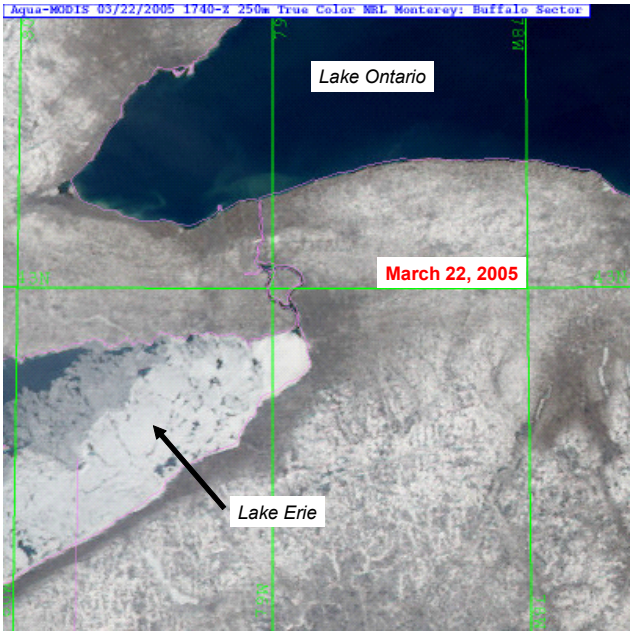
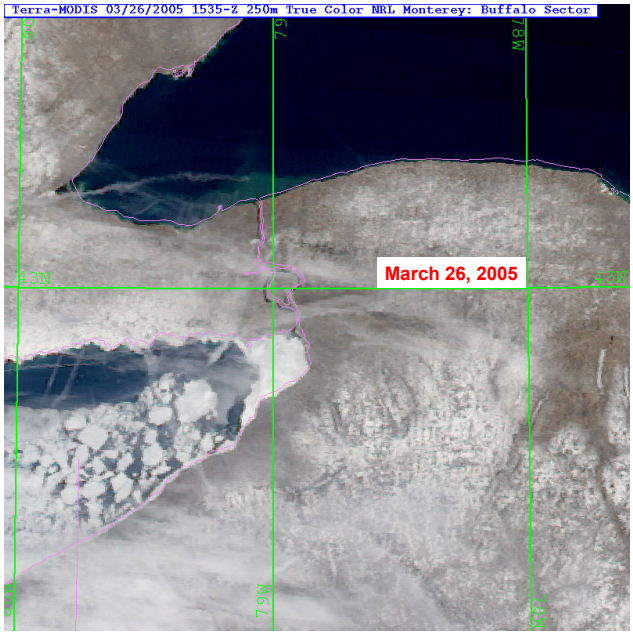
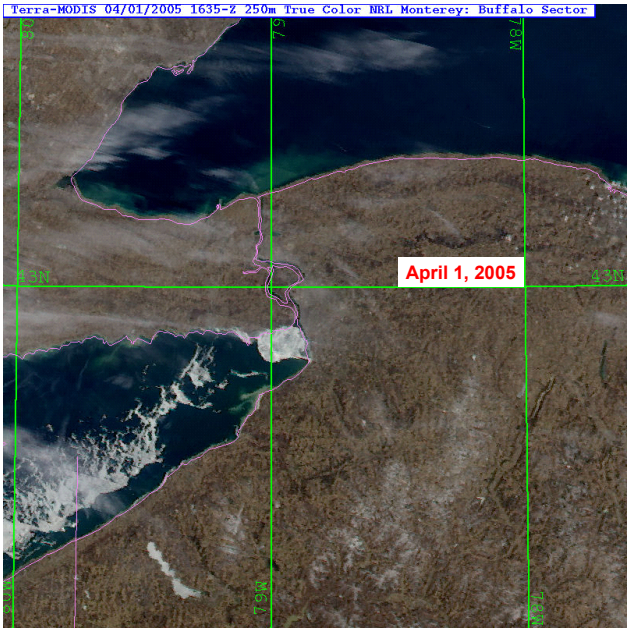
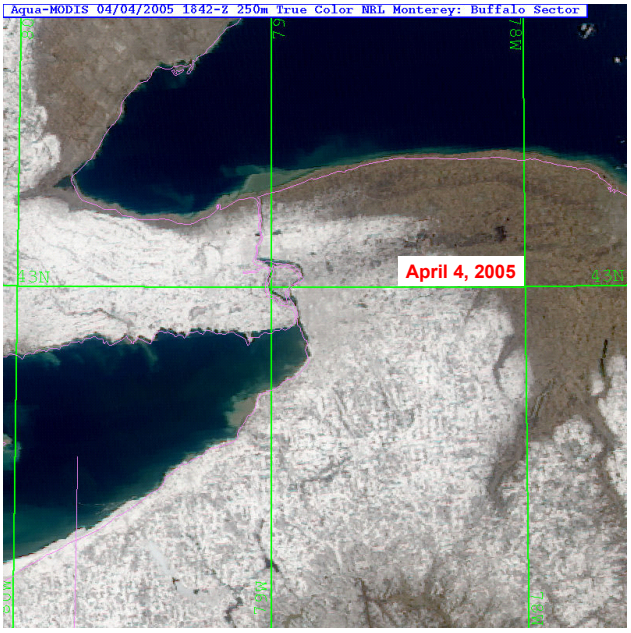
International Niagara Board of Control
One Hundred Fifth Semi-Annual Progress Report
to the
International Joint Commission









Covering the Period March 9 through September 21, 2005

EXECUTIVE SUMMARY

The level of Lake Erie began the reporting period above the long-term average. However, average outflows combined with below average water supplies caused the lake to start its seasonal decline earlier than average. The level fell below the long-term average in July (Section 2). Precipitation on the Lake Erie basin was about 20% below average for the period.

The level of the Chippawa-Grass Island Pool was regulated in accordance with the International Niagara Board of Control's 1993 Directive (Section 3). A dedicated backup generator to supply critical metering, control and computer functions to the International Niagara Control Works was installed and tested.

