INTERNATIONAL ST. CROIX RIVER BOARD

ANNUAL REPORT

2006

ST. CROIX RIVER
MAINE AND NEW BRUNSWICK

2006 ANNUAL REPORT

of the

INTERNATIONAL ST. CROIX RIVER BOARD

covering

The Orders of Approval with respect to the control of the discharge of the St. Croix River at Forest City, Vanceboro, and the water levels of East Grand Lake, Spednic Lake, Grand Falls Flowage and Milltown Dam Forebay.

The Water Quality and Aquatic Ecosystem for the St. Croix River Boundary Waters.

SUBMITTED TO

THE INTERNATIONAL JOINT COMMISSION

by

The International St. Croix River Board

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1.0 GENERAL

1.1 Synopsis for 2006

As with the previous year, 2006 was a good water year on the St. Croix River. Lake levels were maintained at optimal levels for cottagers and guides and good flows in the river provided excellent conditions for canoeists and kayakers.

During the year flows and levels were maintained in accordance with the IJC's Orders except for one very small weather incident at Forest City dam. On December 22, 2006 at approximately 06:00 EST shell ice restricted flow at the gate from the outlet of East Grand Lake. This caused the flows at Forest City Stream to recede below the required minimum flow. Domtar staff promptly responded and dam tending personnel were quickly dispatched to the site to remediate the problem. Flow was restored at approximately 09:30 EST. This incident did not have any significant effects.

Progress continued on the development of the GIS project for the St. Croix River Basin. Four thematic maps of the St. Croix River Watershed were created in a common coordinate system: Environmental Management, Land Use/Land Cover, Recreational Resources, and St. Croix River Base Map. These maps are at a scale of 1:100,000.

Work is currently underway by USGS to produce two new harmonized data layers. These are a Watershed Boundary Dataset (WBD), and a streams and water bodies layer for the National Hydrography Dataset (NHD) for the watershed. The data harmonization effort involves both Canadian and U.S. agencies and stakeholders.

The updated mapping products will be presented to the St. Croix River Watershed stakeholders at the planned Stakeholders' Workshop scheduled for the first week of May 2007 in St. Andrew's, New Brunswick.

The New England District of the U.S. Army Corps of Engineers has created a computer simulation of the reservoirs in the St. Croix watershed using ResSim (Reservoir Simulation Model). This model incorporates available physical data and operational rules for the reservoirs, including complex rules for maintaining water levels during spawning seasons. Work is also on-going to develop a computer simulation of

watershed rainfall-runoff using HEC-GeoHMS (Geospatial Hydrologic Modeling System).

At the Board meeting in August 2006, the IJC agreed to provide funding for a State of the Watershed Report for the St. Croix River Basin. A subcommittee of four Board members and the two Board Secretaries began preliminary work on the project in November 2006. The report will discuss the state of the watershed in seven key areas: water use, water quality and quantity, land use, fisheries and wildlife, and air quality.

1.2 Board Membership

Board membership is provided below. Canadian Board Member, Joseph Kozak retired in fall of 2006.

Canadian Section
Bill Appleby, Canadian Co-Chair, Regional Director, Meteorological Service of Canada, Environment Canada, Atlantic Region

William Ayer, Consultant to New Brunswick Department of the Environment and Local Government

Joseph H. Arbour, Ph.D., Manager, Oceans and Coastal Management Division, Department of Fisheries and Oceans Canada, Maritimes Region

Jessie Davies, Director, Environment and Sustainable Development Research Centre, University of New Brunswick, New Brunswick

Canadian Board member - Vacant

Peter Johnson, Canadian Secretary, Policy and Strategic Planning Division Environment Canada, Atlantic Region

U.S. Section
Colonel Curtis Thalken, U.S. Co-Chair, District Engineer, U.S. Army Corps of Engineers, New England District

Edward Logue, Regional Director, Maine Dept. of Environmental Protection

Carol Wood, Deputy Director, Office of Environmental Measurements and Evaluation, U.S. EPA Region 1

Joan Garner Trial, Ph.D., Senior Biologist, Maine Atlantic Salmon Commission.

Robert M. Lent, Ph.D., Maine District Chief, United States Geology Survey

Barbara Blumeris, U.S. Secretary, U.S. Army Corps of Engineers, New England District

1.3 Policy of the Board Regarding Dam Regulation

The Board continued its policy of leaving the control of operation of the Dams at Forest City, Vanceboro, Grand Falls (owned and operated by Domtar, Inc.) and Milltown (owned and operated by New Brunswick Power) in the owners' hands, exercising only that oversight necessary to ensure adherence to the requirements of the Commission's Orders.

During the reporting period, the Board reviewed conditions prevailing in the river by the following means: a continuous record of water elevations of East Grand Lake and continuous record of discharge below Forest City Dam; a continuous record of water elevations of Spednic Lake and a continuous record of discharge at Vanceboro; a continuous record of water levels above the dam at Grand Falls; a continuous record of discharge at Baring, Maine; and monthly reports received from NB Power indicating daily forebay elevations obtained during regular work days at the Milltown Dam. Data are discussed in Section 2 of this report and summarized in Tables and Figures in the Appendices.

1.4 International Joint Commission Semi-Annual Meeting

Board representatives attended the June 8th Executive Meeting of the International Joint Commission (IJC) in Windsor, Ontario to present the Board's Annual Report. Presenting for the Board were U.S. Co-Chair, Colonel Curtis Thalken, and Canada Co-chair, Bill Appleby. Peter Johnson, Canadian Board Secretary, also attended.

1.5 Annual Public / Stakeholder Meeting in Basin

The annual public meeting was held in the St. Croix Basin on the evening of August 29, 2006 at the Technical School in Calais, Maine. IJC Commissioners Allen Olson and Jack Blaney, IJC staff and IJC St. Croix Board Members attended the meeting. Invited presenters included Donna Adams from Domtar, Dr. Curtis Bohlen and Bill MacDonald from Maine Rivers, and Townsend Barker from U.S. Army Corps of Engineers. Ten members of the public attended the meeting.

After welcoming meeting participants and providing introductory comments, Colonel Thalken introduced Commissioner Olson. Commissioner Olson spoke briefly about the mandate of the Commission and the International St. Croix River Board. After these opening remarks the following presentations were provided.

Colonel Thalken provided a review of the Board's oversight role in the Basin and discussed some of the projects the Board had been carrying out in 2006. Key among these were the GIS Atlas project and a hydrologic model of the St. Croix River system. Large format posters of the GIS Atlas layers were displayed for meeting participants to view and to offer advice on where corrections were required. Townsend Barker provided a brief presentation on the reservoir modeling efforts.

Donna Adams, Hydro Superintendent for Domtar, provided information on Water Management during 2006. Donna discussed general lake level and stream flow targets. She described the year, so far, as a good water year, i.e., there was enough water in the system to satisfy users needs. Dr. Curtis Bohlen, Maine Rivers provided a presentation on the Maine Rivers Alewife research project.

Meeting participants were generally pleased with the presentations and there were no significant questions or concerns raised.

1.6 Annual Site Visit of Facilities in the Basin

Board members met with Domtar Officials in the Woodland Mill at Baileyville, Maine on the morning of the August 30, 2006 and then visited the dam sites (Grand Falls, Vanceboro, and Forest City). Board members met with NB Power officials on the afternoon of August 29th and visited the Milltown Dam. Visit notes and Information

describing the dams is provided in Appendix 2.

