, 2012, Namakan Lake was at 57% of band while Rainy Lake was at 53% of band. Rainy Lake outflows, which had been at the IJC minimum of 100 m<sup>3</sup>/s since September 2011, were increased to 130 m<sup>3</sup>/s (4,590 f<sup>3</sup>/s) on March 20.

### **3 BASIN ISSUES AND OTHER BUSINESS**

#### **3.1 IJC International Watersheds Initiative Projects:**

##### **3.1.1 Seine River Temperature Project**

The Seine River First Nation is planning on expanding and continuing their temperature, water level and fish monitoring project, in conjunction with the Shooneyaa Wa-Biitong of Fort Frances, Ontario Ministry of Natural Resources and the Aboriginal Funding for Species at Risk. The Rainy Boards have submitted an International Watersheds Initiatives (IWI) proposal to cover the involvement of the Seine River First Nation and the installation of two Water Survey of Canada gauges at the two Seine River locations downstream of the Sturgeon Falls (Crilly) dam. The five year project is expected to help determine how peaking and ponding changes to water levels and flows may affect the sturgeon spawn, and how the timing of the spawn may be determined by temperature and other surrogate parameters.

##### **3.1.2 Hydrographic Surveys of Four Pinch Points in the Namakan Reservoir**

In 2011, bathymetry and velocity data were collected in the four narrows of Namakan Lake. In addition, water-level data were collected in Crane, Little Vermilion, Sand Point, and Namakan lakes. Velocity and water-level data have been processed according to

USGS protocols, and a draft of the bathymetry data set should be available by late April 2012. Additional velocity and water-level data will be collected during the 2012 open-water period.

### **3.1.3 Relocated Water Survey of Canada Water Level Gauges**

As mentioned at our 2011 fall appearance, the Water Survey of Canada (WSC) relocated three gauges with funding from the IWI. The water level gauge at the Government Landing in the northwest arm of the lake will allow the Boards to monitor higher levels at this location from inflows from Pipestone Creek, responding to a resident who noted at the 2010 public meeting that water levels at his location were higher than the Rainy Lake mean noted on the website, while the two gauges between Rainy Lake and the dam on Rainy River will assist in the calibration of the hydraulic model of the upper Rainy River. The operating costs of the gauges will be covered by WSC since they no longer operate three gauges at the dam on Rainy River. The real-time data from these gauges are available at the following urls:

Rainy Lake at Northwest Bay:

[http://www.wateroffice.ec.gc.ca/graph/graph\\_e.html?stn=05PB023](http://www.wateroffice.ec.gc.ca/graph/graph_e.html?stn=05PB023)

Rainy River at Pithers Point No. 1:

[http://www.wateroffice.ec.gc.ca/graph/graph\\_e.html?stn=05PC024](http://www.wateroffice.ec.gc.ca/graph/graph_e.html?stn=05PC024)

Rainy River at Pithers Point No. 2:

[http://www.wateroffice.ec.gc.ca/graph/graph\\_e.html?stn=05PC025](http://www.wateroffice.ec.gc.ca/graph/graph_e.html?stn=05PC025)

### **3.1.4 Lake of the Woods Water Quality Forum**

The annual Lake of the Woods Water Quality Forum, held once again in International Falls, MN in March 2012, was partially supported through IWI funds contributed by the IJC. This forum has become the premier scientific symposium attended by a wide array of researchers in the basin and has proven successful for the past nine years. This year, keynote speakers focused on the topic of climate change and the need for adaptation strategies. Additional presentations included an update from the International Multi-Agency Working Group and its Technical Advisory Committee, basin hydrology and modelling and nutrients, algae and biomonitoring research. On the evening prior to the symposium, the IJC's U.S. Co-Chair, Lana Pollack, was the keynote speaker for the Lake of the Woods Water Sustainability Foundation Reception at the forum. She provided an update and insight into the IJC recommendations released to the governments in January 2012, regarding bi-national governance of water quantity and quality in the basin. The annual Kallemeyn Award for excellence in science and research was awarded to a very deserving IRLBC member, Leland Grim. A new stewardship award was presented to Gerry Wilson for her dedication to stewardship in the basin as a result of her long-time involvement with the Lake of the Woods District Property Owners'

Association. The award will be presented annually and is named the Gerry Wilson award in her honour.

