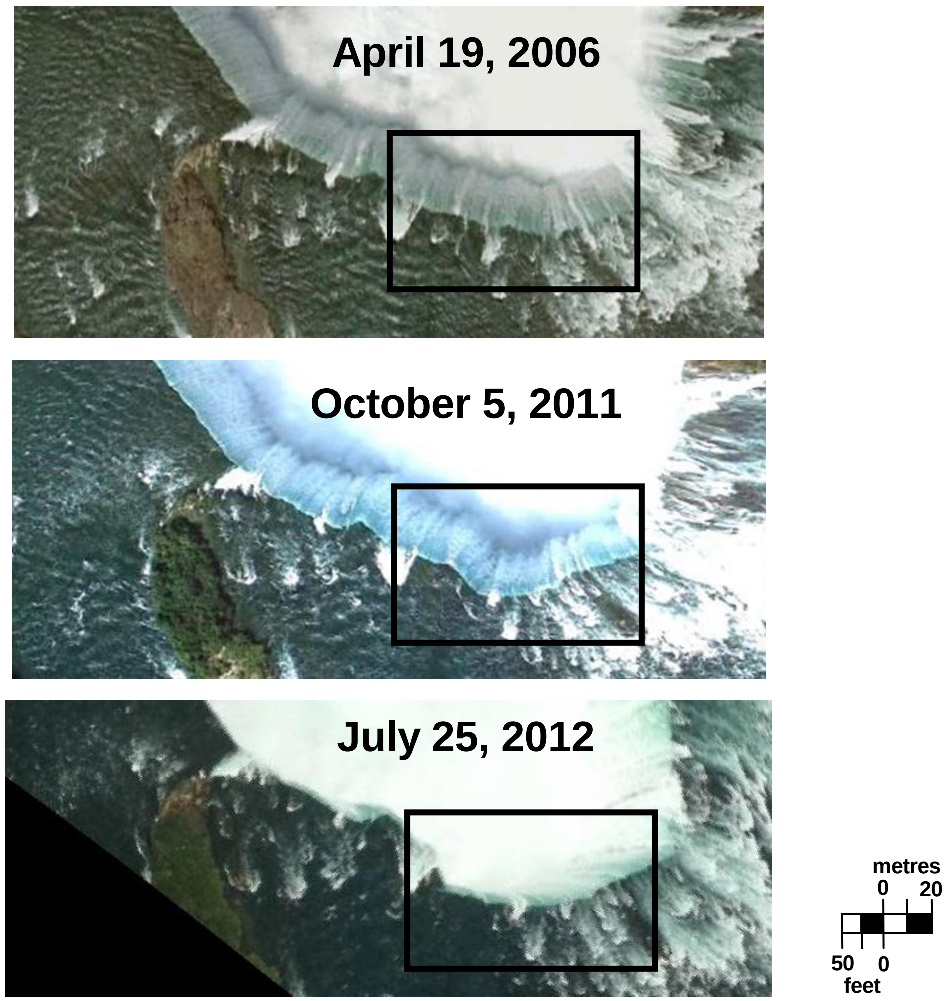
International Niagara Board of Control

One Hundred Nineteenth Semi-Annual Progress Report

to the

International Joint Commission



Covering the Period March 23 through September 20, 2012

EXECUTIVE SUMMARY

The combination of an unusually warm winter and below-average water supplies during the March 23 through September 20, 2012 reporting period had a dramatic effect on the water level of Lake Erie. Instead of experiencing its annual seasonal rise during the spring, peaking for the year in late June or early July, and then starting its annual seasonal decline as it typically does, the level of the lake declined throughout the spring and summer. The lake level averaged 29 cm (11.4 in) above the long-term average in March, fell below average in May, and by August was about 21 cm (8.3 in) below average. Inflow to Lake Erie from upstream, via the Detroit River, remained below average throughout the reporting period. (Section 2).

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

Mr. Nik Wallenda, a high wire artist, successfully walked across a wire suspended above the Horseshoe Falls section of Niagara Falls between 10:16 and 10:41 p.m. on June 15, 2012. The Power Entities collectively elected to maintain the flow over Niagara Falls at an amount equal to the normal tourist season day time flow during the entire period of the walk. This was undertaken to mitigate any additional hazards that might be introduced as a result of significantly changing flow conditions in the immediate vicinity of the walk. The International Niagara Board of Control's representatives were advised of the Power Entities' planned action in advance (Section 5).

Changes to the crestline of the Horseshoe Falls resulting from rockfalls in 2009 and 2012 have been identified by the Board. Although visible in satellite images and oblique photographs taken from elevated vantage points, the change resulting from the rockfalls has not resulted in a broken curtain of water over the length of the crestline nor, in the opinion of the Board, negatively affected the scenic beauty of the Falls (Section 7).

The Niagara Cableway, located just upstream of the OPG and NYPA hydroelectric plants, was successfully removed by a contractor engaged by NYPA, on behalf of the Power Entities, during the first week of April 2012. The cableway, formerly used for the Board's flow measurement program, had become redundant due to the adoption of boat-based, acoustic flow measurement technology for this purpose (Section 8).

OPG continues with construction of the Niagara Tunnel Project. The new tunnel will provide increased water diversion capability for OPG's Sir Adam Beck complex, and is expected to be in service by December 2013 (Section 9).

The Board held an annual meeting with the public during the evening of September 12, 2012 at the Earl W. Brydges Public Library in Niagara Falls, NY. Thirteen members of the public attended the meeting (Section 10).

Mr. William H. Allerton, U.S. Federal Energy Regulatory Commission, was appointed as a member of the U.S. section of the Board for a 3-year term beginning on May 1, 2012. Mr. Allerton's appointment fills the vacancy created by the retirement of Mr. Dan Mahoney at the end of September 2011. Colonel John D. Drolet, alternate U.S. Section Chair, retired on August 3, 2012. Colonel Robert D. Peterson was named the new alternate U.S. Section Chair on September 7, 2012 (Section 11).

COVER: **Cover: Images of the Horseshoe Falls showing recent changes visible in its crestline.**
April 19, 2006 image – © 2012 First Base Solutions Inc.
October 5, 2011 image – © 2012 GeoEye
July 25, 2012 image – © Dan Holt

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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
Cincinnati, Ohio

September 20, 2012

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

Commissioners:

1. GENERAL

The International Niagara Board of Control (Board) submits its One Hundred Nineteenth Semi-Annual Progress Report, covering the reporting period March 23 through September 20, 2012.

All elevations in this report are referenced to International Great Lakes Datum 1985 (IGLD 1985). Values provided are expressed in metric units, with approximate customary units (in parentheses) for information purposes only. The monthly Lake Erie water levels are based on a network of four gauges to better represent the average level of the lake.

2. BASIN CONDITIONS

The combination of an unusually warm winter and below-average water supplies during the reporting period had a dramatic effect on the water level of Lake Erie. Instead of experiencing its annual seasonal rise during the spring, and then peaking for the year in late June or early July before starting its annual seasonal decline as it typically does, the level of the lake declined throughout the reporting period. The lake level averaged 29 cm (11.4 in) above the long-term average in March, fell below average in May, and by August was about 21 cm (8.3 in) below average. The recorded monthly water levels for the period March through August 2012 and departures from long-term averages are shown in Table 1 and depicted graphically in Figure 1. The following paragraphs provide more detail on the main factors that led to the water level changes observed on Lake Erie over the reporting period.

Lake Erie receives water from both its local drainage basin and from the upstream lakes. The water supplied to a lake from its local drainage basin is referred to as its net basin supply. A lake's net basin supply is the sum of the amount of water the lake receives from precipitation falling directly on its surface and runoff (including snow melt) from its surrounding land area, minus the amount of water that evaporates from its surface.