1.7 Board Meeting

The Board met in Calais, Maine on August 29, 2006. The meeting focused primarily on the special projects on-going in the basin. Meeting notes are included in the Appendices.

2.0 MANAGEMENT OF THE WATER LEVELS AND FLOWS

In 2006, the annual mean water level at East Grand Lake was 131.909 metres (432.77 feet), which is higher than the long term mean value of 131.785 metres (432.37 feet).

The annual mean flow from the lake at Forest City Stream was 7.52 m^3/s (266 cfs), 20% higher than the long term mean value of 6.27 m^3/s (221 cfs).

The annual mean water level for the year at Spednic Lake was 116.443 metres (382.03 feet) higher than the long term mean value of 116.247 metres (381.4 feet).

The annual mean flow as recorded at Vanceboro was 26.7 m^3/s (943 cfs), 31 % higher than the long term mean of 20.4 m^3/s (720 cfs).

The annual mean flow at Baring was 88.7 m^3/s (3130 cfs), which is 23 % higher than the long term mean at Baring of 72.3 m^3/s (2550 cfs).

2.1 East Grand Lake Reservoir and Discharges Below Forest City Dam

During the period from January 1 to December 31, the reservoir was operated between a maximum daily mean water level of 132.399 metres (434.40 feet) on 14 June, and a minimum daily mean of 131.220 metres (431.42 feet) on 17 October. The maximum lake level as prescribed by the Commission's Order is 132.570 metres (434.94 feet): the minimum is 130.496 metres (428.14 feet). The Order was maintained throughout the year. The daily mean elevations are presented in Table I and depicted in Figure I of the Appendix.

Table II and Figure II of the Appendix presents the daily mean discharges below the Forest City Dam at the outlet of East Grand Lake for 2006. The maximum daily mean for the reporting period was 22.1 m^3/s (780 cfs) on 14 February and the minimum daily

mean was 2.35 m^3/s (83.0 cfs) on 4 November. The mean discharge for the year was 7.52 m^3/s (266 cfs). The Commission's Order of 2.12 m^3/s (75 cfs) as a minimum flow was maintained throughout the year with the exception of approximately 3 hours starting at approximately 06:00 EST on December 22, 2006 when shell ice restricted flow at the gate from the outlet of East Grand Lake. This caused the flows at Forest City Stream to recede below the required minimum flow. Domtar staff promptly responded after receiving and confirming a low flow alarm that had been sent to the hydro generating operation. Dam tending personnel were quickly dispatched to the site to remediate the problem. Flow was restored at approximately 09:30 EST. A memo was released on December 22, 2006 by Domtar personnel describing the incident and corrective action taken. The minimum flow reached at this time as recorded by the logger was 130.338 metres which relates to a flow of 0.089 m^3\s (3.14 ft^3\s). This incident is depicted in figure VIII of the appendix.

2.2 Spednic Lake Reservoir and Discharges below Vanceboro Dam

During the year, levels in the Spednic Lake reservoir, ranged from a maximum daily mean of 117.559 metres (385.69 feet) on 12 June, to a minimum daily mean of 115.391 metres (378.58 feet) on 20 October. The maximum limit specified in the Commission's Order is 117.610 metres (385.86 feet). The allowable minimum level is 113.233 metres (371.50 feet) for the period January 1 to 30 April and 1 October to December 31 inclusive, and 114.757 meters (376.50 feet) for the period 1 May to 30 September inclusive. These orders were maintained throughout the year.

The daily mean elevations for the Spednic Lake Reservoir during the year are presented in Table III and depicted in Figure III of the Appendix.

The maximum daily mean discharge recorded from the outflow at the reservoir at Vanceboro was 83.3 m^3/s (2940 cfs) on 14 February and the minimum daily mean recorded was 5.95 m^3/s (210), on 28 Oct. The Commission's Order of a minimum flow of 5.66 m^3/s (200 cfs) was maintained throughout the year. Daily mean discharges are presented in Table IV and depicted in Figure IV of the Appendix.

2.3 Water Levels above Grand Falls Dam

Table V of the Appendix and Figure V include a list of the water level elevations of the headpond above the Grand Falls Dam. The recorded maximum daily mean elevation

was 61.973 metres (203.32 feet) on 16 January and the minimum recorded elevation was 61.621 metres (202.17 feet) on 29 April. The maximum prescribed elevation of 62.106 metres (203.76 feet), as set by the Commission, was not exceeded at any time during the year.

2.4 Discharges at Baring, Maine

Table VI of the Appendix and Figure VI presents and depicts the daily mean discharges of the St. Croix River at Baring, Maine. The mean discharge for the report period was 88.7 m^3/s (3130 cfs). The maximum daily mean was 357 m^3/s (12,610 cfs) on 16 January. The minimum daily mean was 30.3 m^3/s (1070 cfs) on 1 May.
Domtar met the minimum flow requirements of 21.2 m^3/s (750 cfs) included in the formulation of the Mill's wastewater discharge permit.

2.5 Headwater Elevations above Milltown Dam

Table VII and Figure VII of the Appendix present and depict daily water elevations in the forebay of the NB Power Corporation plant at Milltown, New Brunswick. These elevations refer to mean sea level datum. As daily observations of elevations are not obtained on holidays or weekends, maximum and minimum daily mean water levels are not quoted in this report. In 2006 Environment Canada established a water level gauge at the dam structure in Milltown. The gauge also supports instrumentation monitoring water quality parameters. Water levels collected at this gauge will be reported in the 2007 St. Croix Annual Report.

3.0 WATER QUALITY

3.1 Milltown Monitor

Water-quality values for the St. Croix River at the Milltown monitor during the summer of 2006 were within the extreme values for the period of daily record based on record since September 1969. Values were above the water-quality objectives for the river.

The maximum dissolved oxygen value recorded was 10.3 mg/L on September 30; the minimum dissolved oxygen value recorded was 6.2 mg/L on July 14, and 15. There is a period of missing dissolved oxygen record in early September due to instrument

malfunction. Based on the water temperatures during that period, the consistent flows and the general trend of rising dissolved oxygen, it is unlikely that the values dropped below the water-quality objective during that period.

St. Croix River at Milltown
Station # 01021050
Water-Quality Monitor
June – September 2006

	June	July	August	September
		Dissolved Oxygen (mg/L)		
		IJC objective = 5.0 mg/L minimum		
Maximum	8.5	8.2	8.4	10.3
Minimum	6.3	6.2	6.6	6.6
Mean	7.3	7.0	7.6	8.7
		Water Temperature (degrees centigrade)		
Maximum	24.0	27.0	26.6	21.4
Minimum	15.5	21.8	18.6	15.3
Mean	19.5	24.7	22.3	18.9
		pH (standard units)		
Maximum	6.8	7.0	7.0	6.8
Minimum	6.4	6.6	6.6	6.5
Median	6.6	6.8	6.8	6.6
	Specific conductance (microsiemens per centimeter at 25 C)			
Maximum	88	90	75	71
Minimum	36	60	56	55
Mean	53	69	63	62

3.2 New Environment Canada Water Quality Monitoring Initiative

In 2006, the Water Quality Monitoring Office of Environment Canada began to implement a national in-situ water quality monitoring network. This network is co-located with the Water Survey of Canada Hydrometric infrastructure, and provides users with near real time analyses of water chemistry for selected rivers within Canada. Currently, two new stations are operating on the St. Croix River; one at Milltown Dam and a second at Forest City. Each station will provide specific conductance, pH, turbidity, temperature, dissolved oxygen, and total nitrate.