### **3.1.5 IJC Phase III Data Harmonization Workshop for the Rainy Basin**

The Canada-U.S. Transboundary Hydrographic Data Harmonization effort led by Mike Laitta of the IJC has almost completed the third phase of the harmonization process for the Rainy River drainage basin. The Phase III workshop was held at the State of Minnesota's Department of Natural Resources office in Saint Paul, Minnesota from February 27 to March 1, 2012. In this workshop, representatives from the State of Minnesota (DNR), Province of Ontario (MNR), U.S. Geological Survey, Environment Canada, Agriculture and Agri-Food Canada and the IJC used their local and hydrological knowledge of the Rainy River basin and worked cohesively to confirm the sub-basins and sub-subbasins perimeters originally generated using ArcGIS tools and geospatial layers. The collaborative effort at the workshop produced a draft for all transboundary basin levels within the Rainy River drainage basin. This harmonized data will be beneficial to studies analyzing the effects the IJC 2000 Rule Curves have had on the Rainy River, Rainy Lake and Namakan Lake hydrology. Having seamless transboundary data will deliver more accurate and robust modeling and analyses for studying the outcome the rule curve has had on the basin. An additional benefit realized was the opportunity to network with geospatial colleagues from many different agencies in both countries and to share information about current research in the Lake of the Woods basin.

### **3.1.6 3<sup>RD</sup> IWI Modelling Workshop**

Staff member Matt DeWolfe, of the International Rainy Lake Board of Control attended the IWI modeling workshop, held in Vancouver in March, 2012. The third in a series of workshops aimed at addressing the needs of the various IJC boards in numeric model selection, implementation and stewardship, this workshop focused on refining guidelines for the selection of numeric models by boards to address various study and operational needs. The workshop included presentations and discussions regarding water quality, hydrologic and hydraulic models from various state, provincial and federal agency representatives associated with the IJC.

## **3.2 Implementation of IJC 2000 Rule Curve Assessment Workgroup Recommended Studies**

The Voyageurs National Park (VNP) project management team continued to work with the Rainy Boards to facilitate the implementation of the projects recommended in the *2009 Plan of Study for the Evaluation of the IJC 2000 Order for Rainy and Namakan lakes and Rainy River*. The project management team worked with principal investigators to prepare and submit scopes of work (SOWs) for three additional studies since October 1 for Rainy Boards approval. The following SOWs were approved by the Boards:

1. Measure Unionid (mussel) diversity and abundance in the Rainy River to assess effects of 2000 Rule Curves.
2. Characterize the hydrology of the Rainy River in terms of levels and flows, tributary and local inflow, flow attenuation and alteration from pre-dam and pre-2000 Rule Curve hydrology.

In addition the Boards approved a principal investigator (PI) and a SOW for the hydrologic modelling portion of the project entitled:

3. Develop reservoir hydrologic model and reservoir PHABSIM habitat model for Rainy Lake and the Namakan Chain of Lakes.

The results of the hydrologic model will provide information needed for several other POS projects in the reservoirs. During the Lake of the Woods Water Quality Forum in International Falls in March the project management team met with several PIs who will be utilizing the information from the hydrologic model for their work on the reservoirs to discuss the projects with the modelling leads.

Four of the projects previously approved by the Boards were granted funding through the Canadian section through the IJC's IWI program. Many of these projects have been initiated and will be entering the data collection and analysis phase during the current fiscal year. This includes studies on fish spawning habitat and reproductive success in Rainy and Namakan and on the Rainy River, marsh bird and amphibian habitat on Rainy and Namakan, hydrological modelling on the Rainy River and effects of flooding and ice damage on Rainy and Namakan lakes.

A progress report has been submitted by Bob Metcalf, Ontario Ministry of Natural Resources, PI for the project characterizing the natural hydrology of the Rainy River in comparison to 2000 rule curve conditions. At the Lake of the Woods Water Quality Forum, Steve Gutreuter United States Geological Survey, PI for the project to assess the effects of water level fluctuations on bioindicators using analytical models presented on the impacts of water-level fluctuations on the reproductive success of the common loon. Ann Timm, United States Department of Agriculture Forest Service, and Rod Pierce, Minnesota Department of Natural Resources, PIs for the project on northern pike spawning habitat and reproductive success presented a poster on the availability of northern pike breeding habitat in Rainy Lake and Namakan reservoir.

