International Lake Superior
Board of Control

Semi-Annual Progress Report to the International Joint Commission

Covering the period September 18, 2009 to March 8, 2010

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International Lake Superior Board of Control

United States
MG John W. Peabody, Member
Mr. John W. Kangas, Secretary

Canada
Mr. David Fay, Member
Mr. Rob Caldwell, Secretary

March 8, 2010

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

Commissioners:

This semi-annual report covers the Board's activities from September 18, 2009 to March 8, 2010.

1. Highlights

During the past six months, the water levels of lakes Superior and Michigan-Huron remained below average but were higher than comparable levels last year.

The level of Lake Superior has been consistently below average since April of 1998, which is the longest sustained period of below-average monthly levels in the 1918-2008 period of record. The level of Lakes Michigan-Huron has been below average since January of 1999, the second longest period on record of consistently below average levels.

The Lake Superior outflows were as specified by Regulation Plan 1977-A. Since September, the monthly outflows from the lake have been between 79 and 103% of average. The Lake Superior and Lake Michigan-Huron net basin water supplies were below average over the September 2009 through February 2010 period.

Ponding by the hydropower entities was allowed during the entire reporting period.

Proposals are under consideration by the Board to study improvement of sea lamprey trapping efficiencies and to study the St. Marys Rapids fish habitat.

2. Monitoring of Hydrologic Conditions

The Board continuously monitors the water levels of lakes Superior and Michigan-Huron, and the water levels and flows in the St. Marys River. The Regulation Representatives' monthly reports to the Board provide hydrologic assessments and recommendations on the regulation of outflows from Lake Superior. These reports indicate the amount of water available for hydropower purposes, after the requirements for domestic use, navigation, and the fishery (St. Marys Rapids) were met.

Tables 1 and 2 list the recent monthly water levels, net basin supplies, and outflows for lakes Superior and Michigan-Huron, respectively. Figure 1 compares the monthly water levels for this period to long-term averages and extremes. Figure 2 shows the monthly precipitation over the lakes Superior and Michigan-Huron basins. Figure 3 shows the monthly net basin supplies for the basins.

Overall, precipitation over the Lake Superior basin was below average for the period from September 2009 through February 2010 at 77% of average for the period and would be expected to be exceeded 93% of the time. September, November, January and February were below average, while October and December were above average. Net basin supplies, which are the net effect of precipitation, evaporation and runoff to the lake, were below average for September, October, January and February and above average for November and December. The September through February net basin supply to Lake Superior was below average and would be expected to be exceeded 79% of the time.

Lake Superior's water levels remained below average during the period. Levels were above chart datum (183.2 m or 601.1 ft) from September through mid-January, falling below datum January 16, 2010 where they are expected to remain until May. Monthly mean Lake Superior levels between September and February ranged from 11 cm (4.3 in) to 16 cm (6.3 in) below their long-term averages. On March 8, 2010, its level was 183.08 (600.66 ft), which was the same as its level a year ago and 16 cm (6.3 in) below average. The level of Lake Superior has been consistently below average since April 1998, which is the longest sustained period of below average monthly levels in the 1918-2008 period of record.

Modeled snow water equivalent (SWE) values as of the beginning of February 2010 show less water available from snow melt than this time last year. Snow survey flights to determine the snow pack on the entire Lake Superior basin were flown March 5 - 9, 2010. SWE was 25% below average, similar to last year. Note that the correlation between SWE and lake level rise is limited.

Precipitation over the Lakes Michigan-Huron basin was 81% of average for the reporting period and would be expected to be exceeded 88% of the time. Precipitation for the months of September, November, January and February was below average while it was above average for October and December. Net basin supplies for September, November, December, January and February were below average. The October supply was above average. Supplies for the period would be expected to be exceeded more than 72% of the time.

Monthly mean Lakes Michigan-Huron levels ranged from about 12 cm (4.7 inches) to 19 cm (7.5 in) below long-term averages from September through February. Water levels were above chart datum 176.0 m (577.5 ft.) for the entire September through February reporting period and are expected to remain above datum well into 2010. On March 8, 2010 the level of Lakes Michigan-Huron was at 176.09 m (577.72 ft), 22 cm (8.7 in) below the long-term average and 2 cm (0.8 in) higher than a year ago. The level of Lakes Michigan-Huron has been below average since January 1999, the second longest sustained period of below-average monthly levels on record.

3. Regulation of the Outflow from Lake Superior

The outflows of Lake Superior were as specified by the Regulation Plan 1977-A from September through February. Lake Superior outflows were 88% of average during the reporting period ranging from 1,750 m^3/s to 2,110 m^3/s (61.8 to 74.5 tcfs). Outflows were not limited by Criteria (c) during the reporting period.

The gate setting at the Compensating Works supplying the main portion of the St. Marys Rapids was at an equivalent one-half gate open, four gates set at 20 cm (8 inches), for the September through February period. Gate No. 1, which supplies water to the Fishery Remedial Works, remained set at 15 m^3/s (530 cfs) throughout the period.

Brookfield Renewable Power's gate refurbishment program continued starting on June 17, 2009. Compensating Works Gates 7, 8, 9 and 10 were closed and Gates 2, 11, 13 and 15 were opened 20 cm (8 in) to maintain the one-half gate equivalent open setting and to accommodate safety considerations. Dewatering structures were installed at Gates 6 and 8 for the refurbishment. On October 28, 2009 Gates 2, 11, 13 and 15 were closed and Gates 7, 8, 9 and 10 were raised to 20 cm (8 in) open. Gates 7, 8, 9 and 10 are the gates that are normally used in order to give better flow distribution across the rapids area at the one-half gate equivalent setting. When the gate refurbishment program resumes in spring 2010 for work on Gates 1 and 2, appropriate gate adjustments will again be made to accommodate the work and safety considerations. Note that progress with work on Gate 1 is subject to approval of the Batchewana First Nation, Ontario Ministry of Natural Resources and Department of Fisheries and Oceans as discussed below in Section 5.

Several scheduled as well as some unexpected flow reductions were experienced at the three hydropower plants. All flow reductions were easily offset within each month. When units were taken off-line, water levels at the U.S. Slip gauge fell but quickly rose again as idled units were brought back on-line. No problems related to water levels were reported as a result of these variations. No ships were reported delayed due to the flow variations. Details are provided in Section 6.

4. Governing Conditions during the Reporting Period

The monthly mean levels of Lake Superior ranged between 183.14 m and 183.42 m (600.85 ft. and 601.77 ft.), within the limits of 182.76 m and 183.86 m (599.6 ft. and 603.2 ft.) specified in the Commission's Orders of Approval.

The daily mean water levels in the lower St. Marys River at the U.S. Slip Gauge downstream of the U.S. Lock varied between elevation 176.25 m and 176.78 m (578.25 ft and 579.99 ft.) from September 18 through March 8. Thus, the requirement for maintaining the level below 177.94 m (583.8 ft.) was satisfied. The daily mean U.S. Slip gauge level was below chart datum of 176.39 m (578.7 ft.) for one day in November, eight days in December, three days in January 2010, six days in February 2010 and eight days in March during the reporting period.

5. Inspections and Repairs at the Compensating Works

Ongoing routine maintenance and inspections of the Compensating Works were undertaken in the past six months. The structure is generally in good condition.

On the Canadian side of the structure, Brookfield Renewable Power's major multi-year repainting and refurbishment program recommenced on June 17, 2009, with completion of 2009's two-gate phase (Gates 6 and 8) on October 22, 2009. Blast cleaning and painting were carried out. Other activities included concrete and mechanical repairs.

Work is expected to recommence in June 2010 focusing on Gates 1and 2. Flow must be maintained to support the fishery while work on Gate 1 is in progress. Brookfield Renewable Power has proposed to install box culverts, with adjustable steel plate gates, on the apron upstream of Gate 1. This will allow flows to be maintained and controlled while allowing Gate 1 to be moved to make it accessible for inspection, repair and any necessary cleaning and painting. Brookfield Renewable Power has submitted this proposal to the Batchewana First Nation resource and project management staff and to the Ontario Ministry of Natural Resources and Department of Fisheries and Oceans. Brookfield Renewable Power's proposal would require closure of Gate 1 for short periods (less than a day) for the safety of personnel while the box culverts are installed during 2010 and during future repairs or inspections, as may be required from time to time. The response to date has been favorable from all three groups but formal approval has not yet been received.

The five year periodic inspection of the Compensating Works is scheduled for late May.

6. Repairs and Maintenance at the Hydropower Facilities

a. U.S. Government Hydropower Plant

As reported previously, the runner for Unit No. 10 was damaged by cavitation. A contract for repairs was awarded to United Kaiser in September 2009. Unit 10 was taken out of service for repairs November 5, 2009. Repairs were completed and the unit put back on line February 12, 2010. The Unit was taken off line when vibration problems developed. It was determined that the shaft bearing needed to be re-shimmed. The shaft is being re-shimmed and the unit is expected back on line March 11, 2010.

During the September through February period units were taken off line at various times for a total of 38.28 hours to correct electrical faults and for scheduled maintenance. Flow allocations were met during the reporting period. ESELCO's plant utilized all of the allocation that the government plant was unable to use.

b. Brookfield Renewable Power

The plant was shut down for about 13 hours on September 19, 2009 to facilitate the annual underwater cable inspection and maintenance for Lake Superior Power, Ltd.

Outages of Unit G2 were experienced on November 2, 11, 13 and 16. The problem was determined to be with the speed control sensor unit ("tach pack") for the generator. Repairs have been made. Another outage of Unit G2 occurred on January 28 due to the same problem. The unit was shut down for an hour on February 3 to install monitoring devices, but the problem has not yet been isolated further.

c. Edison Sault Electric Company

Routine maintenance was conducted during the reporting period. Work in the power canal started October 7, 2009 and ended December 9, 2009. Work is expected to resume in September 2010 and end about November 1, 2010. During the reporting period all flow allocations were utilized.

