

**International Lake Superior  
Board of Control  
Semi-Annual Progress Report to the  
International Joint Commission  
Covering the Period September 16, 2003 to March 24, 2004**

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## Table of Contents

Section	Page
1. Executive Summary	2
2. Monitoring of Hydrologic Conditions	3
3. Regulation of the Outflow from Lake Superior	3
4. Governing Conditions During the Reporting Period	4
5. Repairs, Inspection and Flow Calibration at the Compensating Works	4
6. Repairs, Maintenance and Flow Determination at the Hydropower Facilities	4
7. Water Usage in the St. Marys River	5
8. Long Lac and Ogoki Diversions	6
9. Peaking and Ponding Operations at Hydropower Plants	6
10. Security Issues	7
11. Navigation Improvements and Studies	7
12. Sea Lamprey Control	9
13. Annual Meeting with the Public and Public Information	9
14. Board Membership and Meetings	9

### Figures

Figure 1: Lake Superior and Lakes Michigan-Huron Monthly Levels

Figure 2: Lake Superior and Lakes Michigan-Huron Basin Monthly Precipitation

Figure 3: Lake Superior and Lakes Michigan-Huron Net Basin Supplies

### Tables

Table 1: 2003 - 2004 Lake Superior Hydrologic Factors

Table 2: 2003 - 2004 Lakes Michigan-Huron Hydrologic Factors

Table 3: Monthly Distribution of Lake Superior Outflows (Metric Units)

Table 4: Monthly Distribution of Lake Superior Outflows (Customary Units)

**Front Cover: Great Lakes Fleet, Inc., Vessel "Presque Isle" down bound during January 2004 Extension of Soo Lock Operations.** (Photo courtesy of Carmen Paris, U.S. Army Corps of Engineers, Detroit District, Soo Area Office)

# International Lake Superior Board of Control

March 24, 2004

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

Commissioners:

This semi-annual report covers the Board's activities from September 16, 2003 to March 24, 2004.

## 1. Executive Summary

During the past six months, the water levels of Lakes Superior and Michigan-Huron remained well below average. Shipping, recreation, and shoreline interests continued to be impacted as levels remained at or below chart datum throughout the upper Great Lakes.

The Lake Superior outflows were as specified by Regulation Plan 1977-A. Since September, the monthly outflows from the upper lakes have been between 76% and 100% of average. Recent water supplies have been near-normal, in general.

The Board suspended ponding from September through the first three weeks of December, due to the projection that the water levels in the lower St. Marys River would be below chart datum. These suspensions effectively reduced any potential shipping delays that ponding operations might have otherwise created. The power entities have conducted ponding operations each weekend and holiday since late December and into the non-navigation season. The Board submitted a report on peaking and ponding to the International Joint Commission on January 27, 2004. The Commission issued a public notice on February 12, 2004 inviting comment on its proposal to extend the authority for peaking and ponding until March 20, 2006. On March 22, 2004, the IJC granted an extension for a length of time yet to be determined.

The automation of the U.S. Government hydropower plant was completed in September 2003. Acres International Consulting Engineers conducted flow measurements on all generating units. Data from these measurements will be used to program the flow computation system. Pending final programming, verification flow measurements will be conducted this spring or summer.

Initial analysis of the August 2003 flow measurements in the Edison Sault Electric Company's power canal indicates under-reporting is occurring.

Operation of the U.S. Locks was extended ten days from their normal closing of January 15th to January 25th.

## **2. Monitoring of Hydrologic Conditions**

The Board, through its staff, continuously monitored 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 provided hydrologic assessments and recommendations on the regulation of outflows from Lake Superior. These reports also indicated 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 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 supply comparisons.

Except for September, precipitation over the Lake Superior basin was below average for the past six months. The net basin water supplies, which are the net effect of precipitation, evaporation and runoff to the lake, were above average in September, November, January and February and below average in October and December.

Lake Superior's water levels were above chart datum (183.2 m or 601.1 ft.) until early December 2003, but have been below chart datum since December 17. Lake levels over the past six months ranged from 20 cm to 29 cm (7.9 inches to 11.4 inches) below average, and were below average by an average amount of 24 cm (9.4 inches). On March 24, 2004, its level was 183.04 m (600.52 ft.), which was 21 cm (8.3 inches) below average and 2 cm (0.8 inches) higher than last year. Snow survey flights to determine the snow pack on the Lake Superior basin were made March 15, 2004. Snow water equivalent over the Lake Superior basin is about 40-50% above average.

Precipitation over the Lakes Michigan-Huron basin was at average in January, above average in September and November and below average in October, December, and February. The net basin water supplies to Lakes Michigan-Huron, except for November and December were below average.

Monthly mean Lake Michigan-Huron levels remained well below average, ranging from about 47 cm to 61 cm (19 inches to 24 inches) below long-term averages, and were below average by an average amount of 53 cm (21 inches). Water levels fell below chart datum (176.00 m or 577.5 ft.) on August 28, 2003 and have remained there since. On March 24, 2004 the level of Lakes Michigan-Huron was at elevation 175.91 m (577.13 ft), 44 cm (17.3 inches) below average and 17 cm (6.7 inches) higher than one year ago.