The Rainy Boards and the VNP project management team continue to work on developing the remaining projects outlined in the 2009 POS. Potential PIs were identified and approved for several of the studies scheduled for fiscal year 2014 and beyond. These include:

1. Assess effects on cultural resources at benchmark sites on the Rainy River.

2. Measure changes in fish community health in relation to effects of the 2000 rule curve change.
3. Assess effects on cultural resources at a small number of sites on the reservoirs.

To increase efficiency, the project management team, the Boards and IJC agreed to move the project “Identification of critical benthic habitats at x-sections” from FY15 to FY14 and the project “Measure unionid mussel diversity” from FY12 to FY13. In addition, the project “Detailed bathymetric mapping of littoral zone of selected reservoir locations” was moved from the Canadian Section to the US Section of the IJC and will be conducted using LiDAR surveys as boat based surveys were deemed impractical in the shallow littoral zones.

### **3.3 Name Change for Canadian Paper Company**

The Boards were informed that, effective November 7<sup>th</sup> 2012, AbitibiBowater Inc., owner and operator of the Canadian paper mill at Fort Frances, had changed its name to Resolute Forest Products Limited.

### **3.4 Mining**

The demand and the associated value for copper, nickel, silver, gold and a myriad of other metals continue to increase. Re-opening formerly closed mines or establishing new mines looks increasingly attractive, and many such ventures are currently underway (or proposed) in the Rainy River Basin. The process of mining creates waste rock piles, tailings and residues which have the potential to contaminate water supplies through seepage of toxic heavy metals into ground water or via runoff into surface waters. Transporting materials required for the mining process (such as hydrochloric acid) to the site, and then transporting materials from the mine, also pose environmental risks. Mining operations also can require large volumes of water and leave a large footprint on the landscape, including the destruction or displacement of wetlands and wildlife habitat. Understandably, basin residents are concerned about mining development.

PolyMet, Inc. is a Canadian company that has proposed to construct and operate an open pit mine approximately six miles south of Babbitt in St. Louis County, Minnesota. The U.S. Army Corps of Engineers, U.S. Forest Service, and the Minnesota Department of Natural Resources are co-lead agencies for preparation of a joint federal-state environmental impact statement. If permitted, PolyMet Inc. will be the first copper-nickel sulphide mine in the state of Minnesota. The co-leads are currently evaluating air, surface water, and groundwater modeling efforts in preparation for the environmental impact statement.

The Osisko Hammond Reef gold deposit near Atikokan, ON consists of the development of an open pit mine, an ore processing facility and a tailings management area. The project will also include the associated infrastructure at the mine site, upgrades to an existing road to the site, and a new electrical and communications transmission line. Options are currently being investigated to determine the preferred location for the tailings management area. All facilities will be co-located with the mine site. At this time, the proposed water usage requirements will be 82,000 m<sup>3</sup>/d, with 62,000 m<sup>3</sup>/d being reclaimed from the tailing facility and 20,000 m<sup>3</sup>/d coming from Marmion Lake. At this time, the tailings facility expects to discharge approximately 5,000 m<sup>3</sup>/d. The Osisko Hammond Reef project has entered into a voluntary agreement with the Provincial Ministry of the Environment (MOE) for an individual Environmental Assessment in late August of this year. The coordination of multiple provincial agencies will be the responsibility of the MOE.

The Rainy River Gold Project, a mining project of Rainy River Resources, is a gold exploration project situated in the southern half of Richardson Township, approximately fifty kilometers northwest of Fort Frances, ON. The company recently announced it will be foregoing a planned advanced exploration project in favour of moving directly to mine development. This announcement is supported by an independent preliminary economic analysis (PEA) released in the fall of 2011. It is expected the company will be initiating the mine application process by the end of the first quarter 2012. The project has the potential to become one of Canada's largest open pit mining operations.

