International Niagara Board of Control
One Hundred First Semi-Annual Progress Report
to the
International Joint Commission

Covering the Period March 6 through September 16, 2003

EXECUTIVE SUMMARY

Average precipitation for the Lake Erie basin for the reporting period resulted in lake levels rising to slightly below average by the end of August 2003 (Section 2). Niagara River flows continue to be below average and were about 7 percent below those experienced during the same period in 2002 (Section 5).

The level of the Chippawa-Grass Island Pool was regulated in accordance with the International Niagara Board of Control's 1993 Directive (Section 3). The Directive was revised in May 2003 to incorporate a clarification for tolerance suspension during emergency situations.

The International Niagara Control Works were operated in conjunction with diversions to the Ontario Power Generation and the New York Power Authority to provide additional water to maximize hydroelectric power generation at Niagara during the mid-August electrical energy emergency (Section 4).

The Power Entities (Ontario Power Generation and the New York Power Authority) continue with their generation upgrade programs to increase hydroelectric power production at Niagara (Section 8). The New York Power Authority's re-licensing process is at the stage where the Federal Energy Regulatory Commission, the license granting body, held the initial public scoping meeting in August 2003. The Province of Ontario has directed Ontario Power Generation to proceed with the first phase of the Sir Adam Beck expansion project, a new tunnel to increase diversion capacity, and has engaged a consultant to study further expansion at that site.

Opening of the Lake Erie-Niagara River Ice Boom was delayed beyond April 1 due to the extensive amount of ice remaining in eastern Lake Erie (Section 9). Favourable weather conditions acted to disperse the ice over the next week resulting in rapid melting. As a result, ice boom opening and removal began on April 10 and was completed on April 11. Due to severe conditions prior to and during the February 4, 2003 storm and the resulting damage to the boom and its components, the maintenance required this summer was much more than normal. Thirteen span cables and numerous hardware components (clamps, shackles, etc.) needed replacement, and several floatation barrels were repaired. A Power Entities' study is underway to investigate the factors involved in the failure of twelve spans during an early February 2003 storm event.

TABLE OF CONTENTS

COVER: **View of the New York Power Authority's Intake Gauge house, headgate and Environment Canada's Water Survey vessel during a measurement program in the upper Niagara River. (U.S. Army Corps of Engineers photo)**

TABLES **PAGE**

FIGURES

ENCLOSURES

INTERNET SITES

International Niagara Board of Control	http://huron.lre.usace.army.mil/ijc/niagara.html
International Joint Commission	http://www.ijc.org/
Lake Erie-Niagara River Ice Boom	http://www.iceboom.nypa.gov

INTERNATIONAL NIAGARA BOARD OF CONTROL

Burlington, Ontario
Cincinnati, Ohio

September 16, 2003

International Joint Commission
Ottawa, Ontario
Washington, D.C.

Commissioners:

1. GENERAL

The International Niagara Board of Control (Board) submits its One Hundred First Semi-Annual Progress Report, covering the period March 6 through September 16, 2003.

2. LAKE LEVELS

All elevations in this report are referenced to International Great Lakes Datum 1985. The values are expressed in metric units, with approximate English units (in parentheses) for information purposes only. The monthly lake level data are based on a network of four gauges to better represent the average level of the lake.

During the months of March through August 2003, the level of Lake Erie remained below the long-term average, but heavy summer rains helped it rise closer to

average as the summer progressed. The level of the lake started the period 28 centimetres (11.0 inches) below average. It peaked in July with a mean of 174.19 metres (571.49 feet), which is 13 centimetres (5.1 inches) below the long-term average for the month. In August, the level was at 174.18 metres (571.46 feet), or 7 centimetres (2.8 inches) below average. Recorded water level data for the period March through August 2003 and departures from long-term averages are shown in Table 1 and depicted graphically on Figure 1.

The Lake Erie basin received 49.0 centimetres (19.3 inches) of precipitation during the period March through August 2003. This is about 1 per cent above average for the period. Below average precipitation in March, April and June was balanced out by above average precipitation in May and July. Precipitation data for the period March through August 2003 and departures from long-term averages are shown in Table 2 and depicted graphically on Figure 2.

Lakes Michigan and Huron remained well below their long-term average levels during this period. As a result, inflows to Lake Erie from the upstream lakes continued to be lower than average. Inflows from the upper lakes for the six-month period March through August 2003 were about 12% below the long-term average.

Water supplied to Lake Erie from its local drainage basin (net basin supply) reflected the precipitation during the period. Net basin supplies were below average in March and April, coming out of the winter. Normally, melting snow from the previous winter contributes to the supply to the lake in the early spring, but the 2003 winter was relatively warm and little snow contributed to the runoff in the spring. The above average supplies in May, June, July and August reflect the wet late spring and mid-summer. Net basin supplies for the period March through August 2003 are depicted in Figure 3.

The water level of Lake Erie naturally affects the outflow into the Niagara River, as does the amount of flow retardation in the river due to ice and weeds. Like the water level of the lake, the outflow was below average during the entire period. The flows in the Niagara River are graphically depicted in Figure 4 and summarized in Section 6.

The September 2003 water level forecast indicates that the level of Lake Erie is expected to remain below its long-term average during the next six months.

TABLE 1 - MONTHLY AVERAGE LAKE ERIE WATER LEVELS

(Based on a network of 4 water level gauges)

International Great Lakes Datum (1985)

	Metres			Feet		
Month	Recorded* 2003	Average 1918-2002**	Departure	Recorded* 2003	Average 1918-2002**	Departure
March	173.79	174.07	-0.28	570.18	571.10	-0.92
April	173.97	174.22	-0.25	570.77	571.59	-0.82
May	174.09	174.30	-0.21	571.16	571.85	-0.69
June	174.18	174.33	-0.15	571.46	571.95	-0.49
July	174.19	174.32	-0.13	571.49	571.92	-0.43
August	174.18	174.25	-0.07	571.46	571.69	-0.23