Precipitation is a major contributor to net basin supply, both directly on the lake and through runoff. Recent precipitation data and departures from the long-term averages are shown in Table 2 and depicted graphically in Figure 2. Precipitation on the Lake Erie basin was slightly above average during March, well below average during April, May, and June, and near but still below average during July and August. During the period March through August 2012, the basin received about 37 cm (14.6 in) of precipitation. This is approximately 25% below average for the period.

Over the winter, water is typically stored as snow on the basin, which in turn feeds the lake's annual seasonal rise in water levels as the snow melts. As reported in the Board's 118th Semi-Annual report, there was little or no snow on the land portion of the lake basin as of early February. This continued to be true through the remainder of the winter, resulting in a lack of spring runoff from snowmelt. The lack of runoff from snowmelt, combined with scant precipitation in the spring and summer, resulted in below-average net basin supplies for all months from March through August 2012. The recent net basin supplies to Lake Erie are depicted relative to average in Figure 3.

A major portion of Lake Erie's total water supply comes from Lakes Michigan-Huron via the Detroit River. The level of Lakes Michigan-Huron continued to be well below the long-term average during the reporting period. As a result, inflows to Lake Erie via the Detroit River were about 6% below the long-term average for the six-month period March through August 2012. The monthly mean water level on Lakes Michigan-Huron and the monthly mean flow in the Detroit River are provided in Figures 4 and 5, respectively.

Lake Erie discharges water to Lake Ontario through the Niagara River and the Welland Canal. The portion of the Lake Erie outflow that is diverted through the Welland Canal is relatively small–about 4 to 5% of the total Lake Erie outflow–and is used for navigation purposes through the canal and for the generation of electricity at Ontario Power Generation's DeCew Falls hydroelectric plants. The major portion of the outflow from Lake Erie occurs through the Niagara River and depends on the level of the lake. Generally speaking, above-average water levels result in above-average outflows and below-average levels lead to below-average outflows. Flow is also influenced by ice in the river during the winter and aquatic plant growth in the river in the summer, which can reduce the flow. Recent monthly outflows via the Niagara River are graphically depicted in Figure 6. Consistent with the lake's above-average water level conditions during March and April, the Niagara River flow was above average during these two months. The lack of the usual ice retardation of the flow during those months, due to warm temperatures, also contributed to the higher-than-average flows. The lake's below-average water level conditions from May through August 2012 resulted in below-average Niagara River flows during those months.

The six-month water level forecast prepared at the beginning of September by the U.S. Army Corps of Engineers and Environment Canada indicates that the level of Lake

Erie is expected to continue to decline into December and will remain below average throughout the fall and winter unless very high supply conditions are experienced.

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* 2012	Average+ 1918-2011	Departure	Recorded* 2012	Average+ 1918-2011	Departure
March	174.36	174.07	0.29	572.05	571.10	0.95
April	174.31	174.22	0.09	571.88	571.59	0.29
May	174.27	174.30	-0.03	571.75	571.85	-0.10
June	174.22	174.33	-0.11	571.59	571.95	-0.36
July	174.14	174.31	-0.17	571.33	571.88	-0.55
August	174.04	174.25	-0.21	571.00	571.69	-0.69

*Provisional
+ Period of record is 1918-2011

TABLE 2 – MONTHLY AVERAGE PRECEPITATION ON THE LAKE ERIE BASIN

	Centimetres			Inches			
Month	Recorded* 2012	Average+ 1900-2008	Departure	Recorded* 2012	Average+ 1900-2008	Departure	Departure (in percent)
March	7.26	6.99	0.27	2.86	2.75	0.11	4
April	4.67	8.02	-3.35	1.84	3.16	-1.32	-42
May	3.76	8.51	-4.75	1.48	3.35	-1.87	-56
June	5.69	8.77	-3.08	2.24	3.45	-1.21	-35
July	7.92	8.60	-0.68	3.12	3.39	-0.27	-8
August	7.70	8.17	-0.47	3.03	3.22	-0.19	-6