Twin Metals Minnesota Joint Venture has begun looking at the feasibility of creating an underground copper-nickel-palladium group metals mine near Ely, located in Lake County, Minnesota. This venture is known as Twin Metals Project and would be the largest underground mine in Minnesota if the project proceeds as planned. Press releases indicate that a Nokimis Deposit underground mine would have a 22 year mine life. The deposits are located adjacent to the South Kawishiwi River within the Boundary Waters watershed and are reported as the largest untapped copper deposits in the world. This spring Twin Metals will be collecting baseline environmental data.

As the Boards learned during their August Basin tour last year, there is also the issue of the Steep Rock iron ore mines near Atikokan, ON, which ceased mining operations in 1979. The open pits began filling in the early 1980's and have resulted in the formation of pit lakes. The two adjacent pits, Hogarth and Caland, are the most substantial, and their water levels continue to rise. The water in the pit lakes is chronically toxic to aquatic life. Current modeling results indicate overflow dates ranging from 2030 to 2070. With no intervention, impaired water overflowing from the pit lakes could adversely affect downstream waters including the Seine River, Rainy Lake, and Rainy River, as well as their associated aquatic communities. Through its Steep Rock Rehabilitation Project, the Ontario Ministry of Natural Resources is developing a long-term management plan for the Steep Rock site that will identify mitigation strategies for downstream waters and public safety, and possible uses of the site. Field work in 2011

included the identification and delineation of contaminant source areas and further ecological assessment. Work in 2012 will focus on continued water quality and ecological monitoring, environmental investigation, and addressing public safety issues related to access and underground openings.

These are just a few examples of mining development underway in the Basin. For any of these examples on the U.S. portion of the Rainy Basin, the Minnesota State agencies, Minnesota Pollution Control Agency and Minnesota Department of Natural Resources, have jurisdiction over reviewing environmental impacts and permitting, respectively. The projects in the Canadian portion of the Rainy Basin require permits and approvals from a number of provincial and federal agencies. Provincial agencies include Ministry of Northern Development and Mines, Ministry of Natural Resources, Ministry of the Environment, Ministry of Transportation and Ministry of Tourism and Culture. Federal approvals are coordinated through the Canadian Environmental Assessment Agency and may require approvals and permits from Fisheries and Oceans Canada, Environment Canada, Transport Canada and Natural Resources Canada.

### **3.5 Meetings and Other Business**

The Boards held a joint meeting in Ottawa on October 19<sup>th</sup> to review projects and prepare for their appearance at the IJC semi-annual meetings in Ottawa. The Boards also discussed the International Lake of the Woods and Rainy River Watershed Task Force recommendations for watershed governance of the Lake of the Woods and Rainy River basin, regulation issues, updates on studies for the year 2000 rule curve review and local IJC International Watershed Initiative studies.

On October 19<sup>th</sup>, the Boards appeared before the IJC to present a summary of the Boards' fall report. A copy of the report can be viewed on the Boards' websites under "Publications". (To access the Boards' respective websites, go to [www.ijc.org](http://www.ijc.org) and follow the links under "Boards".)

The Boards also held a number of teleconferences during the fall and winter months to discuss relevant issues as they arose. The Boards held a teleconference on December 5<sup>th</sup> to discuss future water quality monitoring needs for the Rainy River. The Rainy Boards currently report to the IJC on discharges from municipal and industrial sources in addition to ambient water monitoring in the Rainy River for exceedences of alert levels for priority pollutants. In addition, the Boards discussed strategies for maintaining their archive of documents, correspondence and other Board materials and making them more accessible electronically.