7. Flow Verification Measurements

No flow verification measurements were performed during the reporting period. Discharges from all three hydropower plants have been determined to be in compliance. Hydropower canal verification measurements are now made on a five year cycle starting with the next five year periodic inspection scheduled for summer 2010. Compensating Works flow verification measurements may be scheduled in 2011, following completion of Brookfield Renewable Power's refurbishment program.

8. Water Usage in the St. Marys River

Table 3 (Table 4 in cubic feet per second) lists the distribution of outflows from Lake Superior for January 2009 through February 2010. Water uses are divided into four categories: domestic, navigation, fishery, and hydropower. According to the 1979 Supplementary Order, after the first three water requirements are satisfied, the remaining outflow is shared equally between the U.S. and Canada for hydropower purposes. Any remainder, beyond the flow capacity of the hydropower plants, is discharged through the Compensating Works into the St. Marys Rapids.

As shown in the tables, the monthly mean amounts of water used for domestic and industrial purposes ranged from 9 to 11 m^3/s (318 to 388 cfs), or 0.5% to 0.6% of the total monthly outflow from September 2009 through February 2010.

The monthly flow through the U.S. and Canadian locks depends on traffic volume and varied from 3 to 12 m^3/s (106 to 420 cfs), As a percentage of the total river flow, water allocated for navigation varied seasonally from as little as 0.2% (when the locks were closed for the winter) to about 0.6% of the total river flow in the busiest part of the reporting period.

The U.S. locks closed on January 15, 2010, as scheduled and will re-open on March 21, 2010, four days earlier than usual to facility transport of iron ore and coal to rebuild low inventories. The opening of the Canadian lock at Sault Ste. Marie, Ontario was delayed until August 2, 2009 following a serious malfunction of the lock gate closure system on October 1, 2008. A mechanical failure of the lock's two upstream valves resulted in a closure from August 25 until September 4, 2009. The lock closed for the season as usual on October 15,

2009.

The Canadian lock will be closed during 2010 to allow for upgrades to the site infrastructure. The Lock will be drained for inspection and repairs. The lock baffle wall will be rebuilt and water infiltration into the powerhouse will be addressed. Boaters will have access via the U. S. locks at the Soo. The lock is expected to reopen in 2011.

In accordance with the Commission's Orders to fulfill the fishery needs in the main rapids, a minimum gate setting of one-half gate open is required at all times at the Compensating Works. A setting equivalent to one-half gate open for the main rapids is maintained by having four gates partially open to supply the same quantity of water as one gate half open. This spreads the flow more evenly across the main rapids, and is thought to reduce potential damage from ice floes impacting the gates in the winter. In addition, a flow of at least 15 m^3/s (530 cfs) is required in the Fishery Remedial Works (through Gate 1). The flow in the St. Marys Rapids, including that through the Fishery Remedial Works, ranged from 84 to 86 m^3/s (2,966 to 3,037 cfs) between September 2009 and February 2010.

The hydropower plants used an average of 1,765 m^3/s (62.3 tcfs) from September 2009 through February 2010 for electric power production. The allocation for this period averaged 1,766 m^3/s (62.4 tcfs). Usages at each plant are shown in Tables 3 and 4.

9. Long Lac and Ogoki Diversions

Ontario Power Generation (OPG) continued to provide the Board with information on the operations of the Long Lac and Ogoki Diversions. The Ogoki Diversions into Lake Nipigon (which flows into Lake Superior) averaged 100.6 m^3/s (3,600 cfs) and the Long Lac Diversion averaged 27.5 m^3/s (1,000 cfs) from September through February. Combined, these diversions were about 92 percent of average for the period 1944-2009.

Slots cut into Waboose Dam provide a minimum flow northward into the Ogoki River of approximately 2 m^3/s to meet fisheries requirements. "Slot flow" (averaging 2.3 m^3/s (80 cfs)) was passed after November following a period of very wet weather, during which extra flow had been spilled northward to prevent localized flooding.

Continuous flows of at least 2 m^3/s (70 cfs) are maintained from the Saturday of Victoria Day weekend (in May) through Labor Day from the north outlet of Long Lake (Kenogami Dam) for environmental enhancement. No additional water was spilled from September through February.

10. Peaking and Ponding Operations at Hydropower Plants

Peaking and ponding operations are the within-day and day-to-day flow variations that enable the hydropower plants to better match their electricity production with demand. However, these variations cause the water levels in the St. Marys River downstream of the plants to fluctuate more than they otherwise would. The Commission has approved guidelines within which the Board may restrict peaking and ponding operations by the

hydropower entities under certain conditions. Specifically, if the minimum level at the U.S. Slip gauge on the lower river is expected to be below the threshold level of 176.09 m as a result of ponding operations, then the power entities are required to pass peak flows for at least an 8-hour period each day to provide periods of relatively higher levels on the lower St. Marys River each day. The Board provides summaries of peaking and ponding in its semi-annual reports.

The Commission's guidelines are to be examined on a five year basis by the Board, starting with the last year of the International Upper Great Lakes Study or 2010, whichever comes first. At its September 2009 semi-annual meeting the Board agreed to request a postponement of the required 2010 review requirement as a peaking and ponding review is part of the terms of reference of the IUGLS, and studies have been proposed. The Board will send a letter to the Commission requesting that the peaking and ponding report be postponed pending completion of the proposed studies and the IUGLS.

During the reporting period, the power entities undertook peaking and ponding operations under the supervision of the Board. From September 2009 through January 15, 2010 the weekend minimum levels at the U.S. Slip site were expected to be above the threshold level. As a result, ponding by the hydropower companies was allowed on weekends and holidays. From January 16, 2010 through March 8, 2010 levels were of no concern to navigation and ponding was permitted.

To continue to provide timely information on expected flow variations to the users, the Corps distributes monthly notices during the shipping season (March through January) on expected Lake Superior outflows, and a schedule of flow variations at the hydropower plants. No concerns related to peaking and ponding were reported to the Board during the period. While lake levels were higher than last year they continued to be below average presenting a continuing problem to shippers requiring light loading of vessels in many cases.

Figures 4a – 4f compare the hourly Lake Superior outflow and the hourly levels at U.S. Slip on the lower St. Marys River. U.S. Slip levels were higher than levels during the September through February period last year.

11. Proposed Environmental Studies

a. Sea Lamprey Trapping Experiments

Dr. Scudder Mackey, Project Manager, Ecosystem Technical Working Group, International Upper Great Lakes Study (IUGLS) together with the Great Lakes Fishery Commission prepared a study proposal to test the potential for improving sea lamprey trapping efficiencies at the traps located immediately downstream of the hydropower plants at Sault Ste. Marie by altering the temporal distribution of St. Marys River flows during their spawning period (late May through July). Discussions were to be held with the hydropower entities to obtain their input regarding implementation of the proposed plan.

It is hypothesized that trapping of sea lamprey might be greatly improved by the manipulation of both the timing and rate of flow releases through the hydropower plants and possibly the rapids. The proposed experiments are being coordinated by the Great Lakes Fisheries Commission. Though previous analyses suggest that maintaining high hydropower releases (i.e. on-peak flows) during nighttime may aid trapping efficiency, a variety of flow rates are proposed to be tested.

Cooperation of the Board and power entities' will be needed to vary the flow releases during the sea lamprey spawning period in 2010 to facilitate the experiments. The requested flow manipulations will likely include deviations from the Plan 1977-A flow. Escapement of sea lamprey upstream through the Compensating Works at multiple gate opening settings may also be studied, if conditions permit.

At its September 17, 2009 meeting the Board agreed in principle to cooperate with the experiments, however, further details and discussion will be needed and Dr. Mackey was advised that the prior approval of the Commission was required for any deviations from the monthly mean flow specified by the regulation plan. On January 26, 2010 Dr. Mackey furnished a copy of the proposed study to the Board. On January 29, 2010, the Board sent a letter to Dr. Mackey to acknowledge receipt of the study proposal and to advise that the Board would discuss the proposal at it March 8 meeting. The Board noted at its meeting that it had not been supplied with any specifics on proposed flows. Board staff will continue to work with the experiment designers to get as early an indication as possible of proposed flows in order to inform the Commission of any need to deviate from the regulation plan.

b. *Fishery Habitat Study*

Dr. Mark Bain has prepared a proposal for a fisheries habitat study in the St. Marys Rapids in connection with the Environmental Protection Agency's Great Lakes Restoration Initiative (GLRI). The study would support the needs to the IUGLS and potentially be of use to this Board. The purpose is to study how the water levels in the rapids respond to gate changes at the Compensating Works. Water level sensors would be placed throughout the rapids area to measure the response to various gate settings. A model of water level responses would then be created. Additional studies such as fish spawning assays, and monitoring of fish departures and strandings following water level fluctuations would be considered. The objective of these studies is to set guidelines for gate operations with regard to water level changes to avoid fish stranding. To accomplish this study a range of gate opening settings at the Compensating Works will be necessary over the course of about two weeks during the summer of 2010.

On January 21, 2010 Dr. Bain furnished a copy of the study proposal to the Board. On January 28, 2010, the Board sent a letter to Dr. Bain to acknowledge receipt of the study proposal and to advise that the Board would discuss the proposal at its March 8 meeting. The Board noted at its meeting that it had not been supplied with any specifics on proposed flows. Board staff will continue to work with Dr. Bain to get as early an indication as possible of proposed flows in order to inform the Commission of any need to deviate from the regulation plan.

While the Board supports these studies, prior approval of the Commission will be required for any deviations from the monthly mean flow specified by the regulation plan. Coordination with hydropower operations, the Board's 5-year inspection, and flow measurements will be required.

The Board agreed to raise the issue of minor deviations for study purposes with the Commission. It may be useful for the Board to have the authority to approve minor deviations that are within specified limitations.