On September 19, the International Niagara Control Works were operated in conjunction with altered diversions to the generating facilities to maintain lower water levels in the Whirlpool that assisted in a Niagara Parks Police operation. These actions resulted in Falls flows being below the required Treaty minimum for a few hours during the morning.

A series of discharge measurements, part of the on-going program to verify the gauge ratings used to determine flows, are scheduled for 2006 at the International Railway Bridge, Cableway and American Falls sections (Section 7).

The New York Power Authority (NYPA) is nearing completion of its generator upgrade program at the Robert Moses Niagara Power Project. NYPA's application for re-licensing of the project was submitted to the U.S. Federal Energy Regulatory Commission on August 10, 2005. Ontario Power Generation (OPG) completed upgrade of its Beck II station and announced the start of construction of a third tunnel at Niagara to supply additional water to the Sir Adam Beck Complex. Upgrade of the NYPA and OPG plants along with the additional diversion capability to the Beck Complex will result in increased hydroelectric power production at Niagara (Section 8).

The Lake Erie-Niagara River Ice Boom was removed on April 5 and 6th. There were no significant lake ice runs this past winter (Section 9).

The Board held a meeting with the public on September 20, 2005 in Niagara-on-the-Lake, Ontario (Section 10).

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COVER: Satellite images showing the dispersion and dissipation of the ice cover on eastern Lake Erie from March 22 to April 4 (see section 9).

Satellite imagery provided courtesy of the U. S. Naval Research Laboratory/NPOESS NexSat project.

TABLES **PAGE**

FIGURES

ENCLOSURES

INTERNET SITES

International Joint Commission

www.ijc.org

International Niagara Board of Control

www.ijc.org/conseil_board/niagara/en/niagara_home_accueil.htm
www.ijc.org/conseil_board/niagara/fr/niagara_home_accueil.htm

Lake Erie-Niagara River Ice Boom

www.iceboom.nypa.gov

INTERNATIONAL NIAGARA BOARD OF CONTROL

Burlington, Ontario
Chicago, Illinois

September 21, 2005

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

Commissioners:

1. GENERAL

The International Niagara Board of Control (Board) submits its One Hundred Fifth Semi-Annual Progress Report, covering the period March 9 through September 21, 2005.

2. LAKE LEVELS

All elevations in this report are referenced to International Great Lakes Datum 1985 (IGLD 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.

The level of Lake Erie began the reporting period above the long-term average, but above average outflows combined with below average water supplies caused the lake to start its seasonal decline earlier than average. The level fell below the long-term

average in July. The level of the lake started the period 24 centimetres (9.5 inches) above average. Monthly levels peaked in May at 174.41 metres (572.21 feet), which is 11 centimetres (4.3 inches) above the long-term average for the month. In August the level was at 174.16 metres (571.39 feet), or 9 centimetres (3.5 inches) below average. Recorded monthly water level data for the period March through August 2005 and departures from long-term averages are shown in Table 1 and depicted graphically on Figure 1.

The Lake Erie basin received approximately 39 centimetres (15.4 inches) of precipitation during the period March through August 2005. This is about 20% below average for the period. In March, May and June, precipitation was only about half of the monthly average. Precipitation data for the period March through August 2005 and departures from long-term averages are shown in Table 2 and are depicted graphically on Figure 2.

Lakes Michigan and Huron remained below their long-term average water levels during the reporting period, and drier than normal conditions persisted on these basins. As a result of the below average water levels, inflows to Lake Erie from the upstream lakes were about 6% below the long-term average for the six-month period March through August 2005.

Water supplied to Lake Erie from its local drainage basin (net basin supply) was generally below average for the reporting period. Net basin supplies for the period March through August, 2005 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 aquatic vegetation. The Niagara River flow was above average during the first three months of the period, due to the higher than average water levels on Lake Erie. As the water levels fell below

average, so did the Niagara River flow. The flows in the Niagara River are graphically depicted in Figure 4 and summarized in Section 6.

The September 2005 water level forecast indicates that the level of Lake Erie is expected to be below the 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* 2005	Average 1918-2004**	Departure	Recorded* 2005	Average 1918-2004**	Departure
March	174.30	174.06	0.24	571.85	571.06	0.79
April	174.39	174.21	0.18	572.15	571.56	0.59
May	174.41	174.30	0.11	572.21	571.85	0.36
June	174.33	174.33	0.00	571.95	571.95	0.00
July	174.23	174.32	-0.09	571.62	571.92	-0.30
August	174.16	174.25	-0.09	571.39	571.69	-0.30

*Provisional **Period of record is 1918-2004

TABLE 2 - MONTHLY AVERAGE PRECIPITATION ON THE LAKE ERIE BASIN

	Centimetres			Inches			
Month	Recorded* 2005	Average 1900-99+	Departure	Recorded* 2005	Average 1900-99+	Departure	Departure in percent
March	3.00	7.01	-4.01	1.18	2.76	-1.58	-57
April	8.33	8.03	0.30	3.28	3.16	0.12	4
May	4.27	8.33	-4.06	1.68	3.28	-1.60	-49
June	4.55	8.76	-4.21	1.79	3.45	-1.66	-48
July	10.24	8.43	1.81	4.03	3.32	0.71	21
August	8.74	8.10	0.64	3.44	3.19	0.25	8