4.0 STATUS OF POLLUTION ABATEMENT

4.1 Maine

The Town of Baileyville and the State signed an Administrative Consent Agreement in late 2006 to address a number of operational issues. These issues included exceedances for BOD, SS, flow, and bacteria over the last few years. The Town has agreed to correct these issues and has hired a consulting engineering firm to assist them. A penalty was issued for these violations.

The Town of Calais continues to work to upgrade their wastewater system. They are still being operated by a private consulting company and have made many improvements to their pump stations and operations. These upgrades will continue for a number of years.

The Domtar facility remained in compliance with their wastewater license during 2006.

4.2 New Brunswick

<u>McAdam Municipal Wastewater</u>
The McAdam facility is an oxidation ditch treatment process which discharges to Waklehegan Lake. The process has disinfection in the summer and minimizes phosphorous levels in the effluent using alum addition. There are some issues with combined sewers.

St. Stephen Municipal Wastewater

The aerated lagoon along Dennis Stream operates within the effluent standards of 20 mg/l of BOD and 20 mg/l SS year round with disinfection. The system is treating process water from Ganong Bros. Ltd., as well as the municipal wastewater.

Champlain Industrial Park

The extended aeration facility treats the domestic wastewater of 85 employees and a large portion of industrial wastewater. The facility discharges treated effluent to the Waweig River Estuary. New sludge returns pumps have been installed to increase efficiency of sludge return. Temporary sludge tanks have been removed.

East Coast Village MHP

The facultative lagoon treats the domestic wastewater of the 58 mobile homes in the park. The facility discharges treated effluent to a marshy area of Meadow Brook. The receiving stream is not adequate to receive the wastewater. Eventually the services from the municipality of St. Stephen may be extended to the mobile home park.

Fisheries Biological Station

The Fisheries Biological Station currently has an extended aeration system to treat domestic wastewater from the office buildings of the Department of Fisheries and Oceans (DFO). The long-term plan is to expand the DFO site and this will include a new wastewater treatment facility or connecting with the services of the Town of St. Andrews, however, no decisions have been made yet.

Huntsman Marine Science Center

The lower campus of the Huntsman Marine Science Centre consists of a public aquarium facility, a number of teaching, research and service buildings adjacent to three greenhouses and three Quonset buildings that are used for fish rearing. Effluent from the fish rearing facilities empties into a 2-stage settling pond system prior to discharge from the site.

Oak Bay Park

The Oak Bay Campground has a trickling filter to treat the seasonal domestic wastewater of 110 campsites and the treated effluent is discharged to Oak Bay. The facility has recently added chlorination and dechlorination to the treatment process and the outfall pipe has been extended to the high tide mark. The system does not meet the desired effluent limits in the peak camping months.

Milltown Generating Station

The Milltown Generating Station has a Multi Flo system to treat domestic wastewater generated from their facility. The treated effluent is discharged to the St. Croix River. An Approval to Operate has been issued for this site.

5.0 FISHERIES

5.1 Anadromous Fisheries

The St. Croix International Waterway Commission operates a research trap in the Milltown dam fishway, just above head of tide, to monitor anadromous fisheries runs in the St. Croix River. In 2006, agencies and conservation interests collaborated to replace the aging research trap, and the fishway and new trap were operated from May 2 to October 27, inclusive.

A total of 11,829 alewives (*Alosa pseudoharengus*) were recorded. This is the highest return of alewife since 1999 but still well below the 10-year (1996-2005) average of 110,965 and 20-year (1986-2005) average of 1,248,550 fish. Fisheries & Oceans Canada (DFO) transported 6,653 of these alewives 16 kilometers upstream to the Woodland Flowage where they were released to spawn. [The State of Maine maintains a barrier to alewives immediately below this flowage.] The remaining 5,176 fish were released directly from the Milltown fishway to spawn in the lower (Milltown-Woodland) section of the river.

A total of 11 Atlantic salmon (*Salmo salar*) were recovered in 2006, of which four had been stocked as juveniles and seven were aquaculture escapees. All the native fish were released upstream to spawn and the aquaculture fish were sacrificed for research.

5.2 Shellfish Harvesting

St. Croix & Waweig River

The St-Croix River has been closed for shellfishing since the 1980's from the town of St-Stephen to Wileys Corner located south of Johnson Cove and including Waweig River. Depuration activities have been taking place since 2005 between Sandy Point and Wileys Corner. A new sewage treatment plant was installed in the town of St. Stephen

in 2005 which will most probably improve water quality in the area. The last study was carried out in 2003 and the current study will span from September 06 to April 2007. This study will determine if the new system is improving the water quality.

Oak Bay

Since briefly being opened to shellfishing under a conditional harvest plan in 1999, Oak Bay was not reopened in subsequent years. However, a three year MOA (2005-2008) was signed in November, 2005 with a view to reactivating a conditionally approved shellfishery along the eastern portion of the bay beginning in 2006. Depuration harvesting began in 2005 within the western portion of the bay. Sampling has occurred in fall 2006 and plans are in place to re-sample Oak Bay in spring 2007 to determine if bacteria levels have decreased since the last water samples were taken in 2003.

6.0 INTERNATIONAL WATERSHEDS INITIATIVE

The Board continued in 2006 to make progress in the implementation of the IJC's International Watersheds Initiative. Initiatives in 2006 were:

6.1 GIS Project

Four thematic maps of the St. Croix River Watershed were created in a common coordinate system: Environmental Management, Land Use/Land Cover, Recreational Resources, and a St. Croix River Base Map. These maps display the watershed layers at a scale of 1:100,000.

Work is currently underway by USGS to produce new harmonized data layers for the Watershed Boundary Dataset (WBD), and a streams and water bodies layer for the National Hydrography Dataset (NHD). This is one of the first efforts to harmonize these layers across an international boundary. The updated mapping products will be presented to the St. Croix River Watershed stakeholders at the upcoming Workshop in May 2007.

6.2 Hydrology Model

The New England District of the U.S. Army Corps of Engineers has created a computer simulation of the reservoirs in the St. Croix watershed using ResSim (Reservoir

Simulation Model). This model incorporates available physical data and operational rules for the reservoirs, including complex rules for maintaining water levels during spawning seasons. The report has been provided to Domtar for review and if additional information is received, it can be easily incorporated. Although the model can be used in its present form to compare the effects of adopting different goals for reservoir operation, additional efforts include using output from the rainfall-runoff model HEC-GeoHMS.

The HEC-GeoHMS model is being developed to analyze the hydrologic aspects of the St. Croix River watershed. This model processes existing topographic and land use data to compute the volume of runoff/inflow generated from rain events. The St. Croix River GeoHMS model includes both 30m and 10m resolution elevation data, WBD and NHD (watershed and stream alignment) datasets specifically developed for the St. Croix River, and land use data. The runoff volumes computed for the watershed will be routed along the St. Croix River and its reservoirs to be used as inflow to the HEC-ResSim model.

The use of NexRAD precipitation data recorded within the St. Croix River watershed during the 2002 and 2004 drought years is being evaluated for use in conducting the runoff/inflow computations. The NexRAD data includes radar precipitation data that is recorded from stations located in Houlton and Portland, Me and verified for quality control by the National Weather Service - River Forecasting Center (NWSRFC) in Taunton, Massachusetts.

6.3 State of the Watershed Report

The IJC agreed to provide funding for this project at the Board meeting in August 2006. A subcommittee of four Board members and the two Board Secretaries began preliminary work on the project in November 2006. The report will discuss the state of the watershed in seven key areas: water use, water quality and quantity, land use, fisheries and wildlife, and air quality.