## **3. Regulation of the Outflow from Lake Superior**

The outflows of Lake Superior were as specified by Regulation Plan 1977-A during the past six months. The gate setting at the Compensating Works supplying the main portion of the St. Marys Rapids was at an equivalent one-half gate open setting during the reporting period. Gate 1, which supplies water to the Fishery Remedial Works, remained set at 15 m<sup>3</sup>/s (530 cfs).

Lake Superior outflows were 85% of average over the last six months, ranging from 1,680 cms to 2,040 cms (59,300 cfs to 72,000 cfs). Outflows were limited by Criteria (c) only in March 2004.

#### **4. Governing Conditions During the Reporting Period**

The monthly mean levels of Lake Superior ranged between 183.07 m and 183.27 m (600.6 and 601.3 ft.), well within the limits of 182.76 and 183.86 meters (599.6 and 603.2 feet) specified in the Commission's Orders of Approval.

The daily mean water levels in the lower St. Marys River at the U.S. Slip Gage downstream of the U.S. lock varied between elevation 176.19 m and 176.56 m (578.1 and 579.3 feet respectively). Thus, the requirement for maintaining the level below 177.94 m (583.8 feet) was satisfied.

#### **5. Repairs, Inspection and Flow Calibration Measurements at the Compensating Works**

Flow measurements to update the stage-discharge rating relationships at the Compensating Works planned for the summer of 2003 were postponed as levels and flows were similar to those during previous measurements. It is hoped that flow measurements can be performed in the summer of 2004 that will encompass a different hydraulic regime.

Only routine maintenance and inspections of the Compensating Works were undertaken during the past six months. The annual inspection of the U.S. portion showed eight areas needing attention, five of which involve concrete or paint repair. The report is on file for reference. Areas needing attention will be monitored and evaluated for needed repair work to be programmed as part of future maintenance. In late January, debris was observed to be blocking a portion of the north side of Gate #7 on the Canadian side. GLPL personnel will remove the blockage when ice conditions safely permit it.

#### **6. Repairs, Maintenance and Flow Determination at the Hydropower Facilities**

##### *a. U.S. Government Hydropower Plant:*

The automation of the U.S. government hydropower plant was completed in July 2003. Testing of the generating units was completed in September 2003. The System Control and Data Acquisition (SCADA) system has been installed. Acres International Consulting Engineers conducted flow measurements on all of the generating units. This flow data will be used to program the SCADA system. After the programming of the SCADA system is complete, field measurements will be made this spring or summer to verify the flow data being reported. This is expected to resolve the problem of under-reporting of flows through the plant.

The U. S. Army Corps of Engineers' Nashville District plant in Barclay, Kentucky continues to monitor the Soo plant's operation but has not taken over operator decisions as yet. Equipment is in place to allow Barclay to remotely control the plant and remote operation from Barclay has been demonstrated. Remote operation of hydropower plants is a common practice in the hydropower industry and, in fact, is how the Clergue Plant of Great Lakes Power Ltd. is operated. There are still on-site personnel available for routine maintenance and emergency response.

*b. Great Lakes Power Limited:*

There were no significant repairs during the reporting period.

*c. Edison Sault Electric Company:*

USACE and Environment Canada field crews conducted follow-up verification measurements August 12 through 14, 2003 in the ESEC power canal head and tailraces. Data were collected over a range of low to high flows through the plant. Initial analysis of the August 2003 flow measurements show that under-reporting is a problem. The Board is planning additional flow measurements this summer. In addition, the Board will be looking at the flows over an entire year to see if the reported flows are within acceptable tolerances or if corrections to the reported flows will be needed.

In November 2003 ESEC had their unit flows measured to update the efficiency data obtained from Saint Anthony Falls Laboratory flow measurements made in 1988. The parameters in the plant operating software will be adjusted to conform to the new efficiency data. Flow measurements will be repeated this summer to check flows reported by the plant's old and new software.

## **7. Water Usage in the St. Marys River**

Table 3 (Table 4 in U.S. Customary Units) lists the distribution of the outflows from Lake Superior for January 2003 through February 2004. 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 remaining flow allotment, beyond the discharge capacity of the hydropower plants, is normally discharged through the Compensating Works into the St. Marys Rapids.

As shown in the tables, the amount of water used for domestic purposes is typically 4 m<sup>3</sup>/s (140 cfs).

The combined flow through the U.S. and Canadian locks depended on traffic volume and varied from 2 m<sup>3</sup>/s to 15 m<sup>3</sup>/s (70 cfs to 530 cfs respectively, see Table 3) during the past six months. Operation of the U.S. locks was extended ten days and closed on January 25, 2004, following a period marked by heavy traffic hampered by severe ice conditions. The locks are expected to

reopen on March 25, 2004. The Canadian lock closed for the season October 15, 2003 and is expected to reopen in mid-May 2004.