*Provisional **Period of record is 1918-2002

TABLE 2 - MONTHLY AVERAGE PRECIPITATION ON THE LAKE ERIE BASIN

	Centimetres			Inches			
Month	Recorded* 2003	Average 1900-1996+	Departure	Recorded* 2003	Average 1900-1996+	Departure	Departure in percent
March	5.61	6.98	-1.37	2.21	2.75	-0.54	-20
April	5.54	8.00	-2.46	2.18	3.15	-0.97	-31
May	13.61	8.33	5.28	5.36	3.28	2.08	63
June	7.21	8.74	-1.53	2.84	3.44	-0.60	-18
July	11.10	8.46	2.64	4.37	3.33	1.04	31
August	5.94	8.05	-2.11	2.34	3.17	-0.83	-26

*Provisional +Most recent period of record is 1900-1996

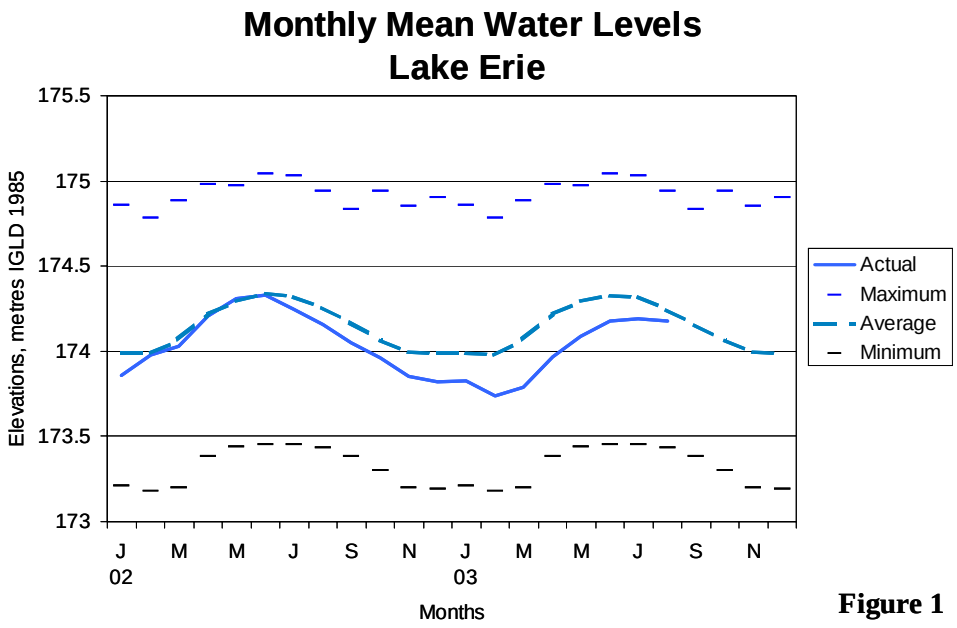


Figure 1

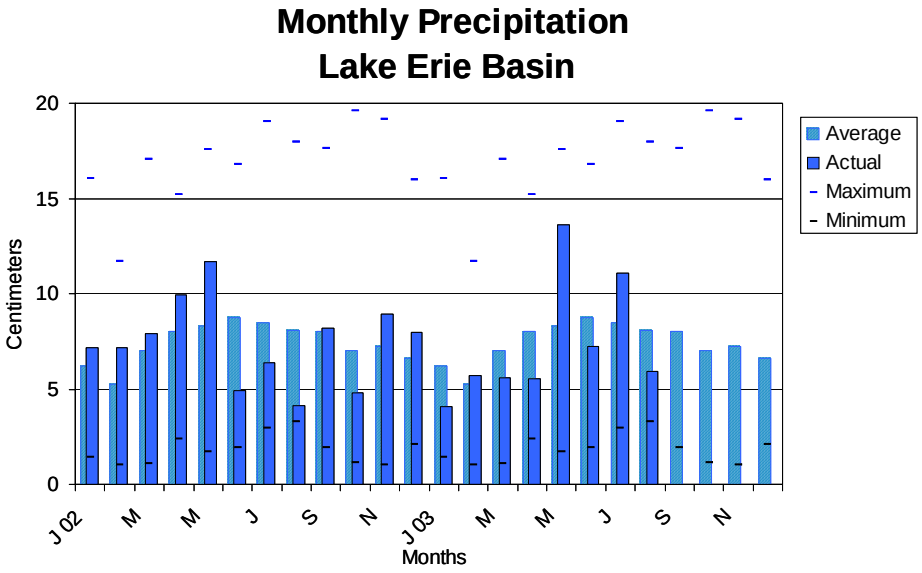


Figure 2

Monthly Net Basin Supplies
Lake Erie Basin

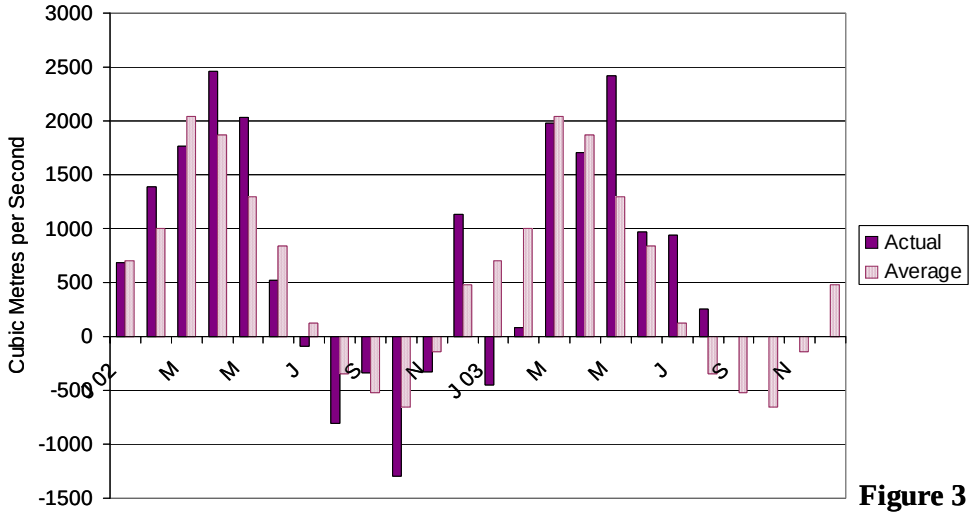


Figure 3

Niagara River Monthly Mean Flows
at Buffalo, New York

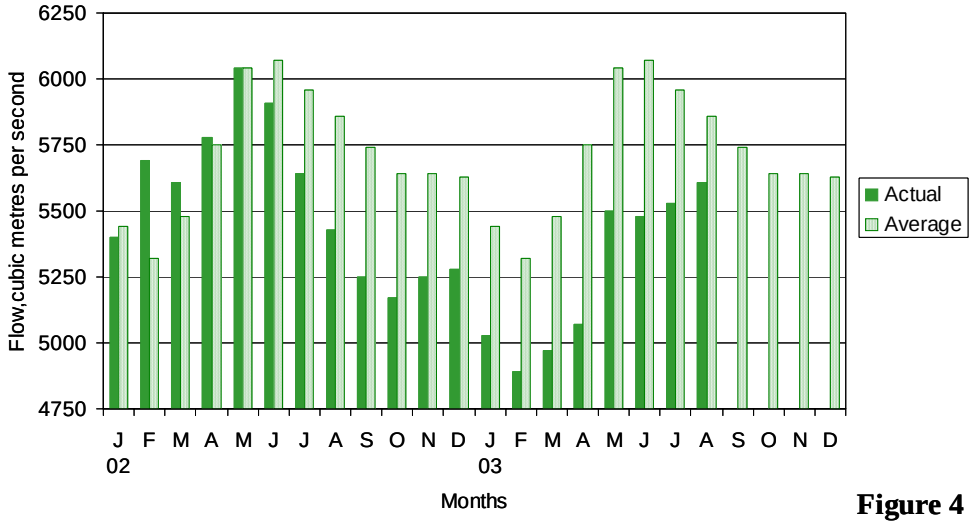


Figure 4

3. OPERATION AND MAINTENANCE OF THE CHIPPAWA-GRASS ISLAND POOL CONTROL STRUCTURE

The water level in the Chippawa-Grass Island Pool is regulated in accordance with the Board's 1993 Directive. The Directive requires that the Power Entities operate the Chippawa-Grass Island Pool (Pool) control structure to ensure the maintenance of an operational long-term average pool level of 171.16 metres (561.55 feet) to ameliorate adverse high or low water levels in the pool. The Directive also establishes certain tolerances for the pool's level as measured at the Material Dock gauge. The Board revised the Directive in May 2003 to clarify that should regulation of the Pool be altered in response to an emergency action that occurs during the second half of a day, that day and the day following be excluded from the monthly calculation of mean Pool level. The revision also updated items such as the change of name from Ontario Hydro to Ontario Power Generation. All elevations, ranges, etc. specified in the 1993 Directive remain unchanged. The Power Entities complied with the Board's Directive throughout the reporting period.

The accumulated deviation of the pool's level from March 1, 1973 through August 31, 2003 was 0.50 metre-month (1.64 foot-months) above the long-term average elevation. The maximum permissible accumulated deviation is 0.91 metre-month (3.00 foot-months).

Tolerances for regulation of the Chippawa-Grass Island Pool levels were suspended for March 19 and April 4, 5, 7, 8, 16 and 17 due to abnormally low flows. Tolerances were also suspended on August 14 through 16 and August 18 through 21 due to operations to maximize hydroelectric power generation at Niagara in response to the extensive regional electrical outage.

On March 19, gate settings at the control structure, in conjunction with plant diversions, were employed to assist New York State Parks Police, who successfully rescued a man from the brink of the Horseshoe Falls.

Replacement of breakers and switchgear that feed electrical power to the control structure's 18 gates is scheduled for the first week of November, 2003. A temporary main panel will be installed to enable nine of the gates to be taken out of service at a time. The period when these gates will be unavailable will be less than 12 hours. The procedure will then be repeated on the remaining nine gates. Upon completion of the installation, a one time total station outage of about twenty minutes will be required.

