International Niagara Board of Control

One Hundred Fifteenth Semi-Annual Progress Report

to the

International Joint Commission

Covering the Period March 11 through September 15, 2010

EXECUTIVE SUMMARY

The level of Lake Erie began the reporting period 10 centimetres (3.9 inches) below its long-term average for the month of March. Below-average precipitation in the winter and spring kept the level below average. The May through July precipitation values, which were 30-45 percent above average, pushed the monthly levels closer to their long-term average, but not above those levels. The lake level peaked on a monthly basis in June, at 174.31 metres (571.88 feet), which was 2 centimetres (0.8 inch) below the long-term average for the month.

Lakes Michigan and Huron continued to be well below the long-term average during this reporting period. As a result, inflows to Lake Erie from the upstream lakes were below the long-term average for the six-month period March through August 2010 (Section 2).

The level of the Chippawa-Grass Island Pool was regulated under the International Niagara Board of Control's 1993 Directive. The Power Entities (Ontario Power Generation and the New York Power Authority) were able to comply with the Board's Directive at all times during the reporting period (Section 3).

Ontario Power Generation continues with construction of the Niagara Tunnel Project. By mid-September, the Tunnel Boring Machine (TBM) had progressed 8.1 kilometres (5.0 miles) (Section 8).

Removal of the Lake Erie-Niagara River Ice Boom began on March 22 and was completed on March 24. On March 29, the New York Power Authority crew began towing the individual spans up the Buffalo River to the boom's new storage site, where the ground crew pulled them on shore. Movement of the spans along the Buffalo River and placement onto the new storage site went very well (Section 9).

The Board held a meeting with the public on September 15 in Niagara Falls, New York (Section 10).

COVER: **A New York Power Authority crew tows an ice boom span past the destroyer *USS The Sullivans* which is on display at the Buffalo and Erie County Naval & Military Park. The photo was taken in early April when the boom spans were moved up the Buffalo River to the boom's new storage site (New York Power Authority photo).**

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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 15, 2010

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

Commissioners:

1. GENERAL

The International Niagara Board of Control (Board) submits its One Hundred Fifteenth Semi-Annual Progress Report, covering the reporting period March 11 through September 15, 2010.

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 customary 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 10 centimetres (3.9 inches) below its long-term average for the month of March. Below-average precipitation in the winter and spring kept the level below average. The May through July precipitation values, which were 30-45 percent above average, pushed the monthly levels closer to their long-term average, but not above those levels. The lake level peaked on a monthly basis in June, at 174.31 metres (571.88 feet), which was 2 centimetres (0.8 inch) below the long-term

average for the month. In August, the level was at 174.19 metres (571.49 feet), or 6 centimetres (2.4 inches) below average. This contrasts with the previous year when Lake Erie was 10 to 24 centimetres (3.9 to 9.4 inches) above average for the same period.

Recorded water level data for the period March through August 2010 and departures from long-term averages are shown in Table 1 and depicted graphically in Figure 1.

The Lake Erie basin received approximately 52.83 centimetres (20.8 inches) of precipitation during the March through August 2010 period. This amount of precipitation is about 8% above average for the time of year. Recent precipitation data and departures from long-term averages are shown in Table 2 and depicted graphically in Figure 2.

Lakes Michigan and Huron continued to be well below the long-term average during this reporting period. As a result, inflows to Lake Erie from the upstream lakes were below the long-term average for the six-month period March through August 2010.

Water supplied to Lake Erie from its local drainage basin (its net basin supply) reflects the amount of precipitation the basin receives during the reporting period as well as evaporation from the land and lake surfaces and runoff from snow accumulation and melt. Net basin supplies for the period March through August 2010 are depicted in Figure 3.

Both the water level of Lake Erie and the flow retardation in the upper Niagara River due to ice and weeds naturally affects the lake's outflow. As was the case for the level of Lake Erie, the Niagara River flow was below average for every month of the reporting period. The flows in the Niagara River are graphically depicted in Figure 4 and summarized in Section 5.

The September water level forecast indicates that the level of Lake Erie is expected to be below its long-term average through 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* 2010	Average 1918-2009**	Departure	Recorded* 2010	Average 1918-2009**	Departure
March	173.97	174.07	-0.10	570.77	571.10	-0.33
April	174.09	174.22	-0.13	571.16	571.59	-0.43
May	174.21	174.30	-0.09	571.56	571.85	-0.29
June	174.31	174.33	-0.02	571.88	571.95	-0.07
July	174.27	174.31	-0.04	571.75	571.88	-0.13
August	174.19	174.25	-0.06	571.49	571.69	-0.20

