# INTERNATIONAL RAINY LAKE BOARD OF CONTROL

## ANNUAL REPORT FOR YEARS 1995-1999

Submitted to

The International Joint Commission

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## 1. INTRODUCTION

This report is in place of separate annual International Rainy Lake Board of Control (IRLBC) reports for the years 1995 through 1999. During this period the Board was heavily committed to directing the study efforts of the "Review Of The IJC Order For Rainy And Namakan Lakes," hereinafter referred to as the Rainy-Namakan Study. Submission of the Board's annual reports to the IJC during this period was delayed until the completion of the Rainy-Namakan Study, because all the Board's resources were dedicated to the study. The study, which resulted in the issuance of a new IJC Order for Rainy and Namakan Lakes on January 6, 2000, is discussed in Section 2. Detailed information about the study can be obtained by consulting study reports submitted by the Board to the IJC.

Regulation of Rainy and Namakan Lakes during the period saw the full range of extremes. Minor deviations from the operating bands for both lakes were experienced in each year. Major deviations above the upper rule curves were experienced in 1996 on both lakes due to runoff from a well above normal snowpack and spring rainfall exceeding 200% of normal. An early spring runoff in 1997 with accompanying warm temperatures resulted in an ice jam related flood threat to the Town of Rainy River, Ontario near the mouth of Rainy River. Supplementary Orders dated April 9, 1997, April 11, 1997 and April 15, 1997, based upon the advice and recommendations of the Board, were issued by the IJC to deal with the situation, which was resolved with only minor damages incurred by the town. Major deviations below the lower rule curves were experienced in the summer and fall of 1997 on Rainy Lake and throughout the spring, summer and fall in 1998 on both lakes, due to an extended dry spell in the region from about July 1997 through early November of 1998. Supplementary Orders dated August 21 and October 29, 1998, based upon consultation with the Board, were issued by the IJC to help alleviate the situation and avoid violation of the emergency condition level on Rainy Lake. The situation improved with a brief fall warm spell and the melt of an early November snowpack, providing 5-8 cm of badly needed runoff. More detail on regulation throughout the period is provided in Section 3.

In the areas of communication and public relations (see Section 4), the Board has made effective use of conference calls, electronic mail, the Internet and written correspondence including letters, faxes, newsletters, newspaper ads and reports in its work. The Board has made extensive use of its Internet homepage and newsletters to provide broad dissemination of work progress and developments in the Rainy-Namakan Study. The Companies have also undertaken a number of initiatives to improve public relations related to water management information flow.

The Board has been very active over the past five years, meeting regularly with the Commission, the Companies and public stakeholders in connection with the Rainy-Namakan Study and other key issues. The Board provided a basin tour and support to Commissioners in connection with the July 1999 IJC Public Hearing to receive comment on the Draft Final Report for the Review of the Rainy-Namakan Study. The Board attended and participated in the IJC's Watershed Board Workshop on March 23, 1999 in International Falls, Minnesota and also a follow-up meeting in Fort Frances, Ontario on July 7, 1999. Section 5 details the key meeting activities of the Board from 1995 through 1999.

Other related Board business (see Section 6) included assessing and informing the Commission of the impacts of an Amendment to the 1996 USA Energy and Water Resources Development Appropriation Act on the Companies ability to comply with the Commission's existing Order for Rainy and Namakan Lakes and the impacts on 1996 high water levels. The Board raised concerns to the Commission over cut-backs in IJC gauge funding in 1995 and 1996 and responded to the IJC's request for assurance of Y2K compliance of structures under the Commission's Orders.

Items of an informational nature are discussed in Section 7 and include the ongoing dam maintenance activities of the Companies, several changes in Board membership for the U.S. Section and a couple of changes in corporate ownership for the Canadian dam owners.

## 2. REVIEW OF THE IJC ORDER FOR RAINY AND NAMAKAN LAKES

### 2.1 General Overview

Following its April 1995 semi-annual meeting, the IJC requested that the Board prepare a plan of study to review its 1970 Supplementary Order for the regulation of Rainy Lake and the Namakan Chain of Lakes. This request followed concerns expressed by several organizations within the basin that the current rule curves did not fully reflect certain benefits such as fisheries and navigation that could be better achieved by a change to the rule curves. This concern culminated in a specific proposal for new rule curves, submitted to the Commission by the Rainy Lake and Namakan Reservoir Water Level International Steering Committee (hereinafter referred to as the Steering Committee) in its "Final Report and Recommendations", dated November, 1993. An opposing viewpoint which supported the retention of the existing 1970 rule curves was submitted to the Commission by Boise Cascade Corporation in a statement dated February 10, 1994. At the IJC semi-annual meetings in the spring and fall of 1994, the Board made presentations to the Commission summarizing the issues and recommended that the Order be reviewed. As a first step the Commission held a public hearing on November 10, 1994 in International Falls, Minnesota to seek public views on the adequacy of its existing order.

The Board then prepared a draft Plan of Study which was released on August 9, 1995 along with an invitation to all interested parties to provide comments on the draft plan by September 30, 1995. On the basis of those responses the draft Plan of Study was modified and a revised Plan of Study prepared dated November 22, 1995. Following the Commission's response to the Board, a final Plan of Study was prepared dated February 1, 1996 and distributed to the public and stakeholders. The Plan was developed based on the recognition that several water resource management jurisdictions exist in the basin area affected. The Board was directly responsible for studies and activities on Rainy and Namakan Lakes, for providing the details of the altered outflow regime to downstream agencies, and for taking into account the impacts further downstream in its recommendations. Responsibility for conduct of a review of the anticipated downstream impacts rested largely with the resource management agencies for the Rainy River, and with the Lake of the Woods Control Board (LWCB) with respect to the Lake of the Woods and the Winnipeg River. The IRLBC initiated studies associated with completion of the key study areas which had been detailed in the Plan of Study, and sought the input of other agencies and groups with an interest in the impacts further downstream.

The Plan of Study called for a Status Report to be submitted to the Commission at the point that the results of the hydrologic modelling and inflow forecasting efforts, and the summaries of existing data and information, were completed. In view of the fact that certain of the technical reports commissioned by the Board contained preliminary conclusions and recommendations, it was also possible for the Board to include some preliminary findings in the Status Report. The Status Report was submitted to the IJC on March 3, 1998. The Report was also provided to stakeholders at the Board's annual public meeting held in International Falls, Minnesota on March 10, 1998 and to the downstream agencies. These agencies were also provided with the detailed model results of Rainy Lake outflows for the rule curve options tested so that they could begin their work. Similar data was made available to those Rainy-Namakan groups who had previously conducted their own studies, to allow them to re-assess the impacts from their own perspectives. The Status Report and supporting technical reports were also made accessible to others upon request.

Following the release of the Status Report, the Board continued with technical studies such as the completion of the economic-social-recreational sector evaluation, determination of flood damages and computation of Rainy River levels under the rule curve alternatives being considered. The IRLBC also specifically sought the response of the resource management agencies to the Status Report, and asked that possible impacts on the fisheries and aquatic environment of the Rainy River be evaluated. In addition the Board sought further input from the International Rainy River Water Pollution Board (IRRWPB) on possible changes to the minimum flow releases from Rainy Lake. The IRLBC, in October of 1998, also followed up on its previous requests to downstream communities for their concerns and views related to the rule curve alternatives evaluated in the Status Report. At the request of the IJC special measures were taken to inform the First Nations in the basin of the findings of the Status Report and to obtain feedback on the rule curve alternatives.

Significant feedback was received by the Board from stakeholder groups and the public on the preliminary findings and factors for consideration contained in the Status Report. The Board also received a large amount of material from the Lake of the Woods Control Board concerning impacts of the proposed changes on Lake of the Woods and the Winnipeg River. This included the LWCB's results of modelling of the changes to water levels on Lake of the Woods and the Winnipeg River, its analysis of impacts, a summary of the submissions it received from its interest groups and the public at large in response to its analysis of impacts, and its consequent formal position on the proposed changes.

Once the IRLBC had completed its own work and had received all the anticipated input from others, it prepared its Draft Final Report. This draft report included much of the contents of the Status Report, additional information based on work carried out since the release of the Status Report, a summary of comments received from stakeholders, a new Downstream Impacts section, and the Board's draft conclusions and recommendations, with supporting rationale. The draft conclusions and recommendations contained in the report were presented to the Commission in Washington, DC on April 13, 1999, and to the public at large at the IRLBC's annual public meeting in Fort Frances, Ontario on April 28, 1999. The report was also officially released for public review as of that date, with the review period open until July 30, 1999.

The Board received a significant number of written submissions in response to its draft report. In addition, the Commission held a formal Public Hearing in Fort Frances on July 7, 1999 in order to

directly receive verbal input. After the close of the review period, the Board summarized all of the input received. Based on the original terms of reference for the study, it concluded that its draft recommendations were still appropriate. However, it felt that some valid concerns remained and believed that a better solution to the issues at hand might be possible if the terms of reference were somewhat expanded. Consequently the Board undertook further analysis. The Final Report, dated October 26, 1999, contained all the contents of the Draft Final Report, plus a summary of the comments received and the Board's response, a section on the additional analysis conducted, and a new Conclusions and Recommendations section which presented two options for consideration by the Commission.

## 2.2 Plan of Study

The Board, in presentations to the Commission at its semi-annual meetings in April and September 1994, recommended that a review of the Rainy and Namakan Lakes rule curves be carried out. As a first step the Commission held a public hearing on November 10, 1994 in International Falls, Minnesota to seek public views on the adequacy of the 1970 Order. Subsequently the Commission asked the Board to develop a draft Plan of Study. This draft Plan was released by the Board for public comment on August 9, 1995, with 281 copies distributed to known stakeholders and interested individuals. A total of 17 written responses were received, of which 12 provided comments on the draft plan and the others expressed opinions on the issues or asked questions. Based on the responses received the Board submitted a revised Plan of Study to the Commission on November 22, 1995. Following the Commission's response to the Board, a finalized Plan of Study dated February 1, 1996 was issued.

Specifically, the Commission had asked the Board to prepare a Plan of Study to assess the existing data and information related to the proposed new rule curves, with the objective of determining what action, if any, the Commission should take regarding the 1970 Supplementary Order. Given the extent of work already conducted by the Steering Committee and Boise Cascade Corporation, the Commission sought to restrict the study to an assessment of the merits of the proposed rule curves versus those of the existing rule curves, rather than a full evaluation of all possible regulation alternatives. Similarly the Board proposed limiting the study to an evaluation, to the extent possible, based on a review and analysis of information already available in numerous specific studies carried out in the basin. However, in certain areas such as the fishery, the information available was not unanimous as to the potential benefits of the proposed new rule curves and new, independent evaluations of existing information were deemed necessary. Further, since the proposed rule curves potentially would increase the risk of flooding, there was a necessity to examine that aspect very carefully. In addition, the Commission agreed that certain other issues such as the impact of the two uncontrolled overflows from Namakan Lake, and the appropriateness of the current minimum outflow requirements from both Rainy and Namakan Lakes should be reviewed at the same time.

The Plan of Study defined a study process, the involvement of the public and other agencies, the organizational structure, resource requirements, a study methodology, and a number of key study areas along with the evaluation process and the tasks to be carried out. The key study areas were defined as hydrologic modelling, inflow forecasting, flood risk assessment, other hydrologic issues, the fishery and other environmental resource factors, and economic/social/recreational factors. A schedule of activities over a two year period was included. The basic structure of the key study areas formed the framework

for Newsletters periodically issued by the Board on study progress, and also for a subsequent study reports including the Status Report, Draft Final Report and Final Report.

## 2.3 Status Report

After the Plan of Study was approved, the Board initiated certain activities associated with its completion. Priority was given to an independent review of the existing information on the fishery of Rainy and Namakan Lakes. A statement of work was developed and two specialists, one from the United States and one from Canada, were retained to carry out this task. The approach and summary of the conclusions reached are described in greater detail in the section of the Final Report on Fisheries Review. The remainder of the tasks were then apportioned to government agencies or study coordinators appointed by the Board. Immediate priority was given to the hydrologic modelling and the establishment of a mechanism for stakeholder input to the inflow forecasting. Work was essentially completed in the hydrologic modelling and environmental resource study areas, including fisheries and wildlife, at the time the Status Report of March 3, 1998 was prepared. In addition the modelling for the inflow forecasting was completed, and under review by a stakeholder group set up by the Board for that purpose when the Status Report was released.

The Plan of Study indicated that the Status Report would contain the results of the hydrologic modelling and inflow forecasting efforts, and summaries of all of the existing data and information. In view of the fact that certain of the studies completed at that time had gone beyond the summary of information stage and conclusions had been reached, the Board was able to provide a number of preliminary findings in the Status Report.

The Status Report was distributed to the IJC, stakeholders and the public for review and comments. The Board also provided details on the hydrologic modelling to downstream natural resource agencies and to the Lake of the Woods Control Board, so that they could begin their review of impacts on the downstream areas. Rainy-Namakan groups, who had previously conducted their own studies, where given the same details to allow them to re-assess (if necessary) the impacts from their own perspective.

### 2.3.1 Status Report Preliminary Findings

Based on the work to date at the time the Status Report was released, the Board reached a number of preliminary findings as listed below. In developing these findings the Board integrated the results of a number of the technical studies, but had yet to undertake the final step of developing specific recommendations. The development of specific recommendations was dependent on additional analysis, consultation with stakeholders and the public, and a thorough understanding of downstream impacts.

- *Enough information exists for the Board to make recommendations to the IJC related to changes to the 1970 Supplementary Order rule curves.*

- *Adoption of the rule curves recommended by the Steering Committee would, on balance, enhance the fisheries and environmental benefits but would increase the potential for spring flooding and reduce hydropower production.*

- *Improved forecasting and management practices are unlikely to offset the potential increased flooding if the Steering Committee proposed rule curves are adopted.*

- *The Steering Committee rule curves are nominally more viable than the IJC rule curves on Namakan Lake and less viable on Rainy Lake as measured by the number of rule curve violations.*

- *There is merit to considering the use of the Steering Committee rule curves on Namakan Lake and the IJC rule curves on Rainy Lake.*

- *The natural lake level and outflow modelling indicates that the Steering Committee rule curves come closer to simulating the timing of the natural spring refill on Namakan Lake and the IJC rule curves come closer to simulating the timing of the natural refill on Rainy Lake.*

- *Adjustments to the minimum flow requirements for the outflow of Namakan Lake and Rainy Lake would decrease the number of lake level excursions outside of either the existing or proposed rule curves during low flow periods.*

- *Any modifications to the existing rule curves, if recommended, must be accompanied by an appropriate fisheries and environmental monitoring program.*

## 2.4 Draft Final Report

Following release of the Status Report, the Board continued with its activities including completion of the economic/social/recreational factors sectoral studies, and additional computations to define the water level changes in the Rainy River under the various rule curve alternatives. The Board also solicited input from resource management agencies and the Lake of the Woods Control Board on the downstream impacts on the Rainy River and Lake of the Woods. A concerted effort was made to determine the views of municipalities and other groups downstream of Rainy Lake, and First Nations within the basin.

The Draft Final Report, dated April 28, 1999, was essentially an extension of the Status Report (as was the Final Report). Sections 1, 2 and 3 were largely drawn from the Status Report, but were updated with the study results obtained since then, and with the addition of public and agency comments on the Status Report. A new separate section of the report, "Downstream Impact Studies," provided a summary of the predicted downstream impacts and the comments received from resource agencies, the Lake of the Woods Control Board and municipalities regarding the downstream areas. This additional information obtained by the Board, plus the original studies, provided the basis for the Board's draft conclusions and recommendations.