The Boards held a teleconference on January 20<sup>th</sup> with the VNP project management team for the implementation of the 2009 Plan of Study (POS). The Boards were updated on the progress of several of the proposed studies outlined in the 2009 POS. Potential PIs and scopes of work for studies in FY14 and FY15 were discussed. A prioritization

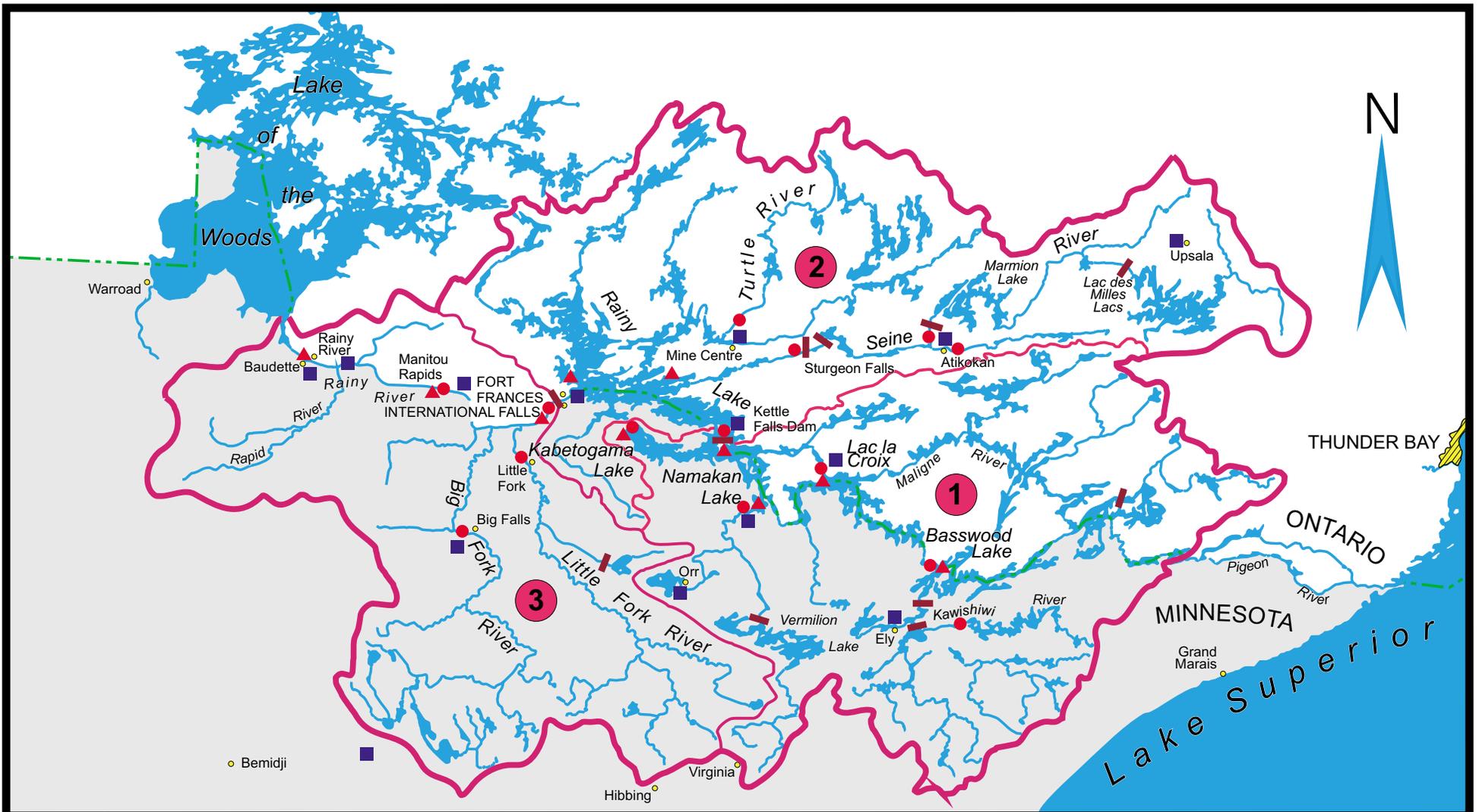
scheme was determined for all planned POS studies in order to assist with funding decisions. The Boards also discussed Seine River First Nations' plans to conduct a number of studies on wild rice in the Seine River area. On March 19th, the Boards held a conference call to discuss preparations for the April board meeting and appearance before the IJC in Washington, as well as discussing a number of potential projects for IWI funding. A decision was made to update the Boards work plan by prioritizing future IWI and POS projects.

#### **4 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, these data were still provisional and subject to revision.