A diesel generator will be on site, and tested prior to the outage, as an emergency backup to operate at least 9 gates. The Pool level will be adjusted to no more than 171.16 metres (561.55 feet) prior to the start of any part of an outage. This will provide room for unplanned storage in the Pool. The outages will not proceed if Lake Erie levels are forecasted to reach or exceed 174. 50 metres (572.51 feet) within 36 hours of the planned start of the outage. These steps will ensure that regulation of Pool levels remains within the tolerances specified by the Board's Directive.

During the reporting period, upgrade of the electrical service to pier 16 of the control structure was completed. All 19 piers have now had electrical service upgraded. Gates 4 and 5 had main oil pumps replaced and gate 16 is undergoing seal replacement, cylinder repair, rollway plate rehabilitation work and concrete repair.

Recorded daily Material Dock water levels covering the period March 1 through August 31, 2003 are shown in Enclosure 1. The locations of the water level gauges on the Niagara River are shown in Enclosure 2.

4. FLOWS OVER NIAGARA FALLS

As specified in the Niagara Treaty of 1950 between the United States of America and Canada, during the tourist season daylight hours, the required minimum Niagara Falls flow is 2832 cubic metres per second (m^3/s) (100,000 cubic feet per second (cfs)). At night and during the winter months, the required minimum Falls flow is 1416 m^3/s (50,000 cfs). The operation of the Chippawa-Grass Island Pool control structure, in conjunction with power diversion operations, ensures sufficient flow over the Falls to meet the requirements of the Treaty.

In response to the electrical blackout in mid-August, Canada and the United States agreed that, at various times during the week following the outage, Falls flows would be reduced below Treaty minimum daytime requirements. This provided for increased diversions that enabled Ontario Power Generation and the New York Power Authority to maximize generation at their Niagara facilities and contribute much needed power to the electricity grid as nuclear and thermal generation was restored. Transition from the night time flow to the day time flow was cancelled for August 15 and 16. For the day time flow hours, Falls flow averaged 1587 m^3/s (56,040 cfs) and 1697 m^3/s (59,930 cfs) on August 15 and 16 respectively. During the day time hours for the period August 18 through 21, the minimum Falls flow requirement was 2549 m^3/s (90,000 cfs). For the day time flow hours, Falls flow averaged 2595 m^3/s (91,650 cfs), 2657 m^3/s (93,830 cfs), 2578 m^3/s (91,030 cfs) and 2597 m^3/s (91,720 cfs) on August 18 through 21 respectively.

Falls flows met or exceeded minimum Treaty requirements at all other times during the reporting period. The recorded daily flows over Niagara Falls, covering the period March 1 through August 31, 2003 are shown in Enclosure 3.