6.4 Proposed Watershed Board Designation

In 2006, the Board decided that, owing to the advanced nature of the Board's implementation of the IJC's International Watersheds initiative, it would be appropriate to change the name of the Board from the International St. Croix River Board to the

International St. Croix Watershed Board and submitted a request letter to the IJC in January 2007. Action on this request will be determined in 2007.

7.0 OTHER DEVELOPMENTS IN THE BASIN

7.1 FERC update

Domtar Maine is the owner of the Forest City Dams and the West Brach Dams on the St. Croix River. The Forest City Dam is on the international waterway. The West Grand Dam is located in Maine. Both projects are licensed with U.S. Federal Energy Regularity Commission (FERC). These licenses have expired and Domtar in March 2006 filed with FERC to renew. In May 2006 FERC approved the use of the traditional licensing process for both these projects. Domtar has been working with stakeholders in the watershed to determine what studies are needed to re-license and holding public informational meetings to keep stakeholders informed. Domtar hopes to complete studies required for re-licensing in December of 2007.

7.2 Proposed LNG Facilities in Maine

In 2006, the Board continued to monitor information on the three Liquefied Natural Gas (LNG) facilities being proposed in the St. Croix area in Maine.

Downeast LNG Inc. is proposing to develop a facility at Robbinston. Robbinston is located near the mouth of the St. Croix River and across the river from St. Andrews, New Brunswick. The U.S. Federal Energy Regulatory Commission (FERC) is the lead federal agency for the environmental reviews of LNG facilities. Information on the proposal can be found on the FERC website *(http://www.ferc.gov/industries/lng/indus-act/terminals/exist-prop-lng.asp)* under Docket No. PF06-13-000. As of this writing (February 2007), the State of Maine has also received an application for this LNG facility. The licensing process at the state level has been turned over to the Board of Environmental Protection for processing. The license was accepted for processing in January 2007 and no formal hearings have been scheduled at this time.

Quoddy Bay LLC is proposing the development of the facility at Split Rock in the Pleasant Point area. Pleasant Point is located in the Western Passage, the southern entrance to Passamaquoddy Bay. The proposed facility at Split Rock would be located on land leased from the Passamaquoddy Indian Tribe. Information on the proposal can be found at the FERC website under Docket No. PF06-11-000.

Also, as of this writing (February 2007), a third group has approached the State of Maine about a possible LNG site in the Red Beach area of Calais. The discussions were preliminary and general in nature and no other information has been submitted to the State or the Federal Government at this time.

The LNG facility proposals are controversial, particularly from the perspective of various local groups. Concerns have also been expressed by the Canadian government regarding LNG tanker transit through Canadian waters to the Head Harbour Passage area. As of this writing (February 2007), Canada has informed the United States that it won't allow liquefied natural gas tankers through Canadian waters to access these proposed LNG facilities on the Maine side of Passamaquoddy Bay. The Premier of New Brunswick and Provincial Ministers have also expressed concerns regarding potential environmental, navigational, and safety risks associated with these proposed facilities.

ACKNOWLEDGEMENTS

The International St. Croix River Board gratefully acknowledges the valuable input and efforts in support of this report provided by the following groups/ individuals and without which the preparation of this report would not be possible:

Lee Sochasky – St. Croix International Waterway Commission
Cristin Dawson – New Brunswick Department of the Environment
Ed Logue – Maine Department of Environmental Protection
Paul Noseworthy – Environment Canada
James Caldwell – U.S. Geological Survey
Peter Johnson - Environment Canada
Barbara Blumeris – U.S. Army Corps of Engineers

APPENDIX 1

SUMMARY - ORDERS OF APPROVAL & BASIN MAP

SUMMARY - ST. CROIX RIVER ORDERS OF APPROVAL

INTERNATIONAL JOINT COMMISSION

9 November, 1915- For approval of a dam and power canal and the obstruction, diversion and use of the waters of the St. Croix River at Grand Falls in the State of Maine and the Province of New Brunswick: Maximum elevation 202.0 feet m.s.l.

3 October, 1923- Erection and repairs of fishways in the St. Croix River.

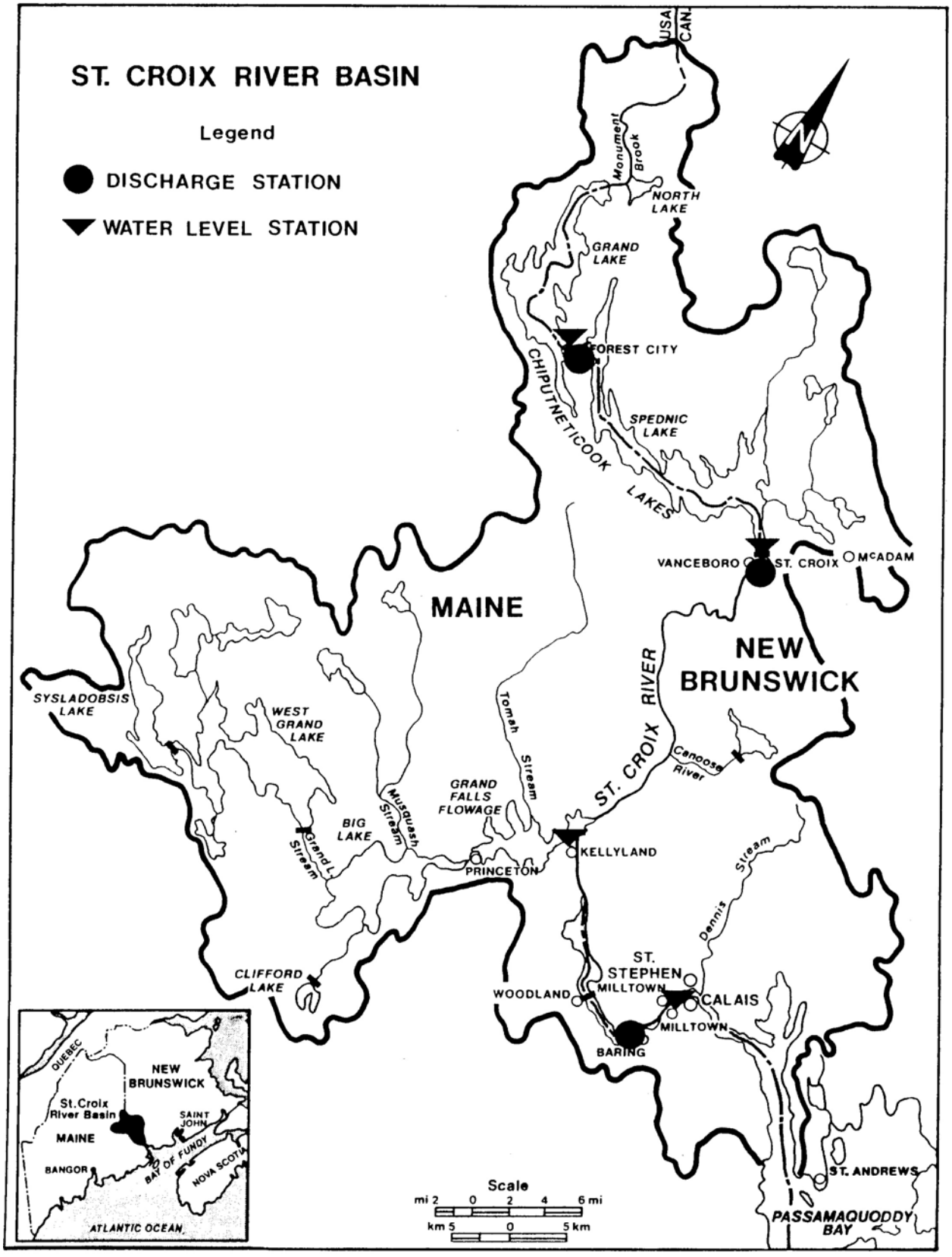
6 October, 1931- For the obstructions of the waters of the St. Croix River at Grand Falls in the State of Maine and the Province of New Brunswick. Increase in elevation to 203.5 feet m.s.l.