12. Annual Meeting with the Public and Public Information

The Board proposes to hold its 2010 annual meeting with the public on the evening of June 9, 2010. The meeting will be held in Sault Ste. Marie, Ontario with a call-in option for interested parties. The Board recognizes the need to coordinate its public communication activities with the International Upper Great Lakes Study Board to avoid possible confusion of the roles and responsibilities of the two Boards by stakeholders.

The Board continues to issue, at the beginning of each month, news releases informing the public about Lake Superior regulation and water level conditions. The Board provides monthly media releases and hydrologic update information to the Commission to maintain a Board web site. Content includes information on Board members and responsibilities as well as news releases, semi-annual reports, meeting minutes and hydrologic data summaries. In addition, in support of the Board and the Commission, the Detroit District Corps of Engineers maintains additional technical information on its own Board Web site.

13. Related Items of Interest

a. Lock Replacement at Sault Ste. Marie, Michigan

A new "Poe sized" lock will replace the existing Davis and Sabin Locks at the Soo Locks complex at Sault Ste. Marie, MI. The purpose of this project is to provide for more efficient movement of waterborne commerce. The Water Resources Development Act (2007) directs that construction shall be at full U.S. Federal expense.

In FY 2009, $17,000,000 was appropriated. Contracts were awarded for construction of cofferdams and deepening of the downstream approach channel. A groundbreaking ceremony marking initiation of construction was held on 30 June 2009. In FY 2010 plans and specifications for the guide walls and an upstream channel excavation contract will be completed and ready for advertisement should Congress appropriate additional funds. Design efforts will continue on the lock chamber to have it ready for advertisement in FY 2011 pending availability of funds.

b. Great Lakes – St. Lawrence Seaway Study

Work is complete on the Supplemental Reconnaissance Report for the Great Lakes Navigation System Review, and the Report is being reviewed by the Great Lakes and Ohio

River Division of the U.S. Army Corps of Engineers (USACE) in Cincinnati, Ohio. The report will be sent to USACE-HQ once key issues in the report are agreed upon with Division. This study incorporated substantial amounts of information developed for the fall 2007 binational Great Lakes St. Lawrence Seaway Study. No expansion of locks or connecting channel size is being recommended in the Supplemental Recon.

FY10 funding of $400,000 is being used to address remaining review comments on the Supplemental Recon by Division and HQ and to finalize the scope of feasibility phase efforts that are identified based upon the recommendations in the Report. Some of this funding is being used to contact potential non-Federal sponsors and to begin formulation of Project Management Plan(s) and draft FCSA(s), should willing sponsors be identified. FY11 funding would be used to execute FCSA(s) and initiate Feasibility Studies.

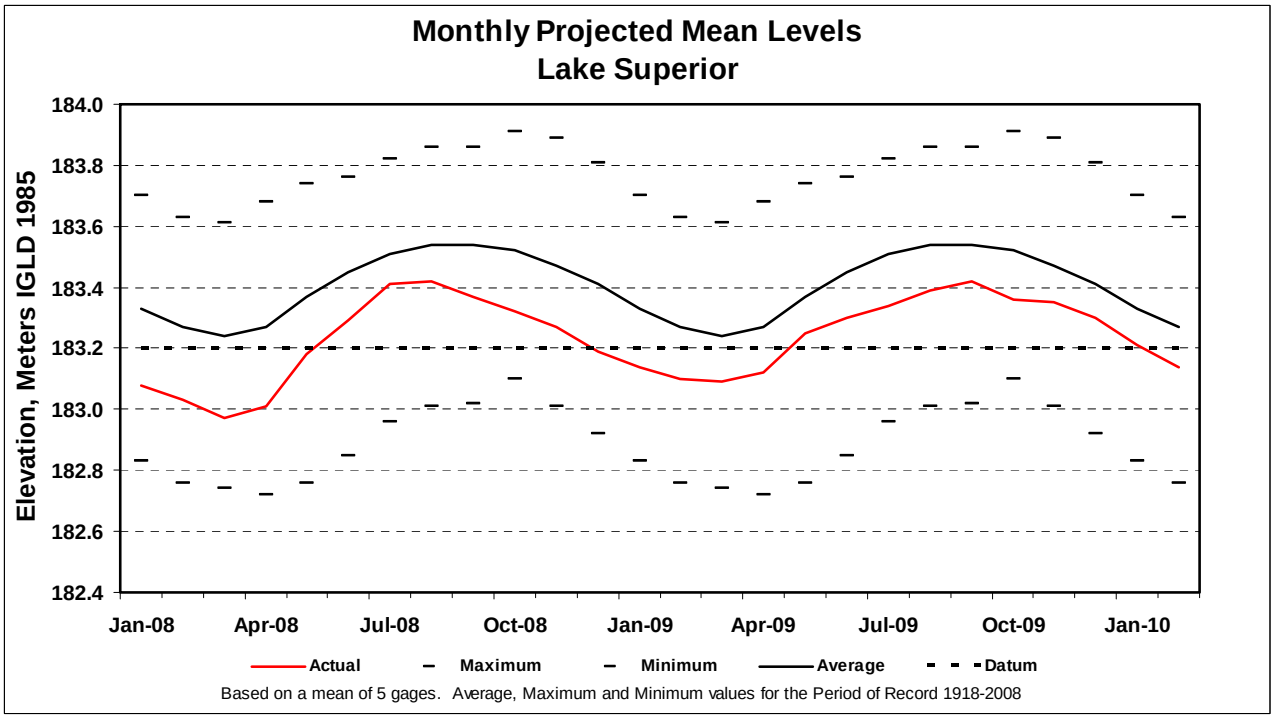
14. Board Membership and Meetings

The Commission has approved the appointment of COL John D. Drolet as the Alternate United States Member of the Board, effective February 23, 2010, vice COL Vince Quarles. The U.S. Chair had requested this change to allow COL Quarles to more closely focus on preventing the Asian carp from reaching Lake Michigan through the Illinois Waterway.

The Board held a meeting on March 8, 2010 in Detroit, MI with the Canadian Member and Alternate United States Member in attendance.

Respectfully submitted,

_____	_____
COL John D. Drolet	David Fay
Alternate Member for United States	Member for Canada


Monthly Projected Mean Levels
Lake Superior
Elevation, Meters IGLD 1985
184.0
183.8
183.6
183.4
183.2
183.0
182.8
182.6
182.4
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
Apr-09
Jul-09
Oct-09
Jan-10
Actual
Maximum
Minimum
Average
Datum
Based on a mean of 5 gages. Average, Maximum and Minimum values for the Period of Record 1918-2008

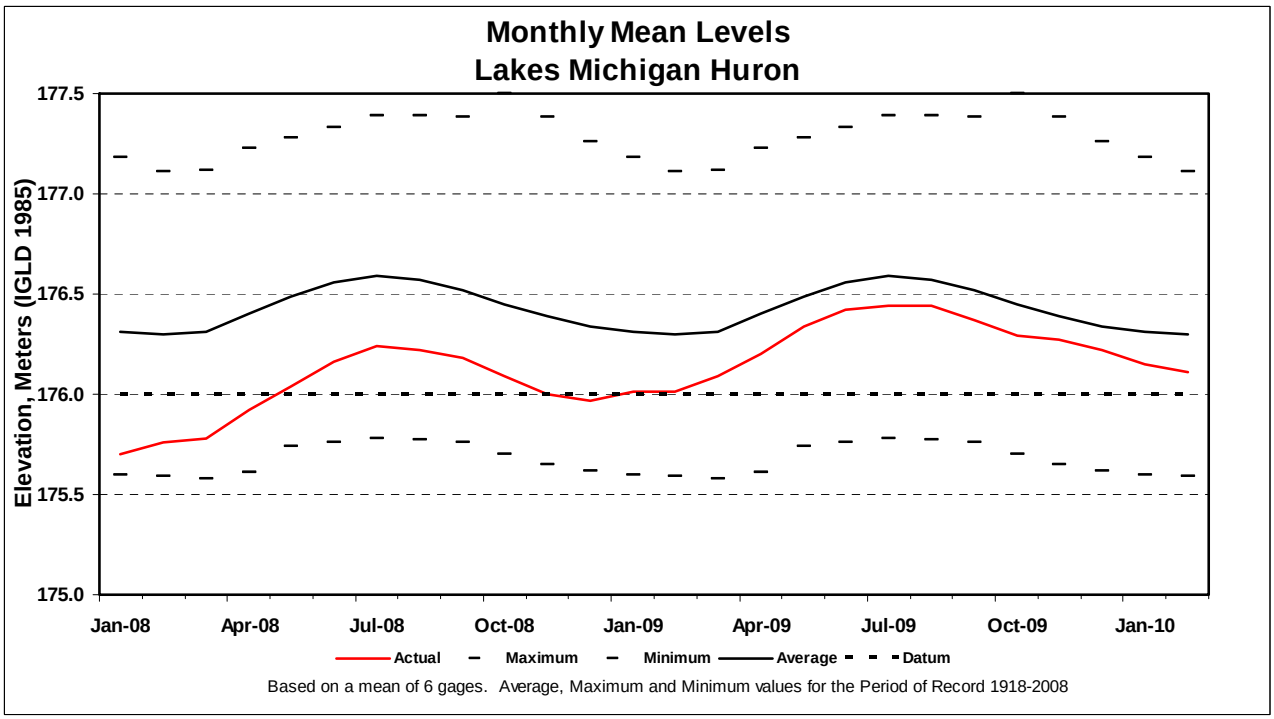
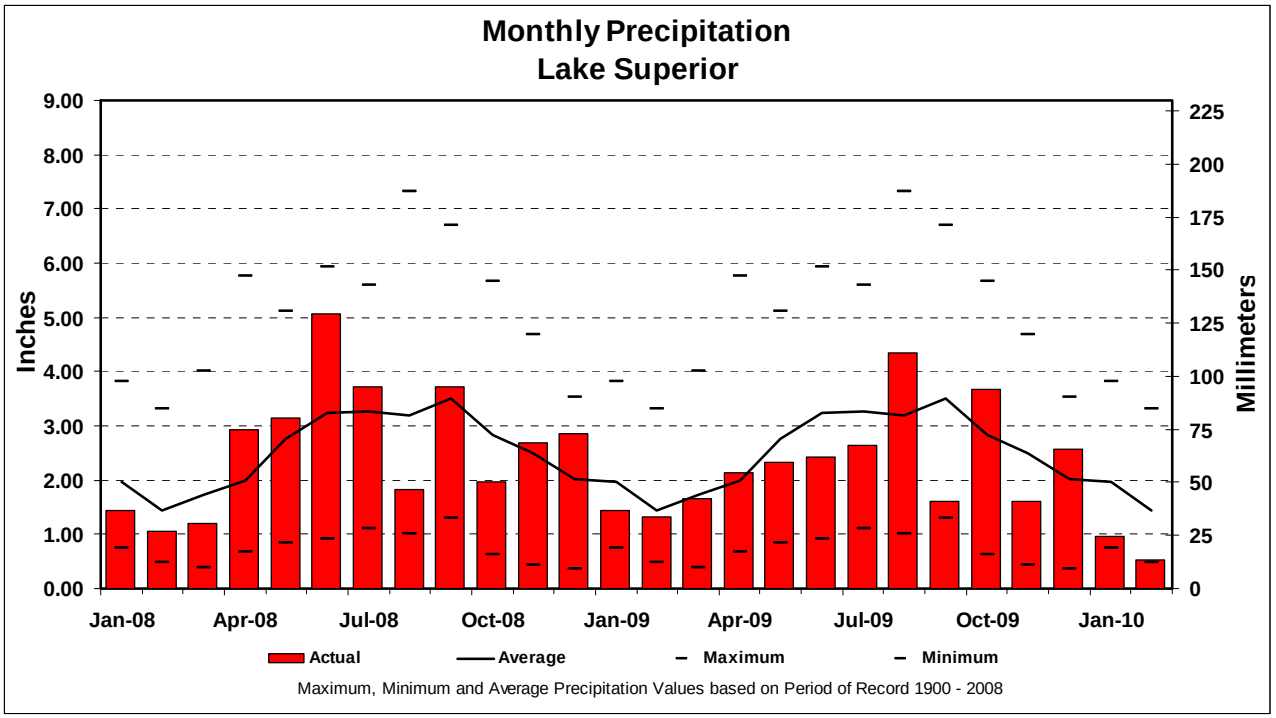