In accordance with the Commission's Orders to fulfill the fishery needs in the Rapids, a minimum gate setting of one-half gate open is required at all times at the Compensating Works. In addition, a flow of at least 15 m<sup>3</sup>/s (530 cfs) in the Fishery Remedial Works (through Gate No. 1) must be maintained. A setting equivalent to one-half gate open for the main rapids was 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 less hazardous for upstream boaters who might accidentally drift into the structure. The flow in the St. Marys Rapids, including that through the Fishery Remedial Works, averaged about 96 m<sup>3</sup>/s (3,390 cfs) for the over the last six months. Gate No. 1 remained set at 15 m<sup>3</sup>/s (530 cfs). This setting is expected to continue.

The hydropower plants used an average of 1,717 m<sup>3</sup>/s (60,630 cfs) for the period September 2003 through February 2004 for electric power generation. The allocation for this period averaged 1,729 m<sup>3</sup>/s (61,060 cfs). Usage at each plant is shown in Tables 3 and 4.

## **8. 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 145.1 m<sup>3</sup>/s (5,130 cfs) and the Long Lac Diversion averaged 33.2 m<sup>3</sup>/s (1,170 cfs) over the reporting period. Combined, these diversions were about 128 percent of average for the period 1944-2003.

During the reporting period, no water was spilled northward into the Ogoki River.

Since May 1999, a continuous flow of at least 2 m<sup>3</sup>/s (70 cfs) is maintained during the summer (mid-May through about Labor Day) from the north outlet of Long Lake. This agreement between OPG and the local First Nations provides water for environmental enhancement of the Kenogami River, and reduces the amount diverted to Lake Superior. There was no need to spill any additional water northward from Long Lake during the reporting period.

## **9. Peaking and Ponding Operations at Hydropower Plants**

Flow variations at the hydropower plants at Sault Ste. Marie cause the water levels to fluctuate in the St. Marys River downstream of the plants. With the water levels and Lake Superior outflows below average, the fluctuations have become a subject of concern for the commercial navigation users. As requested by the Commission in their March 17, 2003 letter, the Board submitted an update report on January 27, 2004, discussing its findings and experiences regarding peaking and ponding in 2003. In summary, the Board found that the interim guidelines and the mechanism for disseminating information to the public appeared to be working very well. The Board recommended that the Commission extend the authority given to the power entities to conduct peaking and ponding operations indefinitely under Board supervision. The Board also

recommended that consideration be given to using a new lower level for ceasing ponding, once dredging operations are completed in the Lower St. Marys River. This is based on indications received from one of the navigation interests that, once the Lower St. Marys River dredging project is complete, more draft will be available to ships in that section and that a level at U.S. Slip of Low Water Datum minus one foot may be more appropriate to use as the threshold level in decisions regarding the suspension of ponding.

The Board will continue to collect data and continue development of a St. Marys River two-dimensional hydrodynamic model. The Board further suggested that future reporting be done on a summary basis as part of these semi-annual reports to the Commission.

During the reporting period, the power entities undertook peaking and ponding operations under the supervision of the Board. Ponding operations were suspended for the months of September through November as well as the weekends of December 6-7, 13-14 and 20-21 while ocean-going vessels were still in the St. Marys River system. This was done as U.S. Slip Gauge levels were expected to be below chart datum. All ocean-going vessels had cleared the St. Marys system as of December 24, 2003 and weekend and holiday ponding operations were then permitted again for the remainder of December. During January through March 2004 St. Marys River levels were of no concern to navigation and ponding was permitted.

To provide timely information to the users, the Corps distributes monthly notices on expected Lake Superior outflows, and a schedule of flow variations at the hydropower plants. The notices also contain instructions for mariners on who to contact to obtain additional information related to water levels and flows.

The IJC issued a public notice on February 12, 2004 inviting comment on the proposal to extend the authority for peaking and ponding operations in the St. Marys River until March 20, 2006. On February 24, 2004 GLPL submitted a letter requesting the IJC to extend the authority indefinitely. On March 22, 2004, the IJC granted an extension for a length of time yet to be determined.

## **10. Security issues**

The Corps of Engineers has issued contracts for lighting and electronic improvements at its facilities. This work is scheduled to be complete this spring. The Corps of Engineers, Coast Guard, and other agencies held a security exercise at the Soo last fall. Lessons learned are being examined and another exercise is planned for later in 2004.