2 October, 1934- For the reconstruction of a dam across the St. Croix River from Milltown in the Province of New Brunswick to Milltown in the State of Maine.

15 October, 1965- For the construction of a storage dam in the St. Croix River at Vanceboro, Maine and St. Croix, New Brunswick:

Discharge from Spednic Lake-	200 cfs (5.66 m3\s) minimum
Elevation of Spednic Lake-	385.86 feet (117.611 metres) maximum
Between 1 October and 30 April-	371.50 feet (113.233 metres) minimum
Between 1 May and 30 September-	376.50 feet (114.759 metres) minimum
Discharge from East Grand Lake-	75 cfs (2.12 m3\s) minimum
Elevation of East Grand Lake-	434.94 feet (132.571 metres) maximum 427.94 feet (130.438 metres) minimum

16 November, 1982- For the reconstruction of the diversion dike in the St. Croix River near Baileyville, Maine.


ST. CROIX RIVER BASIN
Legend
DISCHARGE STATION
WATER LEVEL STATION
USA
CAN.
Monument Brook
NORTH LAKE
GRAND LAKE
FOREST CITY
CHIPUTNETICOOK LAKES
SPEDNIC LAKE
VANCEBORO
ST. CROIX
McADAM
MAINE
NEW BRUNSWICK
ST. CROIX RIVER
SYSLADOBSIS LAKE
WEST GRAND LAKE
Tomah Stream
Canoose River
GRAND FALLS FLOWAGE
Musquash Stream
BIG LAKE
Grand L. Stream
PRINCETON
KELLYLAND
Dennis Stream
CLIFFORD LAKE
ST. STEPHEN
MILLTOWN
WOODLAND
CALAIS
MILLTOWN
BARING
ST. ANDREWS
PASSAMAQUODDY BAY
Scale
mi 2 0 2 4 6 mi
km 5 0 5 km
QUEBEC
NEW BRUNSWICK
St.Croix River Basin
SAINT JOHN
MAINE
BAY OF FUNDY
BANGOR
NOVA SCOTIA
ATLANTIC OCEAN

APPENDIX 2

MILLTOWN, GRAND FALLS, VANCEBORO AND FOREST CITY DAMS

GENERAL DESCRIPTION OF MILLTOWN,
GRAND FALLS, VANCEBORO & FOREST CITY DAMS

Milltown Dam & Fish Passage Facilities

The Milltown facility is located in Milltown, New Brunswick across the river from Calais, Maine and approximately one mile upstream from the international bridge between Calais and St. Stephen, New Brunswick. It consists of a powerhouse with 7 hydroelectric generating units, an upstream fish passage facility that goes from the lower pool around the left side of the powerhouse to the upper pool. The spillway is located to the right of the powerhouse and has 6 openings with large wooden stop logs that can be removed or installed via a railed vertical lifting mechanism. Other sections of the spillway have been equipped with wooden flashboards that are meant to fail and increase the spillway's capacity during high flows. At the far end of the spillway, running perpendicular from the spillway to the right bank, is a gatehouse with 5 vertical lift gates used to control the forebay elevation. A wooden-chute downstream fish passage facility is located in the area between the spillway and the gatehouse.

Grand Falls Dam & Fish Passage Facilities

Grand Falls Flowage Dam is approximately 8 miles upstream of the town of Baileyville, Maine and can store approximately 88,000 acre-feet of water. This dam has 9 steel tainter gates on the right of the spillway, and a concrete emergency spillway approximately 800 to 850 feet in length running from the concrete gatehouse and ending at the left shoreline. The gatehouse is located between the gates and the emergency spillway. A floating walkway allows access to the entire upstream length of the spillway. Lake levels are recorded by a gauging station on the right bank of the dam.

The downstream side of the emergency spillway/dam has a concrete face sloping at an angle of approximately 45 degrees, and supported by concrete buttresses along its length. The space between these buttresses has been enclosed with a pressure-treated timber log system. This log system was installed to minimize the temperature differential in the downstream face area during freezing conditions to reduce possible degradation of the concrete face.

Water is impounded behind Grand Falls Dam and delivered to the hydroelectric plant and fish passage facilities via a channel on the right side of the impoundment, approximately 1000 feet upstream of the dam.

Water flows to the turbines via three steel penstocks. A Denil fishway is located on the side of the hydroelectric plant. It is a concrete structure with a series of bays equipped with guide slots that allow for the installation of wooden V notched weirs to modify flows to levels acceptable for fish migration.

Vanceboro Dam & Fish Passage Facilities

Vanceboro Dam consists of an earth embankment with a concrete gate structure and with rock filled gabions on the upstream face. The concrete structure is 69 feet (21 m) long, and contains a fishway and two tainter gates, each 22'-6" (6.9 m) wide by 14'-6" (4.4 m) high. These gates are operated by electrical cable lifts. The gate structure is located on the International Boundary line between the United States and Canada. Gate sill elevation is at 371.5 feet (113.23 m) NGVD. Normal full pond elevation is at 385.86 feet (117.61 m), with an impounded surface of 20,870 acres (84.5 km2). There are approximately 221,200 acre-feet (0.27 km3) of useable storage at normal full pond. The fishway is a vertical slot fish ladder and is on the left side of the dam and consists of 10 bays or pools. There are 5 vertical lift wooden gates to regulate flow through the ladder. The trash rack on the upstream face of the fish passage consists of steel bars spaced approximately 1 foot in the horizontal direction and 3 feet in the vertical.

Forest City Dam & Fish Passage Facilities

Forest City Dam is a small timber crib rock filled structure with three wooden sluice gates operated with a wooden ratchet lever system that lifts the gates using a steel cable or steel chain. These gates have openings of 8'-4" (2.54 m) and a sill elevation of 427.94 feet (130.44 m) NGVD. Full pond elevation is at elevation 434.94 feet (132.57 m) NGVD, and impounds 105,300 acre-feet (0.130 km3) of water. The fishway is located on the left side (facing downstream) of the dam and consists of timber baffle system with an upstream timber trash rack. A gauging station, located immediately downstream on the right bank, measures stage, which is converted to discharge from East Grand Lake through use of a rating table. A second gauging station upstream measures the lake's water level.

FACITILY SITE VISITS IN 2006

Board members and IJC staff met with NB Power officials on the afternoon of August 29th and visited the Milltown Dam. Board members met with Domtar Officials in the Woodland Mill at Baileyville, Maine on the morning of the August 30, 2006 and then visited the dam sites (Grand Falls, Vanceboro, and Forest City).