*Provisional **Period of record is 1918-2009

TABLE 2 - MONTHLY AVERAGE PRECIPITATION ON THE LAKE ERIE BASIN

	Centimetres			Inches			
Month	Recorded* 2010	Average 1900-2008+	Departure	Recorded* 2010	Average 1900-2008+	Departure	Departure (in percent)
March	4.22	6.99	-2.77	1.66	2.75	-1.09	-40
April	7.47	8.02	-0.55	2.94	3.16	-0.22	-7
May	12.27	8.51	3.76	4.83	3.35	1.48	44
June	12.37	8.77	3.60	4.87	3.45	1.42	41
July	11.10	8.60	2.50	4.37	3.39	0.98	29
August	5.41	8.17	-2.76	2.13	3.22	-1.09	-34

*Provisional +Most recent period of record is 1900-2008

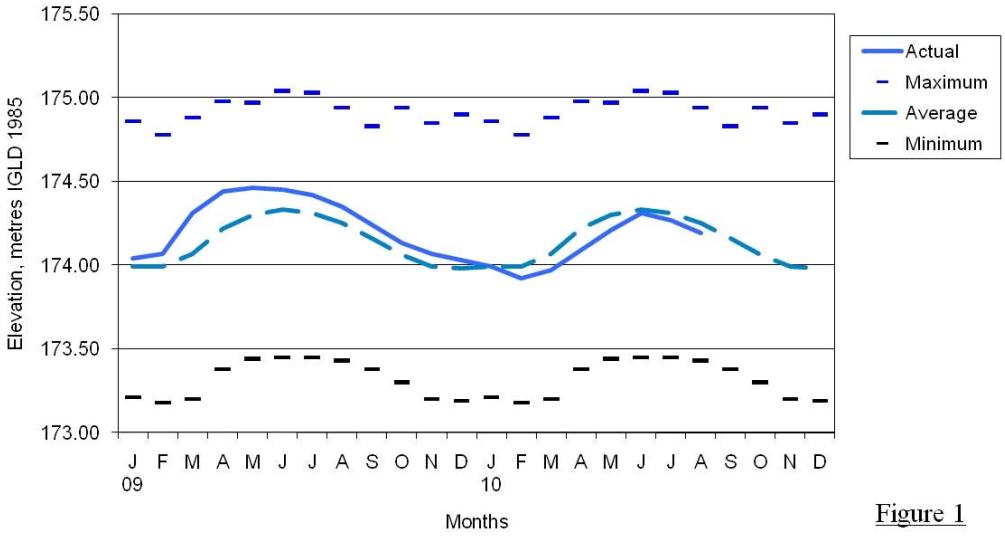


Figure 1

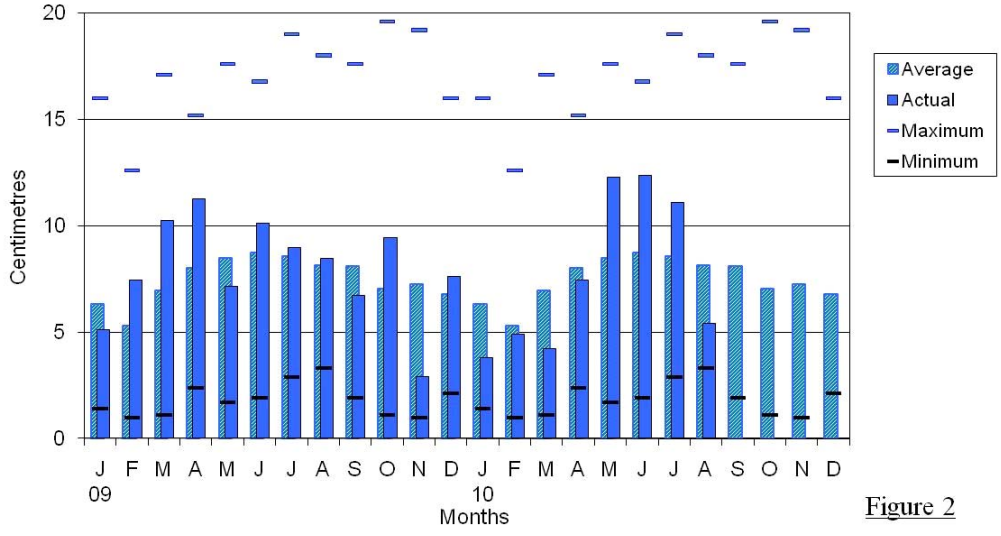


Figure 2

Monthly Net Basin Supplies
Lake Erie Basin

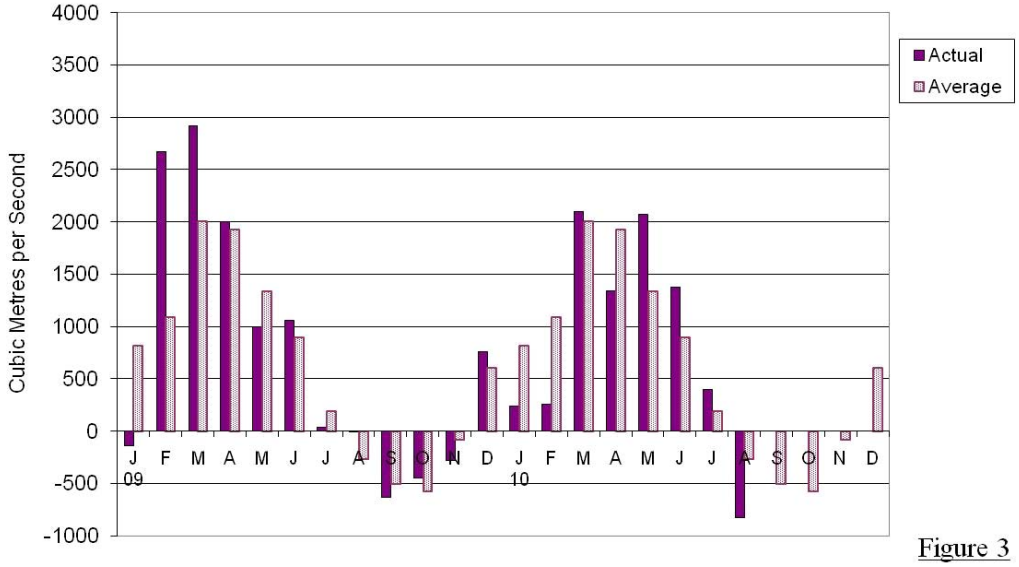


Figure 3

Niagara River Monthly Mean Flows
at Buffalo, New York

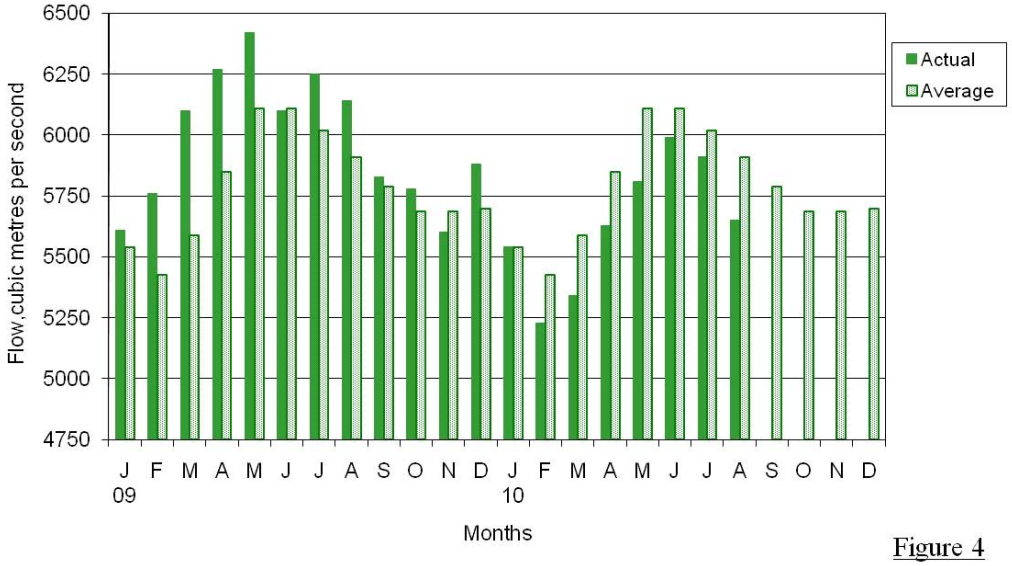


Figure 4

3. OPERATION AND MAINTENANCE OF THE INTERNATIONAL NIAGARA CONTROL WORKS

The water level in the Chippawa-Grass Island Pool (CGIP) is regulated in accordance with the Board's 1993 Directive. The Directive requires that the Power Entities, Ontario Power Generation (OPG) and the New York Power Authority (NYPA), operate the International Niagara Control Works to ensure the maintenance of an operational long-term average CGIP level of 171.16 metres (561.55 feet) to ameliorate adverse high or low water levels in the CGIP. The Directive also establishes tolerances for the CGIP's level as measured at the Material Dock gauge.

The Power Entities complied with the Board's Directive at all times during the reporting period.

The accumulated deviation of the CGIP's level from March 1, 1973 through August 31, 2010 was 0.45 metre-month (1.48 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 CGIP level were suspended for March 13 and 14 due to abnormally low flows.

The locations of the water level gauges on the Niagara River are shown in Enclosure 1. Recorded daily Material Dock water levels covering the period March through August 2010 are shown in Enclosure 2.

A major overhaul (seals, cylinders, pistons and replacement of the roll plate) of Gate 10 is nearing completion. In addition, a minor overhaul of seals will be performed on Gate 14 upon completion of the Gate 10 overhaul.