The Board believed that its draft final report addressed the concerns raised in the Plan of Study and fulfilled the Board's obligations as defined. In general the Board felt that the information base, while not complete, provided an adequate basis for its recommendations and conclusions. It was acknowledged, however, that the information base for the fishery and aquatic environment sectors was more complete for Rainy and Namakan Lakes than for the Rainy River and other downstream areas.

### 2.4.1 Draft Final Report Conclusions and Recommendations

The IRLBC assembled and evaluated a wide array of existing information in all of the areas defined in the Plan of Study. While some data gaps still existed in relation to the possible impacts of changes to the rule curves on fisheries and on the aquatic environment downstream of Rainy Lake, the Board believed enough information was available to derive and justify its recommendations.

Overall the Board recommended the rule curves shown in Figure 1 (From Draft Final Report), which are defined in metric units and are similar to the alternative M1 rule curves for Namakan Lake (same as the Steering Committee proposal except for a wider rising limb in the spring) and the existing IJC rule curves for Rainy Lake. The Board believed that these curves as a set would have less impact, both positive and negative, than the Steering Committee proposal for both lakes and should provide a better balance for the basin as a whole than either the existing IJC rule curves or the proposed Steering Committee rule curves. It was stated that the recommended curves should balance not only the upstream versus downstream environmental benefits, but also the tradeoff on the upper lakes between fishery and environmental resources versus hydropower and flood risk.

The draft recommendations of the Board regarding Rainy and Namakan Lakes are given below:

1. *The recommended rule curves shown in Figure 1 (From Draft Final Report) should be adopted. These are essentially a minor modification of the proposed Steering Committee rule curves on Namakan Lake and the existing IJC rule curves on Rainy Lake.*

2. *The minimum outflow criteria for Namakan Lake should be expressed in terms of the total Namakan Chain of Lakes outflow rather than in terms of the Kettle Falls outflow, so that the overflows from Gold and Bear Portages are accounted for.*

3. *The minimum outflow criteria should be revised as follows for both lakes. On Namakan Lake, the outflow should be reduced to 30 $m^3$/s instantaneous whenever the lake level is below the Lower Rule Curve (LRC), and should be further reducible, at the discretion of the IRLBC but no lower than 15 $m^3$/s, whenever the lake level is below the Emergency Drought Line (EDL) shown on Figure 1 (From Draft Final Report). On Rainy Lake, the outflow should be reduced to 100 $m^3$/s instantaneous whenever the lake level is below the LRC, and should be further reducible, at the discretion of the IRLBC but no lower than 65 $m^3$/s, whenever the lake level is below the EDL shown on Figure 1 (From Draft Final Report). (The current seasonal and diurnal criteria would be eliminated.)*

4. *Any new rule curves adopted should be implemented on a trial basis. The length of the trial could be for a defined period, or linked to certain hydrological extremes occurring during the trial period, but in any case should not be shorter than 10 years so that a range of events can be experienced and adaptations of the biological community can begin to be identified.*

5. *Monitoring programs should be implemented by the resource management agencies in accordance with the recommendations of the fisheries and environmental resources experts to enable the impacts of new rule curves on the biological and aquatic communities to be identified, and to provide an adequate source of information for future reviews.*

6. *The Order should state that, within the rule curve operating bands, regulation operations are to be solely at the discretion of the dam owners in accordance with basin conditions. The flexibility intended to be offered by these bands for responding to current basin conditions and local needs should not be constrained by any additional rules.*

## 2.5 Final Report

A three month public review period was set for the Draft Final Report, from late April to late July 1999. Written submissions were accepted during this period and, in addition, the IJC held a Public Hearing in early July.

Following the review period, the Board summarized and assessed all input. In particular, the parties who had sought and supported rule curve change had expressed dissatisfaction with the recommendations regarding Rainy Lake and with a recommendation regarding operations within the rule curve bands. Nevertheless, the Board concluded that, given the terms of reference for the study under which it had operated, its recommendations (apart from minor revisions) were still appropriate. However, it felt that a better solution might be possible if the terms of reference were somewhat expanded. Consequently some additional analysis was conducted and, ultimately, a second set of recommendations was prepared. This was viewed as Option B, while retaining the original recommendations as Option A, since they were still regarded as a viable response to the original terms of reference.

The bulk of Final Report, dated October 26, 1999, was identical to the Draft Final Report. However, Section 5 had been revised to include a summary of the comments received and positions taken with respect to the Draft Final Report, plus the Board's response to these comments. Section 6 was added to present the additional analysis performed and Section 7 presented the two final sets of recommendations. Minor revisions were made elsewhere.

### 2.5.1 Final Report Conclusions and Recommendations

Extensive public review comments were received on the Board's draft final recommendations, both as written submissions and as verbal presentations at a public hearing held by the IJC. After reviewing and addressing all of the comments, the Board concluded that the bulk of its recommendations still had merit. The Commission had tasked the Board with reviewing all available information and providing advice on the existing rule curves versus those proposed by the Steering Committee, but not a full evaluation of all possible regulation alternatives. In this context the Board believed it had fulfilled its mandate from the Commission, but also felt that a better solution was possibly within reach by somewhat expanding its study mandate. By undertaking some additional work, the Board thought that some relatively minor revisions might be made to the recommended rule curves that, when combined with appropriate operational policy within the rule curve bands, would better achieve some of the environmental objectives without significantly worsening the negative impacts elsewhere. In addition, if the Commission was prepared to consider an expanded role for its Board, the Board felt that the major objection to one of the draft final recommendations might be defused. Consequently, the Board decided to do some additional analysis.

The Board presented two sets of recommendations in its Final Report, Option A and Option B. Option A was the draft set of recommendations, with minor revisions, in response to the original study mandate. Option B was the result of the additional work. It was the Board's preferred option, but was only viable if the Commission agreed with the expanded terms of reference, the altered mode of operation and the additional role proposed for the Board.

***Option A***

*A1. The recommended rule curves shown on Figure 1 (From Final Report) should be adopted. On Namakan Lake, these are essentially the proposed Steering Committee rule curves but with a wider band (time-delayed lower rule curve) during the spring refill period. On Rainy Lake, these are essentially the existing IJC rule curves.*

*A2. The minimum outflow criteria for Namakan Lake should be expressed in terms of the total Namakan Chain of Lakes outflow rather than in terms of the Kettle Falls outflow, so that the overflows from Gold and Bear Portage are accounted for.*

*A3. The minimum outflow criteria should be revised as follows for both lakes. On Namakan Lake, the outflow should be reduced to 30 $m^3$/s instantaneous whenever the lake level is below the Lower Rule Curve, and should be further reducible, at the discretion of the IRLBC but no lower than 15 $m^3$/s, whenever the lake level is below the Emergency Drought Line (EDL) shown on Figure 1 (From Final Report). On Rainy Lake, the outflow should be reduced to 100 $m^3$/s instantaneous whenever the lake level is below the LRC, and should be further reducible, at the discretion of the IRLBC but no lower than 65 $m^3$/s, whenever the lake level is below the EDL shown on Figure 1 (From Final Report). Before reducing the outflow further at the EDL, the Board should consult with the resource agencies and affected municipalities. (The current seasonal and diurnal criteria would be eliminated.)*

*A4. Any new rule curves adopted should be implemented on a trial basis. The length of the trial could be for a defined period, or linked to certain hydrological extremes occurring during the trial period, but in any case should not be shorter than 10 years so that a range of events can be experienced and adaptations of the biological community can begin to be identified.*

*A5. Monitoring programs should be implemented by the resource management agencies in accordance with the recommendations of the fisheries and environmental resources experts to enable the impacts of new rule curves on the biological and aquatic communities to be identified, and to provide an adequate source of information for future reviews.*

*A6. The Order should state that, within the rule curve operating bands, regulation operations are to be solely at the discretion of the dam owners in accordance with basin conditions. The flexibility intended to be offered by these bands for responding to basin conditions and local needs should not be constrained by any additional rules. (The requirement of the existing Order that high and low inflows be anticipated insofar as possible, and outflows thus be set to avoid as far as possible the occurrence of emergency conditions, should be continued.)*

***Option B***

*B1. The recommended rule curves shown on Figure 2 (From Final Report) should be adopted. On Namakan Lake, these are essentially the proposed Steering Committee rule curves but with a wider band (time-delayed lower rule curve) during the spring refill period. On Rainy Lake, these are essentially the existing International Joint Commission 1970 rule curves, but with a slightly wider band during the refill period (time-advanced upper rule curve), and with a modest amount of drawdown in the late summer and fall period.*

*B2. Within the rule curve operating bands, the dam owners should regulate so as to normally target for levels in the middle portion of the band. Level targets set elsewhere within the band should be subject to the approval of, or at the request of, the International Rainy Lake Board of Control, on behalf of the International Joint Commission. (This does not mean that the lake level should always be in the middle of the band. In fact, due to variable inflows and operational needs, much of the time it will not be. However, the middle area is a more desirable target than the rule curve extremes on a long term basis because of the buffer it provides. Targeting elsewhere in the band, or operating elsewhere in the band, may be desirable from time to time in response to hydrologic conditions or to meet certain short term objectives, but all such deviations should be at the discretion of the Board.)*

*B3. The minimum outflow criteria for Namakan Lake should be expressed in terms of the total Namakan Chain of Lakes outflow rather than in terms of the Kettle Falls outflow, so that the overflows from Gold and Bear Portage are accounted for.*

*B4. The minimum outflow criteria should be revised as follows for both lakes. On Namakan Lake, the outflow should be reduced to 30 $m^3/s$ instantaneous whenever the lake level is below the Lower Rule Curve, and should be further reducible, at the discretion of the IRLBC but no lower than 15 $m^3/s$, whenever the lake level is below the Emergency Drought Line (EDL) shown on Figure 2 (From Final Report). On Rainy Lake, the outflow should be reduced to 100 $m^3/s$ instantaneous whenever the lake level is below the LRC, and should be further reducible, at the discretion of the IRLBC but no lower than 65 $m^3/s$, whenever the lake level is below the EDL shown on Figure 2 (From Final Report). Before reducing the outflow further at the EDL, the Board should consult with the resource agencies and affected municipalities. (The current seasonal and diurnal criteria would be eliminated.)*

*B5. Any new rule curves adopted should be implemented on a trial basis. The length of the trial could be for a defined period, or linked to certain hydrological extremes occurring during the trial period, but in any case should not be shorter than 10 years so that a range of events can be experienced and adaptations of the biological community can begin to be identified.*

*B6. Monitoring programs should be implemented by the resource management agencies in accordance with the recommendations of the fisheries and environmental resources experts to enable the impacts of new rule curves on the biological and aquatic communities to be identified, and to provide an adequate source of information for future reviews.*

Recommendations B3 through B6 were identical to Recommendations A2 through A5 respectively. The recommendations were re-ordered to stress the importance of treating B1 and B2 as a pair. If B1 was implemented without B2 and then a third party introduced an additional requirement that the companies always operate at the upper rule curve in the spring period, both the flood risk on Rainy Lake and the negative impacts (including environmental) on the downstream areas would definitely be increased.

### 2.6 New Order For Rainy and Namakan Lakes

Prior to presenting its Final Report to the Commission at the IJC semi-annual meeting in November of 1999, the Board advised the Commission of the two sets of recommendations (Option A and Option B) being considered. The Board's preferred approach strongly favored the Option B alternative. However, before proceeding, the Board sought an indication of the Commission's likely response to this alternative. In particular, this alternative involved (somewhat reluctantly) some additional discretionary powers for the Board. The Board believed that it was not likely in its best interests to proceed publicly with the Option B recommendations, if the Commission did not feel it could support them.

During the end of October 1999, leading up to the IJC's semi-annual meeting in November 1999, discussions were held between the Board and the Commission over the pros and cons of the two sets of recommendations. Commission staff raised concerns in particular about the practicality of the Board's recommendation B2 for having the Companies normally target the middle portion of the band on both lakes. The Board was also advised of questions that Commissioners wanted answered at the upcoming IJC semi-annual meeting and was requested to inform and poll key stakeholders for their reaction to the revised recommendations.

On November 2, 1999, the Board presented its Final Report to the Commission at the IJC's semi-annual meeting in Ottawa. The two sets of recommendations were presented along with the Board's rationale for preferring the Option B alternative, responses to the Commissioner's earlier questions and reactions to the revised recommendations of the key stakeholders polled by the Board.

Following the IJC semi-annual meeting, the Commission accepted the recommendations contained in the Board's Final Report. On November 29, 1999, the Commission issued a notice of intent that invited public comments on a draft Supplementary Order for Rainy and Namakan Lakes, incorporating the Board's recommendation's. The notice also stated that the Commission intended to issue an Order based upon this draft early in January, 2000 in the absence of any new compelling evidence. The IJC found no compelling reason not to move forward, and consequently issued its new Supplementary Order for Rainy and Namakan Lakes on January 6, 2000.

## 3. REGULATION SUMMARY

### 3.1 Overall Perspective

Graph 1 compares the actual 1995-1999 precipitation with normal precipitation for the Rainy-Namakan and Lake of the Woods basins. Graphs 2 and 3 show lake level, computed net inflow and outflow data

for Namakan and Rainy Lakes for the same period, respectively, compared with historic values. Graph 4 provides a legend for interpretation of Graphs 1, 2 and 3.

Overall the hydrologic conditions and lake levels for the 1995-1999 period have to be characterized as anything but normal. For both Rainy and Namakan Lakes the three middle years of 1996 through 1998 represent a period of transition from extremely high runoff and lake levels in 1996 to very low runoff and lake levels in 1998. The transitional year of 1997 evidenced a moderate spring runoff followed quickly by very dry conditions. These dry conditions lasted until November of 1998, producing in 1998 the lowest late summer and fall lake levels on Rainy Lake since the 1930's and on Namakan Lake since the 1940's, prior to the implementation of the 1949 IJC rule curve. During this period Namakan Lake fared far better than Rainy Lake, experiencing a moderation of the more extreme conditions on Rainy Lake and reflecting the fact that Namakan Lake has only about a fourth the storage of Rainy Lake. The years 1995 and 1999 at each end of the period of extremes were more reflective of normal conditions, but they too had their abnormalities.

### 3.2 1995 Regulation Summary

In 1995 both lakes experienced below normal spring and summer inflow, but managed to stay within their respective operating bands until August and September, when both experienced minor deviations below their lower rule curves. The spring rise was delayed until well into April on both lakes and prompted a letter from Minnesota's Congressional Delegation to the IJC urging the Commission to stop the discharge from Namakan Lake into Rainy Lake. The Commission responded that reducing the outflow from Namakan Lake could not be accomplished without unduly harming downstream interests on Rainy Lake. In late September and early October, the region experienced well above normal precipitation with precipitation over the upper basin totaling 10-13 cm from September 28 to October 3, increasing Namakan Lake inflow to near 90%ile and Rainy Lake inflow to near 75%ile. This resulted in both lakes rising rapidly in October to their upper rule curves with Namakan Lake experiencing a minor deviation above its upper rule curve for most of October and early November before returning to within its operating band. The Board received several verbal contacts and one letter from Namakan Lake interests concerned over the sudden rise in lake levels and wanting outflows from Namakan Lake increased.