5. DIVERSIONS AND FLOW AT QUEENSTON

Diversion of water from the Niagara River for power purposes is governed by the terms and conditions of the Niagara Treaty of 1950. The Treaty prohibits the diversion of Niagara River water that would reduce the flow over Niagara Falls to below the amounts specified for scenic purposes.

The high head hydro power plants, OPG's Sir Adam Beck 1 and 2 in Canada and NYPA's Niagara Power Project in the United States, withdraw water from the Chippawa-Grass Island Pool above Niagara Falls and discharge it into the lower Niagara River at Queenston, Ontario and Lewiston, New York, respectively.

During the period March 1 through August 31, 2003, diversion flows for the Sir Adam Beck 1 and 2 plants averaged a total of 1537 m^3/s (54,280 cfs) and those by the Niagara Power Project averaged 1657 m^3/s (58,520 cfs).

The low head hydro power plant, Fortis Ontario's Rankine Plant, diverts water from the Cascades, just upstream of the Horseshoe Falls, and discharges it into the Maid-of-the-Mist Pool. Since the operating efficiency of this older plant is much lower than those of the high head plants, water that is available for power generation is normally dispatched on a priority basis to the high head plants, with the excess being directed to the low head installation.

During the period March 1 through August 31, 2003, diversion flow for the CNP Rankine plant averaged 1 m^3/s (40 cfs).

The average flow from Lake Erie to the Welland Canal for the period March 1 through July 31, 2003, was 224 m^3/s (7,910 cfs) compared to 248 m^3/s (8,760 cfs) for the same period one year ago. Diversion from the canal to OPG's DeCew Generating Stations averaged 189 m^3/s (6,670 cfs) for the period March 1 through August 31, 2003.

Records of Niagara River diversions for power generation covering the period March 1 through August 31, 2003 are shown in Enclosure 4.

The monthly average Niagara River flows at Queenston, Ontario for the period March 1 through August 31, 2003 were:

March	5068 m^3/s	(178,970 cfs)
April	5188 m^3/s	(183,210 cfs)
May	5522 m^3/s	(195,010 cfs)
June	5487 m^3/s	(193,770 cfs)
July	5540 m^3/s	(195,640 cfs)
August	5546 m^3/s	(195,850 cfs)

During this period, the flow at Queenston averaged 5392 m^3/s (190,420 cfs). Flows averaged 5776 m^3/s (203,980 cfs) during the previous year for the period March 1 through August 31, 2002 with the monthly averages ranging between 5417 m^3/s (191,300 cfs) and 6086 m^3/s (214,920 cfs).

6. GAUGING STATIONS

The Niagara River gauges used to monitor the Chippawa-Grass Island Pool levels and flows over Niagara Falls are Slater's Point, Material Dock, American Falls and

Ashland Avenue gauges (see Enclosure 2). All gauges required for the operation of the Chippawa-Grass Island Pool control structure were in operation during the reporting period.

A communication failure occurred at the Ashland Avenue gauge site for the last hour of March 10, the first eight hours of March 11 and from the 10th through the 21st hours of March 31 2003. The Ontario Power Generating Station tailrace gauge was used to estimate the Ashland levels during these periods. Falls flows were above minimum Treaty requirements for these hours.

Both the U. S. National Oceanic and Atmospheric Administration (NOAA) and the Power Entities operate water level gauges at the Ashland Avenue location. Subject to continuing comparison checks of the water level data from both instruments by the International Niagara Committee (INC), the Power Entities' gauge is used for officially recording water levels used in determining the flows over Niagara Falls. Comparison of water level readings from both gauges showed that they were within acceptable INC tolerances throughout the reporting period.

Investigation of the stability of the Ashland Avenue gauge site and river bank has been completed by NYPA's consultant. A report to NYPA is forthcoming. The results indicate no serious concern for the stability of the gauge house or the river bank surrounding it. Work on the riverbank, less than the magnitude first thought prior to the investigation, will be done next year.

New buildings to house the Tonawanda and Huntley gauges will be constructed this fall.

7. FLOW MEASUREMENTS IN THE NIAGARA RIVER AND WELLAND SHIP CANAL

Discharge measurements are regularly scheduled in the Niagara River and Welland Canal as part of a program to verify the gauge ratings used to determine flows in these channels for water level management. Routine measurements were made at the International Railway Bridge Section in April and May 2003, and the present schedule calls for measurements at the Cableway (Ashland rating) Section and the Welland Supply Weir in 2004, and at the American Falls Section in 2005. All measurements are obtained through joint efforts of the United States Army Corps of Engineers and Environment Canada.

The measurements at the International Railway Bridge Section were made using an Acoustic Doppler Current Profiler. A series of 42 discharge measurements were made between April 28 and May 1, 2003. The measurements are still being evaluated relative to the stage-discharge rating equation.

In April and July 2003, discharge measurements were made in the upper Niagara River as part of a continuing effort to collect data for a hydraulic model being designed by the Coordinating Committee on Great Lakes Basic Hydraulic and Hydrologic Data.

8. POWER PLANTS

a) New York Power Authority

Nine of the thirteen units at the Robert Moses Niagara Power Plant have been upgraded. Upgrade of Unit 7 began in January with completion scheduled for October

2003. The next unit to be upgraded will be Unit 5. It is anticipated that this will begin in January 2004. Upgrade of Units 9 and 8, in that order, will see completion of the program by the fall of 2006.

On August 2, 2001, NYPA filed a formal notice of intent (NOI) with the U.S. Federal Energy Regulatory Commission (FERC) that it will seek a new license to continue operating the Robert Moses Niagara Power Project. The current license expires August 31, 2007. A Niagara re-licensing website has been launched at: http://niagara.nypa.gov

FERC approved NYPA's request to use Alternative Licensing Procedures (ALP) for the re-licensing of the Niagara Project. A facilitator was selected in October 2002 to help with the re-licensing process. A series of preliminary meetings were held between December 2002 and June 2003 in Niagara Falls, New York to identify issues and interests of concern to stakeholders and discuss how studies of the issues will be conducted. A "Draft Scoping Document 1 for the Re-licensing of the Niagara Power Project (FERC No. 2216)" dated July 2003 has been prepared. Materials on the Project's re-licensing are posted on the website and available to the public in local libraries. FERC held the initial public scoping meeting in Niagara Falls, New York on August 13, 2003.