Monthly Mean Levels
Lakes Michigan Huron
Elevation, Meters (IGLD 1985)
177.5
177.0
176.5
176.0
175.5
175.0
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
Apr-09
Jul-09
Oct-09
Jan-10
Actual
Maximum
Minimum
Average
Datum
Based on a mean of 6 gages. Average, Maximum and Minimum values for the Period of Record 1918-2008

Figure 1


Monthly Precipitation
Lake Superior
Inches
Millimeters
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
225
200
175
150
125
100
75
50
25
0
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
Apr-09
Jul-09
Oct-09
Jan-10
Actual
Average
Maximum
Minimum
Maximum, Minimum and Average Precipitation Values based on Period of Record 1900 - 2008

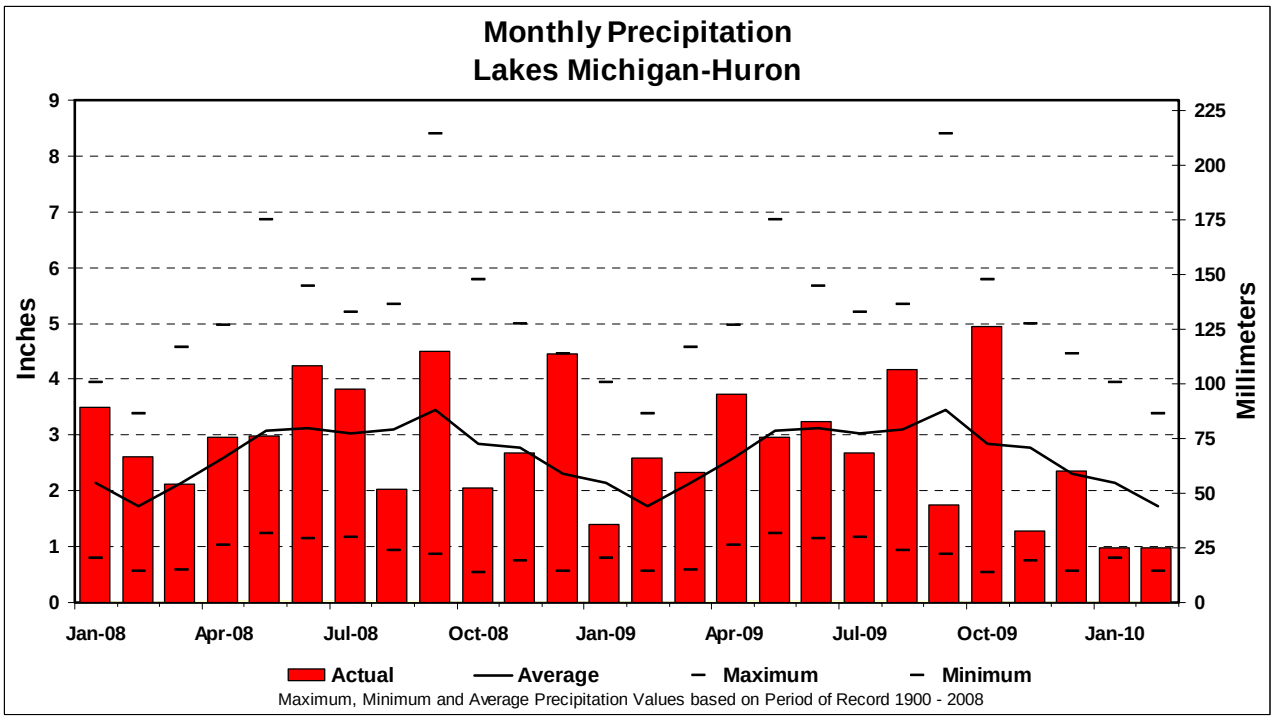
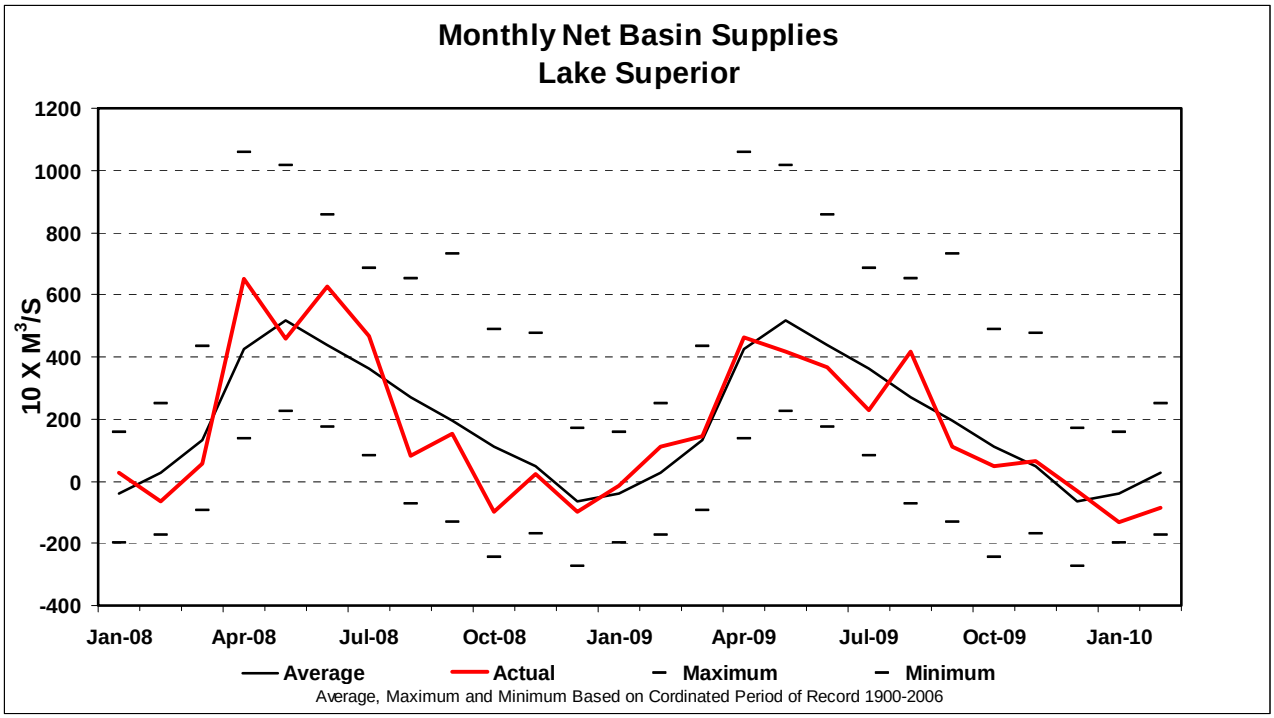

Monthly Precipitation
Lakes Michigan-Huron
Inches
Millimeters
9
8
7
6
5
4
3
2
1
0
225
200
175
150
125
100
75
50
25
0
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
Apr-09
Jul-09
Oct-09
Jan-10
Actual
Average
Maximum
Minimum
Maximum, Minimum and Average Precipitation Values based on Period of Record 1900 - 2008

Figure 2


Monthly Net Basin Supplies
Lake Superior
1200
1000
800
600
400
200
0
-200
-400
10 X M3/S
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
Apr-09
Jul-09
Oct-09
Jan-10
Average
Actual
Maximum
Minimum
Average, Maximum and Minimum Based on Cordinated Period of Record 1900-2006