*Provisional +Most recent period of record is 1900-99

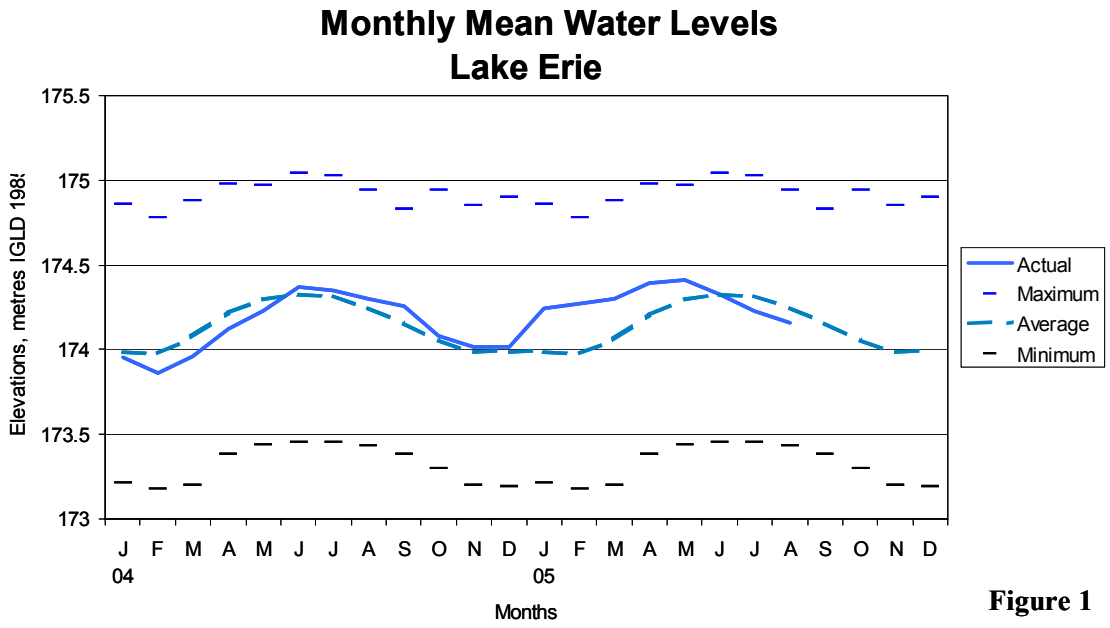


Figure 1

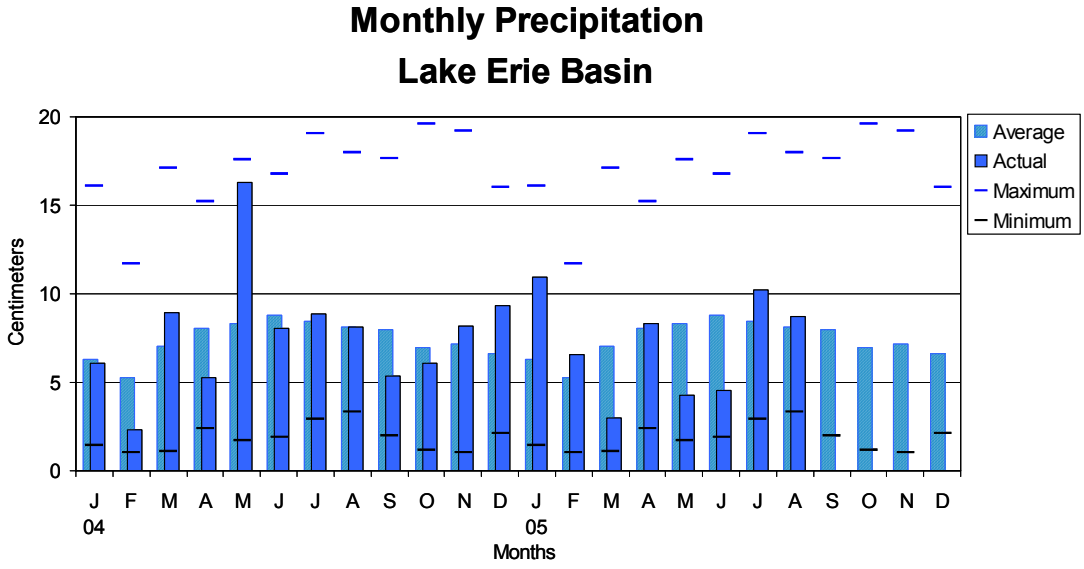


Figure 2

Monthly Net Basin Supplies
Lake Erie Basin

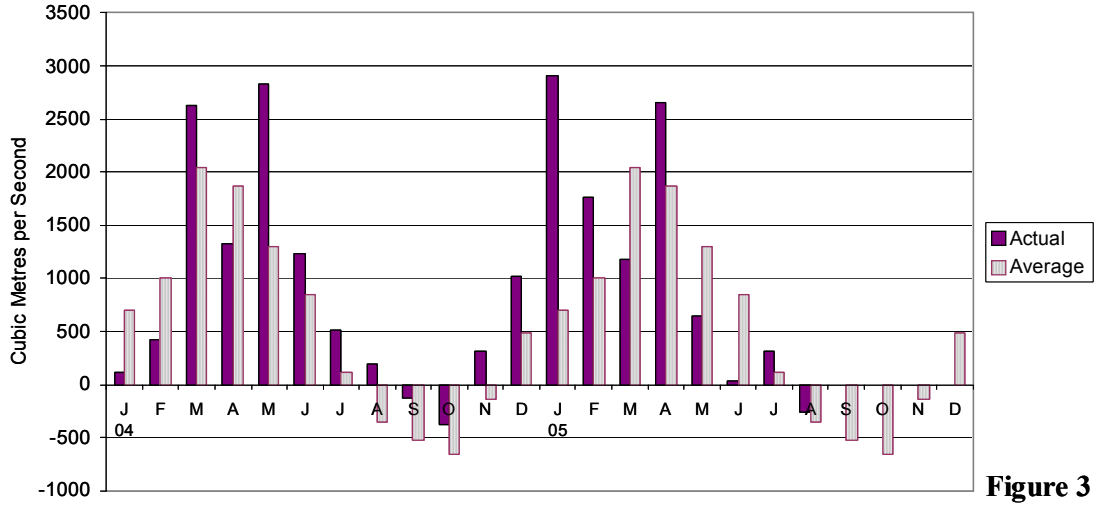


Figure 3

Niagara River Monthly Mean Flows
at Buffalo, New York

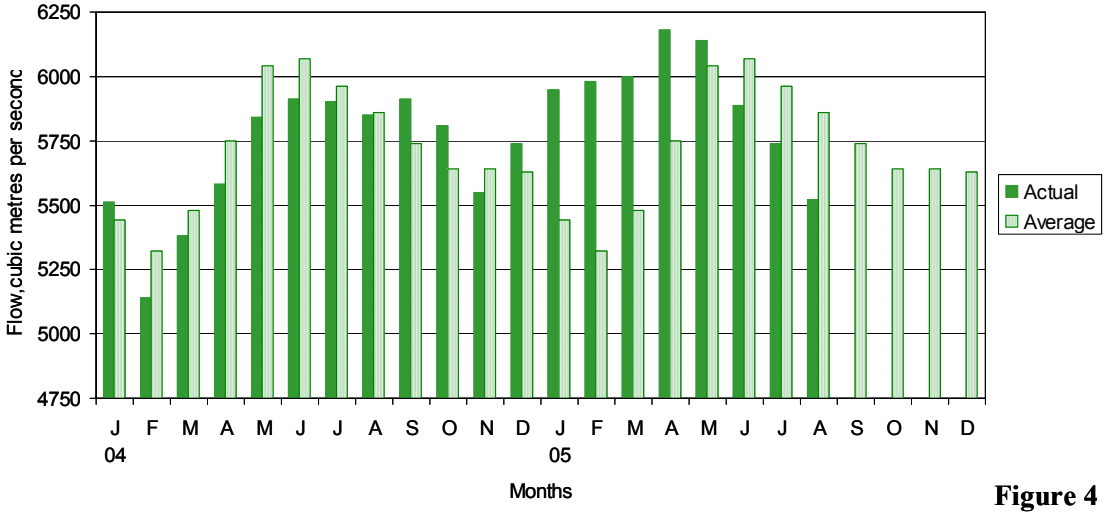


Figure 4

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

The water level in the Chippawa-Grass Island Pool (Pool) is regulated in accordance with the Board's 1993 Directive. The Directive requires that the Power Entities operate the International Niagara 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 (see Enclosure 1). 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, 2005 was 0.38 metre-month (1.25 foot-months) above the long-term average elevation. The maximum permissible accumulated deviation is 0.91 metre-month (3.00 foot-months).

Tolerances were suspended for March 9 to assist in ice management, for August 31 due to abnormally low flows and for September 19 as the result of a Niagara Parks Police operation.

A backup generator to supply electrical power for critical metering, control and computer functions for the control structure was installed and tested on July 14, 2005. The installation of this backup electrical power source extends the ability of the control structure to continue to function in a loss of station service situation from the 30 minutes provided by the existing uninterruptible power supply unit to an almost indefinite period of time.

Recorded daily Material Dock water levels covering the period March through August 2005 are shown in Enclosure 2.

4. FLOWS OVER NIAGARA FALLS

For scenic purposes, 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 Niagara Treaty of 1950.

Violations of the minimum required Falls flow occurred for two hours during the morning of September 19, 2005. For the hour ending 0800 (Eastern Standard Time) the flow was 820 m^3/s (28,960 cfs) below Treaty minimum and 147 m^3/s (5,190 cfs) below for the hour ending 0900. These violations were the result of actions taken by the control structure operator to maintain lower water levels in the area of the Whirlpool in order to assist the Niagara Parks Police in a recovery operation.

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 through August 2005 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 1950 Niagara Treaty. 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 (see Item 4).

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 through August 2005, diversions for the Sir Adam Beck 1 and 2 plants averaged 1654 m^3/s (58,410 cfs) and those by the Robert Moses Niagara Power Project averaged 1981 m^3/s (69,960 cfs).