The tentative schedule for preparation of the Preliminary Draft Environmental Assessment (PDEA) calls for releasing the document for review by all interested parties in the summer of 2005.

b) Ontario Power Generation

The Province of Ontario, sole shareholder of Ontario Power Generation, has directed the company to proceed with the Beck tunnel project, the first phase of its expansion at the Sir Adam Beck complex. In addition, the province has engaged a consultant to proceed with a study for the expansion of the Sir Adam Beck Generating Station.

To date, thirteen of the sixteen units at the Sir Adam Beck II Generating Station have been rehabilitated. The most recent upgrade was on Unit 21, with work beginning in October 2002 and completed in July 2003. Currently, work is proceeding on Unit 22. This began in March with completion expected in December 2003. The next upgrade will be on Unit 13, which is scheduled to start in November 2003 and be completed in June 2004. The upgrade of Unit 14, scheduled from April 2004 to November 2004, will complete the rehabilitation project.

The upgrades and expansions by the Power Entities will not affect the regulation of the Chippawa-Grass Island Pool water levels as governed by the International Niagara Board of Control's Directive. In addition, they will not require any modifications to other rules or regulations (such as the 1950 Niagara Treaty) relating to the diversion of water for operation of the projects.

9. ICE CONDITIONS AND ICE BOOM OPERATIONS

The Buffalo office of the National Weather Service (NWS) characterized March 2003 as a "normal" month for the Buffalo area. Although the persistent cold continued

through the first two weeks, it was replaced by spring-like warm weather for the last two weeks. The contrast is illustrated by the fact that Buffalo experienced its coldest March daytime temperature in 118 years with a maximum of only -19^{o}C (-3^{o}F) recorded on the 3rd while for the 28th, a June-like 23^{o}C (73^{o}F) was reported. The monthly temperature of 0.8^{o}C (33.5^{o}F) was only slightly below the March average of 1.3^{o}C (34.3^{o}F). The lake remained ice covered, with shore fast ice in the eastern portion extending westward along the south shore. By mid-month, some open water areas along the north shore began to appear.

Representatives of the Board conducted a fixed-wing flight on March 24 to observe ice conditions. Ice cover in the eastern basin was calculated to be 3200 square kilometres (1240 square miles) or 62 per cent, with an extensive ice bridge remaining in the Maid-of-the-Mist Pool. The Board notified the Commission that the ice boom opening would be delayed beyond April 1 due to the amount of ice remaining.

The NWS reported April as the driest in 68 years in the Buffalo area. The dry, sunny days and a preponderance of northeast rather than southwest direction winds aided in the reduction of Lake Erie ice cover by dispersing the ice and moving it westward where it melted rapidly. April averaged 1.3^{o}C (2.3^{o}F) below the monthly average of 7.4^{o}C (45.3^{o}F).

The ice bridge in the Maid-of-the-Mist Pool broke apart and began moving out on March 30. By April 2, the ice cover in the eastern basin had reduced somewhat to 2600 square kilometres (1,000 square miles) or 51 per cent. With the dispersion of the ice and rapid melting, the cover was 700 square kilometres (270 square miles) or 14 per cent by April 8 and on April 10 was calculated as 490 square kilometres (190 square miles) or

about 10 per cent. Although some ice remained in the bays along the north shore, most of it was moving westward along the southern portion of the basin. No ice remained in the eastern part of the eastern basin beyond April 8.

Considering that there was no longer an accumulation of ice below the Falls and the eastern part of the lake was open water, ice boom opening and removal began on April10. It was completed the next day with all spans placed at the summer storage area by April15.

Floatation barrels were removed, tag lines installed and the upper ends of all anchor cables inspected on April 16 – 17, completing the 2002-2003 ice boom operation.

Due to severe conditions prior to and during the February 4, 2003 storm and the resulting damage to the boom and its components, the maintenance required this summer was much more than normal. Thirteen span cables and numerous hardware components (clamps, shackles, etc.) needed replacement, and several floatation barrels were repaired. A Power Entities' study is underway to investigate the factors involved in the failure of twelve spans during an early February 2003 storm event.

10. **PEACE BRIDGE**

The Buffalo and Fort Erie Public Bridge Authority (PBA) have undertaken a Bi-National Integrated Environmental Process. This is a planning process, with emphasis on public involvement, to consider capacity expansion of the Peace Bridge, U.S. Plaza and improvement of the connecting roadway system. It includes consultation with federal,

state, provincial and local agencies regarding environmental screening/assessments as well as public meetings and workshops on a number of bridge-related issues.

The preliminary schedule proposes up to two years for the planning and environmental review, a further two years for design, permits and related work, and then up to four years of construction.

As a result of public input, around fifty new ideas (in addition to the original proposals of the late 1990s) were considered. A Modified Draft Scoping Document, which responds to comments and ideas submitted by the public and Involved Agencies, was issued in August 2002. Completion of this document concluded Scoping Step 1 of the Bi-National Integrated Environmental Process. Step 2, the Alternative Screening Process involved a series of four Public Collaborative Workshops which were held over the period mid-September to early December, 2002. A fifth workshop to review the Draft Final Scoping Document was held on August 11, 2003.

The objective was to screen, with public involvement, the alternatives from 59 down to a few with the greatest potential to achieve the project's goals and objectives. This was completed in February 2003. Selection of a preferred alternative is targeted for late 2003, with final approval by mid-2004.

11. **MEETING WITH THE PUBLIC**

In accordance with the Commission's requirements, the Board held an annual meeting with the public the evening of September 15, 2003 in Niagara Falls, Ontario. Information on current and projected Great Lakes levels, the current Public Bridge

Authority undertaking and the operation of the Lake Erie-Niagara River Ice Boom were provided. There were 4 members of the public in attendance.

12. MEMBERSHIP OF THE BOARD

The membership of the Board remains unchanged. Mr. Scott Thieme of the United States Army Corps of Engineers (USACE), Detroit District replaced Mr. David Schweiger on the Board's Working Committee. Colonel Mark Roncoli, who acted as alternate for the U.S. Chair of the Board for the past three years, was succeeded by Colonel Gary Johnston as USACE Chicago District Commander on July 9, 2003.

13. ATTENDANCE AT BOARD MEETINGS

The Board met once during this reporting period. The meeting was held on September 16, 2003 in Niagara Falls, Ontario. Colonel Johnston acted as alternate for BG (P) Hawkins, the U.S. Board Chair, who was unable to attend. Canadian Chair Mr. McLeod and U.S. Member Mr. Tjoumas were in attendance. Canadian Member Mr. DeLaunay was unable to attend.