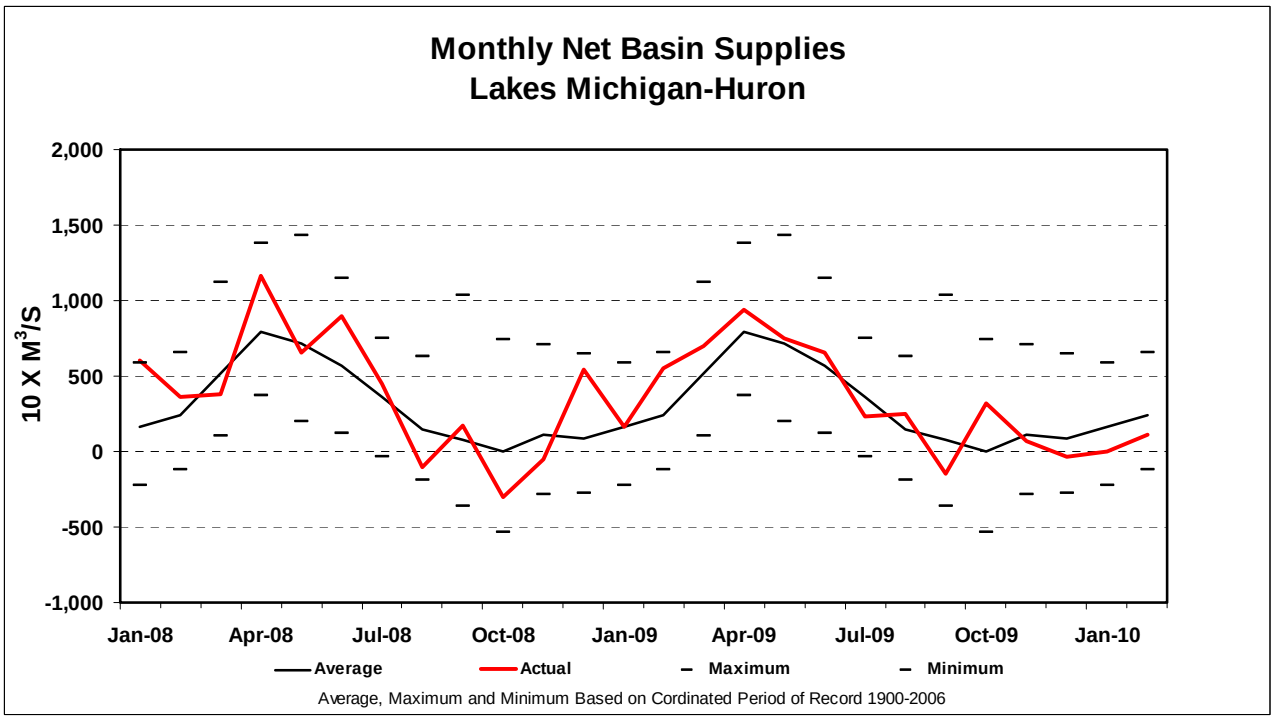
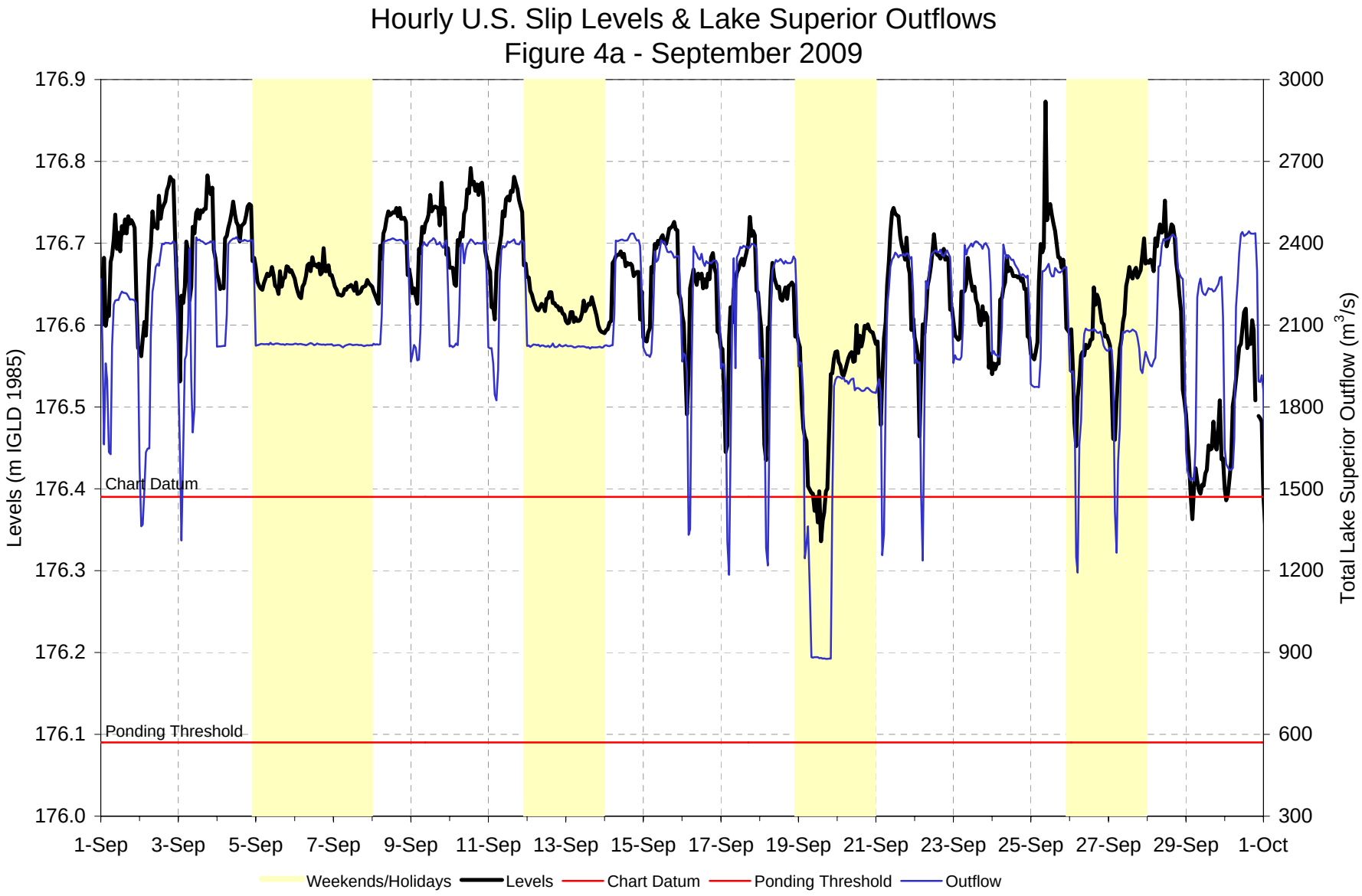
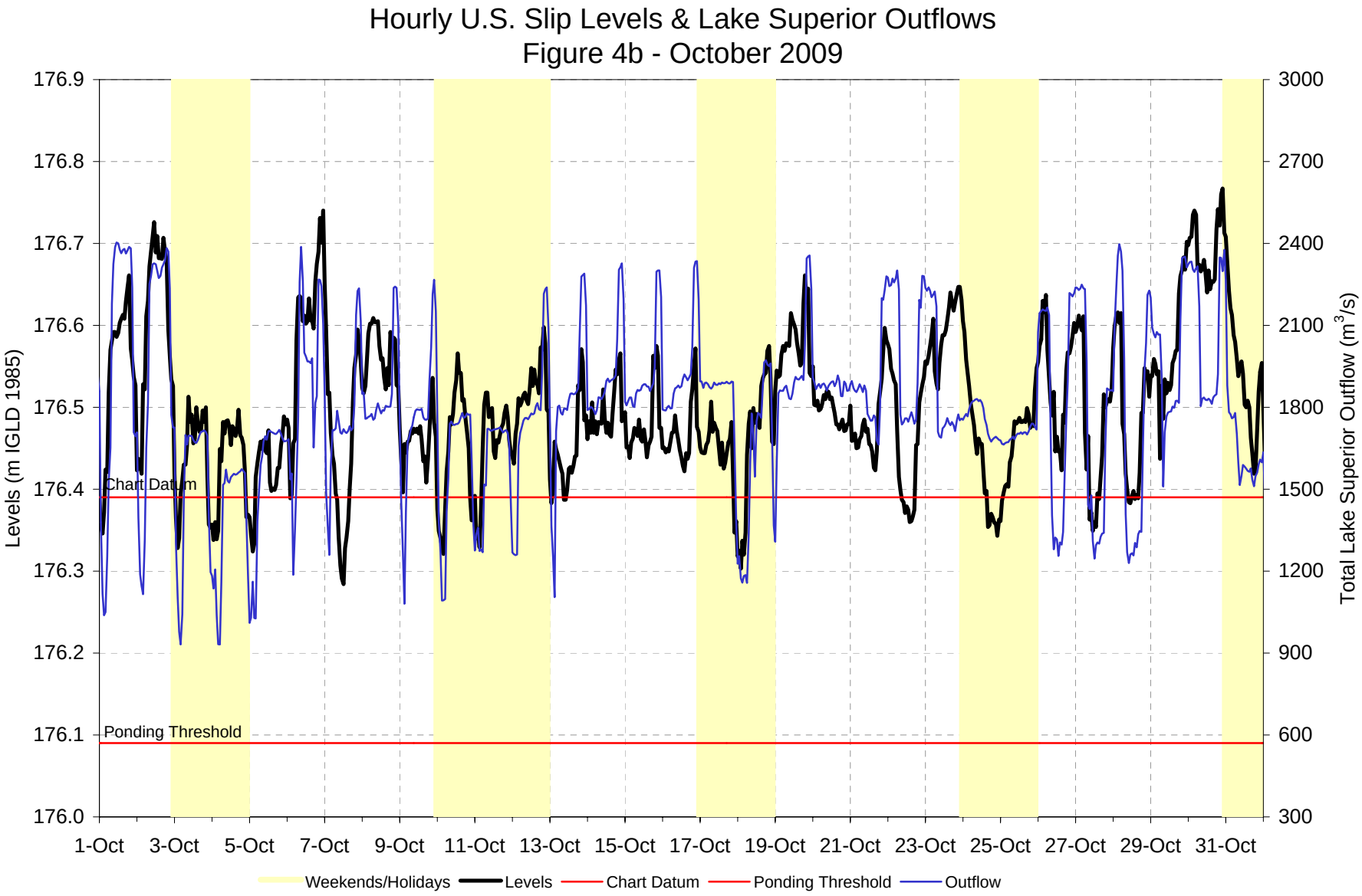