Participants included in the facilities visits are shown below:

Name	Position/Representing
Stephen Keat	Advisor, IJC U.S. Section
Bill Appleby	St. Croix Board, Co-Chair, Canadian Section
Bill Ayer	St. Croix Board, Canadian Section
Joe Arbour	St Croix Board, Canadian Section
Col. Curtis Thalken	St. Croix Board, Co-Chair, U.S. Section
Ed Logue	St Croix Board, U.S. Section
Joan Trial	St, Croix Board, U.S. Section
Bob Lent	St. Croix Board, U.S. Section
Peter Johnson	Secretary, St Croix Board, Canadian Section
Barbara Blumeris	Secretary, St. Croix Board, U.S. Section
Donna Adams	Domtar Industries, Inc.
Larry Doyle	Domtar Industries, Inc.
Jeff Babcock	New Brunswick Power Co.
Glen Hanson	New Brunswick Power Co

General Comments on Facilities

Milltown Dam. During the Board's annual site visits, it has been observed that there is a crack in the floor of the powerhouse. This is not a new issue as the crack has been apparent since the 1980s. However, about three years ago the Board reported to the IJC that there was increased movement in the crack. At that time NB Power took actions to assess the situation and established initial procedures to prevent further movement of the wall. NB Power set up temporary heated hoarding on the face of the wall to prevent freezing and thawing action. NB Power advises us that there has been no significant movement in the crack since the temporary hoarding was set up three winters ago.

At this time NB Power plans to maintain the hoarding and will consider a more permanent enclosure. NB power will provide the Board with their periodic inspection reports and NB power will continue to monitor any wall movement.

Grand Falls Dam. During the site visit in August 2006, it was observed that maintenance work to the Canadian side of the spillway crest and flashboards had been completed. This work was on-going during the Board's visit in 2005. A small crack was noticed where the Canadian spillway meets the abutment and this was referred to Domtar for consideration.

Vanceboro Dam. Generally dam and fishway appear to be in good condition. A small area of vegetation growth on upstream side of dam was noticed and referred to Domtar for consideration.

Forest City Dam. Domtar had hired an independent consultant to assess the fishway and the adjoining deck structure. There appears to be some leaning of the fishway. This will be repaired by Domtar in 2006/2007.