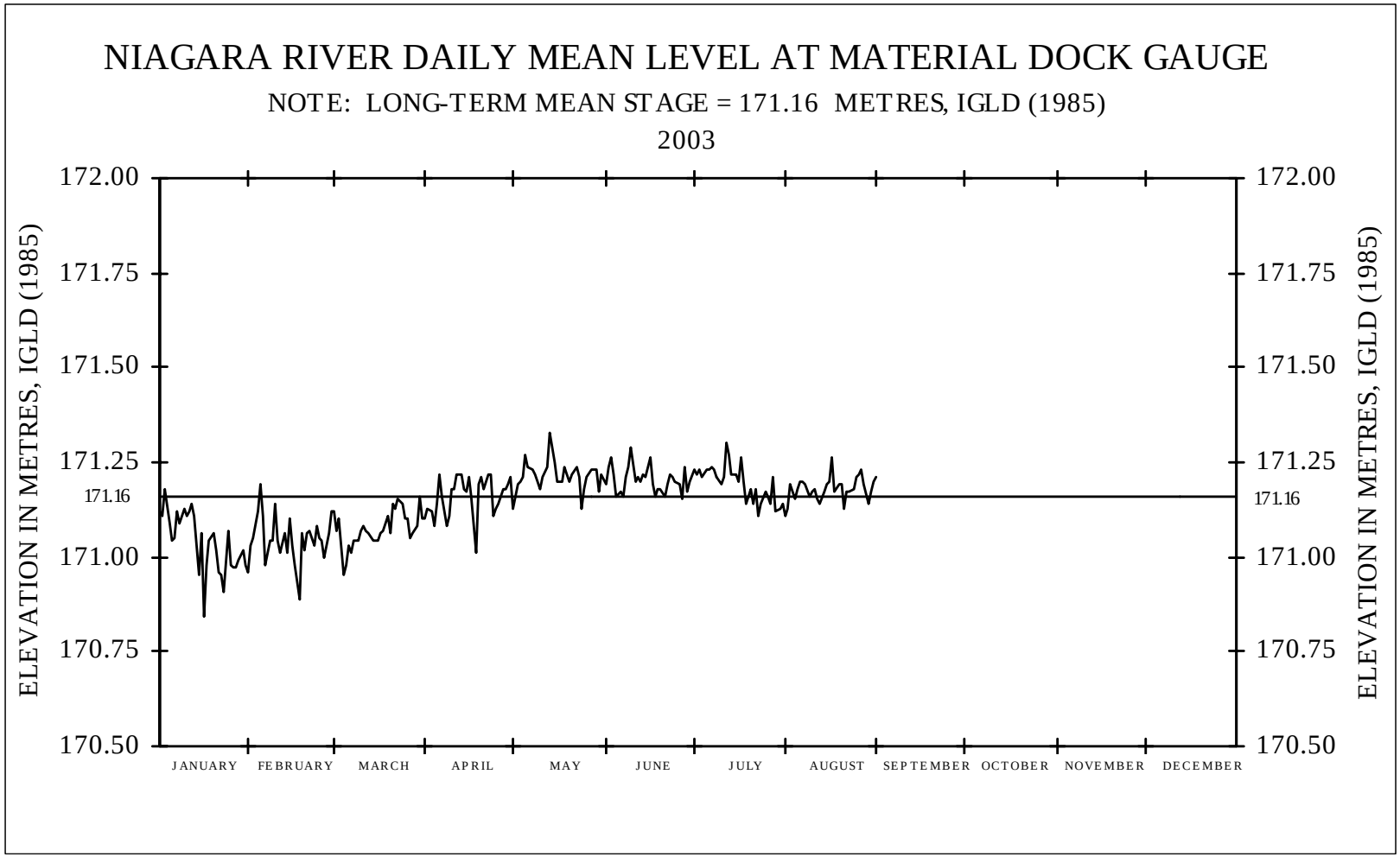
Respectfully Submitted,

CARR MCLEOD
Chair, Canadian Section

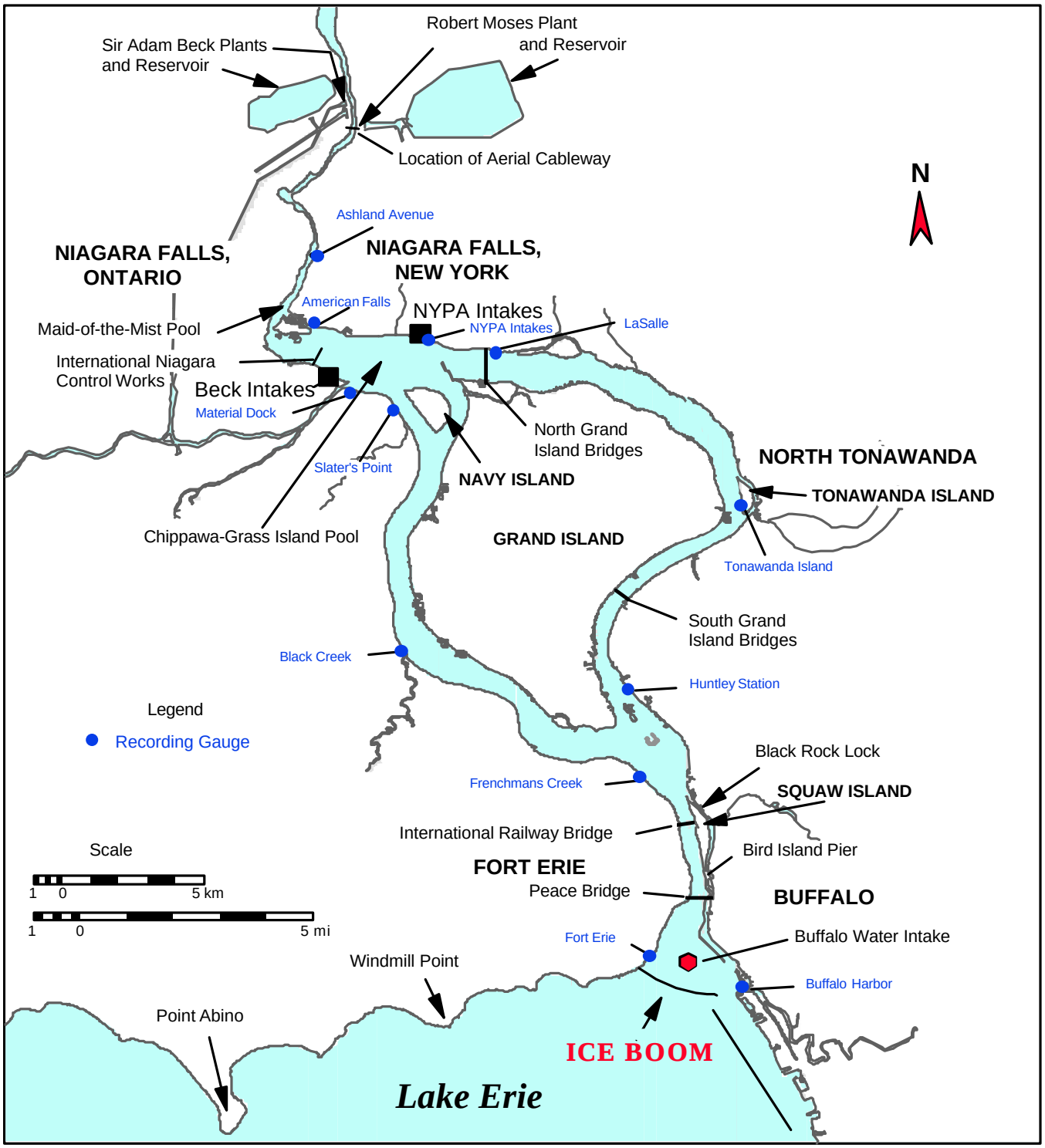
BRIGADIER GENERAL (P) STEVEN R. HAWKINS
Chair, United States Section