The low head generating station, 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. For the period March through August 2005, diversion flow for the Rankine Plant averaged 16 m^3/s (560 cfs).

The average flow from Lake Erie to the Welland Canal for the period March through August 2005, was 264 m^3/s (9,320 cfs) compared to 229 m^3/s (8,090 cfs) for the same period one year ago. Diversion from the canal to OPG's DeCew Generating Stations averaged 209 m^3/s (7,380 cfs) for the period March through August 2005.

Records of Niagara River diversions for power generation covering the period March through August 2005 are shown in Enclosure 4.

The monthly average Niagara River flows at Queenston, Ontario for the period March through August 2005 were:

March	6105 m^3/s	(215,600 cfs)
April	6272 m^3/s	(221,490 cfs)
May	6173 m^3/s	(218,000 cfs)
June	5915 m^3/s	(208,880 cfs)
July	5664 m^3/s	(200,020 cfs)
August	5450 m^3/s	(192,460 cfs)

During this period, the flow at Queenston averaged 5930 m^3/s (209,420 cfs). One year ago, flows averaged 5787 m^3/s (204,370 cfs) for the period March through August with the monthly averages ranging between 5490 m^3/s (193,880 cfs) and 5930 m^3/s (209,410 cfs).

6. GAUGING STATIONS

The Niagara River gauges used to monitor the Chippawa-Grass Island Pool levels and the flows over Niagara Falls are Slater's Point, Material Dock, American Falls and Ashland Avenue gauges (see Enclosure 1). All gauges required for the operation of the Chippawa-Grass Island Pool control structure were in operation during the reporting period. Water level readings from the Material Dock were unavailable for several hours on August 20, 2005 due to a communication failure. Values from the Slater's Point Gauge, the approved alternate, were used during that period.

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.

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 management purposes. All measurements will be obtained through joint efforts of the United States Army Corps of Engineers and Environment Canada. Measurement programs require boat, equipment and personnel from both agencies to ensure safety, quality assurance checks between equipment and methods, and binational acceptance of the data collected. The present schedule calls for Acoustic Doppler Current Profiler (ADCP) measurements at the following locations:

International Railway Bridge: These measurements are scheduled for Spring 2006, in accordance with the 3 year cycle. Measurements are taken at the International Railway Bridge to provide information for evaluating stage-discharge relationships for flow entering the Niagara River from Lake Erie, for management of the Niagara River and for administration of the Niagara Treaty of 1950.