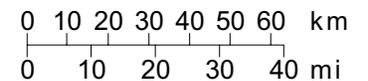
**LEGEND**

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

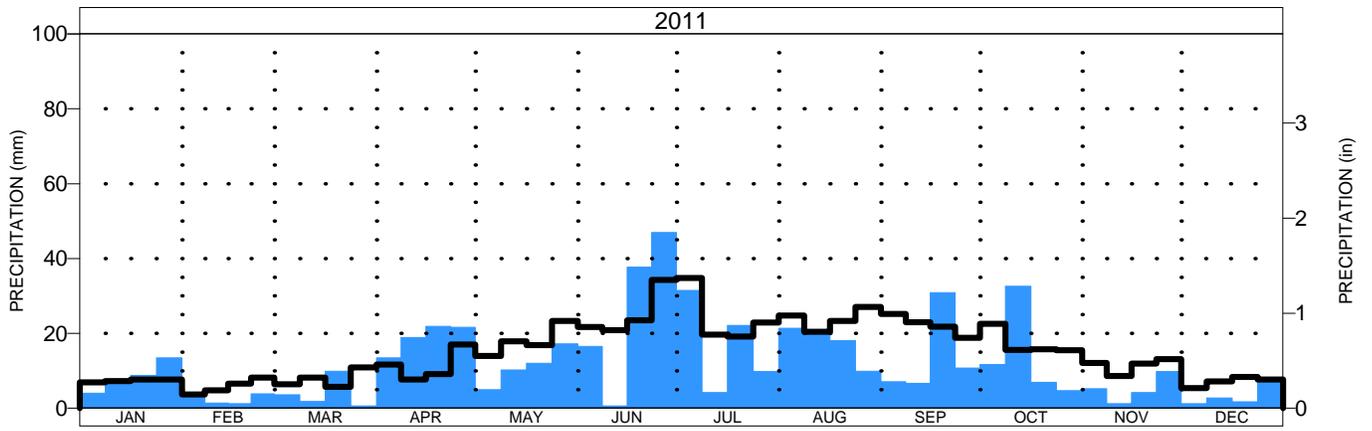
- Control Dams - - - - -
- Data Gauges (Near Real Time)
- Stream Flow - - - - - ●
- Water Level - - - - - ▲
- Precipitation - - - - - ■