DAVID de LAUNAY
Member, Canadian Section

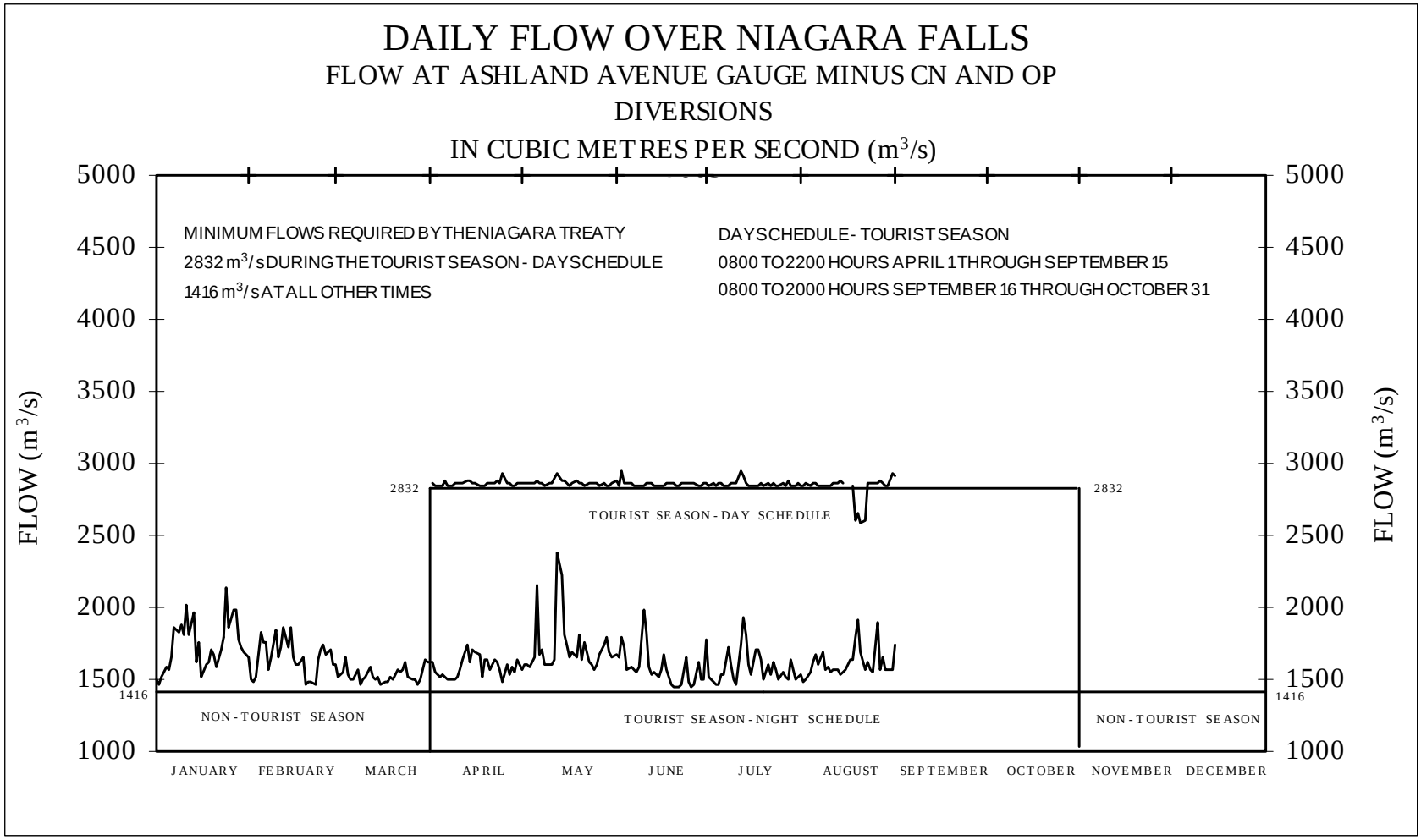
CONSTANTINE G. TJOUMAS
Member, United States Section


NIAGARA RIVER DAILY MEAN LEVEL AT MATERIAL DOCK GAUGE
NOTE: LONG-TERM MEAN STAGE = 171.16 METRES, IGLD (1985)
2003
ELEVATION IN METRES, IGLD (1985)
172.00
171.75
171.50
171.25
171.16
171.00
170.75
170.50
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