### 3.3 1996 Regulation Summary

Inflow to Rainy and Namakan Lakes remained near 75%ile through the fall and winter of 1995-96 and into the spring of 1996. In addition, a substantial snowpack had accumulated over the course of the winter months containing some 10 to 15 cm of water equivalent. Precipitation in April and May was somewhat above normal, followed by excessive June-July precipitation that was more than 200% of normal. In spite of all efforts by the Companies (Boise Cascade and Stone-Consolidated) and the Board to contain the lakes within their operating bands, the inflow was too much and both lakes violated their upper rule curves in late April. Namakan Lake exceeded its upper emergency condition level for 13 days from May 31 to June 12, but did not exceed the all gates open level of 341.10 m. Rainy Lake exceeded its upper emergency condition level for 43 days from May 22 to July 3 and also exceed the all gates open level of 337.90 m for 33 days from May 28 to June 23. Namakan Lake returned to within its band by mid-June, but Rainy Lake did not return to within its band until early July.

Peak inflow to both lakes exceeded 90%ile in May and June. Rainy Lake experienced the sixth highest May-July inflow volume since the establishment of rule curves in 1949 and the ninth highest inflow volume in the period of record since 1912, following completion of the dam at International Falls/Fort Frances. The peak Rainy Lake level of 338.09 m, attained on June 10, was the fourth highest since 1949 and the fifth highest since 1912. Namakan Lake conditions were not quite so severe, recording the seventh highest May-July inflow volume since 1949 and the twelfth highest since 1912. The peak Namakan Lake level of 341.02 m, attained on June 6, was the ninth highest since 1949 and the sixteenth highest since 1912.

Over the remainder of the summer, Namakan Lake levels remained within the operating band, drifting down to the lower rule curve by mid-August and bouncing along the lower rule curve until mid-October. During this same period, Rainy Lake experienced two minor violations of the upper rule curve in mid-July and early August, but lake levels fell to and drifted along the lower rule curve from late September to late October. By September inflow to both lakes had fallen to median levels.

As in the previous year, late September and early October saw significant precipitation, nearly twice normal levels, over the Rainy-Namakan basin. Inflow rose to 85%ile on Namakan Lake and over 90%ile on Rainy Lake. Both lakes rose steadily, with minor violations of their upper rule curves by mid-November. Rainy Lake returned to within the operating band in a matter of days, while Namakan Lake took until early December.

### 3.4 1997 Regulation Summary

As stated earlier, 1997 was a transitional year between the runoff excesses of 1996 and the very dry conditions of 1998. Extraordinary spring weather conditions in April resulted in high Rainy River water levels from local tributary runoff and Rainy Lake discharges, combined with an ice jam at the mouth of the Rainy River. The Board informed the Commission that the Mayor of the Town of Rainy River, Ontario had expressed concern over high ice jam induced river levels and the threat of serious flooding in the town. Some minor flooding was already occurring from the ice jam induced backwater which was reported to be about five feet above the non-affected water level.

The Board consulted with the Commission, state and provincial environmental resource agencies and the Town of Rainy River regarding the situation. Based upon the Board's advice, the Commission issued a series of three closely spaced Supplementary Orders on April 9, 11 and 15, 1997 (see Sections 3.4.1 through 3.4.3) to have close supervision over actions taken. Under the April 9 Order, which was verbally effective at 6:30 pm on April 8, Rainy Lake outflow was reduced from 580 $m^3/s$ to 140 $m^3/s$ on April 8 and Namakan Lake outflow was reduced from 250 $m^3/s$ to about 160 $m^3/s$ on April 10. Following issuance of the April 11 Order, Rainy Lake outflow was increased from 140 $m^3/s$ to 240 $m^3/s$ on April 12 and to 340 $m^3/s$ on April 13. It was further increased to 530 $m^3/s$ on April 14, after a further assessment of conditions and a conference call by Board staff with officials of the Town of Rainy River and the Ontario Ministry of Natural Resources. Namakan Lake outflow continued at its reduced amount of about 170 $m^3/s$.

Based upon the Board's Fax of April 11 to the Commission, advising that the ice jam had moved out into Four Mile Bay of Lake of the Woods and the center portion of the Rainy River was flowing freely

and the risk of further blockage low, the Commission issued its April 15 Supplementary Order. Under this Order, Rainy Lake outflows were increased to the flow required by the 1970 Order as quickly as possible, being careful not to induce air entrainment in the turbine and mill process intakes at International Falls-Fort Frances. Increases in outflow from Namakan Lake followed the increases from Rainy Lake. The April 15 Supplementary Order had an expiration clause terminating the Order on April 22, 1997. The effectiveness of the actions taken under these Supplementary Orders on the ice jam dynamics at the Town of Rainy River are not clear and highly arguable as river levels at the town were more affected by local runoff from the Big Fork and Little Fork River tributaries which abated significantly due to cooler temperatures. However, it is clear that the Commission's actions were highly effective in terms of public perception for providing immediate assistance to a community looking desperately for help.

At the time the Commission issued its Supplementary Order of April 8, Namakan Lake levels were slightly above the band and Rainy Lake levels were well within the band. It was recognized that outflow reductions under the Supplementary Orders would cause the level of Rainy Lake to violate its upper rule curve and further push the level of Namakan Lake above its upper rule curve. However, the board felt and the Commission agreed that doing so would not significantly increase the risk of the occurrence of emergency conditions on either lake in an effort to alleviate high downstream Rainy River levels. With the passage of the downstream crisis at the Town of Rainy River, the Board directed a gradual increase in outflow from both lakes so as to not increase potential for downstream flooding, while attempting to blend both lake levels back into their operating bands.

Namakan Lake returned to within the band on May 21, having been above its upper rule curve for 46 days from April 6. Rainy Lake returned to within the band much sooner on April 27, having been above its upper rule curve for 19 days from April 9. Inflow to both lakes during the April through May period were at or above median levels for the time of year, but fell rapidly through the June-July period. Precipitation through this period also fell to less than 50% of normal. By August inflow to both lakes had fallen to below 10%ile, where it remained for the rest of the year. Namakan Lake levels managed to hover near the lower rule curve throughout the summer and fall with frequent, but very minor violations of the lower rule curve. However, Rainy Lake levels fell below the lower rule curve for 107 days from August 18 to December 2, 1997 by as much as 0.17 m, due to very low inflow. In response, the Companies reduced Rainy Lake outflow to the normal IJC minimum under the 1970 IJC Order.

### 3.4.1 Supplementary Order of April 9, 1997

The spring of 1997 was somewhat extraordinary featuring a moderately heavy early runoff from brief periods of well above normal temperatures and above normal precipitation. The two major tributaries to the Rainy River below the outlet of Rainy Lake, the Big Fork and Little Fork Rivers, responded rapidly with significant discharges into the Rainy River. The warm temperatures and rising river levels were conducive to ice jam formation and produced a major jam below the Town of Rainy River, near the mouth of the Rainy River. The Mayor of the Town expressed concern over the flood threat and minor flooding that was occurring.

In response, a conference call between the Commission and the Board was held in late afternoon on April 8. The Board briefed the Commission on the situation and advised that:

- Rainy Lake was within its prescribed band and that a reduction in Rainy Lake outflow from 580 $m^3/s$ to 140 $m^3/s$ for a period of three days would assist in reducing water levels in the Rainy River without significantly increasing the risk of exceeding the emergency level on Rainy Lake.
- Notwithstanding the fact that Namakan Lake was outside its prescribed band, outflows from Namakan Lake could be reduced by an amount to be determined by the Board for a period of three days without significantly increasing the risk of exceeding the emergency level on Namakan Lake.
- The IRLBC would be in a better position to provide more extensive information and advice on the situation on Friday, April 11, 1997.

Based upon the Board's advice, the Commission issued a Supplementary Order dated April 9, 1997, effective at 6:30 pm on April 8, 1997, ordering and directing that:

- The outflow from Rainy Lake be reduced to 140 $m^3/s$.
- The outflow from Namakan Lake be reduced to an amount determined by the Board that would not significantly increase the risk of exceeding the emergency level on Namakan Lake.
- The reductions were to be maintained until 11:59 pm on April 11, 1997, at which time outflows would revert back to those prescribed by the 1970 Order, subject to further instructions from the Commission.

### 3.4.2 Supplementary Order of April 11, 1997

A second conference call between the Commission and Board was convened on April 11 to review the high water situation at the Town of Rainy River and consider the further advice and information the Board had assembled. The Board advised that:

- Rainy Lake outflow was reduced from 580 $m^3/s$ to 140 $m^3/s$ at 8:30 pm CDT on April 8 and Namakan Lake outflow was reduced from 250 $m^3/s$ to about 160 $m^3/s$ by mid-afternoon on the $10^{th}$.
- Runoff had declined with cooler temperatures in the basin with the Rainy Lake level 7 cm above the band and rising at 3-5 cm/day, but inflow was down from 830 $m^3/s$ to 450 $m^3/s$; Namakan Lake level 17 cm above the band and rising at 4-5 cm/day, but expected to accelerate with the just completed outflow reduction; Rainy River flow at Manitou Rapids (about 50 km upstream from the Town of Rainy River) down from a peak of 1,140 $m^3/s$ on the $8^{th}$ to about 880 $m^3/s$; forecasted weather calling for gradual daytime warming with nighttime lows still well below freezing.

The Board proposed that:

- Till Monday, April 14, Rainy Lake outflow be increased by 100 $m^3/s$ on both April 12 and 13, leaving Namakan outflow unchanged, but allowing the Board some discretionary power to either accelerate or delay the schedule subject to higher than expected level increase on the lakes or adverse news about the ice jam
- Two options be considered on Monday, April 14.
  - Option 1 - discretionary powers be assigned the Board to monitor the situation and take actions deemed appropriate, with the overall objective of gradually increasing outflows from both lakes

to return lake levels back within their bands as quickly as reasonably possible, while not unduly risking un-doing the benefit afforded with regard to the ice jam downstream.

- Option 2 - Convene another conference call with the Commission, at which time the Board would provide updated information and recommendations for consideration by the Commission.

Based upon the Board's advice, the Commission issued a Supplementary Order dated April 11, 1997, ordering and directing that:

- Notwithstanding the terms of the 1970 Order, that, until 11:59 pm on Tuesday, April 15, 1997, regulated outflows from Rainy and Namakan Lakes would be set by the IRLBC so as to provide relief to the Town of Rainy River without significantly increasing the risk of exceeding the emergency level on Rainy and Namakan Lakes.

### 3.4.3 Supplementary Order of April 15, 1997

A final conference call was held between the Commission and Board on April 15 to review the high water situation at the Town of Rainy River and provide updated information to the Commission. The Board advised that:

- The wording of the April 11 Order contained an error - the Board had recommended a gradual increase of outflows, not a reduction as stated in the Order, but this did not prevent the Board from acting as it had proposed and the Commission had agreed verbally on the April 11 conference call.
- Rainy Lake outflow was increased from 140 $m^3$/s to 240 $m^3$/s on April 12, to 340 $m^3$/s on April 13 and 530 $m^3$/s on April 14, following further assessment of conditions and a conference call by Board staff with officials of the Town of Rainy River and the Ontario Ministry of Natural Resources. Namakan outflow continued at about 170 $m^3$/s.
- Rainy Lake was at elevation 337.24 m or about 12 cm above its band and inflow was 500 $m^3$/s. Namakan Lake was at elevation 339.45 m or about 26 cm above its band and rising about 4 cm/day and inflow was about 290 $m^3$/s. Flow in the Rainy River at Manitou Rapids was 870 $m^3$/s, down from its peak of 1,140 $m^3$/s on the 8$^{th}$ but up and rising from its minimum of about 810 $m^3$/s on the 14$^{th}$.
- The ice jam was reported to have moved out into Four Mile Bay on Lake of the Woods and the center portion of the river was now flowing freely and risk of further significant blockage appeared low.

The board proposed that:

- Subject to unforeseen events, that outflows be increased from both lakes to full open by Wednesday, April 16, with the increase from Namakan slightly lagging behind that from Rainy, so as not to reverse the trend there.
- That care be taken to avoid air entrainment in the turbine and mill process water intakes from too rapidly opening the dam gates at the dam at International Falls-Fort Frances.
- By Thursday, April 17, revert back to the 1970 IJC Order with both lakes still above their bands, but both dams fully open in an effort to return the lakes to within their bands as early as possible.

Based upon the Board's advice, the Commission issued a Supplementary Order dated April 15, 1997, ordering and directing that:

- Outflows from Rainy and Namakan Lakes be increased to the flow required by the 1970 Order as quickly as practicable, taking into account the need not to induce air entrainment in the turbine and mill process water intakes at the works at International Falls-Fort Frances, and with increase from Namakan Lake following increase from Rainy Lake.
- The supplementary Order terminate at 11:59 pm, on Tuesday April 22, 19997.

### 3.5 1998 Regulation Summary

The script for 1998 was written in the second half of 1997. The very dry conditions of 1997 continued through the winter and spring months of 1998. Precipitation over the winter was well below normal with a minimal snowpack. Spring runoff was virtually non-existent. The little runoff that did occur was primarily into Namakan Lake. Inflow to both lakes remained near 10%ile through June and then plummeted. Inflow to both lakes remained well below 10%ile until early October with September inflow to Rainy Lake the lowest ever recorded for any month and Namakan Lake inflow the second lowest ever recorded, second only to the October-November inflow of 1976. Further upstream Lac La Croix unregulated flows were the lowest since 1921, when data began being collected.

In response to the deteriorating dry conditions, the Companies reduced outflow from Rainy and Namakan Lakes in May to the minimums specified in the 1970 Order, as both lakes fell below their respective lower rule curves. As the dry conditions worsened into July, it became apparent that the lower emergency condition level on Rainy Lake would be violated by early September without significant precipitation or a reduction in the minimum outflow from the lake.

Following an extensive consultive process with affected basin interests by the Board and based upon the Board's recommendations, the Commission issued a Supplementary Order for Rainy Lake, dated August 21, 1998 (see Section 3.5.1) to more effectively deal with the low water crisis. Whereas Namakan Lake levels were relatively much better off compared to Rainy Lake and whereas flow reductions from Namakan Lake would greatly exacerbate an already critical situation on Rainy Lake, no action beyond maintaining the minimum outflow specified in the existing 1970 Order was taken for Namakan Lake.

Under the Supplementary Order, the Board directed the Companies to initially reduce the Rainy Lake outflow from the normal minimum of 103.4 $m^3/s$ (3,650 cfs) to 85 $m^3/s$ (3,000 cfs) on August 24. The Board directed a further reduction to 75 $m^3/s$ (2,650 cfs) on August 31. With this reduction, the Rainy River water level at the Town of Emo, Ontario was down to near the top of the town's water supply intake. The Board was in close coordination with the town's water manager and a daily water level monitoring program was implemented. The Board directed another outflow reduction to 70 $m^3/s$ (2,470 cfs) on September 8. On September 10, the level of Rainy Lake fell below the lower IJC Emergency Condition level of 336.68 m (1104.6 ft.) and was falling at a rate of about 0.8 cm per week.

Shortly after the outflow reduction on the 8$^{th}$, the Emo water plant operator reported that the depth of water over the Emo intake had dropped below the minimum needed for operation. This situation was expected as outflow was further reduced, but the exact level at which problems could occur was not

know exactly, and so the Board had proceeded slowly until difficulties began to develop. To alleviate the situation, outflow from Rainy Lake was increased from 70 $m^3$/s (2,470 cfs) back up to 75 $m^3$/s (2,650 cfs) on September 11.

An additional issue arose once the outflow was reduced to 70 $m^3$/s (2,470 cfs) on the 8$^{th}$. The fisheries biologist for the Rainy River First Nations expressed concern to the Canadian Section of the IJC regarding a fish kill and adverse impacts to the river fishery, requesting that outflows be increased back to 75 $m^3$/s (2,650 cfs). Concern was also expressed for their Sturgeon hatchery related to their inability to pump from shallow river levels to supply needed water to maintain fish stocks. The increase in outflow on September 11 to 75 $m^3$/s (2,650 cfs) to alleviate the Emo water supply intake problem indirectly satisfied the request.