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

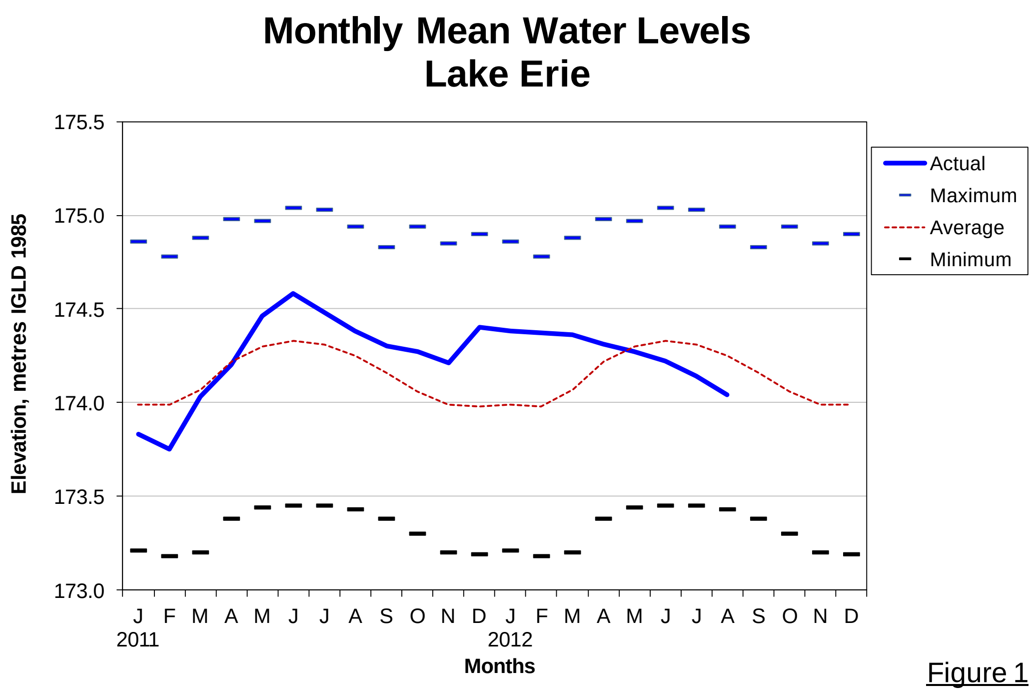


Figure 1

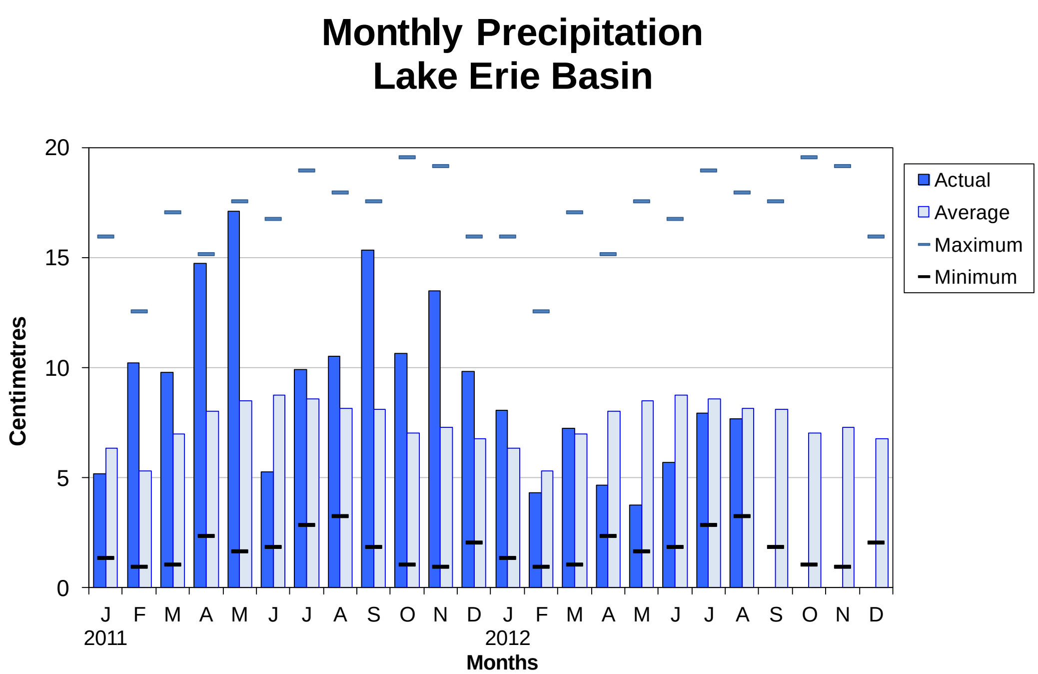


Figure 2

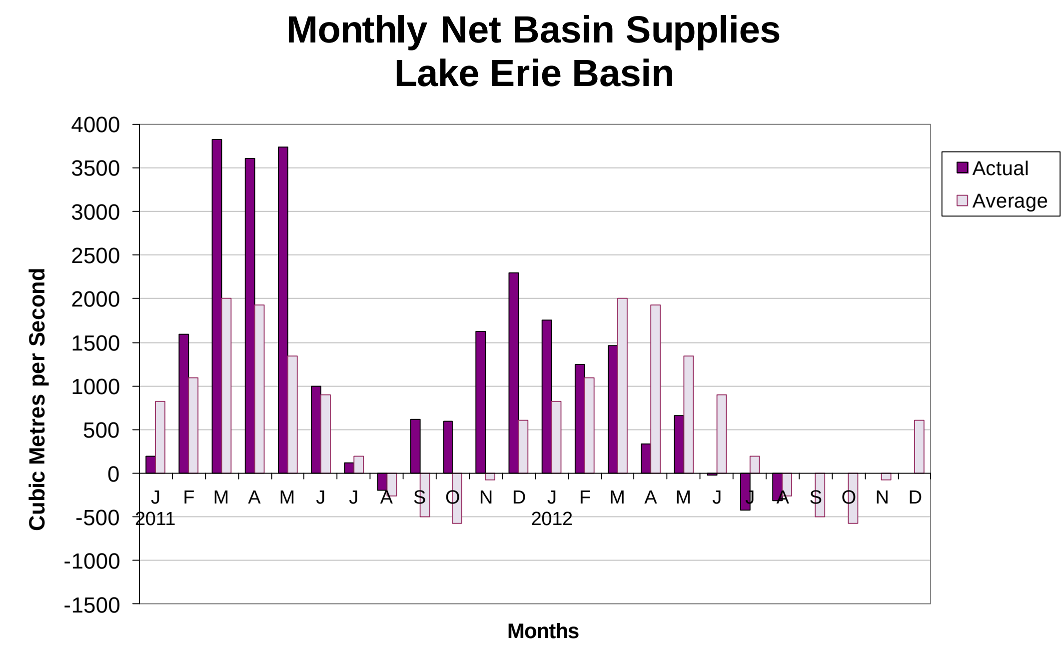


Figure 3

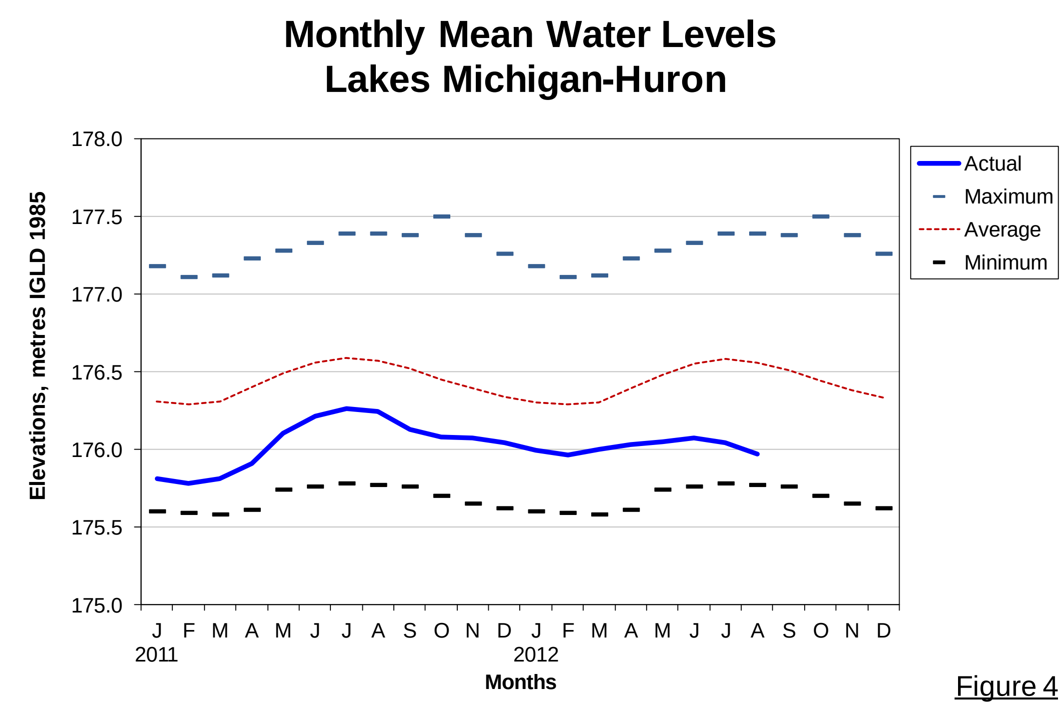


Figure 4

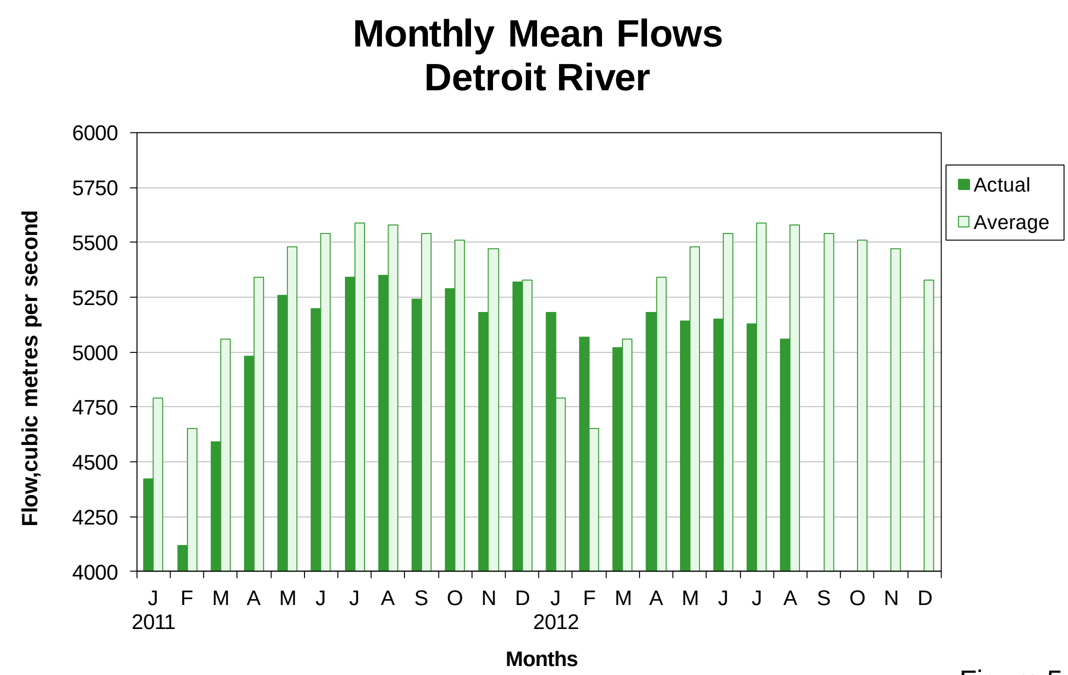


Figure 5

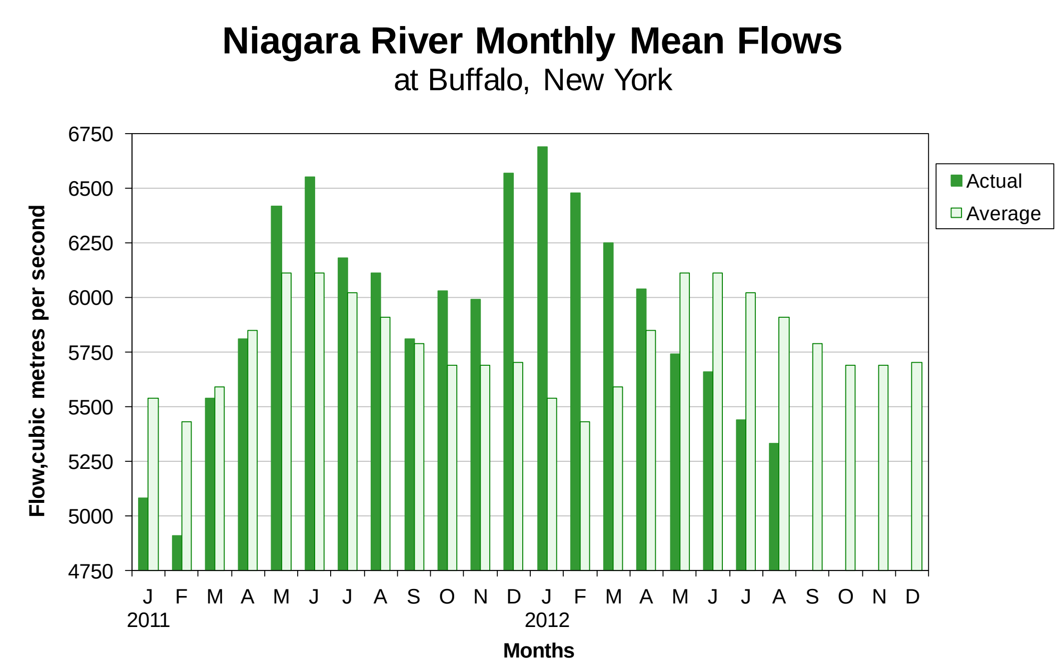


Figure 6

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 (INCW) to ensure the maintenance of an operational long-term average CGIP level of 171.16 m (561.55 ft) 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, 2012 was 0.46 metre-months (1.51 foot-months) above the long-term operational average elevation. The maximum permissible accumulated deviation is ± 0.91 metre-months (± 3.00 foot-months).

Tolerances for regulation of the CGIP level were suspended on April 24, 2012 for police diving operations. Tolerances were also suspended on July 8 and 9, 2012 due to actions taken in response to life-saving and/or emergency operations.

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 2012 are shown in Enclosure 2.

Gate 1 remains out-of-service for work on the Niagara Tunnel Project.

As a result of inspections performed by OPG in 2008, replacement of oil lines on Gates 1-13 of the INCW commenced in 2010 when work was initially completed on

Gate 2. Replacement of the oil lines on Gates 1, 3, 6, 7, 10 and 11 was completed in 2011. Work on Gates 4, 5, 8, 9 has been completed thus far in 2012, with work on Gates 12 and 13 currently underway, and expected to be completed by October 2012. Due to the different structural design, oil lines of the newer gates (Gates 14-18) do not need to be replaced. Gate 9 was removed from service in May 2012 for repairs to ice shields, and replacement of the trunion and wiper seals and rollway hinges. It is also expected to return to service in October 2012. Gate 13 was removed from service on June 12, 2012 due to the failure of a flexible hydraulic hose associated with the control system for the gate. Upon rupture of this hose, the gate dropped open and oil spilled inside the pier. There was no impact to the environment and the gate was returned to service on June 13. Replacement of all similar hydraulic hoses is being planned for the near future.

On August 14, 2012, the large ‘Dangerous Water’ sign located on the Welland River ice diverting structure was removed by OPG. The condition of the sign had deteriorated over time such that it was posing a significant hazard to boaters and pedestrians. Although OPG did not own the sign, it was removed by OPG with the knowledge of all stakeholders. OPG maintains other safety signage in the area.

4. 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).

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 ongoing 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 to determine the flows over Niagara Falls.

The Power Entities' gauge at Ashland Avenue was not reporting water level data for periods of time during April 26, May 2 to 4, June 5, June 24 and 25, July 7 to 9, and August 7, 2012 due to various telecommunications problems that occurred in the U.S. and/or Canada. During these periods, data from the NOAA gauge was used to calculate flow over Niagara Falls. Mitigating actions are being taken with telecommunications providers and by the Power Entities to reduce the number and duration of failures. A comparison of water level readings from the Power Entities' and NOAA's Ashland Avenue gauges showed that they were within the acceptable INC tolerances of ± 2 cm (± 0.8 in) on a daily basis during the remainder of the reporting period.