As a result of inspections done in 2008, replacement of oil lines on Gates 1-13 has begun. This work will be completed on Gate 2 this year. It will continue next year at the rate of three gates per year thereafter. The oil lines in the newer gates (14-18) do not need to be replaced.

4. FLOWS OVER NIAGARA FALLS

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 International Niagara Control Works, in conjunction with power diversion operations, ensures sufficient flow over the Falls to meet the requirements of the Niagara Treaty of 1950.

Falls flow met or exceeded minimum Treaty requirements at all other times during the reporting period. The recorded daily flow over Niagara Falls, covering the period March through August 2010, is 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 for scenic purposes to below the amounts specified above.

The 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 CGIP 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 2010, diversion for the Sir Adam Beck 1 and 2 plants averaged 1639 m^3/s (57,880 cfs) and diversion to the Robert Moses Niagara Power Project averaged 1878 m^3/s (66,320 cfs).

The average flow from Lake Erie to the Welland Canal for the period March through July 2010 was 221 m^3/s (7,805 cfs) compared to 244 m^3/s (8,620 cfs) for the same period in 2009. Diversion from the canal to OPG's DeCew Generating Stations averaged 175 m^3/s (6,180 cfs) for the period March through August 2010.

Records of diversions for power generation covering the period March through August 2010 are shown in Enclosure 4.

The monthly average Niagara River flows at Queenston, Ontario, for the period March through August 2010 and departures from long-term averages, are shown in Table 3. Maximum and minimum monthly average flows, for the period 1900-2009, are shown in Table 4.

TABLE 3 - MONTHLY NIAGARA RIVER FLOWS AT QUEENSTON

	Cubic Metres per Second			Cubic Feet per Second		
Month	Recorded 2010	Average 1900-2009	Departure	Recorded 2010	Average 1900-2009	Departure
March	5439	5642	-203	192080	199230	-7150
April	5737	5888	-151	202600	207920	-5320
May	5827	6095	-268	205780	215240	-9460
June	6000	6067	-67	211890	214260	-2370
July	5912	5968	-56	208780	210760	-1980
August	5647	5959	-312	199420	210440	-11020
Average	5760	5936	-176	203420	209640	-6220

TABLE 4 - MONTHLY MAXIMUM AND MINIMUM NIAGARA RIVER FLOWS AT QUEENSTON

	Cubic Metres per Second				Cubic Feet per Second	
Month	Maximum	Year	Minimum	Year	Maximum	Minimum
March	6880	1986	4340	1934	242960	153260
April	7220	1986	4320	1934	254970	152560
May	7030	1986	4190	1934	248260	147970
June	7410	1985	4270	1964	261680	150790
July	7240	1987	3960	1964	255680	139850
August	6900	1987	3320	1936	243670	117240

During the period March through August 2010, the flow at Queenston averaged 5755 m^3/s (203,246 cfs). In 2009, flows for the same period averaged 6132 m^3/s (216,550 cfs) with the monthly averages ranging between 5989 m^3/s (211,500 cfs) and 6312 m^3/s (222,900 cfs).

6. GAUGING STATIONS

The Niagara River gauges used to monitor the CGIP levels and the flow over Niagara Falls are the Slater's Point, Material Dock, American Falls and Ashland Avenue gauges (see Enclosure 1). All gauges required for the operation of the International Niagara Control Works were in operation during the reporting 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, for water management purposes, as part of a program to verify the gauge ratings used to determine flows in these channels. All measurements are 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 bi-national acceptance of the data collected. The Corps and Environment Canada continue their efforts to standardize measurement equipment and techniques.

Discharge measurements were conducted near the International Railway Bridge Section in May 2010. This series was made to verify measurements made the year before, to coordinate methods used by both countries, and to investigate the possible effect of a moving river bed on flow measurements. Also in May 2010, scheduled measurements were made in the Welland Canal. Measurements are planned for the Fall of 2010 at the Cableway, and at the American Falls Section in 2012.

8. NIAGARA TUNNEL PROJECT AND PLANT UPGRADES

OPG continues with construction of the Niagara Tunnel Project. By mid-September, the Tunnel Boring Machine (TBM) had progressed 8.1 kilometres (5.0 miles), about 80% of the total distance. Invert (bottom) concrete lining had been

completed on 5.5 kilometres (3.4 miles) while arch (top) concrete lining, which commenced on May 27, had progressed 400 metres (1,312 feet). When completed, the increased diversion capacity will mean that OPG's Sir Adam Beck plants can more fully utilize Canada's diversion entitlement for power production. Increased diversion will not affect the regulation of the CGIP which is governed by the International Niagara Board of Control's 1993 Directive.

OPG has also undertaken a unit runner replacement program for its 60 Hz Beck I units. Unit G9 is currently out of service and work is expected to be completed by the end of October. Work on the next unit will commence in the fall of 2011, and it is expected to be completed in January 2013.