## **11. Navigation Improvements and Studies**

While the following items are not under the jurisdiction of the Commission, they are of interest to the Board and its operations. Status reports on the following are provided to keep the Commission informed:

### *a. Vidal Shoals Dredging*

The previously reported dredging of the Vidal Shoals in the upper St. Marys River began in June, 2001 following approval from the U.S. State Department, which had consulted with Canada's Department of Foreign Affairs and International Trade (DFAIT). Analysis has shown that this dredging has no effect on levels and flows. This dredging project consisted of deepening of existing channels in the Upper St. Marys River between Pointe Louise Turn and the South Channel portion to the navigation locks, upstream of Sault Ste. Marie. Dredging is substantially complete except for the 300-foot wide northern channel area between Point Aux Pins and the West Approach to the locks. This work is expected to be completed in the summer of 2004, pending resolution of a dispute between the contractor and the Corps of Engineers over dredging of the northern channel portion. Detroit District personnel and equipment will remove strikes located in the southern portion in spring 2004.

*b. Little Rapids Cut Dredging*

The Corps of Engineers Lower St. Marys River navigation channel dredging project, extending from the south approach of the Soo Locks to the northern end of the Rock Cut on the west side of Neebish Island, is expected to be completed this summer with the removal of critical areas remaining in the main channel. An additional dredged material placement site will be used to allow completion of the project. The required depth will be 8.5 meters (28.5 feet) below Low Water Datum with an allowable shoal tolerance of 0.09 m (0.3 feet). This work will be entirely in U.S. waters. The U.S. State Department and Canadian Department of Foreign Affairs and International Trade have indicated they have no objection to the project provided it does not cause any transboundary impact on water levels and flows.

The environmental assessment process was completed with the signing of a "Finding of No Significant Impact" on September 30, 2002. Proposals for doing this dredging contract were opened January 28, 2003 and the contract was awarded on February 26, 2003. Work started in July 2003 and is expected to be completed this summer.

Questions raised by Environment Canada about the impact of the dredging on trans-boundary water levels and the flow distribution around Sugar Island have been resolved. A 2-dimensional model analysis of the St. Marys River was done in coordination with Environment Canada. It was agreed that the findings showed no net impact.

*c. Great Lakes / St. Lawrence Seaway Study*

Work is progressing on the Great Lakes / St. Lawrence Seaway study in evaluating the engineering, economic and environmental conditions of the waterway. The GLSLS Study is looking at the requirements of maintaining the present system over the next 50 years. The Study is also looking at the implications this has on the system's economic and environmental components. Evaluation of expanding, modifying or improving the existing navigation infrastructure is not part of this study effort. The environmental team is led by the US Fish and Wildlife Service; the economic team is led by Transport Canada; and the engineering team is led by the Corps of Engineers. The Study is in the 9<sup>th</sup> month of an anticipated 30-month bi-national effort. The Board will continue to monitor the progress and update the Commission as appropriate in future reports.

#### *d. Lock Replacement at Sault Ste. Marie, Michigan*

The Limited Re-evaluation Report, including an economic/cost analysis and an Engineering technical appendix, was submitted to Headquarters for review and approval March 3, 2004. All eight Great Lakes states have agreed to a funding apportionment based on origin and destination tonnages. Contingent on approvals and funding, completion is expected to take ten years from the start of construction. The cost is currently estimated at \$386,000,000 fully funded. The Board will continue to monitor the project progress and update the Commission as appropriate in future reports.

### **12. Sea Lamprey Control**

The Great Lakes Fishery Commission (GLFC) and the Sea Lamprey Control Centre (SLCC) did not request flow adjustments or other assistance from the Board to carry out its sea lamprey control program during the last six months. The Board remains available to assist the GLFC and SLCC on request.

Edison Sault Electric Company is working in cooperation with the US Fish and Wildlife Service to install 2 sea lamprey traps in the tailrace of their powerhouse. Currently, there are sea lamprey traps at Unit 10 of the US Government Plant and at Great Lakes Power Ltd.

### **13. Annual Meeting with the Public and Public Information**

The Board will hold its 2004 annual meeting with the public in four locations simultaneously on June 21, 2004. The tentative locations are Duluth, Minnesota; Thunder Bay, Ontario; a location on Lake Michigan; and a location on Georgian Bay, Ontario (possibly Parry Sound). The four locations will be linked in teleconference for a portion of the meeting to permit people to share their views with those at other sites.

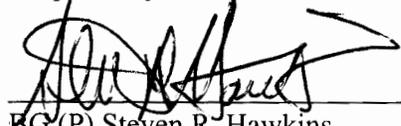
The Board continues to issue, at the beginning of each month, news releases informing the public about Lake Superior regulation and water level conditions. In support of the Board and the Commission, the Detroit District of the Corps of Engineers maintains a Board home page on the Internet. Content includes information on Board members and responsibilities as well as news releases, semi-annual reports, meeting minutes and hydrologic data summaries.

### **14. Board Membership and Meetings**

Colonel Gary E. Johnston acted on behalf of the U.S. Member, BG (P) Steven R. Hawkins while he was on active duty in Iraq. BG (P) Hawkins returned from Iraq on February 3, 2004 and resumed acting as the U. S. Member with Colonel Johnston as the Alternate Member. Mr. David Fay resumed acting as the Canadian Secretary to the Board on October 14, 2004.

The Board met on March 24, 2004 in Amherst, New York with Colonel Johnston and Mr. Carr McLeod in attendance.