**International Rainy Lake Board of Control  
IRLBC**

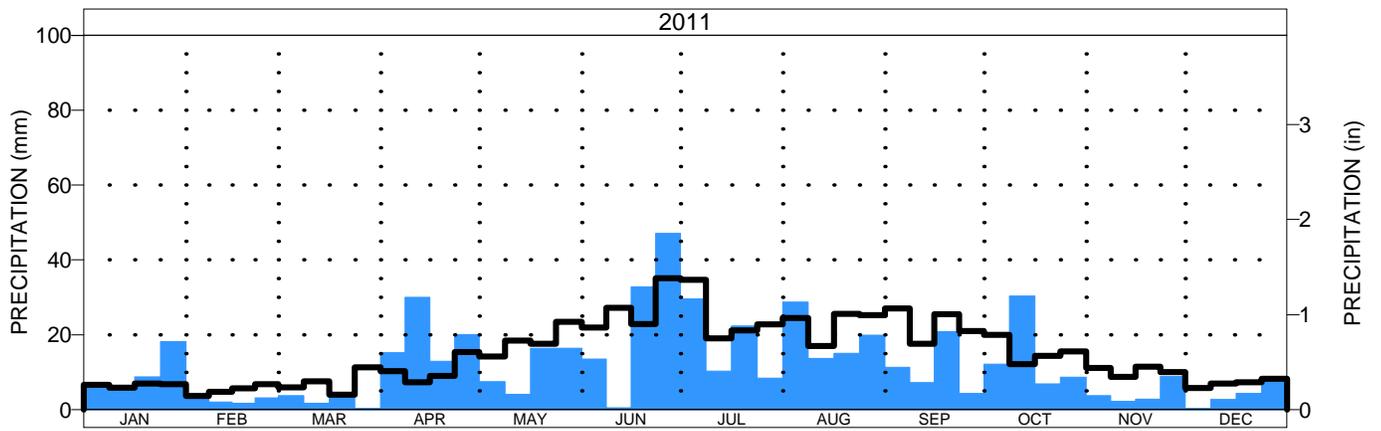
**Rainy River  
Drainage Basin**



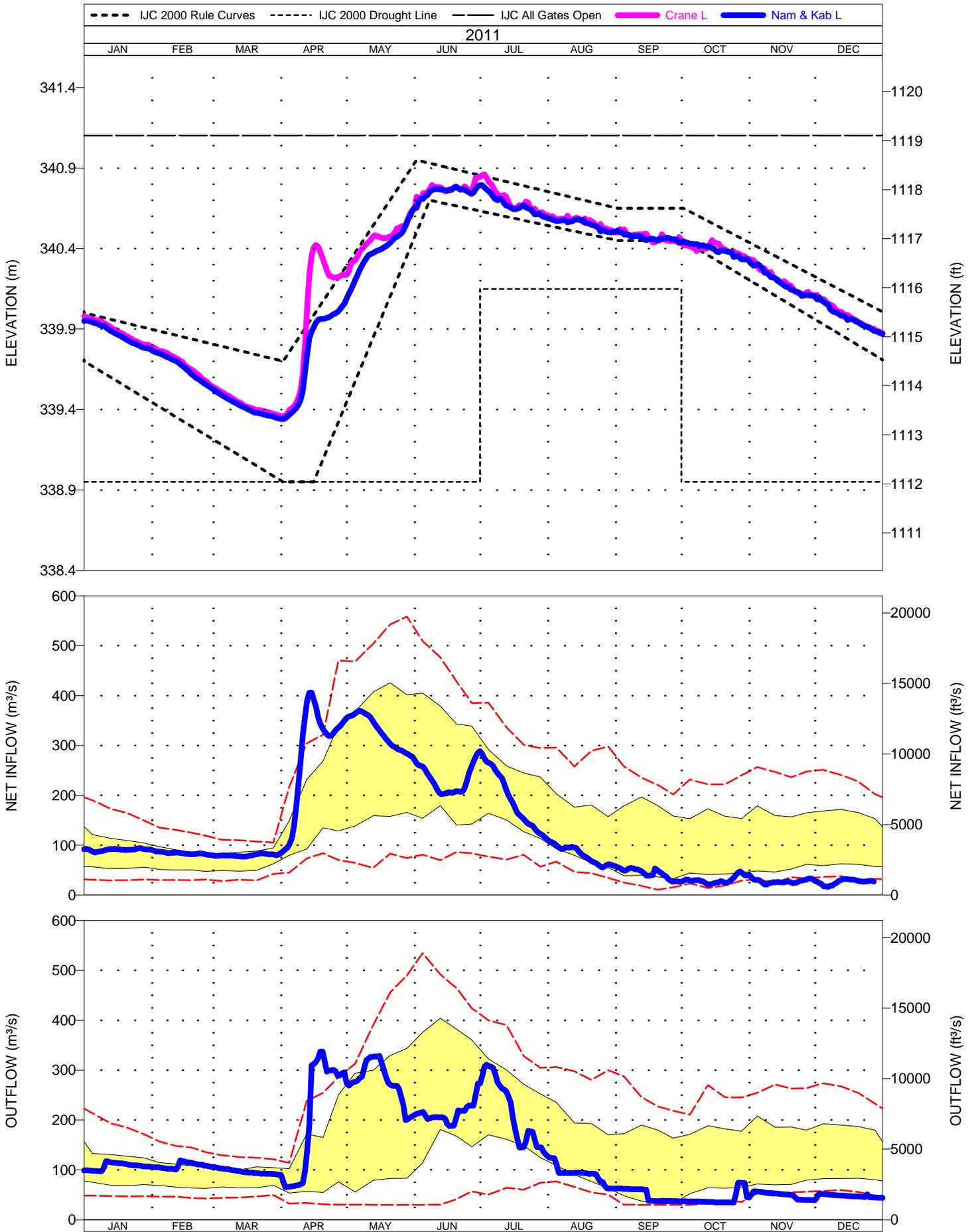
### LAC LA CROIX PRECIPITATION



### RAINY-NAMAKAN PRECIPITATION



# NAMAKAN LAKE



# RAINY LAKE