In addition, work continues on the replacement of ND1's (DeCew) two penstocks and overhaul of its four units. The first penstock is expected to return to service in December 2010, with the remaining one due back in July 2011.

9. ICE CONDITIONS AND ICE BOOM OPERATION

On March 11 2010, a helicopter flight was conducted to measure ice thickness on the eastern part of Lake Erie. Average thickness, of the five sites sampled, was 16 centimetres (6 inches). Similar measurements taken in mid-March 2009 resulted in an average of 27 centimetres (11 inches). Open water in the area of the lake upstream of the boom was observed. Ice cover on the eastern portion of Lake Erie was 4340 square kilometres (1675 square miles). By March 18, the ice cover had diminished to about 570 square kilometres (220 square miles). Based on the quantity and quality of the ice remaining, the International Niagara Board of Control issued a media advisory on March 18 that, with favourable conditions, boom removal was about to begin.

Favourable conditions were experienced and boom opening began on March 22 with four spans removed. Eight more spans were removed on March 23 and the remaining ten spans were removed on March 24.

Floatation barrels were removed from the lake on March 25 and 26. Both the Canadian and U.S. Coast Guards were notified that this year's ice boom removal had been completed.

On March 29, the New York Power Authority crew began towing the individual spans up the Buffalo River to the boom's new storage site, where the ground crew pulled them on shore. This operation was completed on April 6. Movement of the spans along the Buffalo River and placement onto the new storage site went very well. There was good coordination and communication with both the US Coast Guard and the City of Buffalo Harbor Master.

10. MEETING WITH THE PUBLIC

In accordance with the Commission's requirements, the Board held its annual meeting with the public. This year, the meeting was held during the evening of September 15 in Niagara Falls, New York. The session was attended by eight members of the public. Information on items including current and projected Great Lakes levels, the operation of the Lake Erie-Niagara River Ice Boom, and OPG's Niagara Tunnel Project was presented.

11. MEMBERSHIP OF THE BOARD

On July 29, Lieutenant Colonel (LTC) Stephen Bales became the U.S. Chair of the Board's Working Committee when he succeeded LTC Daniel Snead to become Commander of the U.S. Army Corps of Engineer's Buffalo District. A position on both the Canadian Sections of the Board and its Working Committee remain vacant.

12. ATTENDANCE AT BOARD MEETINGS

The Board met once during this reporting period. The meeting, chaired by Colonel Drolet, was held in Niagara Falls, Ontario on September 15. Mr. Mahoney was unable to attend.