Respectfully submitted,



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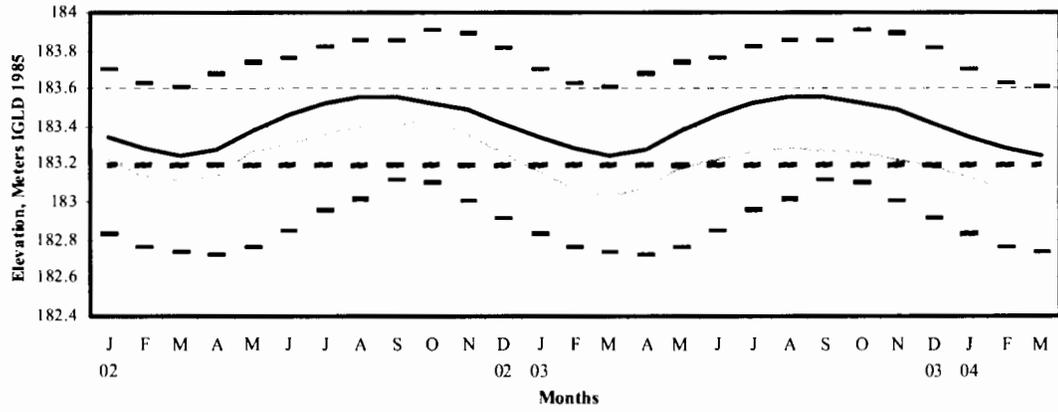
BG (P) Steven R. Hawkins  
Member for United States



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Mr. Carr McLeod  
Member for Canada

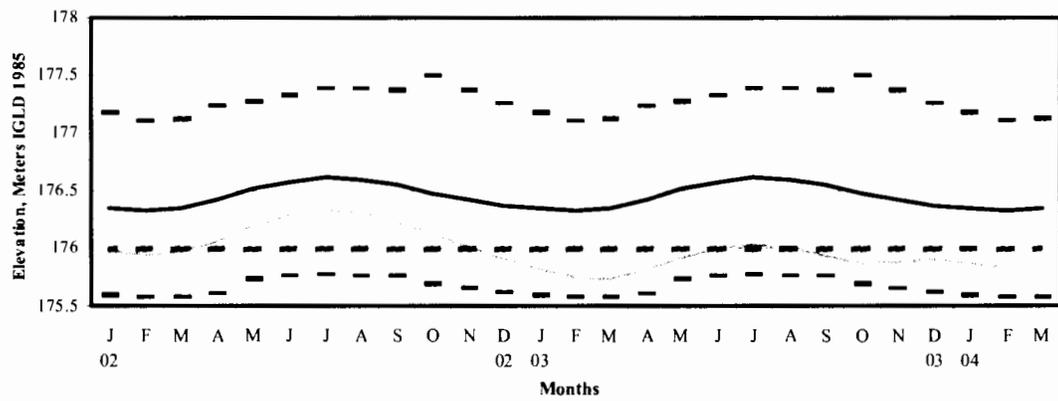
**Monthly Mean Levels  
Lake Superior**



Actual — Maximum — Minimum — Average - - - Datum

Based on a mean of 5 gages. Average, Maximum and Minimum values for the Period of Record 1918-2003