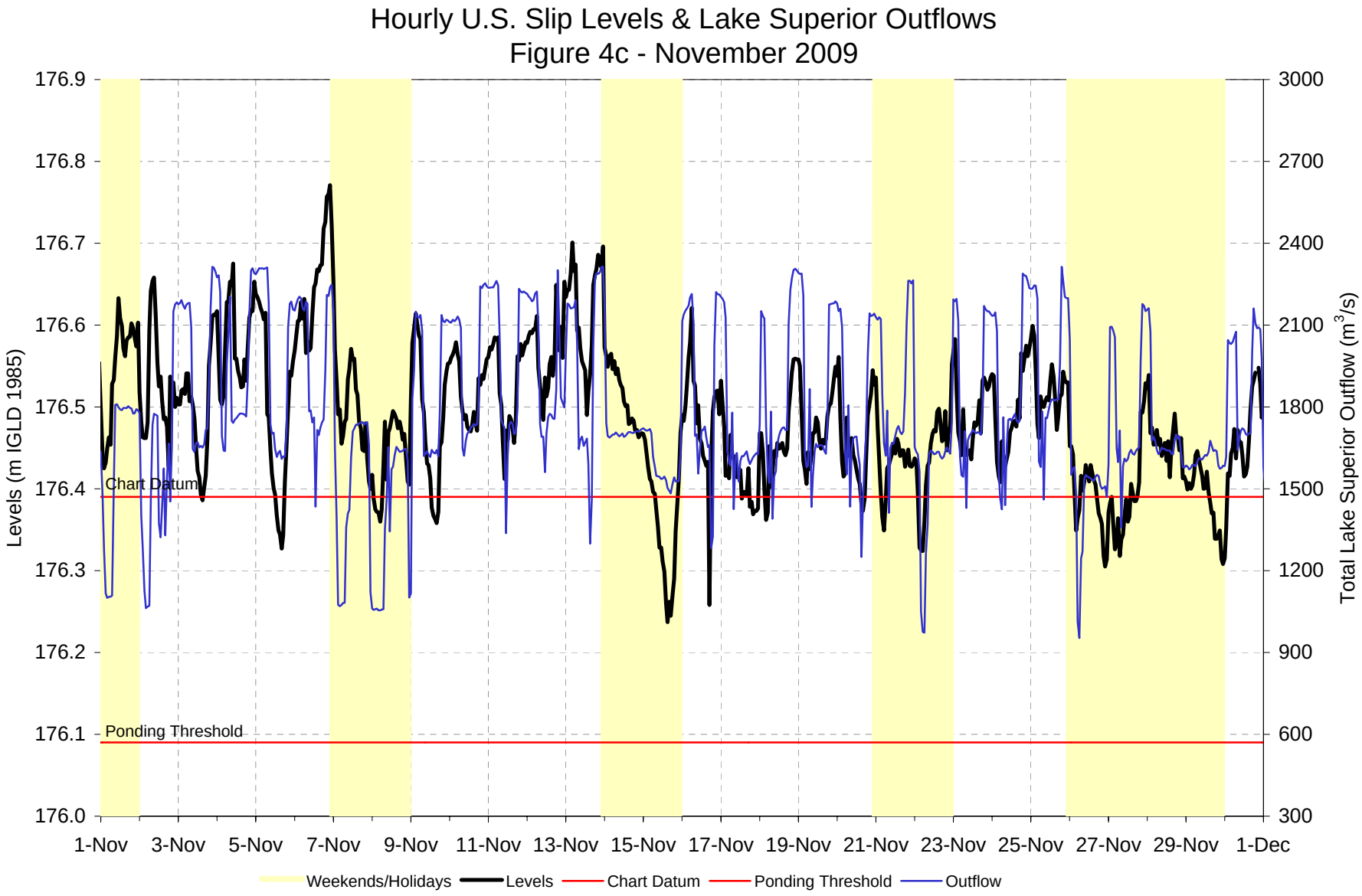
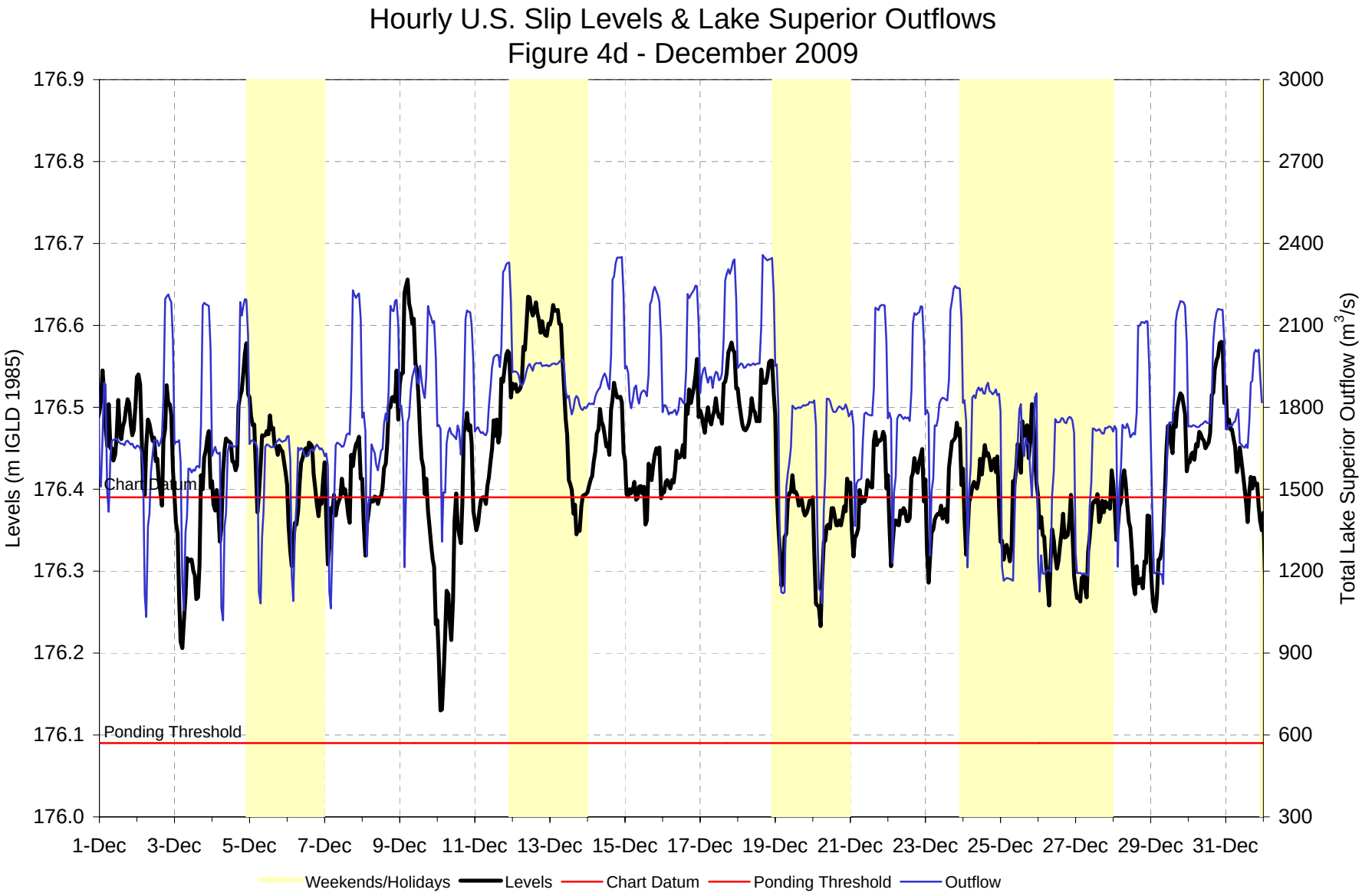