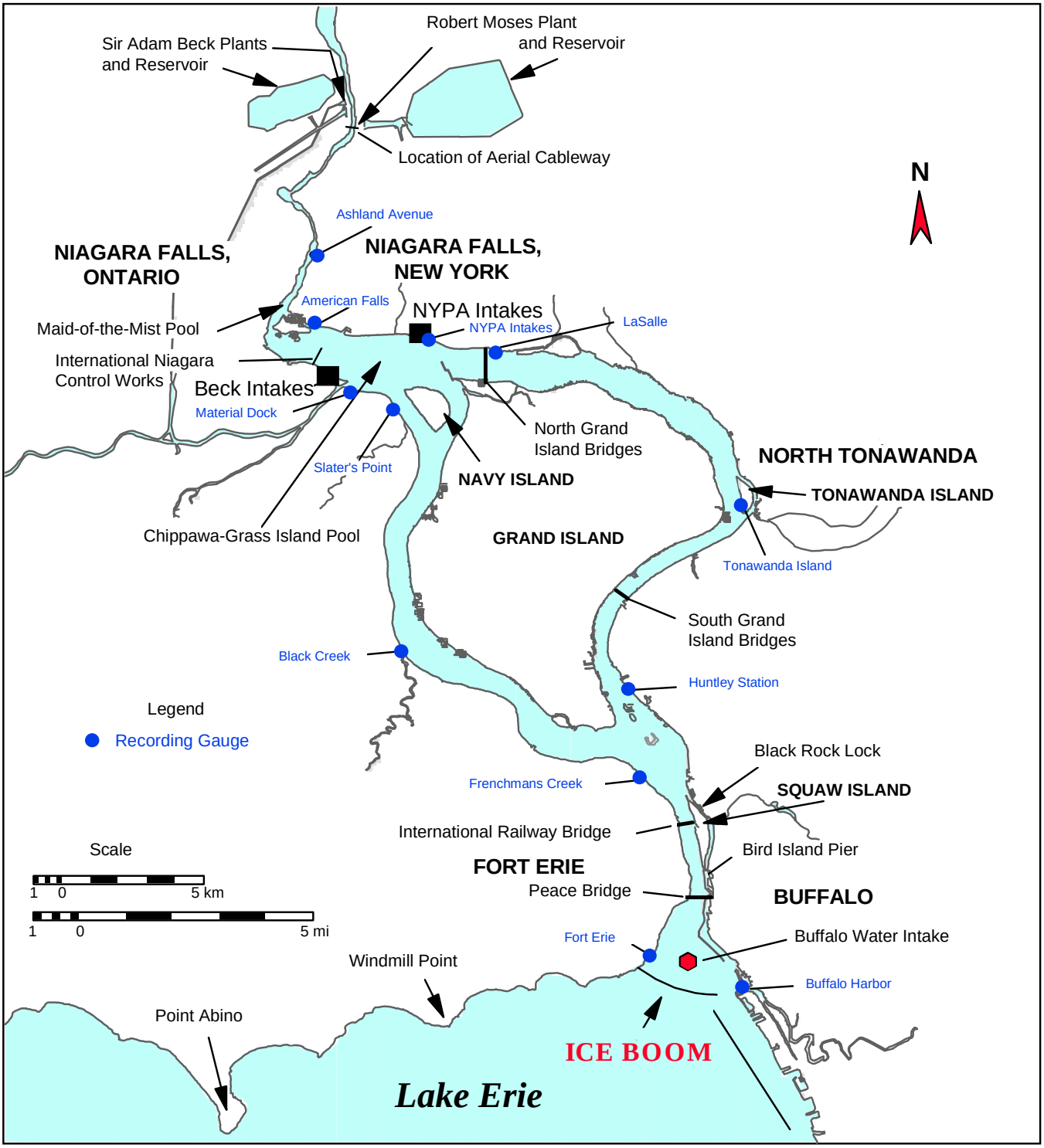
RALPH MOULTON
Chair, Canadian Section

MAJOR GENERAL JOHN W. PEABODY
Chair, United States Section