**Monthly Mean Levels  
Lakes Michigan-Huron**

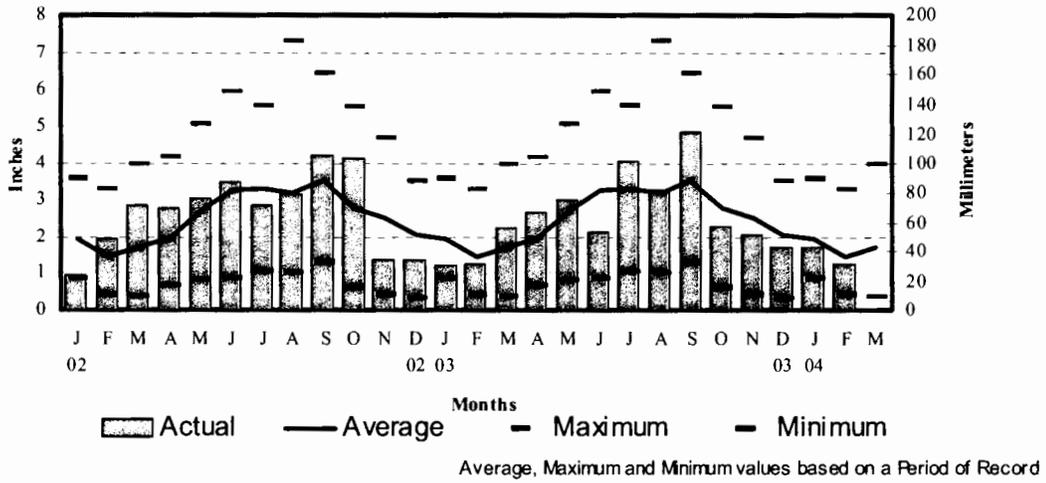


Actual — Maximum — Minimum — Average - - - Datum

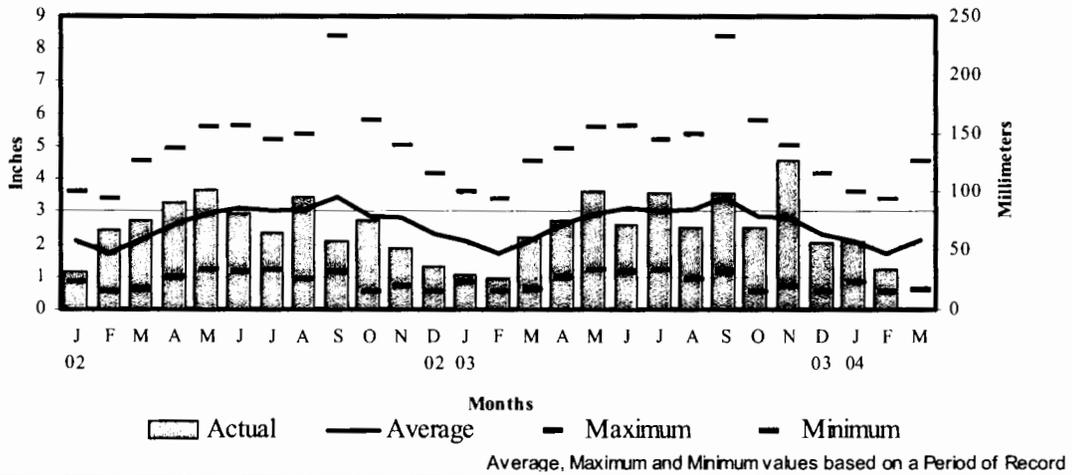
Based on a mean of 6 gages. Average, Maximum and Minimum values for the Period of Record 1918-2003

**Figure 1**

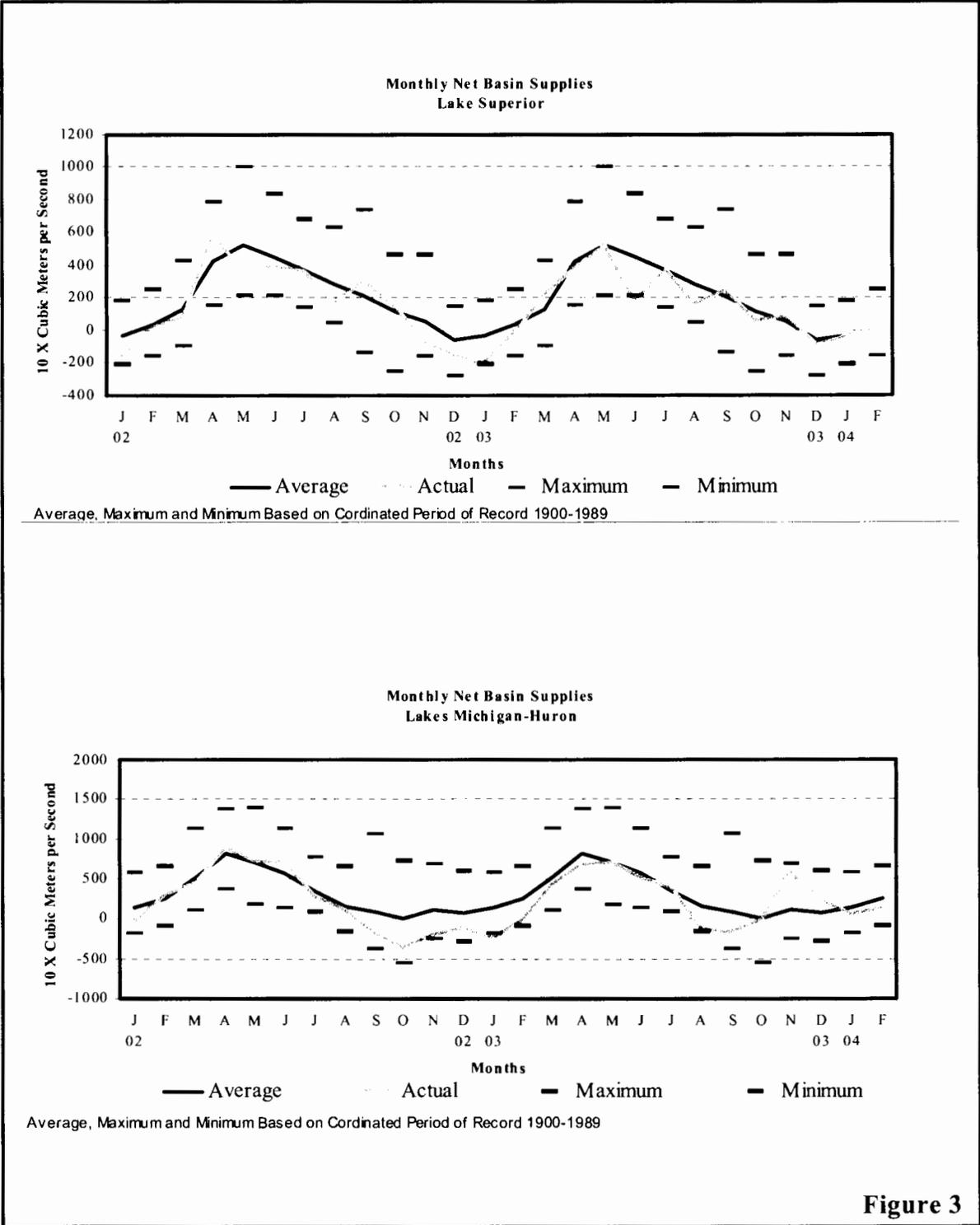
**Monthly Precipitation  
Lake Superior**