In October, the Town of Emo completed installation of a second water supply intake in a deeper water location closer to shore, essentially removing the Emo intake as a constraint to further flow reductions within the parameters of the Supplementary Order. The Rainy River First Nations fish hatchery switched to a newly developed alternate system to river water, using well water and treatment. The new system seemed to be working fine initially, but the hatchery lost 50% of the their stock from a suspected residual chemical from their water treatment. These problems were ultimately resolved and the Board directed a final outflow reduction to 65 $m^3$/s (2,295) cfs on October 27, where the outflow remained through year's end.

The Companies monitored Dissolved Oxygen (DO) levels in the Rainy River on a weekly basis, reporting to the IRLBC and International Rainy River Water Pollution Board (IRRWPB), as required by the August Order. DO levels were never a problem at any time, remaining well above the 5.0 mg/l required by the Order and in fact never fell below 7.7 mg/l, which occurred in August. By October, DO levels were above 9.0 mg/l and rising as expected with cooler river temperatures which increase oxygen saturation levels. The Companies questioned the need to continue weekly monitoring and in November asked that consideration be given to canceling the DO monitoring requirements. The Board and Commission reviewed the situation. The Commission issued a Supplementary Order dated October 29, 1998 (see Section 3.5.2), amending its August Order to allow the IRRWPB to determine the necessary monitoring frequency, with the Companies providing the DO information as requested by the IRRWPB. DO monitoring continued through the end of the year on a more or less weekly basis.

The flow reductions on Rainy Lake under the Supplementary Order plus well above normal October precipitation and the melt of an early snowpack, containing about 8 cm of water content, combined to raise inflow levels to near median in late November and early December. The early fall snowpack had resulted from an earlier period of cooler fall temperatures. Unseasonably warm temperatures in November and December allowed the badly needed snowmelt runoff to occur, when freezing temperatures would have otherwise slowed it in a normal year. Namakan inflow also rose to median levels during this period, while lake levels remained nearly steady from mid-October until returning to within the operating band in early November. Rainy Lake levels rose sharply (about 0.6 m from mid-November), but were still outside the band at year's end.

The level of Namakan Lake was below its lower rule curve for a period of 164 days from June 1 through November 11, setting new low water records (since the implementation of the 1949 IJC rule curve) for

the months of August, September and October. The previous record lows had occurred in August-September 1980, September-October 1981 and October 1967. The level of Rainy Lake was below its lower rule curve for a period of 239 days from May 19 through January 12, 1999, setting new low water records (since the implementation of the 1949 IJC rule curve) for the months of August through December. The previous record lows had occurred in August-September 1980, September-November 1958 and November-December 1976. The minimum Rainy Lake level of 336.48 m on October 14 was 1.05 m below the lower rule curve, the largest violation ever recorded since implementation of the lower rule curve in 1970. This level was only 3 cm higher than the lowest level recorded on the lake since IJC rule curves came into effect in 1949 (A low level of 336.45 m was reached in mid-April 1970). Comparison of record lows for Namakan and Rainy Lakes prior to the implementation of the 1949 IJC rule curves are not meaningful, due to differing regulation objectives in the earlier years.

### 3.5.1 Supplementary Order of August 21, 1998

In response to the very dry conditions and low Rainy Lake levels In 1998, the Board sought input from United States and Canadian agencies and interests regarding their views on potential adverse impacts of reducing the outflow from Rainy Lake below the normal minimums specified in the 1970 Order in an effort to prevent the occurrence of emergency conditions on the lake.

The Board contacted the International Rainy River Water Pollution Board (IRRWPB), Ontario Ministry of the Environment (OMOE), Ontario Ministry of Natural Resources (OMNR), Minnesota Pollution Control Agency (MPCA), Minnesota Department of Natural Resources (MDNR), Minnesota Department of Health (MDH), Rainy River First Nation (through the OMNR), the Minnesota municipalities of International Falls and Baudette, the Ontario towns of Emo and Rainy River, and the dam operators (Boise Cascade Corporation and Abitibi-Consolidated Corporation).

The Board reviewed past constraints to flow reductions, during drought periods, below the minimum flow established by the 1970 Order for Rainy Lake. The basin conditions surrounding the issuance of IJC Supplementary Orders for Rainy and Namakan Lakes on April 29, 1987, May 22, 1987 and June 24, 1988 were in many ways similar to the 1998 situation and provided a good frame of reference for dealing with the dry conditions in 1998.

Overall there were no major objections to a reduction from the USA and Canadian interests contacted regarding water quality, water supply and fish and wildlife. The main concerns that surfaced centered around ensuring adequate Rainy River levels for the municipal water supply intakes of International Falls, Minnesota and the Town of Emo, Ontario, maintaining Rainy River DO levels above 5 mg/l and providing sufficient notice of flow reductions to allow the Rainy River First Nations Sturgeon hatchery water intake to be moved as it was felt to be vulnerable to the relatively poorer water quality associated with Rainy River flows as low as 2,250 cfs (63.7 $m^3/s$).

Based upon the feedback received and the Board's past experience, the Board provided the information it had gathered from affected interests along with its conclusions and recommendations to the IJC in a letter report, dated August 13, 1998. The Board concluded that:

- It appeared Rainy Lake would violate its lower emergency condition level sometime around mid-September without significant precipitation or a reduction in the minimum permissible outflow from Rainy Lake.
- The lower limit of any outflow reduction from Rainy Lake was 2,250 cfs (63.7 $m^3/s$), based upon water quality, fishery, and hydraulic concerns related to water supply intakes.
- The diurnal fluctuations, between 3,300 cfs (93.4 $m^3/s$) and 4,000 cfs (113.3 $m^3/s$) in the Rainy River outflow from the International Falls/Fort Frances dam under the 1970 Order are detrimental to benthic organisms and macrophytes in the river.

The Board recommended that:

- The minimum permissible outflow from Rainy Lake be reduced from the current Order's average of 3650 cfs (103.4 $m^3/s$) to 2250 cfs (63.7 $m^3/s$) until such time as the lake level is back in its band.
- The Board be given the authority to set the actual outflows at or above the minimum permissible value, at its discretion, until Rainy Lake is back within its rule curve band, subject to maintaining Rainy River DO levels at or above 5 mg/l, ensuring adequate water supply for the Town of Emo, Ontario and providing a minimum two days notice to the Rainy River First Nation fish hatchery supervisor.
- Monitoring of DO be carried out by the dam owners to the satisfaction of the IRRWPB

The Commission considered the Board's conclusions and recommendations and announced its intent to issue a Supplementary Order in an August 17, 1998 media release. The Commission provided an opportunity for public comment until August 20, 1998. The Commission received no objections and proceeded to issue its Supplementary Order for Rainy Lake, dated August 21, 1998 ordering that:

- Outflow from Rainy Lake be determined by the IRLBC provided that the outflows were no lower than 2,250 cfs (63.7 $m^3/s$).
- Rainy River DO levels are maintained no lower than 5 mg/l.
- Adequate water supply levels are maintained to the Town of Emo, Ontario's water supply intake.
- Disruption to the Rainy River First Nations fish hatchery be minimized.
- The Board inform Abitibi-Consolidated and Boise Cascade (The Companies) in writing of the permissible outflow.
- The Companies ensure DO levels are monitored once per week at designated locations (upstream from Fort Frances, downstream at the 19 km range marker and just above Manitou Rapids) and daily outflow and weekly DO information is provided to the IRLBC and IRRWPB Co-Chairs.
- The IRRWPB or either Company inform the IRLBC and the Commission of flows causing difficulties downstream from International Falls/Fort Frances.
- The Board keep the Commission informed on a weekly basis of lake levels, flows and any other relevant information on conditions.
- Unless otherwise ordered by the Commission, the Order shall continue in force until the level of Rainy Lake is within the band prescribed in the Order.

### 3.5.2 Supplementary Order of October 29, 1998

The August 21 Supplementary Order was amended by a Supplementary Order dated October 29, 1998. The amendment arose from a request by Boise Cascade to discontinue the DO monitoring as Rainy River DO levels had risen above 10 mg/l when Rainy River water temperature fell sharply with the approach of winter. Boise also expressed safety concerns for their staff, who were gathering the DO samples, due to thin ice and asked if samples could be gathered at fewer, but safer locations. The Commission ordered that the second paragraph of its August 21 Supplementary Order be deleted and replaced by the following:

- The Companies would ensure that DO levels were monitored in the Rainy River at such times and locations as the IRRWPB decided were necessary to ensure DO levels above 5.0 mg/l.
- The Companies would provide daily outflow and also DO information, on a schedule as specified by the IRRWPB, to the Co-Chairs of the IRLBC.

Following the issuance of the October 29 Supplementary Order, DO samples continued to be collected by Boise at two locations (Emo water treatment plant and Rainy River above the dam at International Falls/Fort Frances) on a more or less weekly basis through December 29.

## 3.6 1999 Regulation Summary

The rapid rise of Rainy Lake through December and early January of 1999 caused concern that the continued uplifting of the winter ice cover would cause extensive damage to docks. Normally the ice cover forms at a time when levels are steadily falling into early April due to the winter drawdown. Investigation of the matter by the IRLBC revealed that most docks around Rainy Lake were high and dry and would not be damaged by ice uplift. A greater concern that surfaced was that cottage water lines around the lake were mostly exposed by the low water and in fact some lines had been encapsulated in the ice sheet and subsequently lifted and buckled.

In late December in an effort to provide some relief from ice uplift damage to cottage water lines, the Board gave consideration to the advisability of increasing the Rainy Lake outflow so as to blend the lake level back into the band, without too much further rise, even though the level was still well below the lower rule curve (LRC). It was envisioned that ideally, the lake would rise a little higher (to about 337.0 m, the low point of the upper rule curve (URC) at the end of winter) and then be held flat until the following spring. The down side of any outflow increase was having the inflow drop off and then not getting back in the band, or only at a lower level. Further, the upper limit of any outflow increase was constrained to the normal IJC minimum for the time of year of 93.4 $m^3/s$ (3,300 cfs), while lake levels were still below the LRC, and would have required an additional Supplementary Order.

Finally, it was determined that initial concerns over damage to cottage water lines were overstated and damage was not widespread. For these reasons the Board elected to wait until early January and then take action to increase Rainy Lake outflow. Any residual problems with the cottage water lines were alleviated as lake levels returned to within the operating band in mid-January and outflow was increased to allow the normal winter drawdown to proceed.

In anticipation of Rainy Lake levels returning to within the operating band by mid-January and the need to increase outflow for the winter drawdown, the Board directed the Companies on January 8 to increase Rainy Lake outflow to 93.4 $m^3/s$ (3,300 cfs), the normal minimum for the time of year under the 1970 Order. Further, the Board directed that the Companies could increase the outflow at their discretion, once the lake level was back in the band, but requested that the outflow increase be ramped up at no more than 50 $m^3/s$ intervals with at least a half week interval in between increases to minimize disruption of the downstream Rainy River ice cover. The August 21 and October 29, 1998 Supplementary Orders expired with the return of Rainy Lake levels to within the band on January 13.

Hydrologic conditions in 1999 tended to be somewhat wet, but were closer to normal than any of the four previous years. A moderate, but more than adequate early spring runoff allowed both lakes to refill easily. Sufficient water was available to allow the Companies to raise both lakes along their upper IJC rule curves from April through mid-June, meeting desirable levels for fish spawning. For much of this period both lakes were in minor violation of their upper rule curves as the Companies endeavored to keep Rainy Lake levels at the upper rule curves in compliance with FERC requirements (see Section 6.1).

Both lakes remained within their respective bands from June through September, but experienced a number of fluctuations between the upper and lower rule curves. Some of the fluctuations were the result of precipitation extremes during the period, but others resulted from the actions of the Companies. Precipitation throughout the spring and into the first half of July was well above normal, exceeding 200% of normal for much of the period. This contrasted with the mid-July-August period which was well below normal overall. Heavy rainfall in the first half of September was followed by below normal precipitation for the remainder of the year.

Rainy Lake experienced a rapid drawdown from near mid-band down to the LRC in August. The drawdown resulted from the Companies working at odds with each other regarding lake regulation. Boise Cascade was attempting to avoid penalty by compliance with their FERC requirement which calls for levels to be maintained in the coincident areas of the Steering Committee and IJC rule curves. The coincident area of the two sets of rule curves is reduced essentially to a single line, the IJC LRC, by the beginning of September. Boise Cascade was attempting do everything in its power to get lake levels down to the IJC LRC by the end of August. At the same time Abitibi-Consolidated was attempting to utilize its fair share of the water for power generation. The net result was a rapid fall in lake levels until the end of August. The Board advised the Companies that quite apart from any other objectives or constraints, both companies need to jointly set a strategy in compliance with the IJC Order, which consists not only of stated levels but of required "anticipatory " actions as well. Abitibi-Consolidated responded by reducing their Rainy Lake discharge to 50% of the IJC minimum. This action combined with Boise Cascade's reduction in discharge (when lake levels reached the IJC LRC) and heavy September rainfall resulted in lake levels climbing back to, and remaining near, mid-band through November. This situation clearly pointed out the difficulties encountered when the regulations of outside agencies contravene the intent of one of the Commission's existing Orders.

A minor violation of the Namakan Lake URC occurred in mid-October, but was short-lived. This violation was associated with gate repairs to the USA portion of the International Dam at Kettle Falls, which required a cofferdam to close off the three USA sluiceways for about 45 days. Additionally for

safety reasons, all the dam gates were closed for about a week, while divers performed their duties. In anticipation of this loss of discharge capacity, Namakan Lake was lowered to about 20% of its band in August. The work took longer than anticipated and coupled with September-October Namakan Lake inflow near 90%ile resulted in a minor violation of the Namakan Lake URC in mid-October lasting about a week. The Board had advised the Companies of the violation and they responded by accelerating the program to remove the cofferdam.

# 4. COORDINATION AND PUBLIC RELATIONS

## 4.1 Overall Perspective

Over the course of the last five years the Board has endeavored to maintain a high level of communication with the Commission, the Companies and stakeholders in the Rainy-Namakan basin regarding critical lake regulation activities and the Rainy-Namakan Study. It has made effective use of the telephone to include conference calls, electronic mail, the Internet and written correspondence including letters, faxes, newsletters, newspaper ads and reports. The Board feels it has done a credible job of ensuring a high level of effective communication. The Companies have demonstrated a willingness to work on improving their communication with the public and the Board. Communication between the Companies and the Board concerning lake level regulation activities has been and is very good, particularly with respect to compliance with the Commission's Supplementary Orders in 1997 and 1998.

## 4.2 Board Internet Homepage

In response to the Commission's December 2, 1996 letter requesting development of Board web pages to establish a Commission-Boards/Task Forces presence on the Internet, the Board developed an IRLBC homepage in 1996. The Board's homepage follows the IJC's subsequently issued guidelines for gathering and disseminating public information in electronic format, approved by the Commission on February 18, 1997. The homepage contains links to information on the Board's responsibilities, reports and membership as well as links to water level and flow information contained on the web sites maintained by the Lake of the Woods Control Board and U.S. Army Corps of Engineers, St. Paul District. The reports section of the homepage was particularly useful in public dissemination of the reports, newsletters and news releases related to the Rainy-Namakan Study.

## 4.3 Board Newsletters and Informational Letters

In connection with the Board's responsibility for the Rainy-Namakan Study and desire for broad dissemination of study progress to stakeholders, the Board published and distributed a series of six informational newsletters. The newsletters were timed for release at key points during the study from November of 1996 through the last newsletter in November of 1999. The Newsletters were broadly distributed through the mail and posted on the Board's web site (see Section 4.2). Of particular note were the following newsletters:

- November 1996 announcing the Approval of the Plan of Study and work to-date.