Water levels from the Material Dock gauge were unavailable for three hours on April 21, 2012 for diving inspection and cleanout of the gauge well, and from the evening of August 4, 2012 to the late afternoon of August 5, 2012 due to the failure of a communications modem. During these times, water level readings were obtained from the Slater's Point gauge. Water levels from the Slater's Point gauge were unavailable for four hours on March 8 due to a local power outage and from July 12 to 16, 2012, due to extended power outages and modem failure. The Slater's Point gauge was also unavailable for three hours on May 11, 2012 for diving inspection and cleanout. Water levels from the Fort Erie gauge were unavailable for a short duration on May 30, 2012 for diving inspection and cleanout of the gauge well. During this time, water level readings were obtained from the Buffalo telemark. Water levels from the Frenchman's Creek gauge were unavailable from May 6 to 7, 2012 due to a local power outage, for three hours on May 11, 2012 for diving inspection and gauge well clean out, and from July 24 to 25, 2012 due to the failure of the gauge's uninterruptible power supply.

All gauges required for the operation of the INCW were in operation during the remainder of the reporting period.

A temporary water level datalogger was installed at the Maid of the Mist Steamship Company dock by OPG on August 8, 2012. The datalogger is in place on a trial basis and will record water levels at this location during the ice-free season of 2012 and perhaps beyond. Once data is acquired and assessed, the case for installing a permanent water level gauge in the vicinity of this location, to act as an alternative for the Ontario Power Generating Station tailwater gauge, will be further investigated.

5. FLOWS OVER NIAGARA FALLS

During the tourist season day time 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 INCW, 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 times during the reporting period with the sole exception on July 8, 2012, as noted below. The recorded daily flow over Niagara Falls, covering the period March through August 2012, is shown in Enclosure 3.

During the evening of June 15, 2012, Mr. Nik Wallenda, a high wire artist, successfully walked across a wire suspended above the Horseshoe Falls section of Niagara Falls. Mr. Wallenda traversed the Canadian Horseshoe Falls from Terrapin Point on the U.S. side to Table Rock in Canada, beginning at 10:16 p.m. and finishing at 10:41 p.m. Under normal operations, the operators of the INCW would begin to reduce the flow over Niagara Falls from the tourist season day time flow to the night time values during this period. However, the Power Entities collectively elected to maintain the flow over Niagara Falls at a level equal to the normal tourist season day time flow during the entire period of Mr. Wallenda's walk. This was undertaken to mitigate any additional hazards that might be introduced as a result of significantly changing flow conditions in the immediate vicinity of the walk. Transition to tourist season night time flow was initiated immediately following the completion of Mr. Wallenda's walk. Therefore, the Falls flow minimum specified in 1950 Niagara Treaty was met or exceeded throughout the event. The Board's representatives were advised of the Power Entities' planned action in advance.