APPENDIX 3

HYDROGRAPHS

YEAR: 2006 STATION: 01AR009 - GRAND LAKE AT FOREST CITY

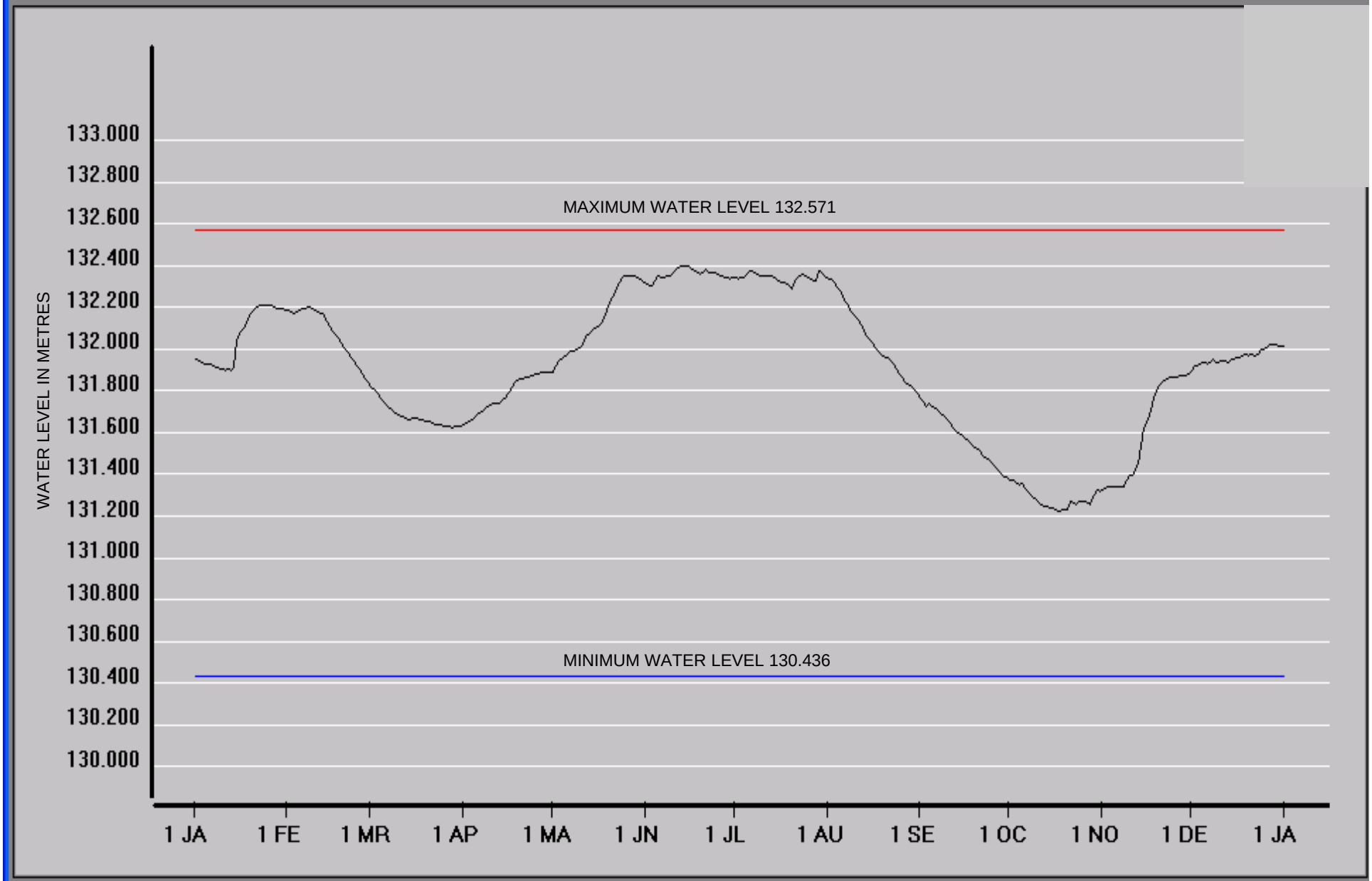


FIGURE I

YEAR: 2006 STATION: 01AR011 FOREST CITY STREAM BELOW FOREST CITY DAM

FIGURE II

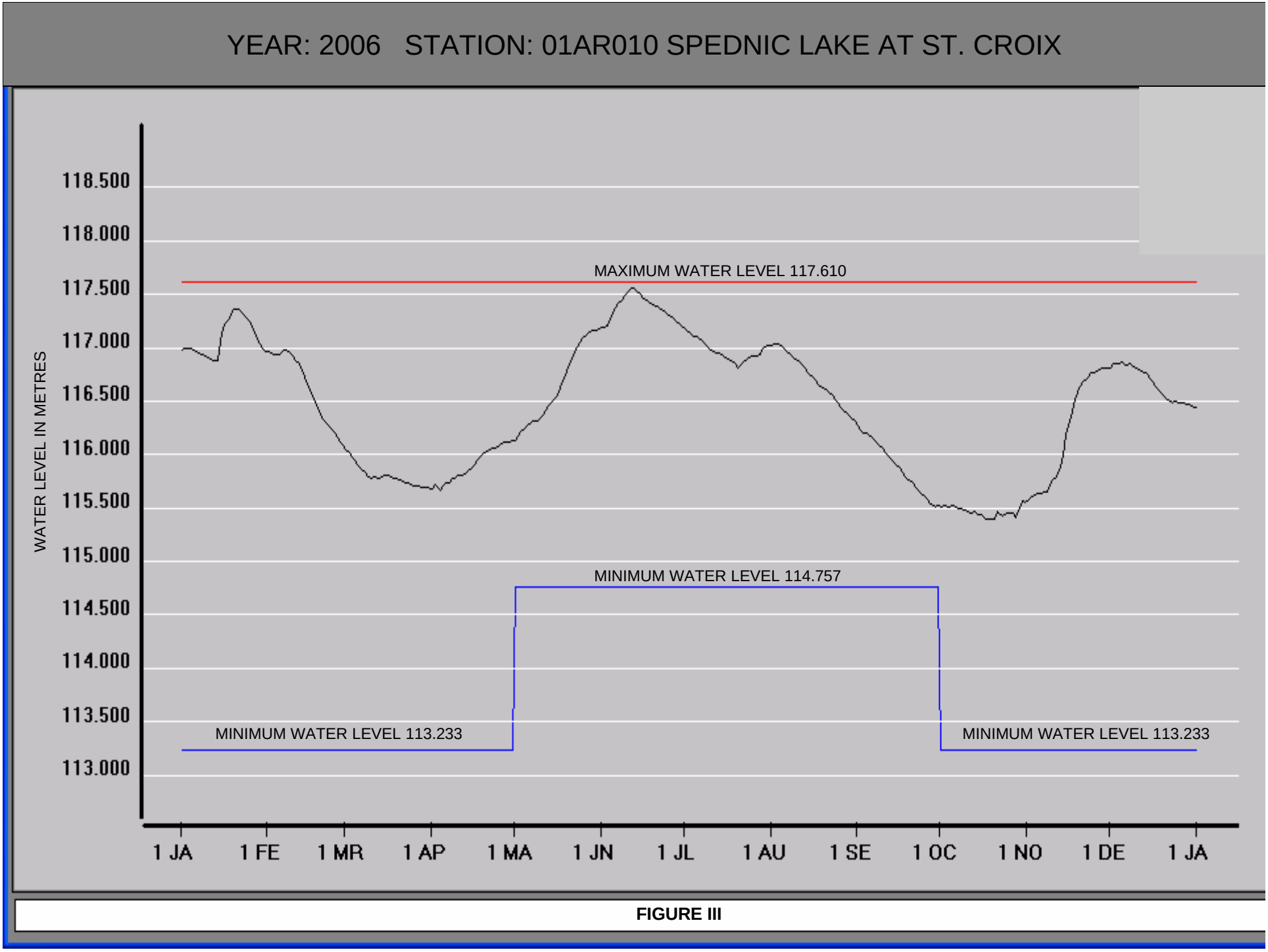

YEAR: 2006 STATION: 01AR010 SPEDNIC LAKE AT ST. CROIX
WATER LEVEL IN METRES
118.500
118.000
117.500
117.000
116.500
116.000
115.500
115.000
114.500
114.000
113.500
113.000
MAXIMUM WATER LEVEL 117.610
MINIMUM WATER LEVEL 114.757
MINIMUM WATER LEVEL 113.233
MINIMUM WATER LEVEL 113.233
1 JA
1 FE
1 MR
1 AP
1 MA
1 JN
1 JL
1 AU
1 SE
1 OC
1 NO
1 DE
1 JA