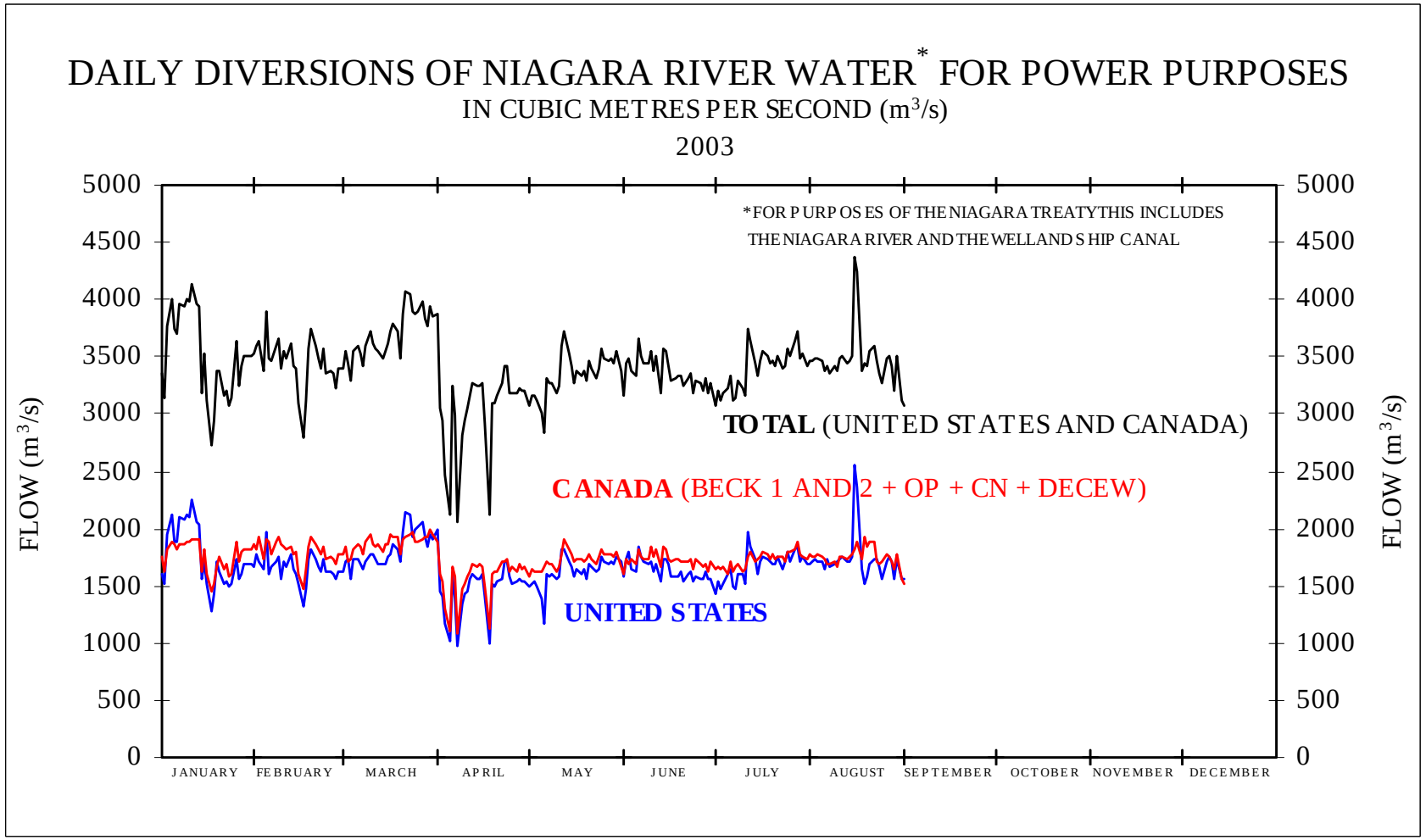
ENCLOSURE 1


Sir Adam Beck Plants
and Reservoir
Robert Moses Plant
and Reservoir
Location of Aerial Cableway
N
Ashland Avenue
NIAGARA FALLS,
ONTARIO
NIAGARA FALLS,
NEW YORK
American Falls
NYPA Intakes
NYPA Intakes
LaSalle
Maid-of-the-Mist Pool
International Niagara
Control Works
Beck Intakes
Material Dock
North Grand
Island Bridges
NORTH TONAWANDA
TONAWANDA ISLAND
Slater's Point
NAVY ISLAND
Chippawa-Grass Island Pool
GRAND ISLAND
Tonawanda Island
South Grand
Island Bridges
Black Creek
Huntley Station
Legend
Recording Gauge
Black Rock Lock
Frenchmans Creek
SQUAW ISLAND
International Railway Bridge
Bird Island Pier
Scale
FORT ERIE
Peace Bridge
BUFFALO
1 0 5 km
1 0 5 mi
Fort Erie
Buffalo Water Intake
Windmill Point
Buffalo Harbor
Point Abino
ICE BOOM
Lake Erie

ENCLOSURE 2


DAILY FLOW OVER NIAGARA FALLS
FLOW AT ASHLAND AVENUE GAUGE MINUS CN AND OP DIVERSIONS
IN CUBIC METRES PER SECOND (m^3/s)
MINIMUM FLOWS REQUIRED BY THE NIAGARA TREATY
2832 m^3/s DURING THE TOURIST SEASON - DAY SCHEDULE
1416 m^3/s AT ALL OTHER TIMES
DAY SCHEDULE - TOURIST SEASON
0800 TO 2200 HOURS APRIL 1 THROUGH SEPTEMBER 15
0800 TO 2000 HOURS SEPTEMBER 16 THROUGH OCTOBER 31
FLOW (m^3/s)
5000
4500
4000
3500
3000
2500
2000
1500
1000
2832
2832
1416
1416
TOURIST SEASON - DAY SCHEDULE
NON - TOURIST SEASON
TOURIST SEASON - NIGHT SCHEDULE
NON - TOURIST SEASON
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

ENCLOSURE 3


DAILY DIVERSIONS OF NIAGARA RIVER WATER* FOR POWER PURPOSES
IN CUBIC METRES PER SECOND (m3/s)
2003
*FOR PURPOSES OF THE NIAGARA TREATY THIS INCLUDES THE NIAGARA RIVER AND THE WELLAND SHIP CANAL
TOTAL (UNITED STATES AND CANADA)
CANADA (BECK 1 AND 2 + OP + CN + DECEW)
UNITED STATES
FLOW (m3/s)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

ENCLOSURE 4