Actions were taken by the operator of the INCW shortly after 7:00 p.m. on July 8, 2012 to reduce Falls flow to assist the Niagara Falls, ON Fire Department marine unit in a successful rescue operation. At 7:10 p.m. on the 8^{th}, a disabled vessel with a single occupant was observed floating below the buoyed non-navigation line upstream of the INCW. All gates in the INCW were closed by 7:25 p.m. in an attempt to entrain the vessel in a safe area from which to facilitate a rescue. At 7:50 p.m., the disabled vessel, having reached a location approximately 305 m (1000 ft) upstream of the INWC, was under tow of the Niagara Falls Fire Department marine unit and removed to safety. The result was a Falls flow of 2671 m^3/s (94,320 cfs) for 8:00 p.m., which was 161 m^3/s (5,690 cfs) below the Treaty minimum requirement of 2832 m^3/s (100,000 cfs).

6. FALLS RECESSION

Several chronological descriptions of the historical configuration and events related to recent recession of the Falls exist in literature. The differences in description provide an interesting challenge for someone reviewing the Falls' history. As with recession itself, there are many published views on the mechanism responsible for it. The analysis, sorting, and summarization of the varying descriptions and mechanisms is beyond the scope of this report; however, in general most descriptions agree on several basic points and indicate that the rate of recession of the Horseshoe Falls has been quite variable. In the past, it appears that recession was faster when the Horseshoe had a well-defined horizontal notch in its crestline and slower when the crestline was in the form of a horizontal arch. Periods of rapid recession were observed following the formation of notches in the early and late 19th century.

As part of its activities, the Board monitors the Horseshoe Falls for changes in its crestline that might affect its scenic beauty. Satellite images and photographs taken by associates of the Board or others are reviewed for significant changes that might result in a broken curtain of water along its crestline or suggest the formation of a notch, which could signal a period of rapid falls recession, unseen in more than a century.

A review of satellite images of the Horseshoe Falls for July 2009 and March 2010 available on Google Earth indicated that a portion of the crestline located to the west of the central part or “apex zone” of the Falls had receded. Further investigation using oblique photographs indicated that the rockfall resulting in the change occurred sometime on August 20 or 21, 2009. The change in the crestline that occurred due to the rockfall can be seen in the difference between the April 19, 2006 and October 5, 2011 photographs shown on the cover of this report. Boxes have been added to highlight the area that changed.

During the early evening on July 18, 2012, staff on the Maid of the Mist Steamboat Company vessels that were near the Horseshoe Falls reported that they experienced what seemed to be a “little tsunami” that caused the boat closest to the Falls to bob up and down about 2 m (6.6 ft). In addition, the water below the Horseshoe Falls quickly changed to a muddy brown colour and stayed like that for an hour. They also reported a change in the current below the Falls that requires them to back the boats up instead of circling around after viewing the Falls. They suspected that a large chunk of rock had broken off and fallen into the water closer to the US side of the horseshoe. A review of oblique photographs taken by members of the public and posted to the Internet confirmed that a rockfall had occurred, resulting in a change in the crestline immediately to the west of the area affected by the August 2009 rockfall. The recent change is visible in the August 25, 2012 photograph provided on the report's cover.

Although visible in satellite images and oblique photographs taken from elevated vantage points, the change resulting from the 2009 and 2012 rockfalls has not resulted in a broken curtain of water over the length of the crestline nor, in the opinion of the Board, negatively affected the scenic beauty of the Falls. The Board will continue to monitor the crestline for changes that affect the scenic beauty of the Falls, or may suggest the formation of a notch that might signal that the Horseshoe Falls is entering a period of rapid recession.

7. 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 previously in Section 5 of this report.

The hydro power plants, OPG's Sir Adam Beck (SAB) I and II 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, ON and Lewiston, NY, respectively.

During the period of March through August 2012, diversion for the SAB I and II plants averaged 1555 m^3/s (54,910 cfs) and diversion to the Robert Moses Niagara Power Project averaged 1852 m^3/s (65,400 cfs).

The average flow from Lake Erie to the Welland Canal for the period March through August 2012 was 246 m^3/s (8,690 cfs). Diversion from the canal to OPG's DeCew Falls

Generating Stations averaged 193 m^3/s (6,820 cfs) for the period March through August 2012.

Records of diversions for power generation covering the period March through August 2012 are shown in Enclosure 4.

The monthly average Niagara River flows at Queenston, Ontario, for the period of March through August, and departures from the 1900-2011 long-term average are shown in Table 3. Maximum and minimum monthly average flows, for the period of record 1900-2011, are shown in Table 4. During the period March through August 2012, the flow at Queenston averaged 5777 m^3/s (204,010 cfs), with the monthly average ranging between 5315 m^3/s (187,700 cfs) and 6360 m^3/s (224,600 cfs). The flow at Queenston for the same period in 2011-12 averaged 5957 m^3/s (210,370 cfs), with the monthly averages ranging between 5653 m^3/s (199,630 cfs) and 6561 m^3/s (231,700 cfs). As indicated in Table 3, the monthly Niagara River flow at Queenston decreased from March through August. This is consistent with the impact of the steady decline in the level of Lake Erie experienced during the spring and early summer of 2012 that resulted in lower outflow to the Niagara River.

TABLE 3 - MONTHLY NIAGARA RIVER FLOWS AT QUEENSTON

	Cubic Metres per Second			Cubic Feet per Second		
Month	Recorded 2012	Average 1900-2011	Departure	Recorded 2012	Average 1900-2011	Departure
March	6360	5640	720	224,600	199,170	25430
April	6112	5893	219	215,840	208,110	7730
May	5773	6093	-320	203,870	215,170	-11300
June	5656	6067	-411	199,740	214,250	-14510
July	5444	5968	-524	192,250	210,760	-18510
August	5315	5957	-642	187,700	210,370	-22670

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	7320	1974	4130	1934	258,500	145,850
April	7550	1974	4380	1935	266,630	154,680
May	7560	1974	4530	1934	266,980	159,980
June	7610	1986	4470	1934	268,740	157,860
July	7510	1986	4360	1934	265,210	153,970
August	7190	1986	4370	1934	253,910	154,330

8. Flow Measurements in the Niagara River and Welland 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 flow in these channels for water management purposes. All measurements are obtained through joint efforts of the U.S. Army Corps of Engineers and Environment Canada. Measurement programs require boats, equipment and personnel from both agencies to ensure safety, quality assurance checks between equipment and methods, and bi-national acceptance of the data collected. These agencies continue their efforts to standardize measurement equipment and techniques.

Regularly scheduled measurements are taken near the International Railway Bridge on a 3-year cycle to provide information for evaluating stage-discharge relationships for flow entering the Niagara River from Lake Erie. The most recent discharge measurements near the International Railway Bridge were taken in May 2012. As a result of reviewing previous discharge measurements made near the International Railway Bridge, a revision of the 2001 Buffalo rating equation is being proposed and is under review by the Board’s Working Committee. The Buffalo rating equation is used in Great Lakes water supply routing models to estimate the flow in the Niagara River and to verify other Niagara River flow estimates.

Discharge measurements are made in the American Falls Channel on a 5-year cycle to verify the rating equation for the flow in this channel. The 1978 American Falls equation is used to ensure 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 CGIP, the Board monitors this relationship. Historically, measurements were made from the pedestrian bridges between Goat Island, Green Island and the U.S. mainland, using conventional measurement methods. However, prior to the planned 2005 measurement series, a temporary superstructure was placed over the main pedestrian bridge requiring the establishment of an alternate measurement technique, which delayed the 2005 measurements. Subsequently, in May 2007, Acoustic Doppler Current Profiler (ADCP) measurements were successfully made at a new location on the channel, closer to the American Falls gauge, using a tethered boat. The measurements matched the rating equation very well, with a maximum difference of 2%. On May 8 and 9, 2012, discharge measurements in the American Falls Channel using a remote control boat were made as part of the regular measurement cycle at this location. Preliminary results indicate that the 2012 measurements also fit the rating.