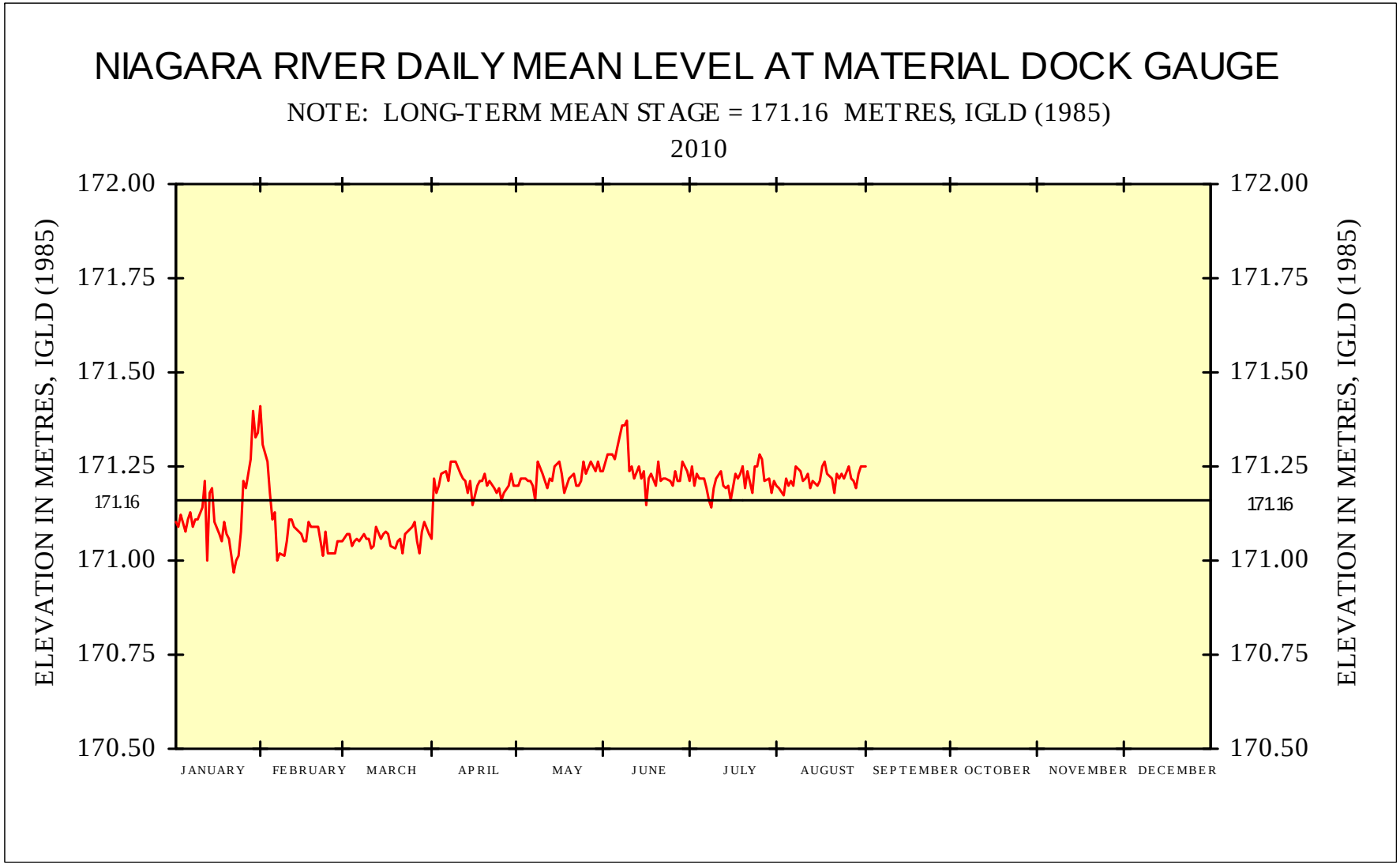
VACANT

Member, Canadian Section

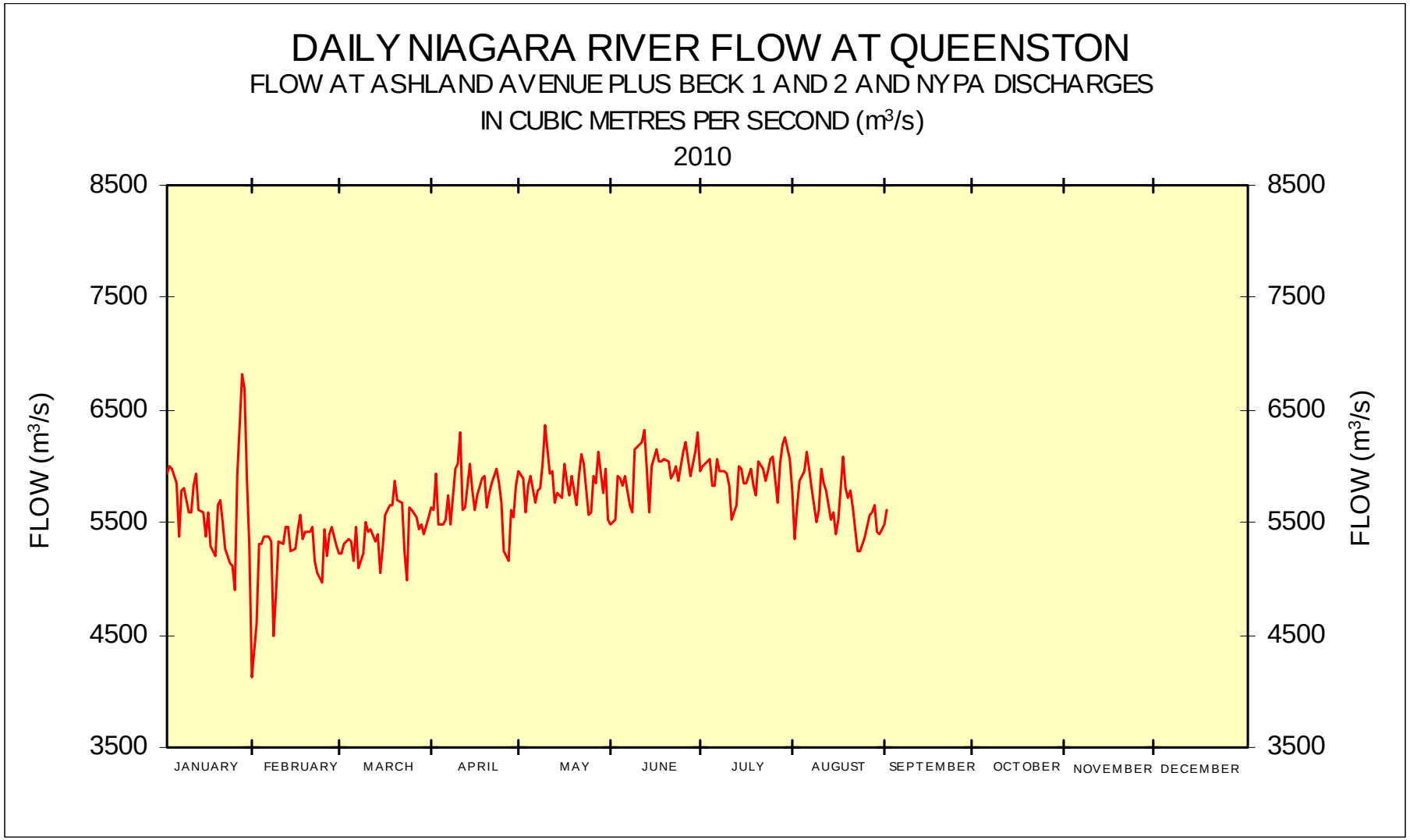
DANIEL MAHONEY
Member, United States Section