- March 1998 announcing the release of the Board's March 3, 1998 Status Report.
- April 1999 releasing the Board's April 28, 1999 Draft Final Report and preliminary recommendations
- November 1999 releasing the Board's October 26, 1999 Final Report and recommendations.

In an effort aimed at ensuring the widest possible feedback from USA and Canadian stakeholders on Rainy River and Lake of the Woods, the Board prepared and sent out a pro-active letter in October 1998 soliciting feedback on downstream impacts of possible changes to the Rainy-Namakan rule curves and minimum flow released from Rainy Lake. The Board requested and received the support of the International Lake of the Woods Control Board in this effort for the Lake of the Woods interests.

### 4.4 Company Initiatives

The Companies have been active on a number of fronts to be responsive to public information needs. Flow changes and gate openings on Rainy and Namakan Lakes are announced on radio stations CFOB in Fort Frances, KGHS in International Falls and CKDR in Dryden, Ontario. A toll free information line (1-800-274-LAKE) is maintained along with weekly lake level graphs published in the Fort Frances Times, International Falls Daily Journal and Atikokan Progress. The Companies have responded to Board suggestions of harnessing the Internet to assist their public relations effort and are currently adding water level regulation information to their web site, but this work is not yet finished. The Companies have implemented a proactive program of calling affected downstream Rainy River users and advising them of significant gate changes at the dam at International Falls/Fort Frances. Participation at the Atikokan Trade Show and with the Seine River Water Level Committee in 1999 has helped to promote greater understanding of regulation objectives in the northern portions of the Rainy basin.

## 5. MEETINGS AND TOURS

### 5.1 IJC Executive and Semi-Annual Appearances

Over the past five years the Board has been actively involved with the IJC primarily with respect to the Rainy-Namakan Study, high water on both lakes in 1996, Supplementary Orders issued in 1997 related to the ice jam flood threat to the Town of Rainy River, Ontario and the record low water levels experienced by Rainy Lake during 1998. The Board met with Commissioners to discuss key topics as shown below:

- February 21, 1995 IJC Executive Meeting in Windsor, Ontario - to discuss considerations in the Commission's mandate to review its Order for Rainy and Namakan Lakes and the development of a plan of study for accomplishment of the work.
- April 5, 1995 Spring Semi-Annual Meeting in Washington, D.C. - to continue the February 21, 1995 discussion on development of a Rainy-Namakan Plan of Study.
- October 26, 1995 Fall Semi-Annual Meeting in Ottawa, Ontario - to present a background on the Rainy basin and rule curve issues for the benefit of the three new Canadian Commissioners, a status report on the plan of study, a discussion of funding cutbacks to IJC funded gauges and an advisory of

the Wellstone Amendment to the 1996 USA Energy and Water Resources Development Appropriation Act.

- April 18, 1996 Spring Semi-Annual Meeting in Washington, D.C. - to provide a status report on the Rainy-Namakan Study and Impact of the Wellstone Amendment.
- October 24, 1996 Fall Semi-Annual Meeting in Ottawa, Ontario - to present an update on the Rainy-Namakan Study progress and next steps, a summary of the Fisheries Review, a review of 1996 lake regulation under the Wellstone Amendment (see Sections 6.1 and 6.2), continued concerns over funding of IJC water level and flow gauges.
- October 9, 1997 Fall Semi-Annual Meeting in Vancouver, British Columbia - to present the results of simulation modelling of Rainy and Namakan Lakes outflows and levels, and an update of the work progress and revised budget and schedule for completion of the Rainy-Namakan Study.
- April 2, 1998 Spring Semi-Annual Meeting in Washington, D.C. - to present an update on Rainy-Namakan Study progress since October 1997 and work remaining, the outcome of stakeholder meetings held in March 1998 by the Board and a review of the study budget and schedule (the Board submitted a detailed accounting study costs to-date by work item, a projection of remaining costs and a schedule for study completion).
- October 29, 1998 Fall Semi-Annual Meeting in Ottawa, Ontario - to provide an update on Rainy-Namakan Study progress since April 1998 and work remaining, present draft recommendations under consideration by the Board, discuss budget and a revised schedule for completion of the Rainy-Namakan Study and provide an update on drought conditions in the Rainy basin.
- April 13, 1999 Spring Semi-Annual Meeting in Washington, D.C. - to present the Board's Draft Final Report and recommendations on the Rainy-Namakan Study.
- November 2, 1999 Fall Semi-Annual Meeting in Ottawa, Ontario - to present the Board's Final Report and recommendations on the Rainy-Namakan Study.

The Board essentially met with the Commission twice a year over the course of the study, except for 1997, when the board did not attend the Spring Semi-Annual Meeting in Washington. The Board was experiencing delays in the modelling component of the study and had no significant new information to report. The Commission agreed with this assessment and in lieu of attendance at the semi-annual meeting, the Board submitted a short report on the Board's activities for Commissioner's use and information at the meeting.

### 5.2 July 7, 1999 IJC Public Hearing

The Commission held a public Hearing in Fort Frances, Ontario on July 7, 1999 to receive public comment on the Draft Final Report for the Rainy-Namakan Study, released to the public on April 28, 1999. Following introductory and background comments by Commissioners, the Board gave some additional study background information, a brief presentation of the Draft Final Report conclusions and recommendations and responded to a few questions. The bulk of the time was devoted to submissions by interested individuals and agencies. The Hearing was well attended and the Commissioners received many verbal and written comments from a wide range of stakeholders representing interests on Rainy and Namakan Lakes, Rainy River, Lake of the Woods and the Winnipeg River. These comments are characterized in the Board's Final Report as well as in the Commission's transcript of the proceedings. In general the comments were in favor of the recommended changes on Namakan Lake, split on changes to Rainy Lake and concerned on the Rainy River, Lake of the Woods and Winnipeg River about

upstream improvements at the potential expense of downstream areas. Boise Cascade and Abitibi-Consolidated, were adamantly opposed to any changes on Rainy Lake or Namakan Lake, claiming increased flood risk, loss of hydropower generation, no proof of benefit to the fishery and expressing concern for adverse impacts to downstream areas. The Companies favored the existing IJC Order for the lakes.

### 5.3 July 7-8, 1999 Basin Tour

The Board arranged a tour of some of the key features of the Rainy-Namakan basin on July 7-8, 1999 to acquaint Commissioners and staff more fully with the basin for which they would be making important decisions, following submission of the Board's Final Report for the Rainy-Namakan Study that fall. The tour took advantage of the Commission's presence in the basin in connection with the July 7 IJC Hearing (see Section 5.2).

The tour consisted of an afternoon visit on July 7 to the Rainy River First Nations fish hatchery, affected in 1998 by low water levels in the Rainy River. Although Commissioners were not able to attend this part of the tour, several IJC and Board staff made the visit. July 8 was a full day of touring. The morning and afternoon portions of the tour were by boat on Kabetogama and Namakan Lakes and included: inspections of the uncontrolled overflow at Gold Portage, the Ash River and Sullivan Bay area houseboat concessions and outfitters, and inspection of the International and Canadian dams at Kettle Falls and Squirrel Falls. The final portions of the tour by bus included a visit with local resort owners at the Harmony Beach Resort and inspection of the Rainy Lake outlet works and dam. The tour was long, but interesting and enjoyed by all in spite of the overcast rainy conditions. The hospitality of Voyageurs National Park (VNP) and the Park Superintendent, Barbara West, was instrumental in the success of the tour and was greatly appreciated by all. The park provided guides and boat transportation for the touring on the lakes.

### 5.4 Annual Public Meetings

The Board held its annual spring public meetings in 1996, 1998 and 1999. The Board's annual public meeting was not held in 1995, because the Board and the IJC had just been in the basin in November 1994 for the IJC's initial public hearing in connection with the Rainy-Namakan Study. The 1997 spring meeting was intentionally deferred and ultimately canceled, because there were no new developments in the study to report to the public at that time. For the most part, the annual meetings during this period were focused on progress and developments in the ongoing rule curve study. A brief summary of the meetings follows:

- March 5, 1996 at Fort Frances, Ontario - The meeting was attended by about 25 people, including one staff person from the U.S. Section of the IJC. Following the pattern of previous years, the meeting started with a representative of the Companies presenting a review of the past year's regulation. Then a Board staff member presented a forecast for the spring season. Finally, the Board Members presented information on the Plan of Study, study schedule and progress to-date. Major points raised by the attendees included:

  - IJC process for reviewing the Rainy-Namakan rule curves was too slow.

- Concern expressed by an Emo Councilor regarding potential impacts of rule curve change to the Emo water intake.
- Points made by counsel and engineering consultants to the Companies.
  - Boise Cascade and Stone-Consolidated are not corporately connected.
  - Boise Cascade operating authority is affected by FERC, while Stone-Consolidated in Canada does not recognize FERC authority.
  - Stone-Consolidated controls the bulk of outflow capacity from Rainy and Namakan Lakes.
  - Regulation within areas of coincidence between FERC and Steering Committee curves under the Wellstone Amendment is very difficult due to the small coincident band width at certain times.

- March 10, 1998 at International Falls, MN - The meeting was attended by about 50 people, including one staff person from the U.S. Section of the IJC. The meeting focused on the conclusions and preliminary findings of the Board's Status Report, released just prior to the meeting. Major points raised by the attendees included:

  - Concern that downstream impacts were not being adequately assessed and suggestions that the downstream areas be modelled.
  - Comments by the Canadian Co-Chair of the Steering Committee that the experimental approach to implementing rule curve changes, first on Rainy Lake and later on Namakan Lake based upon Rainy Lake outcomes, was inappropriate as the two are very different ecosystems. Sustainability was espoused as a better approach.

- April 28, 1999 at Fort Frances, Ontario - The meeting was attended by about 65 people. The meeting focused on the recommendations in the Board's Draft Final Report, which was released to the public the same day. The public comment and review period for the report and the upcoming July IJC Hearing were announced. Major points raised by the attendees included:
  - Reiteration that downstream impacts not adequately addressed and IJC study process did not allow adequate involvement of downstream interests.
  - Reiteration of views that Steering Committee recommendations for Rainy Lake should be adopted.
  - Concerns expressed by environmental resource agencies over the Board's recommendation #5, suggesting that the resource agencies should bear the primary burden for resourcing and implementing a monitoring program to assess the effectiveness of any changes implemented.
  - Polarization of views over the Board's Draft Final Recommendation #6 with the Companies viewing it as a positive step by the IJC to assert its primacy in the regulation of the lakes and the opposing view of the Steering Committee that the recommendation amounted to nothing more than carte blanche power for the Companies to the regulate the lakes as they pleased within the recommended new band.

### 5.5 Other Meetings

During the Board's conduct of the Rainy-Namakan Study, the Board met with a number of stakeholder groups to discuss various study aspects, seeking their input and involvement. Detailed information

concerning these meetings and comments received by the Board can be found in the Board's Final Report on the Rainy-Namakan Study. A brief listing of these key study-related meetings follows:

- March 5, 1996 in Fort Frances, Ontario - Meeting with Steering Committee to review the Plan of Study and address any concerns on early study work.
- March 5, 1996 in Fort Frances, Ontario - Meeting with downstream interest groups, located mainly on the Rainy River downstream of Rainy Lake, invited to participate in the study by sharing their views and concerns regarding how any changes in the regulation of Rainy and Namakan Lakes might impact their area. The Board briefly outlined how impacts on the downstream areas were to be considered in the study and how the Board would count on the attendees to identify their concerns and how they wished to be involved in the process.
- March 5, 1996 in Fort Frances, Ontario - Meeting with Inflow Forecasting Group, representatives of a number of parties who were invited to participate in the assessment of inflow forecasting techniques for Rainy and Namakan Lakes. Beforehand the parties had stated the view that any increased flood risk due to the Steering Committee's rule curves might be offset through improved inflow forecasting and reservoir management.
- March 10, 1998 in International Falls, Minnesota - Meeting with the Steering Committee to discuss the Board's findings in its March 3, 1998 Status Report and remaining work to complete the study.
- March 10, 1998 in International Falls, Minnesota - Meeting with the Inflow Forecasting Group to discuss the Board's findings on inflow forecasting.
- April 27, 1999 in Fort Frances, Ontario - Meeting with representatives of area First Nations to present the findings and recommendations contained in the Board's Draft Final Report.
- April 28, 1999 in Fort Frances, Ontario - Meeting with the Steering Committee to present the findings and recommendations contained in the Board's Draft Final Report.

Prior to each of its annual public meetings in the basin, the Board met with representatives of the Companies involved in water level management. The meetings included discussion of the Company's regulation over the past year, the Company's ongoing dam maintenance program, water level related public relations activities, Rainy-Namakan Study progress and study-related concerns, and other Board or company concerns. The Board met with the Companies on March 4, 1996, March 9, 1998 and April 27, 1999.

Board staff participated in a meeting with IJC staff and staff from the St. Croix and St. Lawrence Boards on October 28, 1995 in Ottawa. The Commission sought input on consideration of new assessment methods for evaluating impacts of current and future changes in the Commission's Orders of Approval.

Board staff attended and participated in the IJC's Watershed Board Workshop in International Falls, Minnesota on March 23, 1999 and subsequent follow-up meeting in Fort Frances, Ontario on July 7, 1999, providing their views and experience to the proceedings.

### 5.6 Board Meetings and Conference Calls

The Board met on numerous occasions and held many conference calls over the 1995-99 period, primarily in connection with the Rainy-Namakan Study and Board appearances before the Commission, but also in connection with other varied issues including the Commission's Supplementary Orders in

1997 and 1998 and the IJC 1999 Public Hearing and basin tour. The meetings took place in Fort Frances, International Falls, Washington D.C., Vancouver, and Ottawa.

## 6. OTHER BUSINESS

### 6.1 Wellstone Amendment

At the October 1995 IJC semi-annual meeting, the Board advised the Commission of the proposed amendment to the 1996 Energy and Water Resources Development Appropriations Act. This amendment was proposed by Senator Paul Wellstone (MN) as an interim measure to maintain Rainy/Namakan levels closer to those recommended by the Steering Committee. The amendment passed into USA law on November 13, 1995, with the terms to be enforced by FERC, under penalty of up to a $10,000/day fine for non-compliance.

The effect of the so-called "Wellstone Amendment" was as follows: where existing and proposed rule curves are coincident, levels will be maintained within the range of that coincidence; where existing and proposed rule curves are not coincident, levels will be maintained at limit of existing curves closest to the proposed curves. The net effect was an earlier rise in spring, stable or declining June levels, summer drawdown on both lakes with a reduced winter drawdown on Namakan Lake. The areas of coincidence between the two sets of curves produced unusually narrow operating bands on both lakes, particularly in the spring, much like earlier versions of the IJC Order (the original single rule curves were replaced by bands), which were deemed unmanageable.

The Board noted that Boise Cascade has limited physical capacity to comply with the Wellstone legislation, since most of outlet works are in Canada. The USA powerhouse is the only outlet in the USA, while the Canadian powerhouse and 15 sluices (10 on main dam, 5 on canal) are in Canada. The lack of discharge capacity in the USA versus Canada greatly limited the ability of Boise Cascade to comply with the Wellstone amendment without the cooperation of Stone-Consolidated. The same situation existed for Namakan Lake with Canadian control over discharge being greater. It was also noted that FERC doesn't even legally have jurisdiction over the Namakan site (their licensing only covers the USA powerhouse on Rainy), and yet they are directed to enforce the Wellstone amendment on Namakan as well.