Discharge measurements are made on a 3-year cycle at the Cableway section, located just upstream of the OPG and NYPA hydroelectric generating stations at Queenston-Lewiston, to verify the 2009 Ashland Avenue gauge rating of the outflow from the Maid-of-the-Mist Pool below the Falls. The Ashland Avenue gauge is used to determine the flow over Niagara Falls for purposes of the 1950 Niagara Treaty. Discharge measurements were last conducted near the Cableway section in October 2010 and, following the regular measurement schedule for this site, are planned again for the fall of 2013. As such, no Board required discharge measurements are planned near the Cableway section in 2012.

In the spring of 2007, ADCP technology replaced the use of conventional current meter measurements at the Cableway section. This made the continued use of the flow measurement cableway that spanned the Niagara River at the Cableway section redundant. After a one-year delay, resulting from a rock slide prior to the originally scheduled removal date in May 2011 that prevented safe access to the cable anchor point on the Canadian side of the gorge, the contractor engaged by NYPA on behalf of both Power Entities successfully removed the cableway during the first week of April 2012. The cableway removal was co-funded by NYPA and OPG under the Power Entities' Niagara Joint Works Budget.

Discharge measurements are made on a 3-year cycle in the Welland Supply Canal above Weir 8 to verify the Weir 8 rating, which is used in the determination of flow through the Welland Canal. Regularly scheduled measurements were last made in the Welland Supply Canal in May 2010. However, due to the St. Lawrence Seaway Management Corporation's inability to provide water level data for the time of the 2010 measurements, these measurements could not be used to verify the rating. Therefore, off-schedule measurements were made in the Welland Supply Canal on May 3, 2012 to address the lack of results from the 2010 measurements. The preliminary analysis of the data from the 2012 measurements indicates that the measurements fit the current rating, which is based on the 2007 and 2009 measurement series. Therefore, it is anticipated that the next regularly scheduled measurements in the Welland Supply Canal will take place in 2015 as part of a new 3-year cycle.

The rated Weir 8 discharge is currently based on data provided by an Acoustic Doppler Velocity Meter (ADVM) and water level gauging equipment installed by the St. Lawrence Seaway Management Corporation. In order to provide redundancy for this installation, a second set of Acoustic Doppler Velocity Meter (ADVM) and water level gauging equipment will be installed upstream of the existing ADVM by the Seaway Corporation. When the new equipment becomes operational, discharge measurements at the Weir 8 site will be required in order to develop a Weir 8 rating for this new installation. These measurements may be in addition to the anticipated Weir 8 scheduled event.

9. NIAGARA TUNNEL PROJECT AND PLANT UPGRADES

OPG continues with the construction of the Niagara Tunnel Project. Placement of the invert (bottom) concrete lining had been completed on July 30, 2012. As of September 17, 2012, the arch (top) concrete lining had progressed to 8950 m (29,364 ft). The new tunnel will provide increased water diversion capability for OPG's SAB complex, and is expected to be in service by December 2013. The increased diversion capacity will enable OPG's SAB plants to 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 Board's 1993 Directive.

OPG has also undertaken a unit runner replacement program for its 60 Hz SAB I units. Work to replace the G3 runner and for a generator re-wind started in April 2012 and is expected to be complete by March 2013.

The SAB I units were originally built with Johnson Valves at the bottom of the penstocks that could be activated to stop water from entering the units. These valves are currently being removed and their function replaced with headgates that can prevent water from entering the penstocks. As the units are upgraded, sleeves will be installed where the Johnson Valves were removed to improve flow through that portion of the penstock. A sleeve was not installed when G7 was initially upgraded. The unit was taken out of service again, from early March 2011 until late-February 2012, to complete this work. Although an Index Test for G7 was scheduled for May 2012, it was postponed because of vibration problems with the unit. It is recognized that the rating tables currently being used for G7 do not reflect the improvements in performance of the unit expected with the installation of the Johnson Valve sleeve because the table was based on earlier model tests, and that they may result in a slight over-reporting of the water used by the unit. OPG is working to resolve the issues with G7.

10. MEETING WITH THE PUBLIC

In accordance with the Commission's requirements, the Board held an annual meeting with the public. This year's meeting was held during the evening of September 12, 2012 at the Earl W. Brydges Public Library in Niagara Falls, NY with thirteen members of the public in attendance. Information was provided on the mandate and activities of the Board, current and projected Great Lakes water levels, the operation of the Lake Erie-Niagara River Ice Boom, and the OPG Niagara Tunnel Project.

11. MEMBERSHIP OF THE BOARD AND ITS WORKING COMMITEE

Mr. William H. Allerton, U.S. Federal Energy Regulatory Commission, was appointed as a member of the U.S. section of the Board for a 3-year term beginning on May 1, 2012. Mr. Allerton's appointment fills the vacancy created by the retirement of Mr. Dan Mahoney at the end of September 2011.

Colonel John D. Drolet, alternate U.S. Section Chair, retired on August 3, 2012. Colonel Robert D. Peterson was named the new alternate U.S. Section Chair on September 7, 2012.

Mr. Jacob Bruxer, Environment Canada, was appointed by Mr. Thompson to the position of Canadian Co-Chair of the Board's Working Committee on June 21, 2012.

Lieutenant Colonel Stephan H. Bales passed command of the Buffalo District of the U.S. Army Corps of Engineers to Lieutenant Colonel Owen J. Beaudoin on June 21,

2012. In doing so, LTC Beaudoin also succeeded LTC Bales as U.S. Co-Chair of the Board's Working Committee.

Ms. Lori Gale, from the New York Power Authority, joined the U.S. Section of the Board's Working Committee on August 9, 2012, filling the vacancy created by the retirement of Mr. Doug Harding in July.

12. ATTENDANCE AT BOARD MEETINGS

The Board met once during this reporting period. The meeting was held September 20, 2012 in Lansdowne, ON. Mr. Thompson, Canadian Section Chair, Col. Peterson, alternate U.S. Section Chair, Ms. Keyes, Canadian Member, and Mr. Allerton, U.S. Member, were in attendance.

Respectfully Submitted,

Original Signed by
COL Robert Peterson, Alt. Chair

Original Signed by

Mr. AARON F. THOMPSON
Chair, Canadian Section

For:

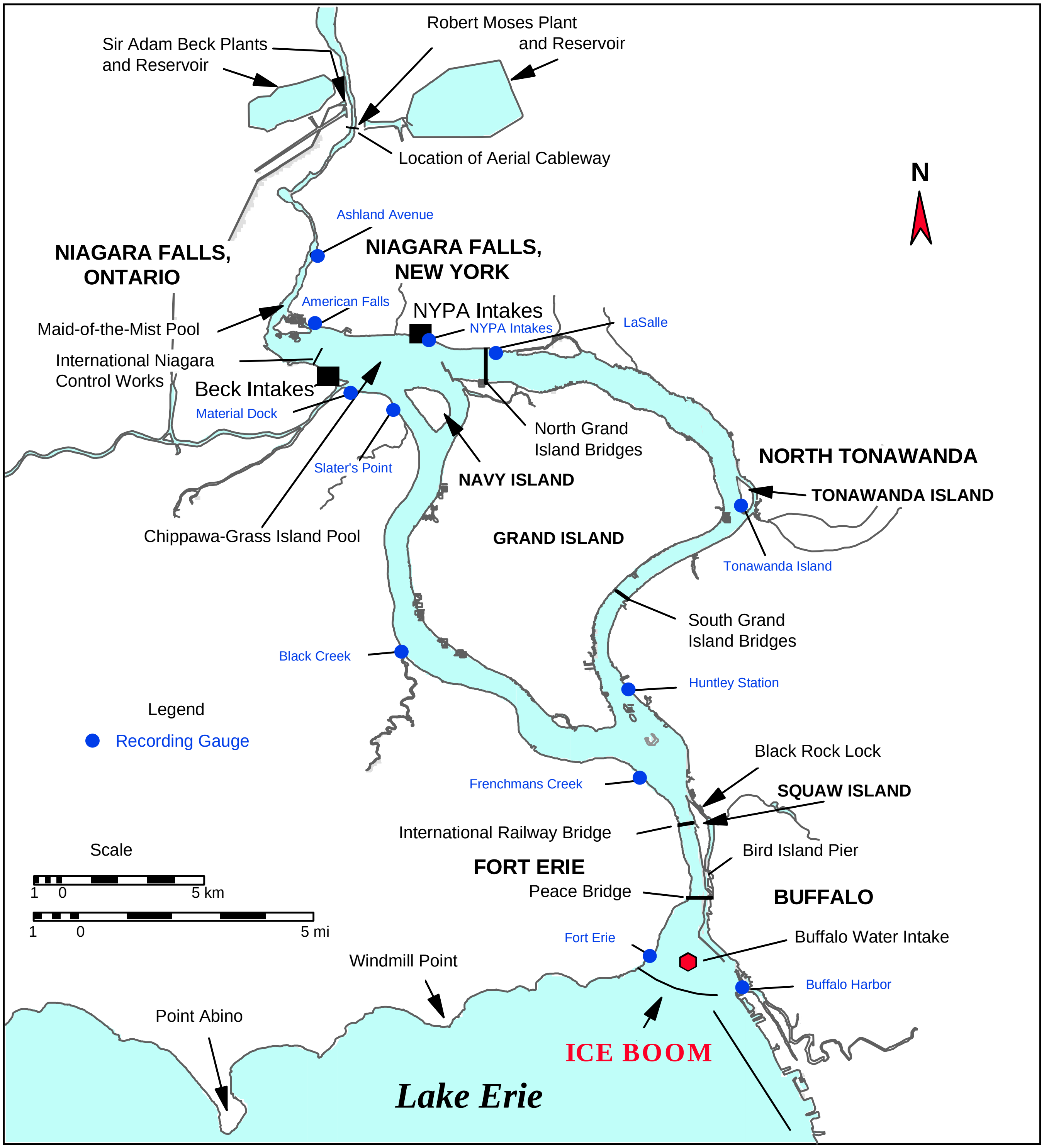
BG MARGARET W. BURCHAM
Chair, United States Section

Original Signed by:

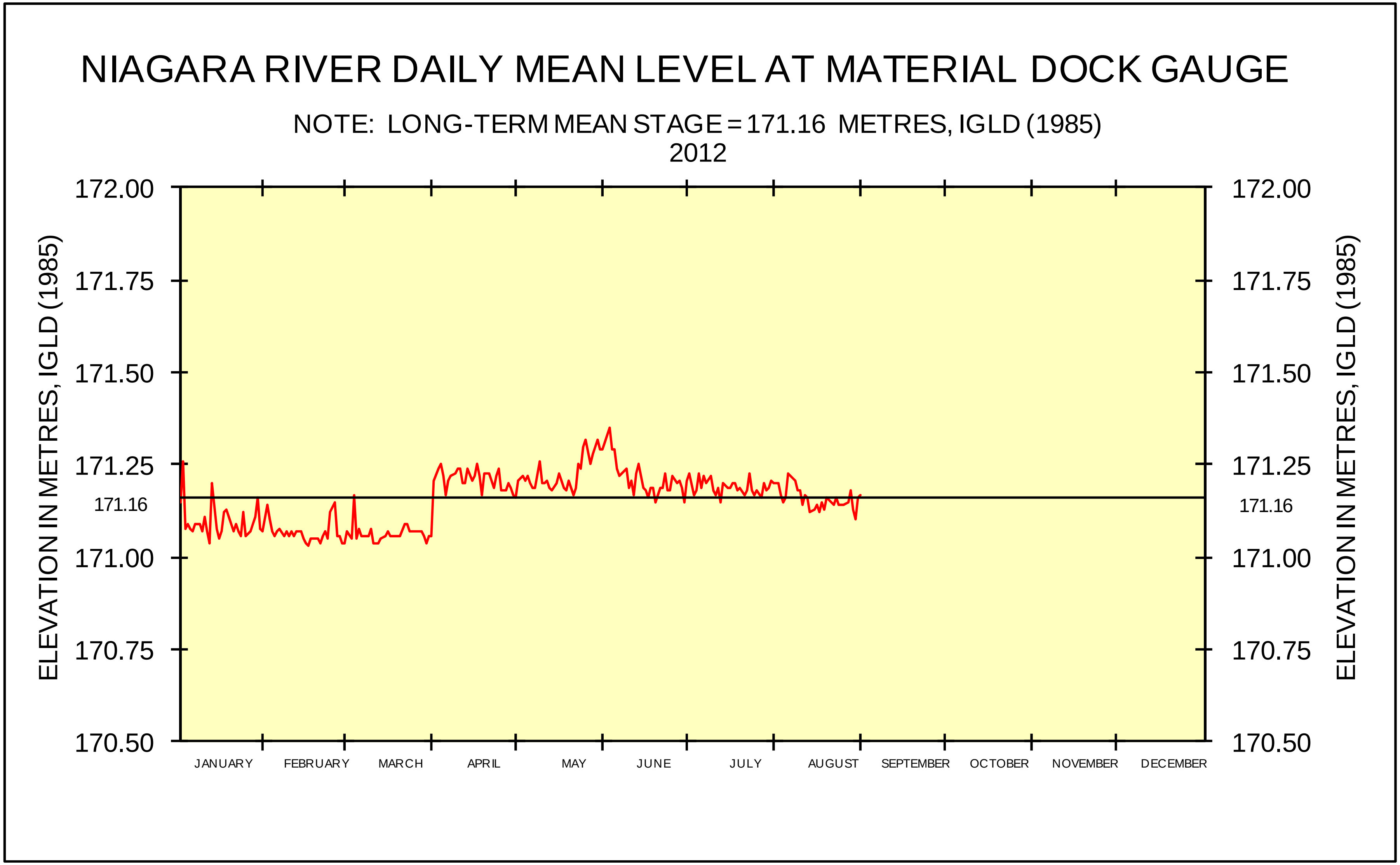
Ms. JENNIFER L. KEYES
Member, Canadian Section

Original Signed by:

Mr. William H. Allerton
Member, United States Section

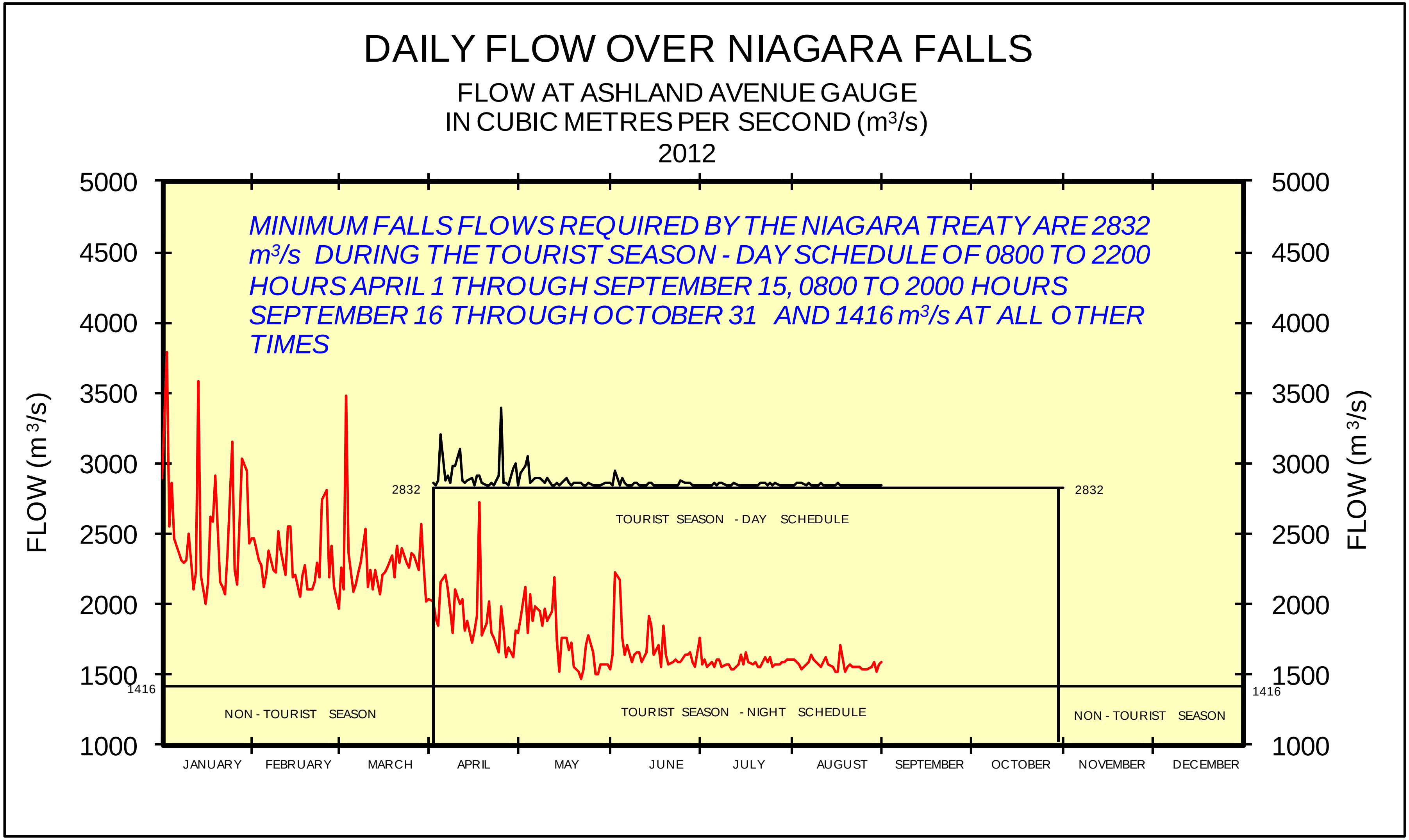

Robert Moses Plant
and Reservoir
Sir Adam Beck Plants
and Reservoir
Location of Aerial Cableway
N
Ashland Avenue
NIAGARA FALLS,
ONTARIO
NIAGARA FALLS,
NEW YORK
American Falls
NYPA Intakes
NYPA Intakes
LaSalle
Maid-of-the-Mist Pool
International Niagara
Control Works
Beck Intakes
Material Dock
North Grand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

ENCLOSURE 1

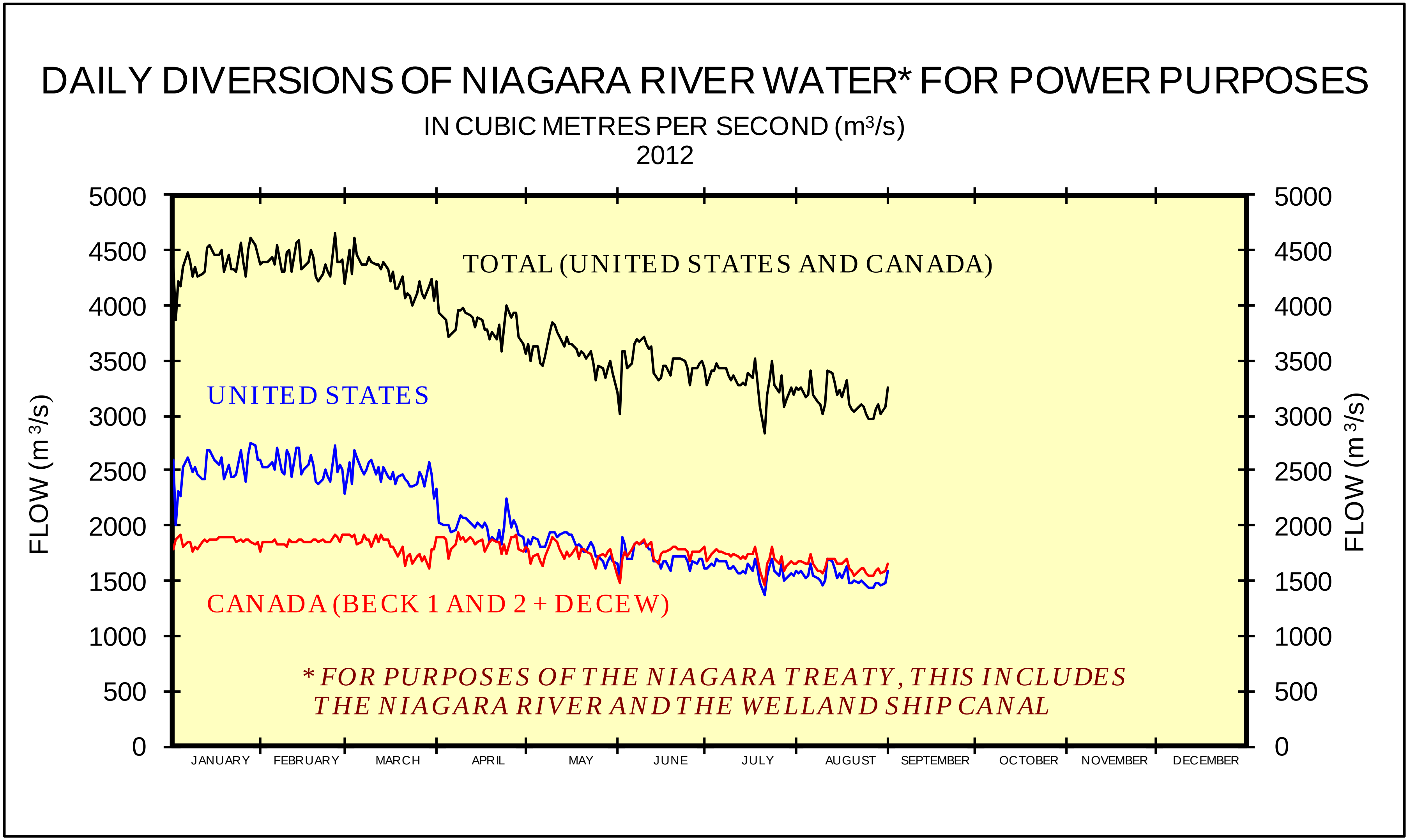


NIAGARA RIVER DAILY MEAN LEVEL AT MATERIAL DOCK GAUGE
NOTE: LONG-TERM MEAN STAGE = 171.16 METRES, IGLD (1985)
2012
ELEVATION IN METRES, IGLD (1985)
172.00
171.75
171.50
171.25
171.16
171.00
170.75
170.50
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

ENCLOSURE 2


DAILY FLOW OVER NIAGARA FALLS
FLOW AT ASHLAND AVENUE GAUGE
IN CUBIC METRES PER SECOND (m³/s)
2012
MINIMUM FALLS FLOWS REQUIRED BY THE NIAGARA TREATY ARE 2832 m³/s DURING THE TOURIST SEASON - DAY SCHEDULE OF 0800 TO 2200 HOURS APRIL 1 THROUGH SEPTEMBER 15, 0800 TO 2000 HOURS SEPTEMBER 16 THROUGH OCTOBER 31 AND 1416 m³/s AT ALL OTHER TIMES
FLOW (m³/s)
5000
4500
4000
3500
3000
2500
2000
1500
1000
2832
1416
TOURIST SEASON - DAY SCHEDULE
NON - TOURIST SEASON
TOURIST SEASON - NIGHT SCHEDULE
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)
2012
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 (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