Cableway: These measurements, for verification of the Ashland Avenue rating equation, are scheduled for Spring 2006. This is outside of the normal 3 year cycle. More detailed analysis of measurements taken in 2001 and 2004 is ongoing. This additional set of ADCP data will help in the process of investigating a revision to the current rating. Along with recommendations on rating curve updates, the Spring 2006 measurements will

be used to document a change to boat mounted hydroacoustic methods. If sufficient data supports this change from conventional measurements using the aerial cablecar, efforts will be started to decommission the cable and cablecar. Restoration of the U.S. anchor point of the cableway was completed this spring which ensures the integrity of the installation.

American Falls: The American Falls Section is measured to verify the rating used to determine the amount of flow in the American Falls Channel and demonstrate compliance that a dependable and adequate flow of water is maintained over the American Falls and in the vicinity of Three Sisters Islands. Since American Falls flow is directly related to the operation of the Chippawa-Grass Island Pool, the Board monitors this relationship. The American Falls Section was scheduled for measurement in 2005, following the 5-year cycle for this location. Ongoing repairs to the bridge have made the prospect of conducting continued conventional measurements difficult. Plans are to utilize new technology in the form of an ADCP mounted on a remote controlled tethered boat, at a location upstream of the bridge, nearer to the American Falls gauge. Measurements using new hydro-acoustic methods in comparison with conventional methods will be started in the fall of 2006 and may require additional measurements outside of the 5-year cycle.

If the new remote controlled tethered boat is not available in the fall of 2006, conventional measurements will be conducted to ensure deviations from the schedule are minimized. Data from the May 2000 measurements were in general slightly higher than the 1978 rating. This continues to reflect a trend in the measurements since 1984. This may be due to the rating being derived with measurements affected by weed retardation, while subsequent measurements were taken during weed free months. A change in the measurement schedule from 2005 to 2006 is therefore not expected to have any impacts. The rating was recommended for future review. Based on pending change in

methodology and section location, the equation could be revised after sufficient data is collected.

Welland Canal: These measurements are scheduled for 2007, in accordance with the 3 year cycle.

8. POWER PLANTS

a) New York Power Authority

Eleven of the thirteen generating units at the Robert Moses Niagara Power Plant have been upgraded. Upgrade of Unit 9 will be completed in December 2005 and Unit 8 is scheduled for completion in December 2006, concluding the upgrade program which will increase generating capacity by 325 megawatts. Testing to verify performance and finalize water use determination will follow.

The New York Power Authority is proceeding with the re-licensing process for the Robert Moses Niagara Power Project. The current license expires August 31, 2007. The process is following the U. S. Federal Energy Regulatory Commission's (FERC) Alternative Licensing Procedures (ALP). The New York Power Authority's application was submitted to the Federal Energy Regulatory Commission on August 10, 2005. A Niagara re-licensing website continues to be updated with all pertinent information including correspondence and comments received from stakeholders, meetings, etc. The website is: http://niagara.nypa.gov

b) Ontario Power Generation

At a ceremony in Niagara Falls, Ontario on August 19, Ontario Power Generation announced the start of construction of its 10.4 kilometre (6.5 mile) Niagara Tunnel project. Strabag AG of Austria will design and build this third tunnel which will increase the supply of water to the Sir Adam Beck generating complex by about 25%. Preparation work will commence this fall for tunnelling, using one of the largest tunnel boring machines in the world, to begin a year from now. Additional power generation from the increased diversion of water is expected to commence in late 2009. Total cost of the project, which will enable the Beck complex to produce an additional 1.6 terawatt-hours of electricity per year, will be $1 billion.

Ontario Power Generation's program to upgrade the sixteen units at the Sir Adam Beck II Generating Station has been completed. Work on Unit 14, the final unit to be upgraded, was finished in April. Testing to verify performance and finalize water use determination will be undertaken this fall. The upgrade program has increased the generating capacity of the station by 194 megawatts.

With completion of the Beck II upgrade program and construction of the new tunnel, Ontario Power Generation will be able to more fully utilize the Canadian entitlement of water diversion for hydroelectric power generation under the terms of the 1950 Niagara Treaty.

9. ICE CONDITIONS AND ICE BOOM OPERATIONS

Dissipation of the Lake Erie ice cover progressed slowly towards the later part of March. Ice cover on the eastern basin of Lake Erie (the portion of the lake east of a line between Long Point, Ontario and Erie, Pennsylvania), based on March 21 RADARSAT

information, was determined to be 90 percent. That is an area of about 4610 square kilometres (1,780 square miles). Considering the quantity of ice remaining and the presence of an ice bridge in the Maid-of-the-Mist Pool below the Falls that could impede ice passage downstream, the Board informed the Commission that a delay in ice boom opening beyond April 1 was expected.

The ice field began to break apart and drift westward towards the central part of the lake around March 26. A large open water area developed in Long Point Bay and along the northern half of the eastern basin. Aerial reconnaissance on March 29 showed that ice cover on the eastern basin had reduced to 28% or 1450 square kilometres (560 square miles). The ice bridge in the Maid-of-the-Mist Pool broke apart during the night of March 30.

A reconnaissance flight on April 4, delayed until then due to inclement weather, showed that the ice continued to disappear quickly as strong northeast winds had pushed it towards the middle of the lake where it was melting rapidly. Ice cover was only 210 square kilometres (80 square miles) and so a media advisory that boom opening would begin was issued.

Removal of the ice boom began on April 5. Ten spans were opened and removed on that day with the remaining 12 spans opened and removed on April 6. All spans were placed behind the Buffalo Harbor breakwall. They were subsequently pulled onshore to the summer maintenance/storage area by April 8. Floatation barrels were removed on April 11 and 12 and placed on shore by April 13, completing this year's operation.

There were no significant lake ice runs this season.