**Monthly Precipitation  
Lakes Michigan-Huron**



**Figure 2**



**Figure 3**

**TABLE 1**  
**2003 - 2004 Lake Superior Hydrologic Factors**

Month	Levels			Net Basin Supplies			Outflows			
	Monthly Mean Recorded <sup>1</sup>		Difference From Average <sup>2</sup>	Monthly Mean Recorded		Exceedance Probability (%)	Monthly Mean Recorded		Percent of Average <sup>3</sup>	
	meters	Feet		M3/s	tcfs		m3/s	tcfs		
2003										
Jan	183.16	601.92	-0.18	-0.59	-1980	-70	>99	1880	66	97
Feb	183.07	600.62	-0.21	-0.69	-230	-8	74	1740	61	92
Mar	183.03	600.49	-0.22	-0.72	2210	78	22	1660	59	88
Apr	183.08	600.66	-0.20	-0.66	3900	138	56	1780	63	91
May	183.18	601.98	-0.20	-0.66	5280	186	48	1960	69	92
Jun	183.23	601.15	-0.23	-0.75	1710	60	98	2160	76	98
Jul	183.26	601.25	-0.27	-0.89	3760	133	44	2020	71	88
Aug	183.29	601.35	-0.26	-0.85	1650	58	84	2100	74	88
Sep	183.27	601.28	-0.29	-0.95	2470	87	36	1990	70	84
Oct	183.26	601.25	-0.27	-0.89	640	23	62	2040	72	88
Nov	183.23	601.15	-0.26	-0.85	950	34	34	1730	61	76
Dec	183.19	601.02	-0.23	-0.75	-880	-31	61	1780	63	86
2004										
Jan	183.14	600.85	-0.20	-0.66	-330	-12	45	1680	59	87
Feb	183.07	600.62	-0.21	-0.69	370	13	43	1740	61	92

Notes: m<sup>3</sup>/s = cubic meters per second      tcfs = 1000 cubic feet per second

<sup>1</sup> Water Levels are a mean of five gauges on Lake Superior, IGLD 1985

<sup>2</sup> Average levels are for period 1918-2003, based on a mean of five gauges. Differences computed as meters and then converted to feet.

<sup>3</sup> Average flows and exceedance probabilities are based on a period of record 1900-1989.

**TABLE 2**  
**2003 - 2004 Lakes Michigan-Huron Hydrologic Factors**

Month	Levels		Difference		Net Basin Supplies		Exceedance		Outflows		Percent of Average <sup>3</sup>
	Monthly Mean Recorded <sup>1</sup> meters	Monthly Mean Recorded <sup>1</sup> feet	From meters	Average <sup>2</sup> feet	Monthly Mean Recorded m <sup>3</sup> /s	Monthly Mean Recorded tcfs	Probability (%)	Monthly Mean Recorded m <sup>3</sup> /s	Monthly Mean Recorded tcfs		
2003											
Jan	175.82	576.84	-0.52	-1.71	-2200	-78	>99*	4060	143	91	
Feb	175.75	576.61	-0.57	-1.87	-140	-5	98	3740	132	86	
Mar	175.73	576.54	-0.61	-2.00	4310	152	63	4090	144	85	
Apr	175.82	576.84	-0.60	-1.97	6680	236	71	4350	154	85	
May	175.92	577.17	-0.60	-1.97	7070	250	47	4470	158	83	
Jun	176.00	577.43	-0.58	-1.90	5130	181	62	4520	160	83	
Jul	176.04	577.56	-0.57	-1.87	3990	141	37	4580	162	83	
Aug	176.02	577.49	-0.57	-1.87	-110	-4	83	4580	162	83	
Sep	175.94	577.23	-0.60	-1.87	-1460	-52	88	4460	158	81	
Oct	175.87	574.00	-0.61	-2.00	-150	-5	51	4480	158	82	
Nov	175.89	577.07	-0.53	-1.74	6020	213	<1	4530	160	84	
Dec	175.90	577.10	-0.47	-1.54	2400	85	20	4540	160	88	
2004											
Jan	175.87	577.00	-0.47	-1.54	510	18	75	3890	137	87	
Feb	175.84	576.90	-0.48	-1.57	1450	51	76	4440	157	102	

Notes: m<sup>3</sup>/s = cubic meters per second      tcfs = 1000 cubic feet per second

- <sup>1</sup> Water Levels are a mean of six gauges on Lakes Michigan-Huron, IGLD 1985
  - <sup>2</sup> Average levels are for period 1918-2003, based on a mean of six gauges. Differences computed as meters and then converted to feet.
  - <sup>3</sup> Average flows and exceedance probabilities are based on a period of record 1900-1989.
- \* New record low net basin supply for January.