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

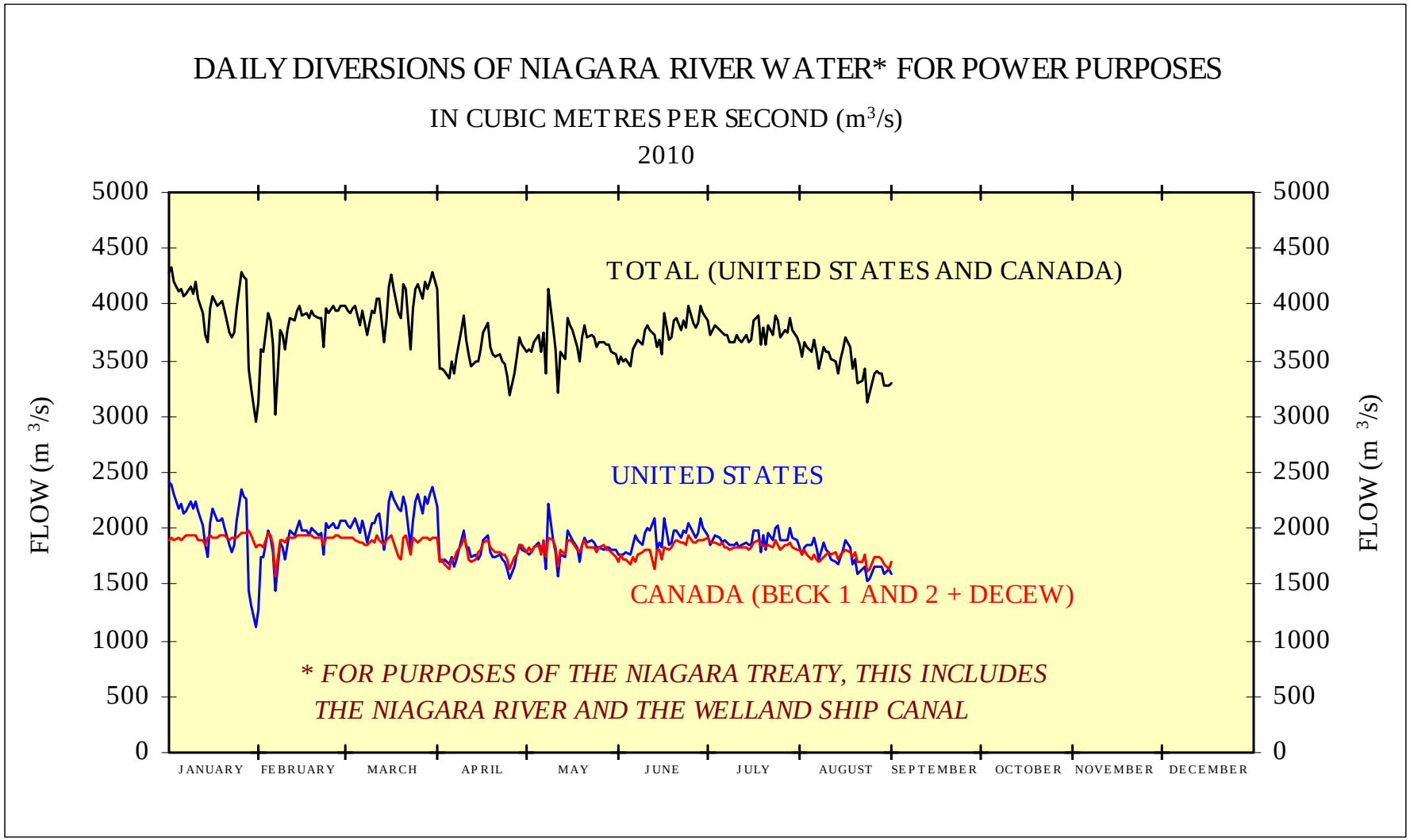
ENCLOSURE 1


NIAGARA RIVER DAILY MEAN LEVEL AT MATERIAL DOCK GAUGE
NOTE: LONG-TERM MEAN STAGE = 171.16 METRES, IGLD (1985)
2010
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 NIAGARA RIVER FLOW AT QUEENSTON
FLOW AT ASHLAND AVENUE PLUS BECK 1 AND 2 AND NYPA DISCHARGES
IN CUBIC METRES PER SECOND (m³/s)
2010
8500
7500
6500
5500
4500
3500
FLOW (m³/s)
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)
2010
TOTAL (UNITED STATES AND CANADA)
UNITED STATES
CANADA (BECK 1 AND 2 + DECEW)
* FOR PURPOSES OF THE NIAGARA TREATY, THIS INCLUDES
THE NIAGARA RIVER AND THE WELLAND SHIP CANAL
FLOW (m 3/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