Monthly Net Basin Supplies
Lakes Michigan-Huron
2,000
1,500
1,000
500
0
-500
-1,000
10 X M3/S
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
Apr-09
Jul-09
Oct-09
Jan-10
Average
Actual
Maximum
Minimum
Average, Maximum and Minimum Based on Cordinated Period of Record 1900-2006

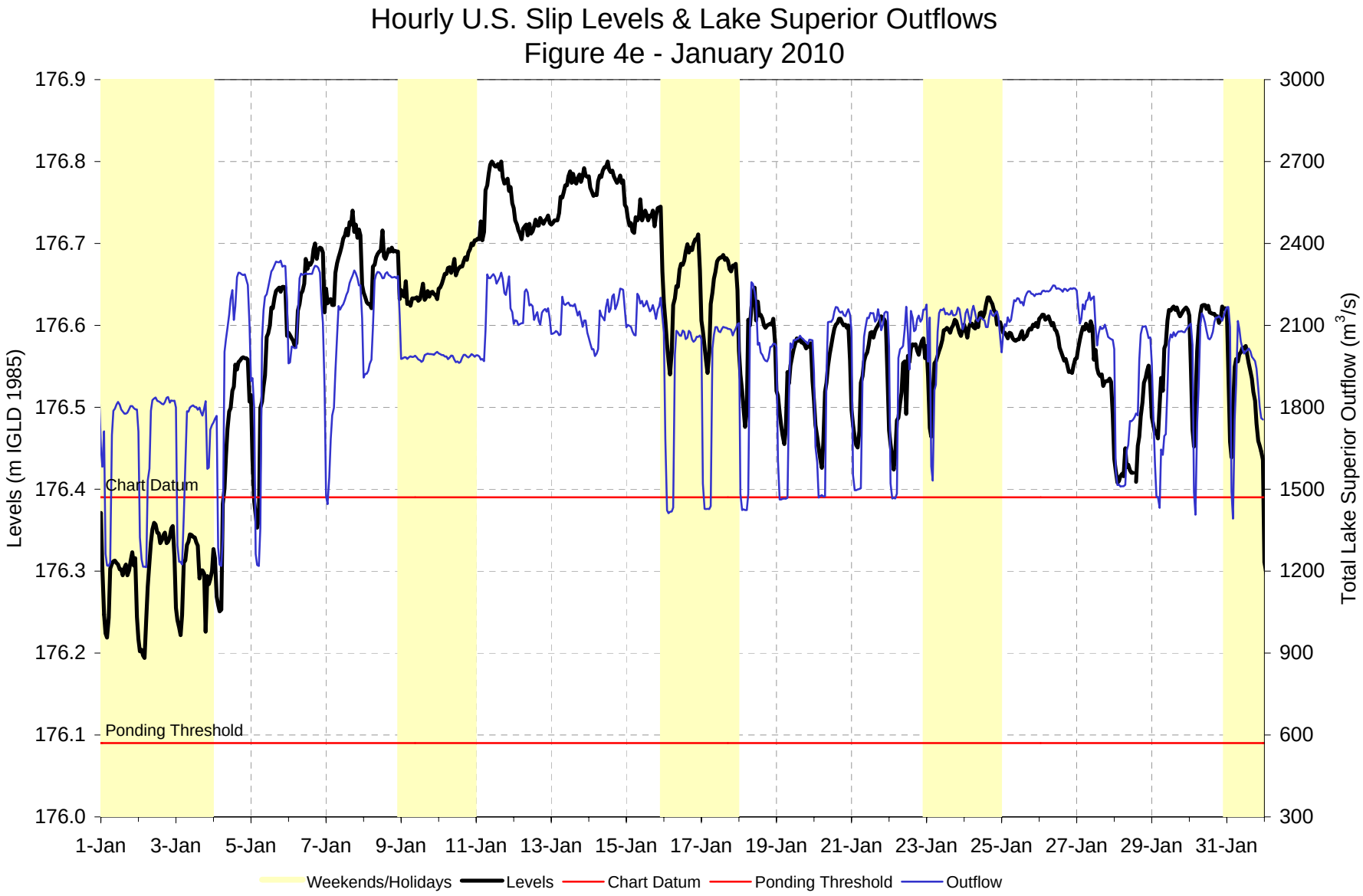
Figure 3


Hourly U.S. Slip Levels & Lake Superior Outflows
Figure 4a - September 2009
Levels (m IGLD 1985)
Total Lake Superior Outflow (m3/s)
176.9
176.8
176.7
176.6
176.5
176.4
176.3
176.2
176.1
176.0
3000
2700
2400
2100
1800
1500
1200
900
600
300
Chart Datum
Ponding Threshold
1-Sep
3-Sep
5-Sep
7-Sep
9-Sep
11-Sep
13-Sep
15-Sep
17-Sep
19-Sep
21-Sep
23-Sep
25-Sep
27-Sep
29-Sep
1-Oct
Weekends/Holidays
Levels
Chart Datum
Ponding Threshold
Outflow


Hourly U.S. Slip Levels & Lake Superior Outflows
Figure 4b - October 2009
Levels (m IGLD 1985)
Total Lake Superior Outflow (m3/s)
176.9
176.8
176.7
176.6
176.5
176.4
176.3
176.2
176.1
176.0
3000
2700
2400
2100
1800
1500
1200
900
600
300
Chart Datum
Ponding Threshold
1-Oct
3-Oct
5-Oct
7-Oct
9-Oct
11-Oct
13-Oct
15-Oct
17-Oct
19-Oct
21-Oct
23-Oct
25-Oct
27-Oct
29-Oct
31-Oct
Weekends/Holidays
Levels
Chart Datum
Ponding Threshold
Outflow


Hourly U.S. Slip Levels & Lake Superior Outflows
Figure 4c - November 2009
Levels (m IGLD 1985)
Total Lake Superior Outflow (m3/s)
176.9
176.8
176.7
176.6
176.5
176.4
176.3
176.2
176.1
176.0
3000
2700
2400
2100
1800
1500
1200
900
600
300
Chart Datum
Ponding Threshold
1-Nov
3-Nov
5-Nov
7-Nov
9-Nov
11-Nov
13-Nov
15-Nov
17-Nov
19-Nov
21-Nov
23-Nov
25-Nov
27-Nov
29-Nov
1-Dec
Weekends/Holidays
Levels
Chart Datum
Ponding Threshold
Outflow


Hourly U.S. Slip Levels & Lake Superior Outflows
Figure 4d - December 2009
Levels (m IGLD 1985)
Total Lake Superior Outflow (m3/s)
176.9
176.8
176.7
176.6
176.5
176.4
176.3
176.2
176.1
176.0
3000
2700
2400
2100
1800
1500
1200
900
600
300
Chart Datum
Ponding Threshold
1-Dec
3-Dec
5-Dec
7-Dec
9-Dec
11-Dec
13-Dec
15-Dec
17-Dec
19-Dec
21-Dec
23-Dec
25-Dec
27-Dec
29-Dec
31-Dec
Weekends/Holidays
Levels
Chart Datum
Ponding Threshold
Outflow


Hourly U.S. Slip Levels & Lake Superior Outflows
Figure 4e - January 2010
Levels (m IGLD 1985)
Total Lake Superior Outflow (m3/s)
176.9
176.8
176.7
176.6
176.5
176.4
176.3
176.2
176.1
176.0
3000
2700
2400
2100
1800
1500
1200
900
600
300
Chart Datum
Ponding Threshold
1-Jan
3-Jan
5-Jan
7-Jan
9-Jan
11-Jan
13-Jan
15-Jan
17-Jan
19-Jan
21-Jan
23-Jan
25-Jan
27-Jan
29-Jan
31-Jan
Weekends/Holidays
Levels
Chart Datum
Ponding Threshold
Outflow

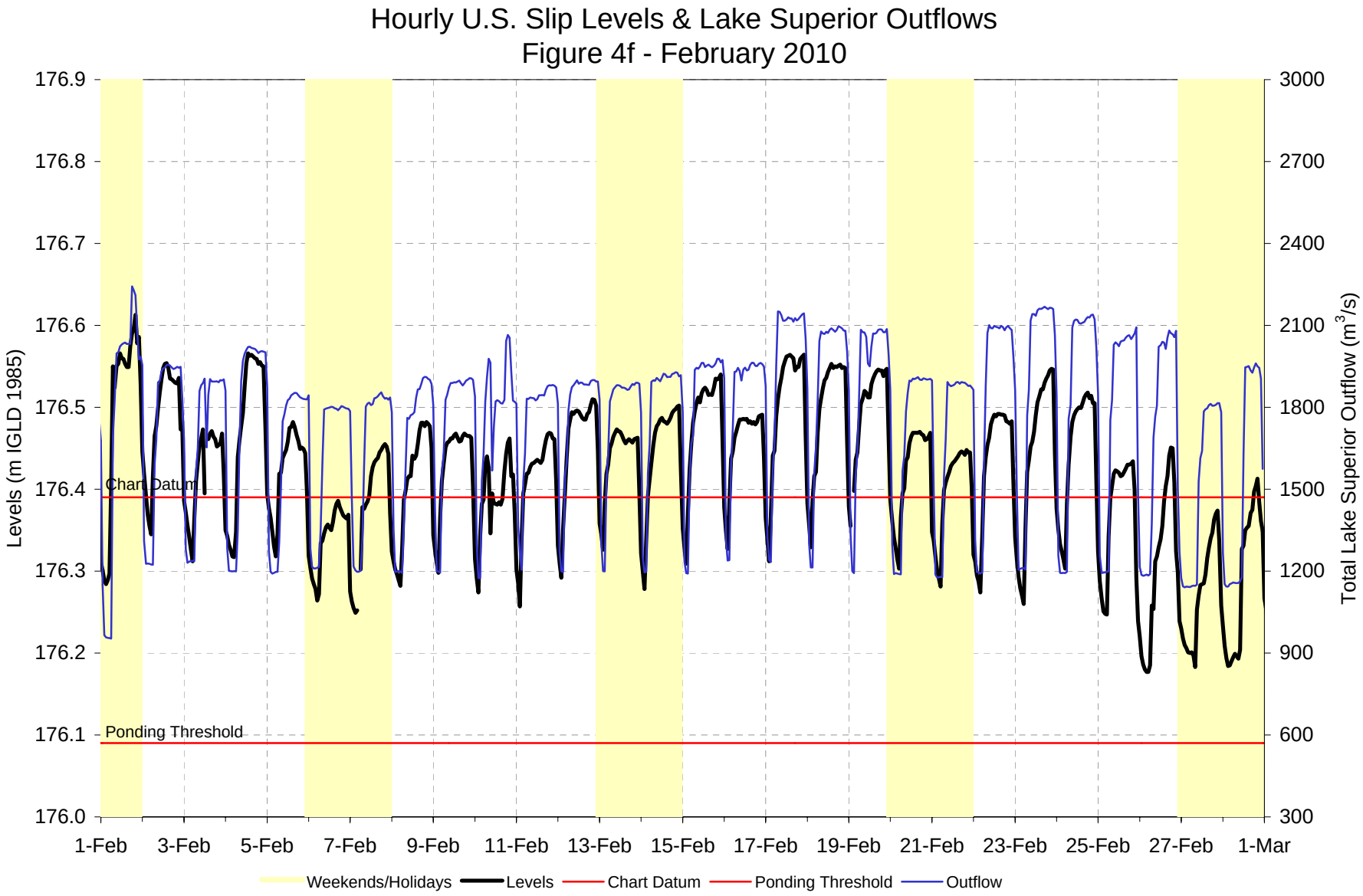

Hourly U.S. Slip Levels & Lake Superior Outflows
Figure 4f - February 2010
Levels (m IGLD 1985)
Total Lake Superior Outflow (m3/s)
176.9
176.8
176.7
176.6
176.5
176.4
176.3
176.2
176.1
176.0
3000
2700
2400
2100
1800
1500
1200
900
600
300
Chart Datum
Ponding Threshold
1-Feb
3-Feb
5-Feb
7-Feb
9-Feb
11-Feb
13-Feb
15-Feb
17-Feb
19-Feb
21-Feb
23-Feb
25-Feb
27-Feb
1-Mar
Weekends/Holidays
Levels
Chart Datum
Ponding Threshold
Outflow