**TABLE 3**  
**MONTHLY DISTRIBUTION OF LAKE SUPERIOR OUTFLOWS (cubic meters /second )**

Year and Month	POWER CANALS				NAVIGATION CANALS			DOMESTIC USAGE					Total Lake Superior Outflow m <sup>3</sup> /s	
	US Gov't Hydro.	Edison Sault Electric	US Total	Great Lakes Power	Total Power Canals	United States	Canada	Total Navigation Canals	Sault Ste. Marie US+Can.	Algonia Steel	St. Marys Paper	Total Domestic Usage		Fishery St. Marys Rapids
2003														
JAN	299	568	867	906	1773	5.0	0	5	0.4	3.4	0.3	4	95	1877
FEB	325	492	817	827	1644	2.1	0	2	0.4	3.2	0.3	4	94	1744
MAR	333	445	778	786	1564	3.2	0	3	0.5	3.4	0.3	4	94	1665
APR	350	485	835	833	1668	9.8	0	10	0.4	3.3	0.3	4	94	1776
MAY	340	602	942	907	1849	12.2	0.7	10	0.4	3.2	0.3	4	96	1962
JUN	349	692	1041	1004	2045	14.2	2.0	16	0.4	3.1	0.3	4	97	2162
JUL	335	613	948	948	1896	15.0	2.6	18	0.4	3.0	0.3	4	98	2016
AUG	352	629	981	997	1978	14.5	2.4	17	0.4	3.2	0.3	4	98	2097
SEP	381	548	929	945	1874	13.3	2.4	16	0.3	3.3	0.3	4	98	1992
OCT	386	569	955	969	1924	11.3	0.6	12	0.3	3.4	0.3	4	98	2038
NOV	382	415	797	822	1619	9.5	0	10	0.3	3.3	0.3	4	98	1731
DEC	386	441	827	841	1668	10.5	0	10	0.3	3.3	0.3	4	97	1779
2004														
JAN	380	405	785	790	1575	6.5	0	6	0.3	3.3	0.3	4	96	1681
FEB	386	435	821	821	1642	2.0	0	2				5	91	1740

**TABLE 4  
MONTHLY DISTRIBUTION OF LAKE SUPERIOR OUTFLOWS (cubic feet / second)**

Year and Month	POWER CANALS				NAVIGATION CANALS			DOMESTIC USAGE					Total Lake Superior Outflow m <sup>3</sup> /s	
	US Govern't Hydro.	Edison Sault Electric	US Total	Great Lakes Power	Total Power Canals	United States	Canada	Total Navigation Canals	Sault Ste. Marie US+Can.	Algoma Steel	St. Marys Paper	Total Domestic Usage		Fishery St. Marys Rapids
2003														
JAN	10600	20100	30700	32000	62700	176	0	176	14	120	11	145	3350	66400
FEB	11500	17400	28900	29200	58100	74	0	74	14	113	11	138	3320	61600
MAR	11800	15700	27500	27800	55300	113	0	113	18	120	11	149	3320	58900
APR	12400	17100	29500	29400	58900	346	0	346	14	117	11	142	3320	62700
MAY	12000	21300	33300	32000	65300	431	25	456	14	113	11	138	3390	69300
JUN	12300	24400	36700	35500	72200	501	71	572	14	109	11	124	3430	76300
JUL	11800	21600	33400	33500	66900	530	92	622	14	106	11	121	3460	71100
AUG	12400	22200	34600	35200	69800	512	85	597	14	113	11	138	3460	74000
SEP	13500	19400	32900	33400	66300	470	85	555	11	117	11	139	3460	70500
OCT	13600	20100	33700	34200	67900	399	21	420	11	120	11	142	3460	71900
NOV	13500	14700	28200	29000	57200	335	0	335	11	117	11	139	3460	61100
DEC	13600	15600	29200	29700	58900	371	0	371	11	117	11	139	3430	62800
2004														
JAN	13800	14000	27800	27800	55600	247	0	247	11	117	11	139	3250	59200
FEB	13600	15400	29000	29000	58000	71	0	71				176	3210	61500

NOTES 1. Flows for individual users were originally coordinated in m<sup>3</sup>/s, and are converted here to U.S. customary units (cfs) and rounded to 3 significant figures. Total flow for each category and total Lake Superior flow in this table are computed from the individual flows in cfs.