The Board pointed out that the two companies could end up working at cross-purposes during spring refill in May with Boise Cascade cutting back their powerhouse flows to zero in order to be at the existing upper rule curve, to avoid the $10K/day fine, while Stone-Consolidated could be generating at full capacity plus opening sluices to try to draw the level down to mid-band or lower in recognition of a heavy snowpack, applying judgement as is the intended use of the band. This is exactly what happened in 1996. The reverse of this situation occurred in August of 1999 (see Section 3.6), when Boise Cascade did everything in its power to lower the level of Rainy Lake to the LRC in an attempt to comply with FERC regulations. This action put Abitibi-Consolidated in the position of having to give up a portion of its share of the water available for power generation in order to avoid a violation of the IJC LRC. Boise Cascade asked for Stone-Consolidated's cooperation in meeting the Wellstone criteria, but Stone-Consolidated responded that they would follow only the IJC Order, or other direction from the IJC.

## 6.2 Reaction to 1996 High Water and Wellstone Amendment

There was a fair bit of concern in the basin over the 1996 high water event and the localized flooding that it caused, and considerable coverage in the local media as a result (copies of which were forwarded to the Commission staff as they became available). The issue became somewhat polarized and politicized (in the USA) as some claimed that the Wellstone amendment, by requiring the lakes to be higher in the spring, had caused the flooding, while others claimed that Boise had not drawn the lakes down in anticipation of the event, as the IJC requires of them. The Steering Committee, MDNR and Senator Wellstone got a fair bit of pressure for their position, and in turn blamed Boise. Senator Wellstone asked FERC to review Boise's handling of the event.

Meanwhile, a consortium in the USA portion of the basin, apparently led by someone campaigning for the "Resource Party", sought support for a suit for damages against Wellstone and MDNR. Overall, there was certainly more concern in the area over the flooding aspect of rule curve change than there was in 1995, but those supporting the proposed change felt the event could have been better managed.

The FERC review in response to Senator Wellstone's questions on Boise's handling of the spring event concluded that Boise Cascade had operated in general conformance with the Act (1996 USA Energy and Water Resources Development Appropriations Act, which implemented the Wellstone Amendment). The review also found that, the IJC "all gates open" level would not have been exceeded if the lake had been drawn to the IJC lower rule curve.

Their report was issued in September 1996 and it is worth noting that the report answered specifically the questions asked by Senator Wellstone. However, regarding the second conclusion, FERC Chair Elizabeth Moler was quoted in the press as saying it would have been a hard call to make, and that Boise had little way of knowing such measures had to be taken, even with the latest technology. In a letter to Wellstone she apparently said: "The licensee is studying NEXRAD which may be able to more accurately predict inflows into Rainy Lake. However, because the spring 1996 high water situation on Rainy Lake was attributable to complex combinations of rapid snowmelt and rainfall, it is unlikely that NEXRAD would have provided all of the information needed to make timely decisions to meet the situation".

## 6.3 Funding of IJC Gauges

At the October 1996 IJC semi-annual meeting the Board expressed its deep concern for the actual cuts in IJC gauge funding to the U.S. Geological Survey (USGS) in the United States and for potential funding cutbacks in Canada for gauges utilized by the Board in carrying out its IJC mandate. The Board had brought this issue to the Commission's attention on several occasions in 1995 and 1996. These gauges are critical to the Board's IJC mandate. The USA gauges monitor uncontrolled flow from Namakan Lake to Rainy Lake (Gold Portage), major inflow to Lake of the Woods (Big Fork River), and the Warroad gauge on Lake of the Woods is referenced by treaty (1925 Convention and Protocol). The Canadian gauges are significant for monitoring the levels of Namakan and Rainy Lakes.

Temporary funding from the Corps of Engineers in St. Paul supported a base level of service for the USA gauges that were cut from the IJC monitoring program. This base support level was considered

insufficient to ensure the quality and integrity of the gauge data collected and used by the Board in its monitoring support to the IJC.

The Board wishes to thank the Commission for the restoration of its USA funding support for these gauges in 1997 and ask that past concerns be remembered in any future cost-cutting measures.

### 6.4 Y2K Compliance of Structures Subject to IJC Orders

The Board received the Commission's letter of March 11, 1999, requesting the Board to consult with the owners of operating structures subject to IJC Orders, regarding their Y2K preparedness plans. By letters dated April 21, 1999 to Boise Cascade Corporation and Abitibi-Consolidated Incorporated, the Board requested written information for the dam at Fort Frances-International Falls, the International Dam at Kettle Falls and the Canadian Dam at Squirrel Falls, outlining actions taken or planned to be taken, describing the assurance these actions provides, and highlighting any potential risks identified regarding Y2K concerns. The Companies were also asked if Y2K issues with other structures or gauging stations in the basin raised any concerns regarding operations in compliance with Commission Orders.

The Y2K issue was discussed with the Companies on April 28, 1999 in Fort Frances during the Board's annual series of meetings with key interests and the public. Letter responses to the Board's request were received from Boise Cascade in a letter dated April 28, 1999 and from Abitibi-Consolidated in a letter dated May 27, 1999. The Companies had either tested critical components for compliance, were in the process of testing for compliance or had received certifications of compliance from component manufacturers. Both believed that sufficient manual override capability existed at the three dams to handle any unforeseen contingency and expressed confidence that the dams will function beyond the year 2000 without problem. The Board concurred that the Companies had taken effective and responsible measures to ensure that the control facilities for Rainy and Namakan Lakes would function properly beyond January 1, 2000. The Board felt that these measures provided a high degree of assurance that the lakes will be able to be regulated in compliance with the Commission's Orders into the next millennium.

The Companies raised a concern about their ability to access the daily lake level readings in near real-time from the three gauges for Rainy and Namakan Lakes that are controlled by others. The Board explained that the U.S. Army Corps of Engineers, St. Paul District, Water Control Section had performed extensive field testing of its data collection platforms that showed the date function is not critical for DCP data transmissions. The Board explained that concerns existed for daily water level data accessed from some gauges via telephone, but that neither the Companies nor the Board had any control over this service and it was the Board's understanding that potential Y2K problems were being aggressively dealt with by the local phone company. In the unlikely event of an interruption in DCP data transmissions or phone service, lake level data will still be available via manual observer readings.

## 7. INFORMATION ITEMS

### 7.1 Maintenance Activities and Dam Safety

During the past five years the Companies have taken a number of actions related to the ongoing maintenance of the outlet facilities at International Falls/Fort Frances, Kettle Falls and Squirrel Falls. These actions are listed below:

- Ongoing grouting program for seepage problem with USA side of International Falls-Fort Frances dam initiated in 1995 and completed in 1997.
- Repair and upgrade of three turbines in February and March of 1996 at the USA powerhouse at International Falls due to metal fatigue to one turbine and cracks discovered in two other turbines, resulting in about $500,000 in repair costs. Implementation of 1,500 cfs flow limit per turbine to prevent future cracking.
- Inspection of Kettle Falls dam by ACRES International in the Fall of 1997. No major problems found although ACRES recommended repairing erosion discovered under one gate sill. Repairs were completed in August-September 1999 to gates 2 and 3 (concrete replacement to gate sills) with stop log work on the remaining three bays. The Companies jointly funded repairs requiring a cofferdam for bays 2 and 3. ACRES International was the consultant for the job.
- Modification of USA mill process water intake on upstream side of International Falls dam to allow higher Rainy Lake outflow without causing air entrainment problems phased for completion over 1998-99 (this was a concern in the spring of 1997 (see Section 3.4.3).
- Upgraded and relocated the cable restraint at the Squirrel Falls dam in 1998-99 following the accidental passage of a boat through the dam, in response to concerns from Voyageurs National Park.
- Grouting of pier faces at the International dam at Kettle Falls and the Canadian dam at Squirrel Falls completed in 1998-99.
- U.S. portions of the dam at International Falls-Fort Frances were scheduled to be inspected by FERC in 1999 as a part of FERC's routine 5-year inspection program.

The Companies are participating in an Ontario Ministry of Natural Resources/Water Power Industries Task Force aimed at addressing dam safety issues. Major water power users in Ontario have been invited to participate beginning in 1999 and finishing in 2001. The task force will work to develop and implement dam safety standards, bringing Ontario in line with the other Provinces in Canada. The Companies plan to keep the Commission and the Board informed of developments.

### 7.2 Board Membership

Over the five years covered by this report, the United States Co-Chair of the Board has changed three times. Colonel John M. Wonsik was appointed on July 12, 1995 to replace Lt. Colonel James T. Scott, who had served on the Board since August 7, 1993. On February 18, 1998 Lt. Colonel William J. Breyfogle was appointed to replace Colonel Wonsik. Colonel Breyfogle served as U.S. Co-Chair just a short period of time until July 29, 1998, when Colonel Kenneth S. Kasprisin was appointed by the Commission.

## 7.3 Company Ownership

For most of their history the Canadian and United States powerhouses and portions of the dams at the outlets of Rainy and Namakan Lakes were owned by the same private company. In spite of ownership changes over the years, the USA company owning the USA outlet works also owned the Canadian outlet works through a wholly owned Canadian subsidiary. Personnel in the Canadian subsidiary regulated the lakes.

As reported in the 1994 annual report, this started to change in 1994. Boise Cascade Corporation, owner of the USA outlet works, restructured its Canadian subsidiary, Boise Cascade Canada, into a new Canadian public company, known as Rainy River Forest Products. Boise continued as the major shareholder but announced its intent to reduce its stake in the company.

Effective November 1, 1995, Rainy River Forest Products was bought by, and became part of, Stone-Consolidated Corporation. Then, effective May 30, 1997, Stone-Consolidated merged with Abitibi-Price, creating a new company now known as Abitibi-Consolidated Incorporated, a wholly Canadian company. Thus the Canadian and United States outlet works now have totally separate ownership. The two companies work together to regulate the lakes in compliance with the IJC Order.

Respectfully submitted,

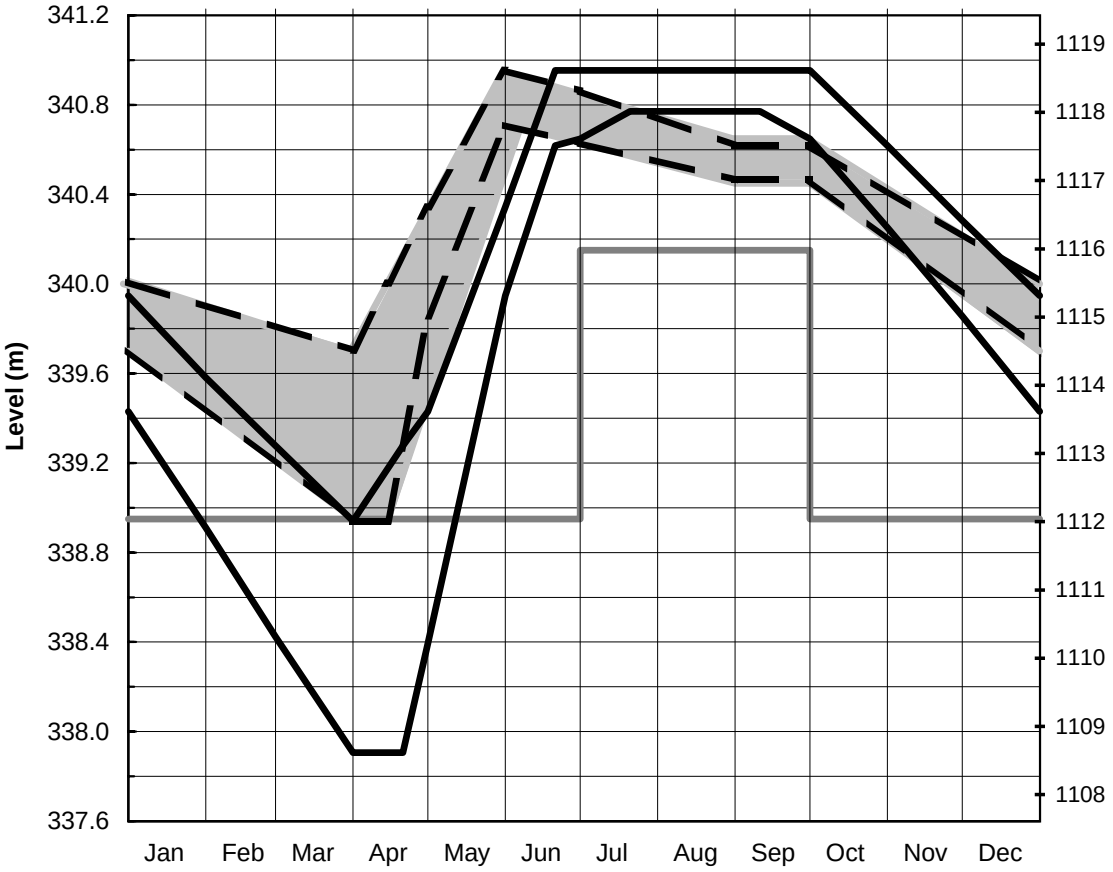
| | |
|---|---|
| Kenneth S. Kasprisin, P.E.<br>Member for the United States | Dale R, Kimmett, P.Eng.<br>Member for Canada |
| Colonel, U.S. Army Corps of Engineers<br>District Engineer<br>St. Paul, Minnesota | Director, Strategic Issues & Enforcement Planning<br>Environment Canada<br>Ottawa, Ontario |

*FIGURE 1*

*(From Draft Final Report)*

## Namakan Lake

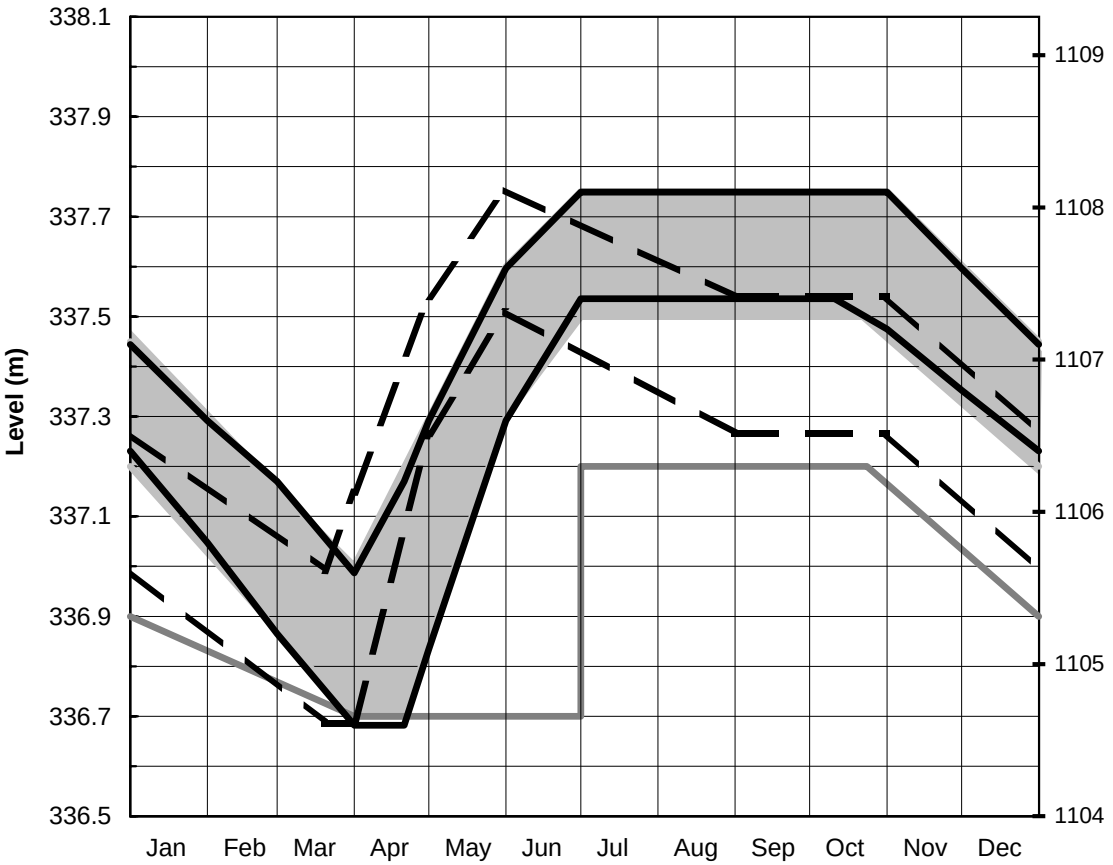
Recommended Rule Curves




| Date | LRC | URC | EDL |
|---|---|---|---|
| Jan 01 | 339.70 | 340.00 | 338.95 |
| Apr 01 | 338.95 | 339.70 | |
| Apr 15 | 338.95 | | |
| Jun 01 | | 340.95 | |
| Jun 07 | 340.70 | | |
| Jun 30 | | | 338.95 |
| Jul 01 | | | 340.15 |
| Sep 01 | 340.45 | 340.65 | |
| Sep 30 | | | 340.15 |
| Oct 01 | 340.45 | 340.65 | 338.95 |