TABLE 1. 2009 - 2010 Lake Superior Hydrologic Factors

Month	Levels				Net Basin Supplies			Outflows		
	Monthly Mean Recorded[1]		Difference From Average[2]		Monthly Mean Recorded		Exceedance Probability[3]	Monthly Mean Recorded		Percent of
	Meters	Feet	Meters	Feet	m3/s	tcfs	(%)	m3/s	tcfs	Average[4]
2009										
JAN	183.14	600.85	-0.19	-0.62	-160	-6	36	1,570	55	81
FEB	183.10	600.72	-0.17	-0.56	1110	39	14	1,550	55	81
MAR	183.09	600.69	-0.15	-0.49	1460	52	42	1,560	55	83
APR	183.12	600.79	-0.15	-0.49	4,640	164	36	1,590	56	82
MAY	183.24	601.18	-0.13	-0.43	4,150	147	72	1,920	68	91
JUN	183.30	601.38	-0.15	-0.49	3,650	129	66	2,120	75	96
JUL	183.34	601.51	-0.17	-0.56	1,980	70	93	1,930	68	85
AUG	183.39	601.67	-0.15	-0.49	4,490	159	8	1,810	64	77
SEP	183.42	601.77	-0.12	-0.39	1,130	40	70	2,110	74	90
OCT	183.36	601.57	-0.16	-0.52	470	17	66	1,800	64	79
NOV	183.35	601.54	-0.12	-0.39	660	23	42	1,780	63	80
DEC	183.30	601.38	-0.11	-0.36	-300	-11	34	1,780	63	87
2010										
JAN	183.21	601.08	-0.12	-0.39	-1300	-46	91	2,000	71	103
FEB*	183.14	600.85	-0.13	-0.43	-870	-31	94	1,750	62	92

Notes: m3/s = cubic meters per second tcfs = 1,000 cubic per second

[1] Water Levels are a mean of five gauges on Lake Superior, IGLD 1985

[2] Average levels are for the period 1918-2008, based on a mean of five gauges. Differences computed as meters and then converted to feet.

[3] Exceedance probabilities are based on 1900 - 2006.

[4] Average flows are for the period 1900 - 2006.

* Provisional

TABLE 2. 2009 - 2010 Lakes Michigan-Huron Hydrologic Factors

Month	Levels				Net Basin Supplies			Outflows		
	Monthly Mean Recorded[1]		Difference From Average[2]		Monthly Mean Recorded		Exceedance Probability[3]	Monthly Mean Recorded		Percent of Average[4]
	Meters	Feet	Meters	Feet	m3/s	tcfs	(%)	m3/s	tcfs	
2009										
JAN	176.01	577.46	-0.30	-0.98	1670	59	46	4,040	143	90
FEB	176.01	577.46	-0.29	-0.95	5490	194	3	4,270	151	97
MAR	176.09	576.72	-0.22	-0.72	6,970	246	22	4,420	156	92
APR	176.20	578.08	-0.20	-0.66	9,420	333	26	4,670	165	91
MAY	176.34	578.54	-0.15	-0.49	7,490	265	40	4,850	171	91
JUN	176.42	578.81	-0.14	-0.46	6,520	230	31	4,980	176	92
JUL	176.44	578.87	-0.15	-0.49	2,340	83	79	5,070	179	92
AUG	176.44	578.87	-0.13	-0.43	2,460	87	28	5,070	179	92
SEP	176.37	578.64	-0.15	-0.49	-1,450	-51	87	5,040	178	92
OCT	176.29	578.38	-0.16	-0.52	3,230	114	7	4,940	174	91
NOV	176.27	578.31	-0.12	-0.39	670	24	56	5,040	178	94
DEC	176.22	578.15	-0.12	-0.39	-310	-11	72	4,950	175	96
2010										
JAN	176.15	577.92	-0.16	-0.52	-10	0	85	4,580	162	102
FEB*	176.11	577.79	-0.19	-0.62	1140	40	82	3,700	131	84

Notes: m^3/s = cubic meters per second tcfs = 1,000 cubic per second

[1] Water Levels are a mean of six gauges on Lakes Michigan-Huron, IGLD 1985

[2] Average levels are for the period 1918-2008, based on a mean of six gauges. Differences computed as meters and then converted to feet.

[3] Exceedance probabilities are based on 1900 - 2006.

[4] Average flows are for the period 1900 - 2006.

* Provisional

TABLE 3

MONTHLY DISTRIBUTION OF LAKE SUPERIOR OUTFLOWS (Cubic Meters / Second)

	POWER CANALS					NAVIGATION CANALS			DOMESTIC USAGE				Fishery	Total Lake
Year and Month	U.S. Gov't Hydro	Edison Sault Electric	US Total	Brookfield Power	Total Power Canals	United States	Canada	Total Navigation Canals	Sault Ste. Marie US + CAN	Algoma Steel	St. Marys Paper	Total Domestic Usage	St. Marys Rapids	Superior Outflow (m^3/s)
2009														
JAN	396	340	736	741	1,477	3.5	0.0	4	0.4	7.9	0.3	9	84	1,574
FEB	403	326	729	729	1,458	2.1	0.0	2	0.4	8.7	0.3	9	84	1,553
MAR	401	329	730	729	1,459	2.6	0.0	3	0.4	9.0	0.3	10	83	1,555
APR	402	500	902	584	1,486	7.2	0.0	7	0.4	9.1	0.3	10	84	1,587
MAY	404	648	1052	768	1,820	10.3	0.0	10	0.4	9.1	0.3	10	85	1,925
JUN	396	655	1051	966	2,017	11.4	0.0	11	0.4	9.7	0.3	10	85	2,123
JUL	404	506	910	908	1,818	13.3	0.0	13	0.4	10.0	0.3	11	85	1,927
AUG	404	478	882	815	1,697	12.6	1.3	14	0.4	10.3	0.3	11	85	1,807
SEP	405	555	960	1,040	2,000	11.0	0.9	12	0.3	10.0	0.3	11	85	2,108
OCT	404	339	743	949	1,692	10.4	0.3	11	0.3	8.8	0.3	9	84	1,796
NOV	360	375	735	935	1,670	10.3	0.0	10	0.3	9.6	0.3	10	86	1,776
DEC	354	393	747	931	1,678	9.4	0.0	9	0.3	10.0	0.3	11	86	1,784
2010														
JAN	349	597	946	954	1,900	4.5	0.0	4	0.3	9.9	0.3	10	85	1,999
FEB	352	472	824	827	1,651	3.0	0.0	3	0.3	10.3	0.3	11	85	1750

NOTE: (1) POWER CANALS COLUMNS INCLUDE FLOWS THROUGH POWER PLANTS AND SPILLWAYS.

TABLE 4

MONTHLY DISTRIBUTION OF LAKE SUPERIOR OUTFLOWS (Cubic Feet / Second)

	POWER CANALS					NAVIGATION CANALS			DOMESTIC USAGE				Fishery	Total Lake
Year and Month	U.S. Gov't Hydro	Edison Sault Electric	US Total	Brookfield Power	Total Power Canals	United States	Canada	Total Navigation Canals	Sault Ste. Marie US + CAN	Algoma Steel	St. Marys Paper	Total Domestic Usage	St. Marys Rapids	Superior Outflow (cfs)
2009														
JAN	14,000	12,000	26,000	26,200	52,200	124	0	124	14	279	11	304	2,970	55,600
FEB	14,200	11,500	25,700	25,700	51,400	74	0	74	14	307	11	332	2,970	54,800
MAR	14,200	11,600	25,800	25,700	51,500	92	0	92	14	318	11	343	2,930	54,900
APR	14,200	17,700	31,900	20,600	52,500	254	0	254	14	321	11	346	2,970	56,100
MAY	14,300	22,900	37,200	27,100	64,300	364	0	364	14	321	11	346	3,000	68,000
JUN	14,000	23,100	37,100	34,100	71,200	403	0	403	14	343	11	368	3,000	75,000
JUL	14,300	17,900	32,200	32,100	64,300	470	0	470	14	353	11	378	3,000	68,100
AUG	14,300	16,900	31,200	28,800	60,000	445	46	491	14	364	11	389	3,000	63,900
SEP	14,300	19,600	33,900	36,700	70,600	388	32	420	11	353	11	375	3,000	74,400
OCT	14,300	12,000	26,300	33,500	59,800	367	11	378	11	311	11	333	2,970	63,500
NOV	12,700	13,200	25,900	33,000	58,900	364	0	364	11	339	11	361	3,040	62,700
DEC	12,500	13,900	26,400	32,900	59,300	332	0	332	11	353	11	375	3,040	63,000
2010														
JAN	12,300	21,100	33,400	33,700	67,100	159	0	159	11	350	11	372	3,000	70,600
FEB	12,400	16,700	29,100	29,200	58,300	106	0	106	11	364	11	386	3,000	61,800

NOTE: (1) POWER CANALS COLUMNS INCLUDE FLOWS THROUGH POWER PLANTS AND SPILLWAYS

(2) Flows for individual users were originally coordinated in m3/s, and are converted here to U.S. customary units (cfs) and rounded to 3 significant figures.

(3) Total flow for each category and total Lake Superior flow in this table are computed from the individual flows in cfs.