10. MEETING WITH THE PUBLIC

In accordance with the Commission's requirements, the Board held an annual meeting with the public on September 20, 2005 in Niagara-on-the-Lake, Ontario. The Board welcomed Commission participation. Information on items including current and projected Great Lakes water levels, the Ontario Power Generation tunnel project and the operation of the Lake Erie-Niagara River Ice Boom was presented. Eight members of the public were in attendance.

11. MEMBERSHIP OF THE BOARD

Membership of the Board and its Working Committee is unchanged from the last reporting period.

12. ATTENDANCE AT BOARD MEETINGS

The Board met once during this reporting period. The meeting was held on September 21, 2005 at Queenston, Ontario. Colonel Gary Johnston acted as the U.S. Board Chair on behalf of Brigadier General Berwick. U.S. Member Mr. Tjoumas was unable to attend.

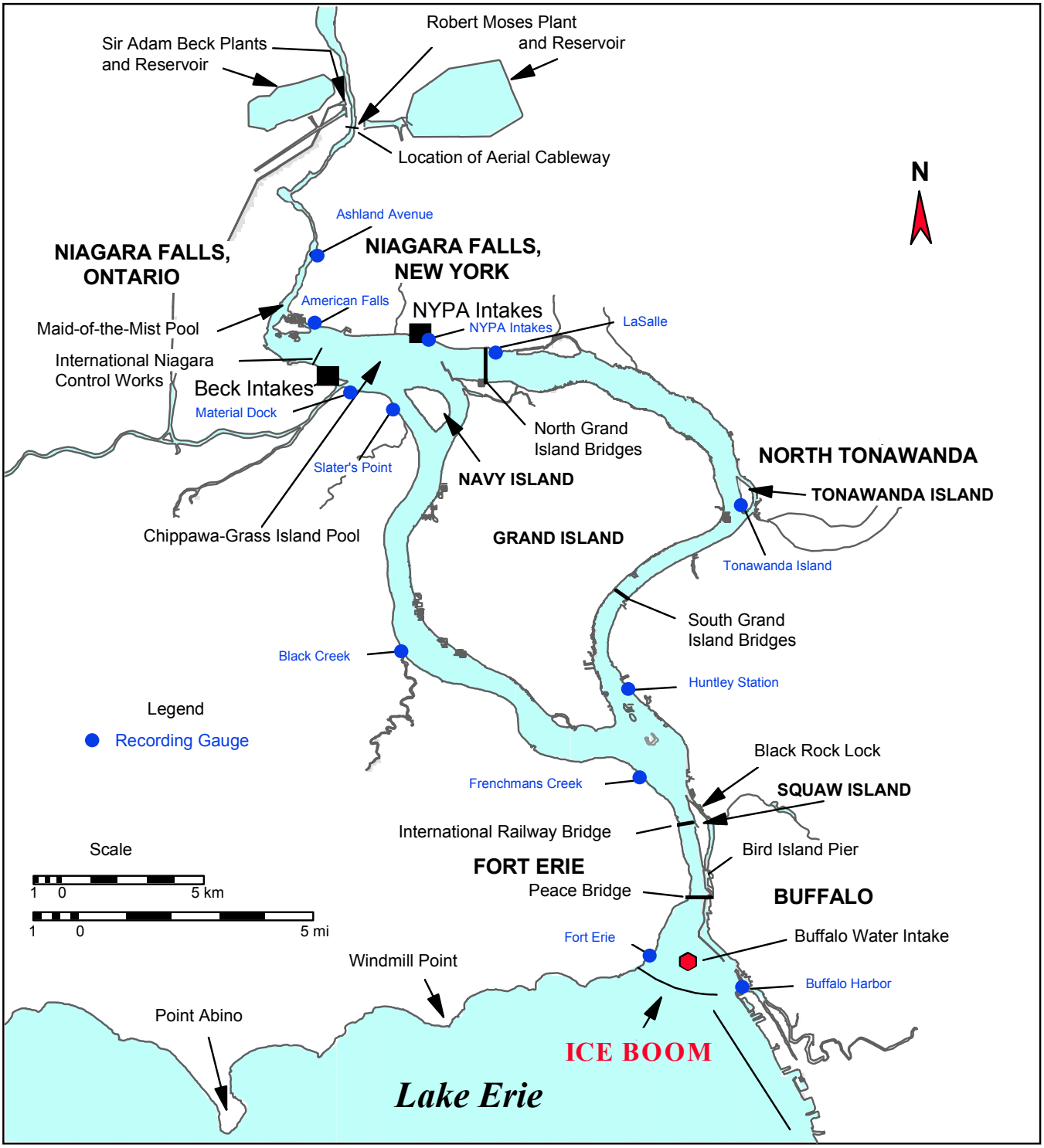
Respectfully Submitted,

CARR MCLEOD
Chair, Canadian Section

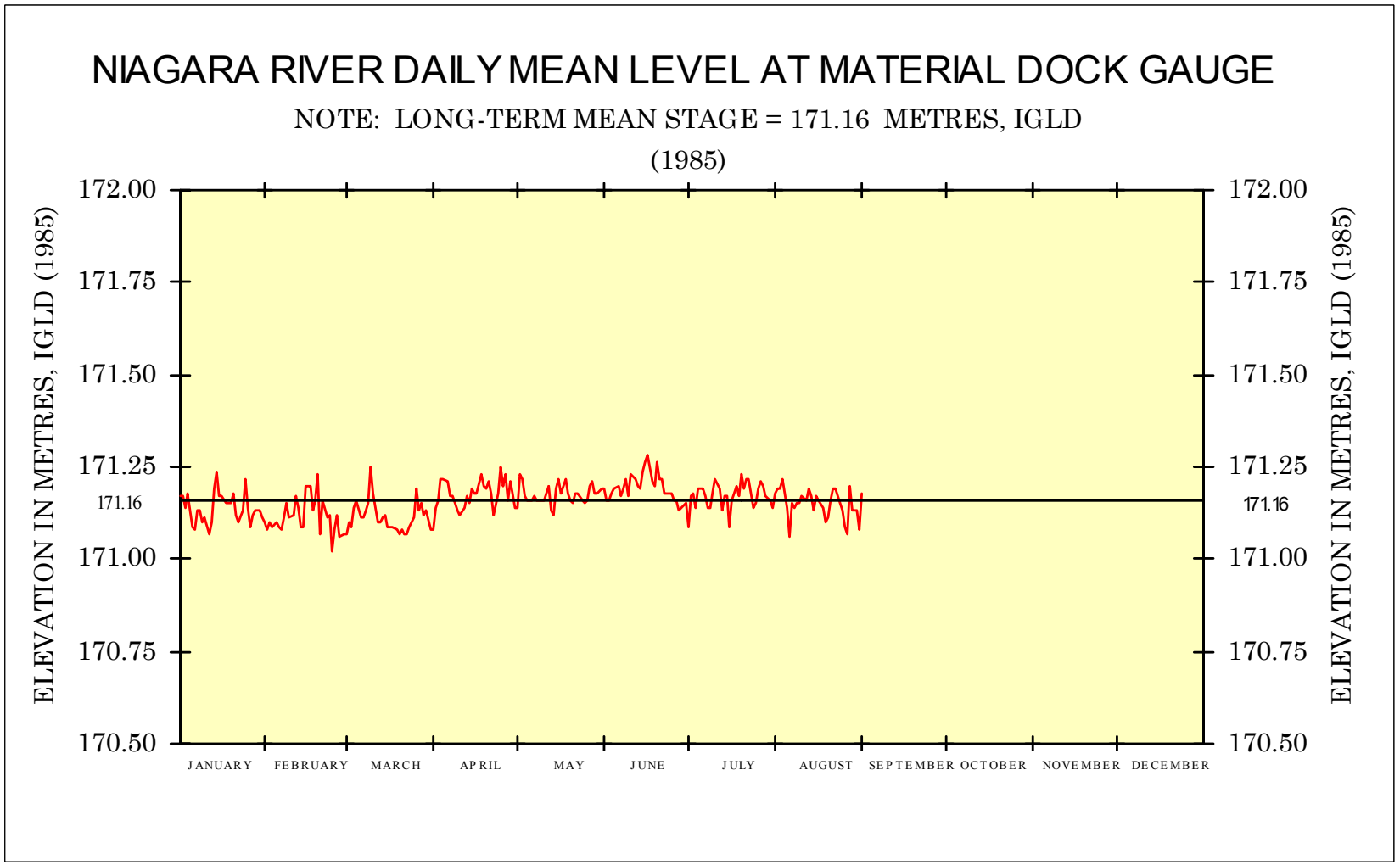
COL.
for BRIGADIER GENERAL BRUCE A. BERWICK
Chair, United States Section

ROBERT MESSERVEY
Member, Canadian Section

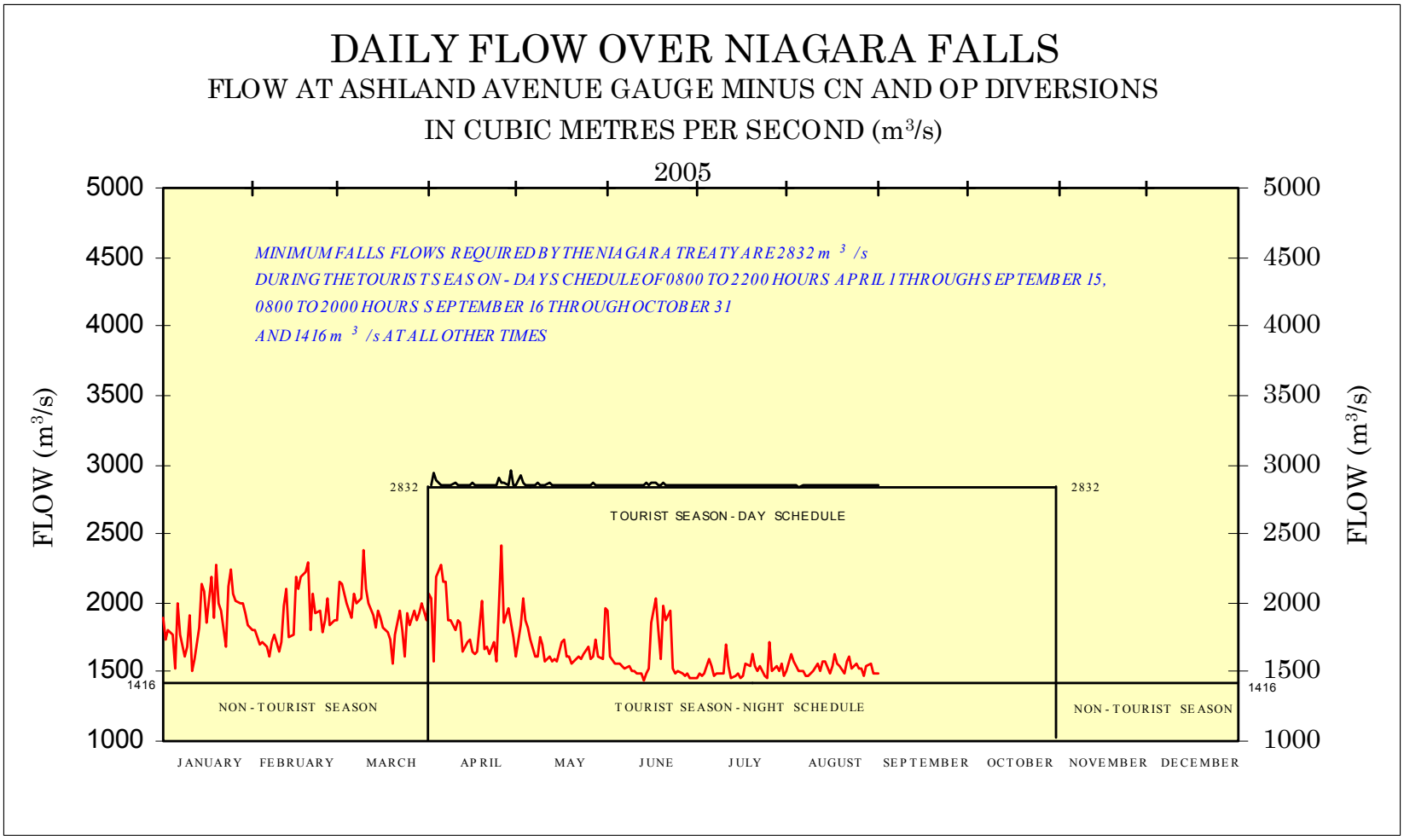
CONSTANTINE G. TJOUMAS
Member, United States Section