## Rainy Lake

Recommended Rule Curves



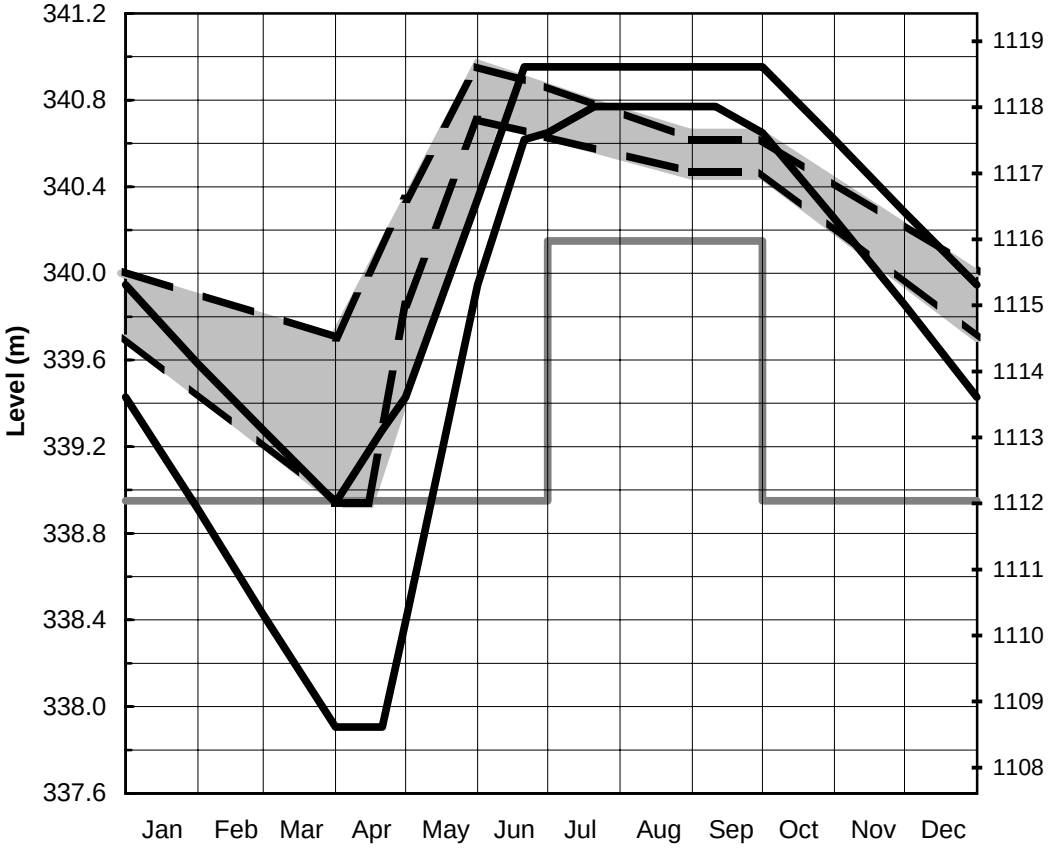

| Date | LRC | URC | EDL |
|---|---|---|---|
| Jan 01 | 337.20 | 337.45 | 336.90 |
| Apr 01 | 336.70 | 337.00 | 336.70 |
| Apr 21 | 336.70 | | |
| Jun 01 | 337.30 | 337.60 | |
| Jun 30 | | | 336.70 |
| Jul 01 | 337.50 | 337.75 | 337.20 |
| Sep 30 | | | |
| Oct 24 | 337.50 | | 337.20 |
| Nov 01 | | 337.75 | |

***FIGURE 1***

***(From Final Report)***

## Namakan Lake

Option "A" Rule Curves




Recommended Rule Curves (Band)

Emergency Drought Line

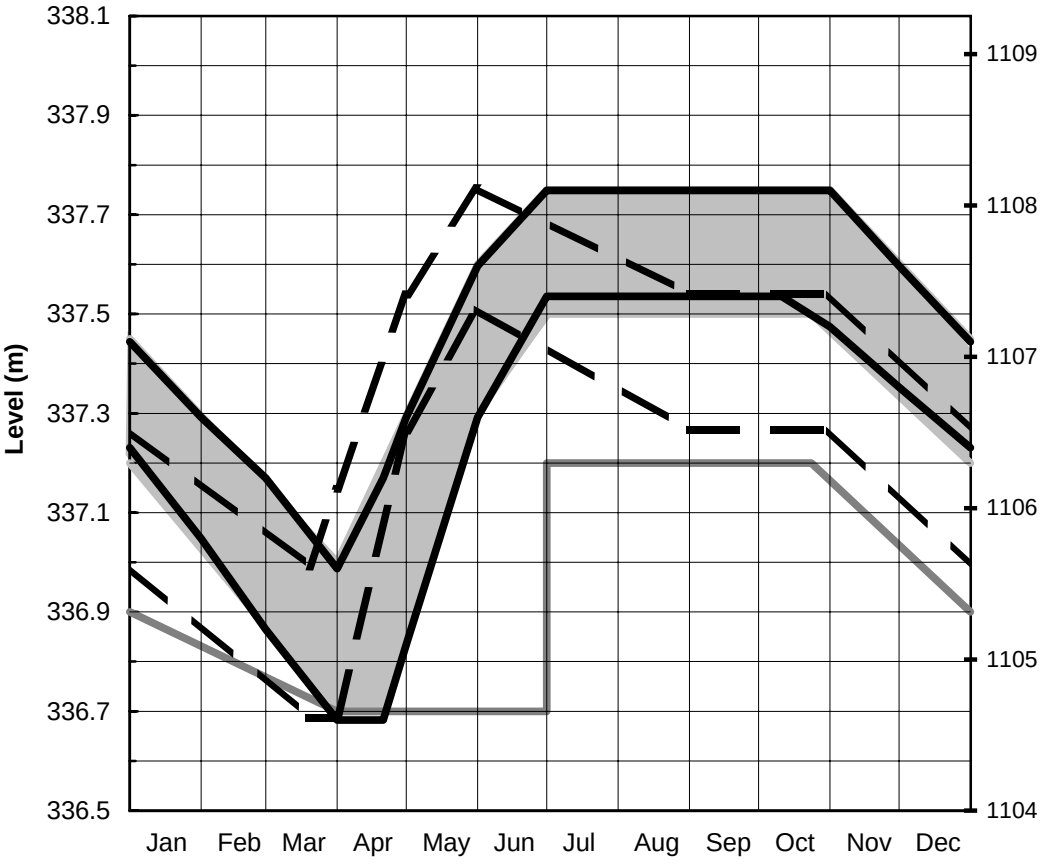
IJC 1970 Rule Curves

SC Rule Curves

| Date | EDL | LRC | URC |
|---|---|---|---|
| Jan 01 | 338.95 | 339.70 | 340.00 |
| Apr 01 | | 338.95 | 339.70 |
| Apr 15 | | 338.95 | |
| Jun 01 | | | 340.95 |
| Jun 07 | | 340.70 | |
| Jun 30 | 338.95 | | |
| Jul 01 | 340.15 | | |
| Sep 01 | | 340.45 | 340.65 |
| Sep 30 | 340.15 | | |
| Oct 01 | 338.95 | 340.45 | 340.65 |

## Rainy Lake

Option "A" Rule Curves




Recommended Rule Curves (Band)

Emergency Drought Line

IJC 1970 Rule Curves

SC Rule Curves

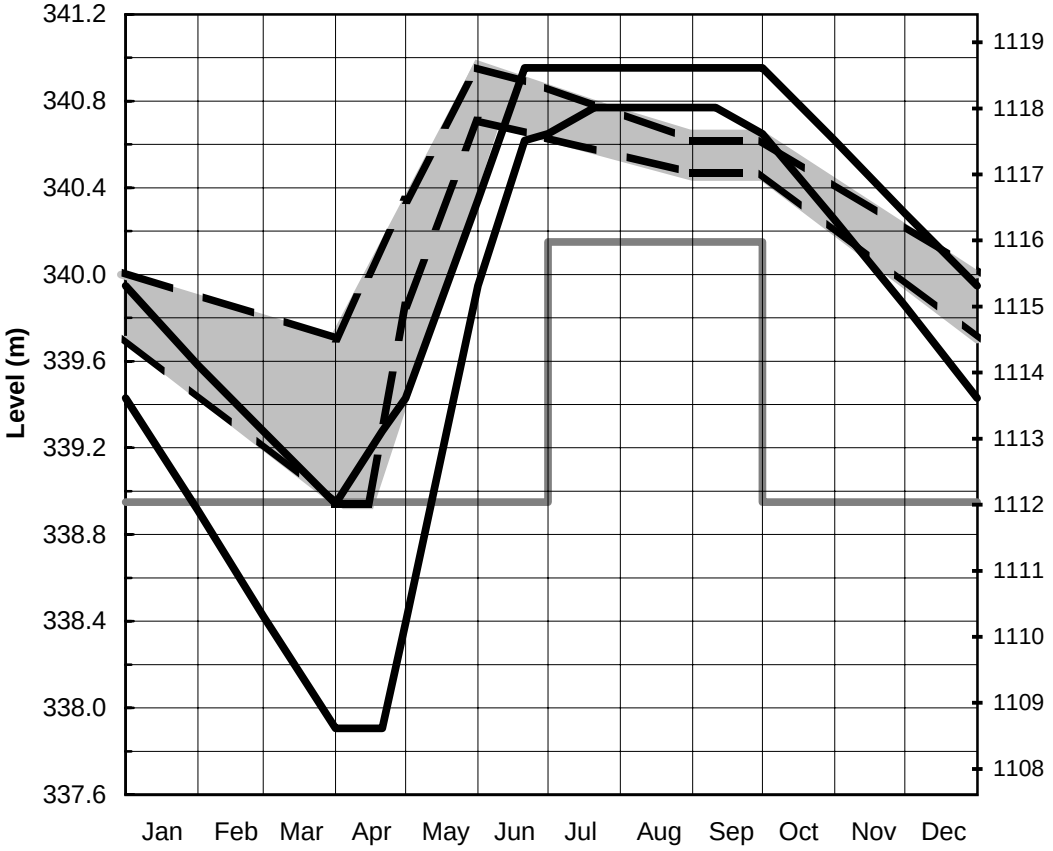
| Date | EDL | LRC | URC |
|---|---|---|---|
| Jan 01 | 336.90 | 337.20 | 337.45 |
| Apr 01 | 336.70 | 336.70 | 337.00 |
| Apr 21 | | 336.70 | |
| Jun 01 | | 337.30 | 337.60 |
| Jun 30 | 336.70 | | |
| Jul 01 | 337.20 | 337.50 | 337.75 |
| Sep 30 | | | |
| Oct 24 | 337.20 | 337.50 | |
| Nov 01 | | | 337.75 |

***FIGURE 2***

***(From Final Report)***

## Namakan Lake

Option "B" Rule Curves




Recommended Rule Curves (Band)

Emergency Drought Line

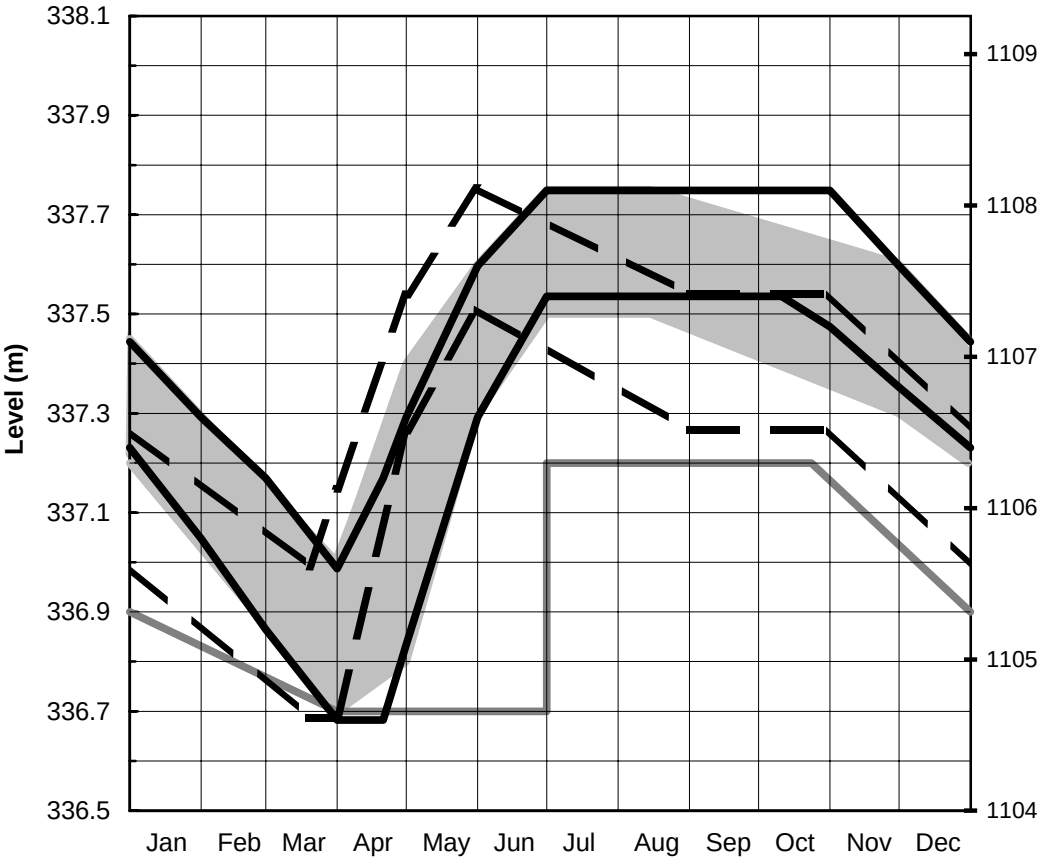
IJC 1970 Rule Curves

SC Rule Curves

| Date | EDL | LRC | URC |
|---|---|---|---|
| Jan 01 | 338.95 | 339.70 | 340.00 |
| Apr 01 | | 338.95 | 339.70 |
| Apr 15 | | 338.95 | |
| Jun 01 | | | 340.95 |
| Jun 07 | | 340.70 | |
| Jun 30 | 338.95 | | |
| Jul 01 | 340.15 | | |
| Sep 01 | | 340.45 | 340.65 |
| Sep 30 | 340.15 | | |
| Oct 01 | 338.95 | 340.45 | 340.65 |

## Rainy Lake

Option "B" Rule Curves




Recommended Rule Curves (Band)

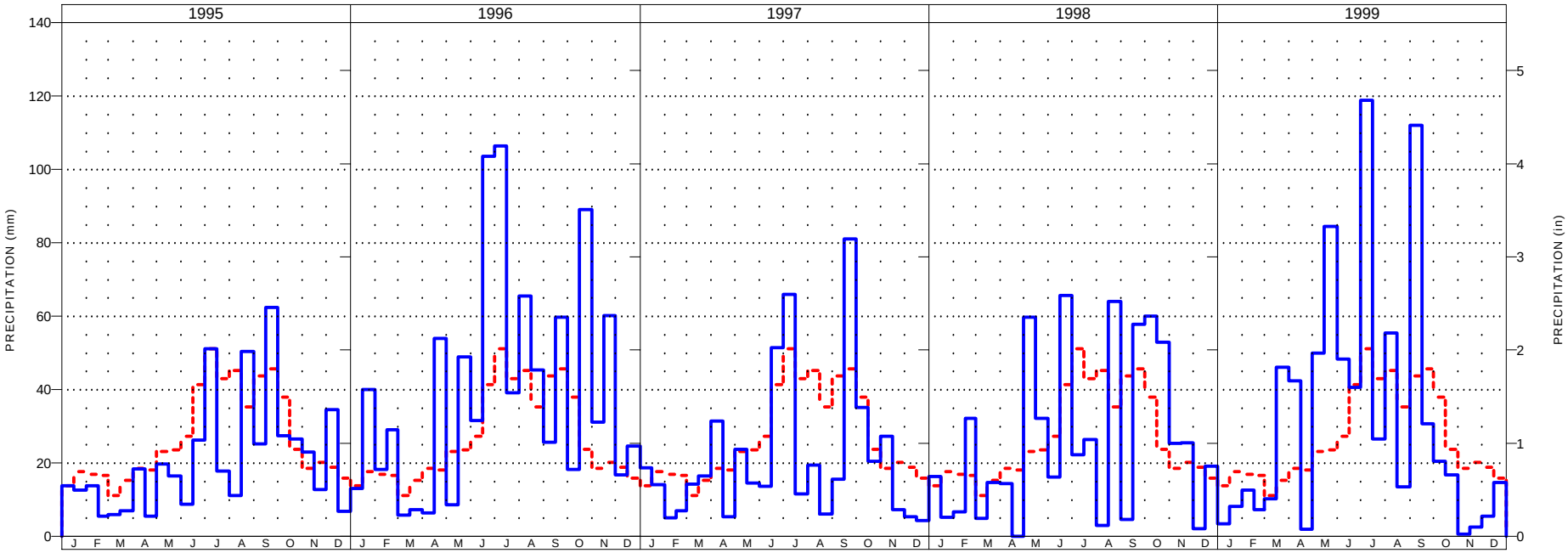
Emergency Drought Line

IJC 1970 Rule Curves

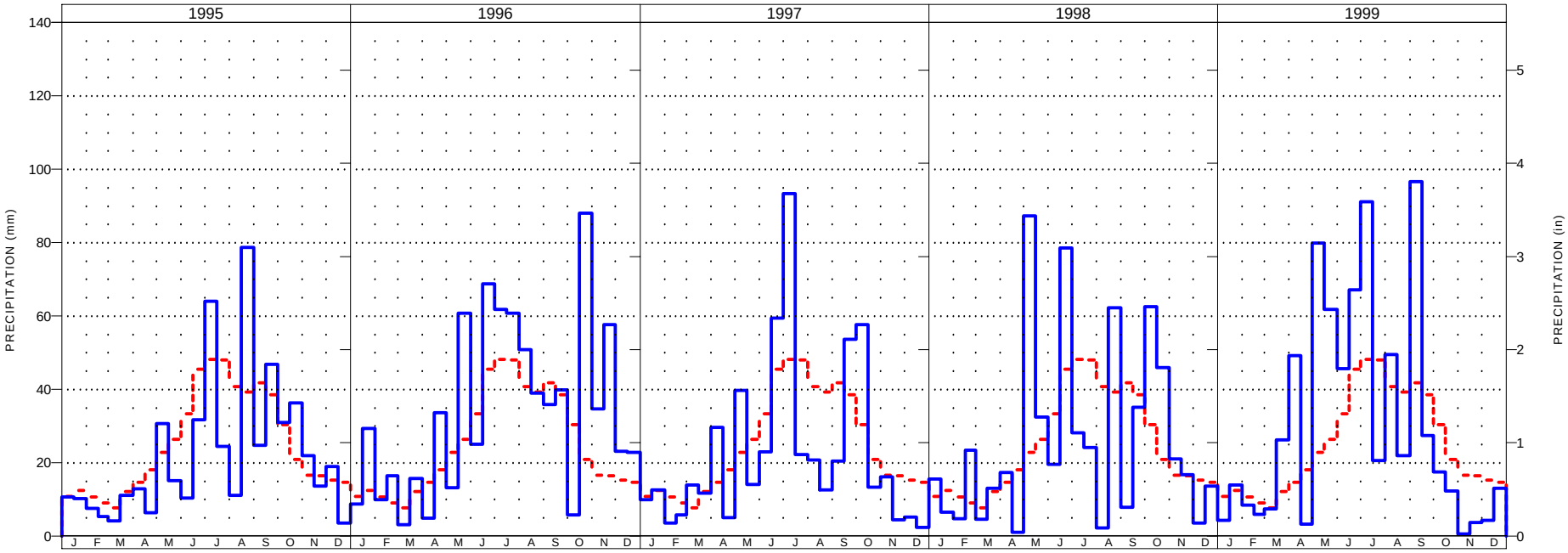
SC Rule Curves

| Date | EDL | LRC | URC |
|---|---|---|---|
| Jan 01 | 336.90 | 337.20 | 337.45 |
| Apr 01 | 336.70 | 336.70 | 337.00 |
| May 01 | | 336.80 | 337.40 |
| Jun 01 | | 337.30 | 337.60 |
| Jun 30 | 336.70 | | |
| Jul 01 | 337.20 | 337.50 | 337.75 |
| Aug 15 | | 337.50 | 337.75 |
| Oct 24 | 337.20 | | |
| Dec 01 | | 337.30 | 337.60 |

# RAINY-NAMAKAN PRECIPITATION 1995-1999



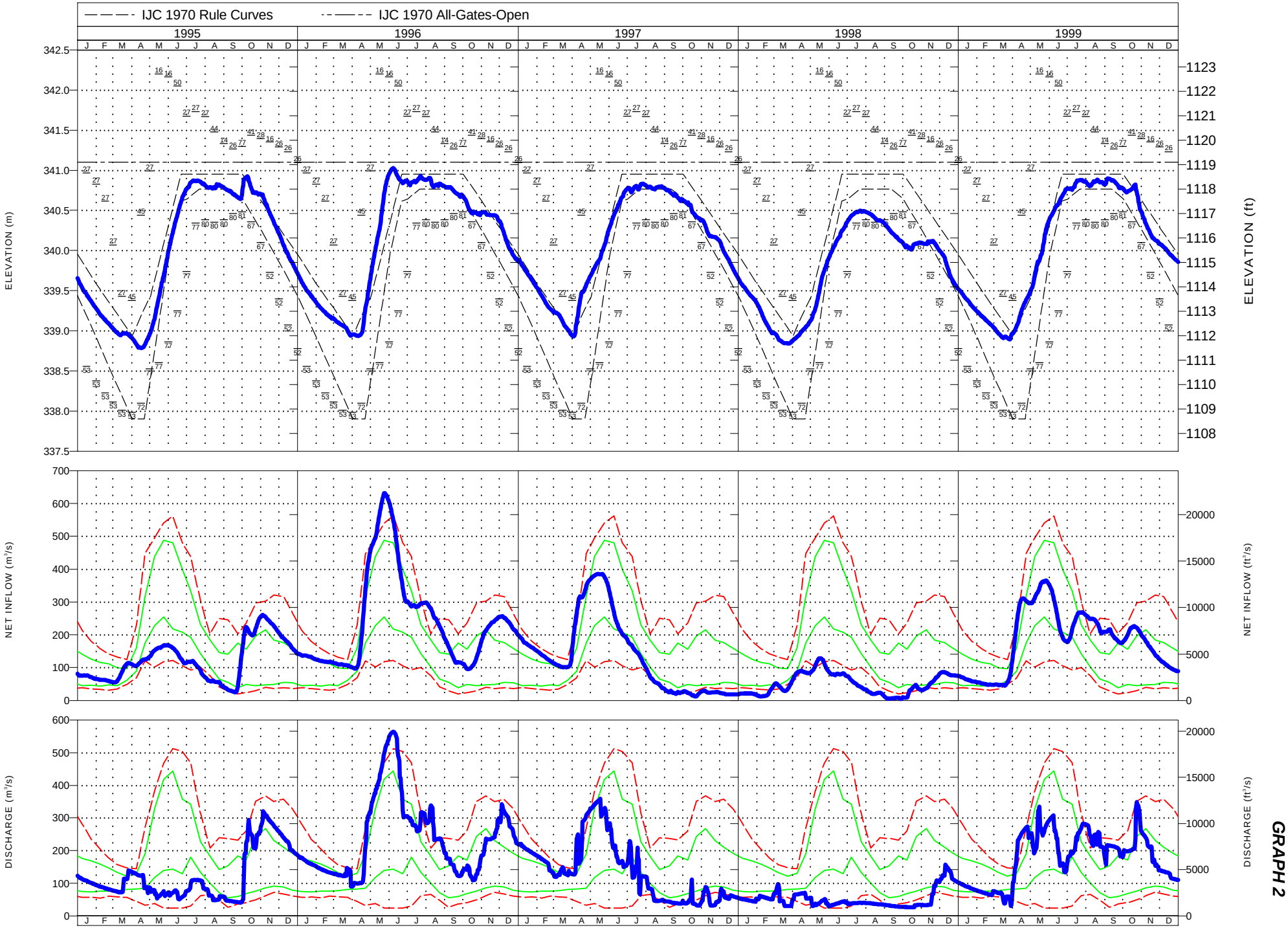

# LAKE OF THE WOODS PRECIPITATION 1995-1999




***GRAPH 1***

# NAMAKAN LAKE 1995-1999

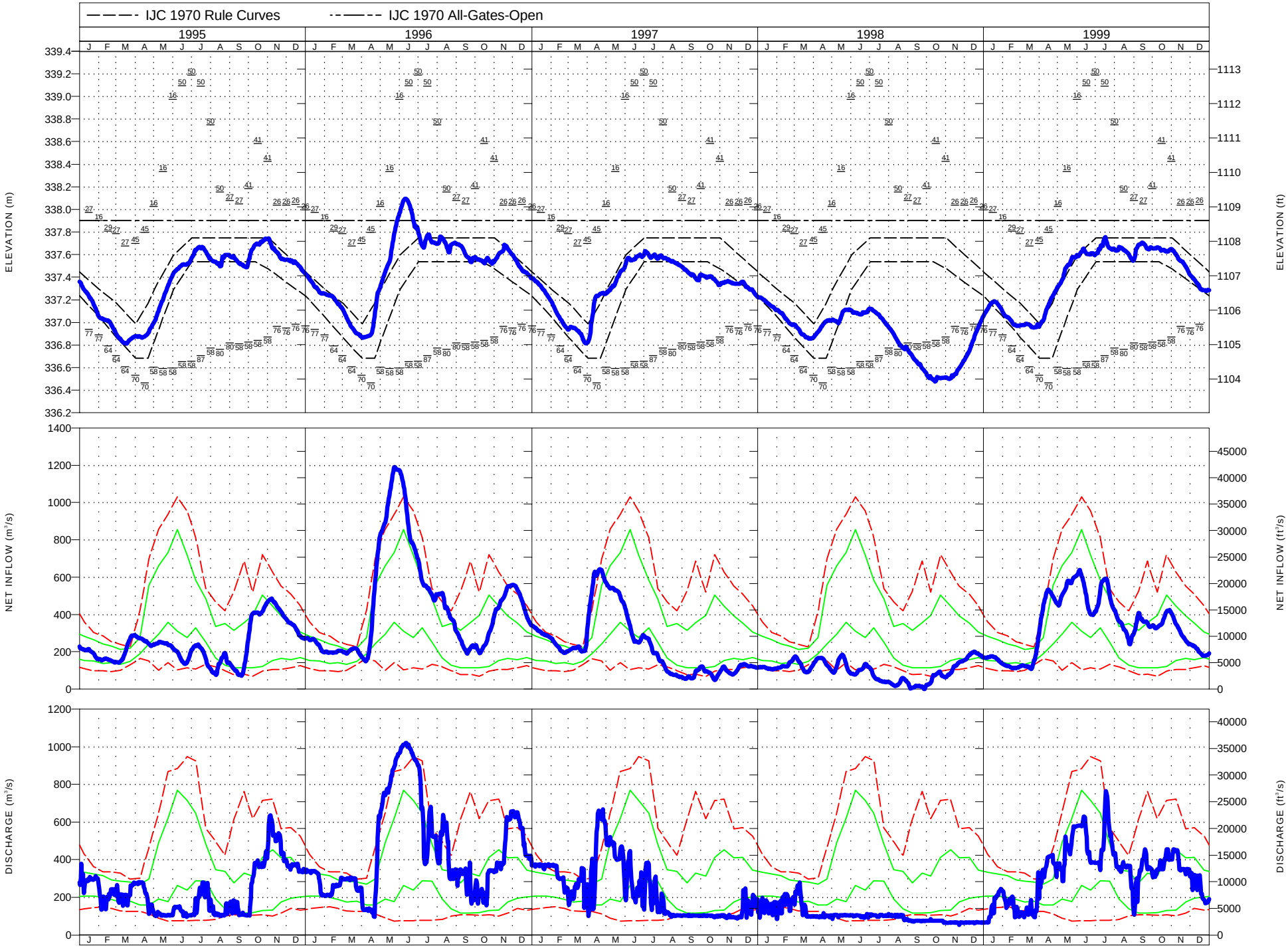
ISSUED: 2000.06.27




GRAPH 2

ISSUED: 2000.06.27

# RAINY LAKE 1995-1999




GRAPH 3

## LEGEND - PRECIPITATION

Actual data for year shown

Historical normal

All data are shown as half-monthly totals.

## LEGEND - LEVEL AND FLOW

### Actual Data

Actual data for year shown
- levels are daily values
- inflows are 14-day means plotted daily at the centre of each 14-day period
- outflows are daily values

### Statistical Data

50 — Maximum level recorded and its year of occurence:
Namakan Lake - within the period 1912-1992
Rainy Lake - within the period 1911-1992

Level/flow has been above this line 10% of time.

Normal level/flow range
- level/flow has been above this range 25% of time
- level/flow has been within this range 50 % of time
- level/flow has been below this range 25% of time

Level/flow has been below this line 10% of time

$\overline{77}$ — Minimum level recorded and its year of occurrence
Namakan Lake - within the period 1949-1992
Rainy Lake - within the period 1949-1992

All statistical levels are based on 3-day means at mid and end month.

All statistical flows are based on half-monthly means for the first and second half of each month.

Period of record for all percent data is 1963-1992.

Datums for water levels are:
- Namakan Lake - US Coast & Geodetic Survey (1912)
- Rainy Lake - US Coast & Geodetic Survey (1912)