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

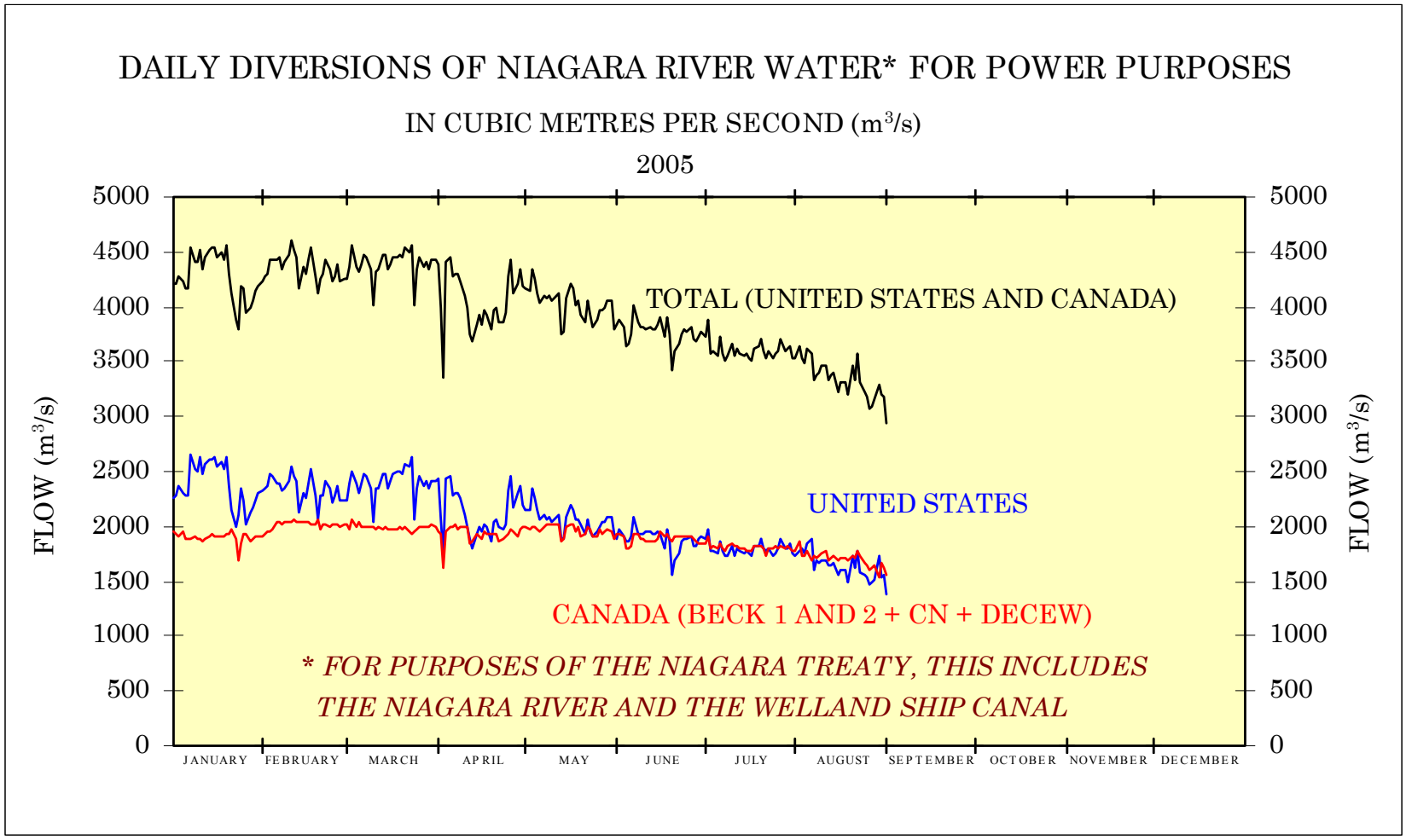
ENCLOSURE 1


NIAGARA RIVER DAILY MEAN LEVEL AT MATERIAL DOCK GAUGE
NOTE: LONG-TERM MEAN STAGE = 171.16 METRES, IGLD
(1985)
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 2


DAILY FLOW OVER NIAGARA FALLS
FLOW AT ASHLAND AVENUE GAUGE MINUS CN AND OP DIVERSIONS
IN CUBIC METRES PER SECOND (m3/s)
2005
MINIMUM FALLS FLOWS REQUIRED BY THE NIAGARA TREATY ARE 2832 m 3 /s
DURING THE TOURIST SEASON - DAYS CHEDULE OF 0800 TO 2200 HOURS APRIL 1 THROUGH SEPTEMBER 15,
0800 TO 2000 HOURS SEPTEMBER 16 THROUGH OCTOBER 31
AND 1416 m 3 /s AT ALL OTHER TIMES
FLOW (m3/s)
5000
4500
4000
3500
3000
2500
2000
1500
1000
2832
2832
TOURIST SEASON - DAY SCHEDULE
1416
1416
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)
2005
FLOW (m3/s)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
TOTAL (UNITED STATES AND CANADA)
UNITED STATES
CANADA (BECK 1 AND 2 + CN + DECEW)
* FOR PURPOSES OF THE NIAGARA TREATY, THIS INCLUDES
THE NIAGARA RIVER AND THE WELLAND SHIP CANAL
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

ENCLOSURE 4