FIGURE III

YEAR: 2006 STATION: 01AR004 – ST. CROIX AT VANCEBORO

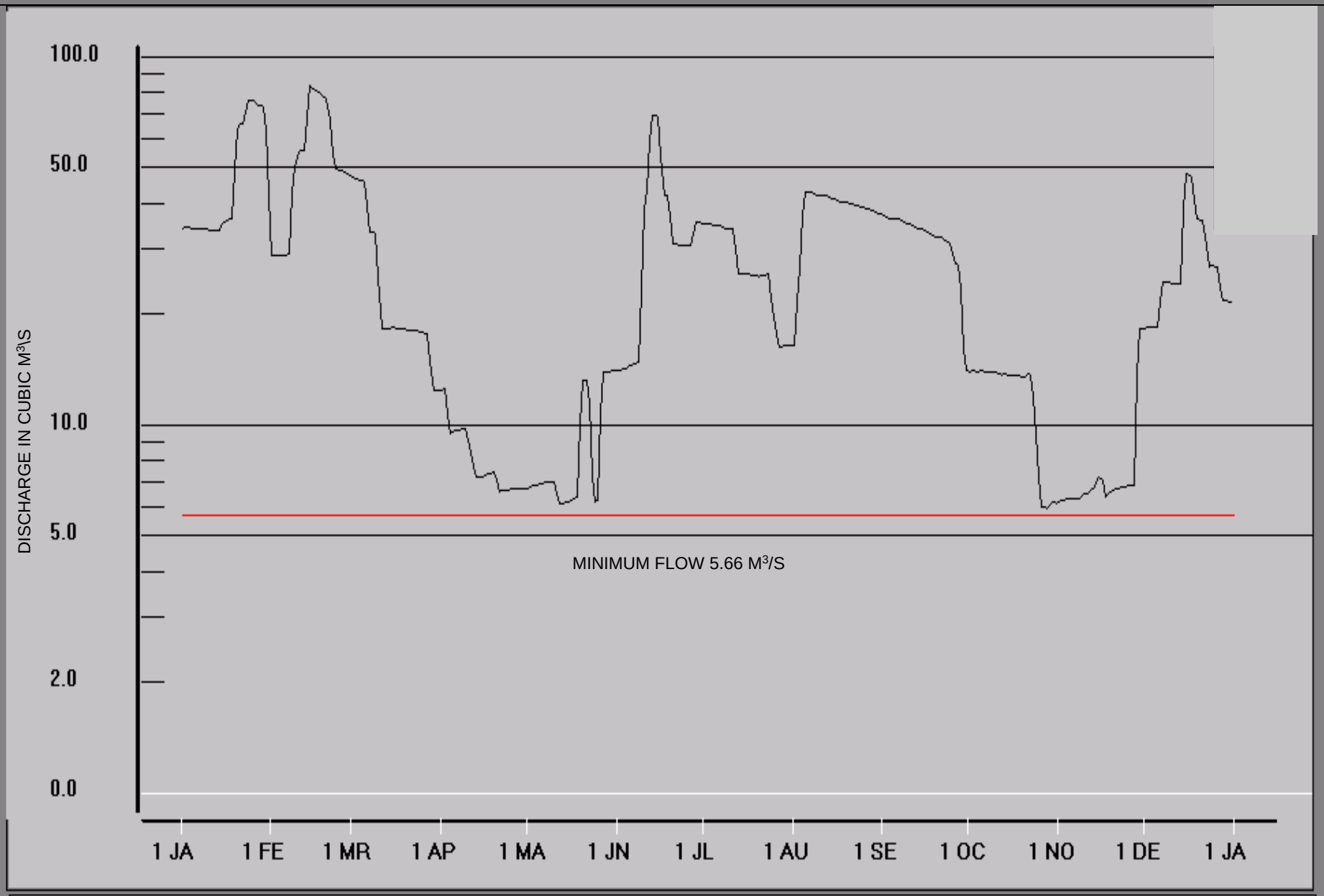


FIGURE IV

YEAR: 2006 STATION: 01AR013 GRAND FALLS FLOWAGE AT GRAND FALLS

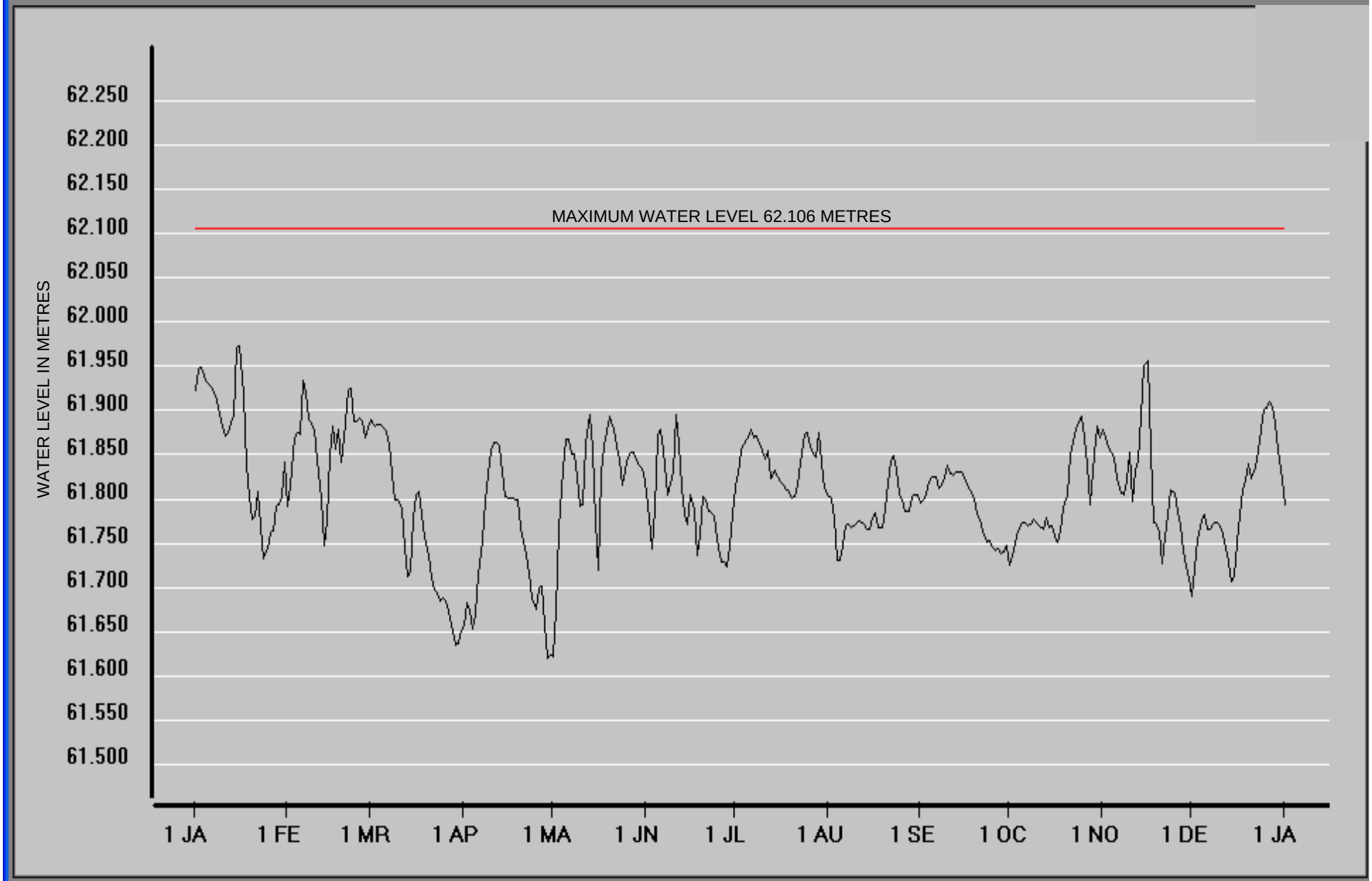


FIGURE V

YEAR: 2006 STATION: 01AR005 ST. CROIX AT BARING

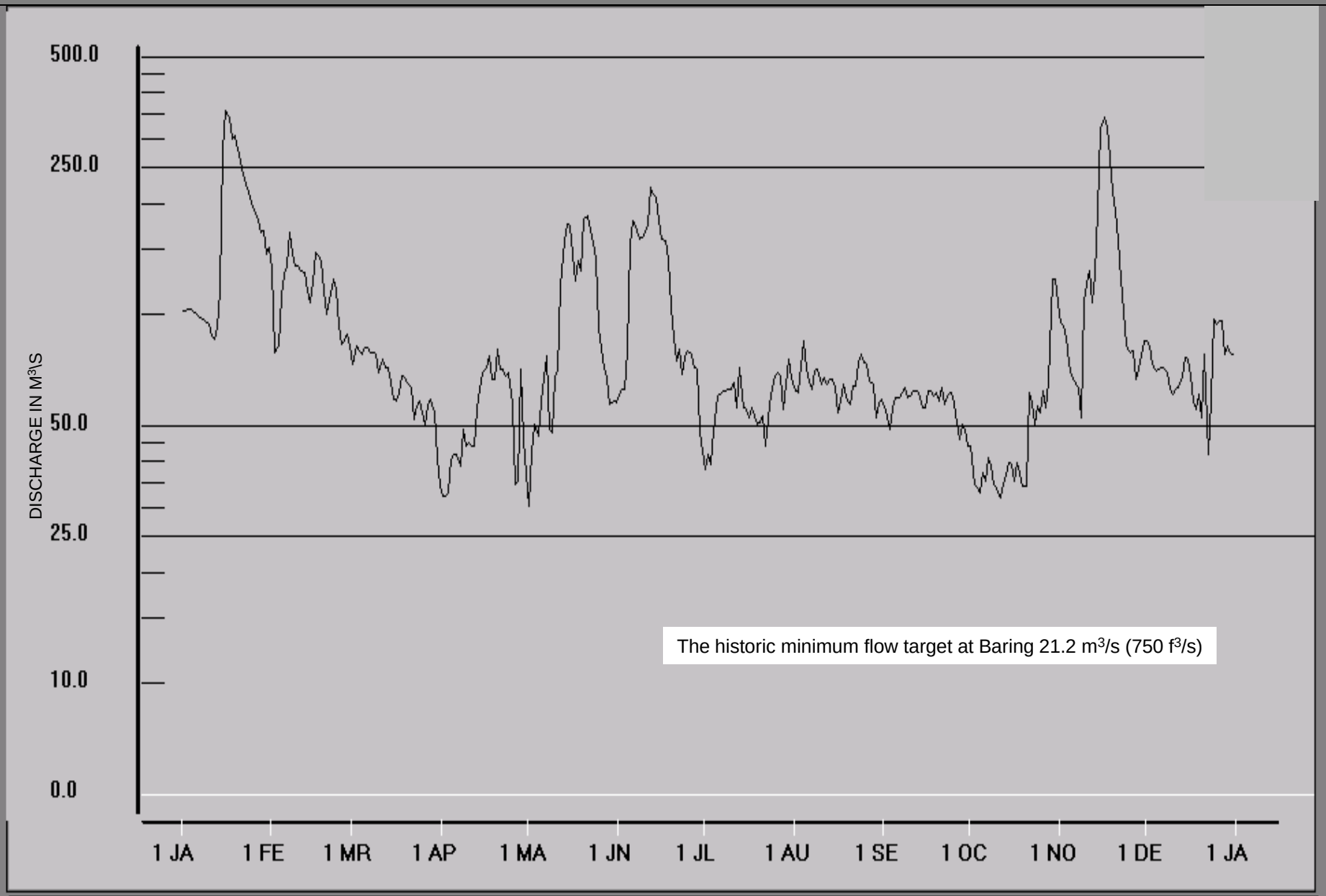


FIGURE VI

YEAR: 2006 STATION: 01AR000 - MILLTOWN

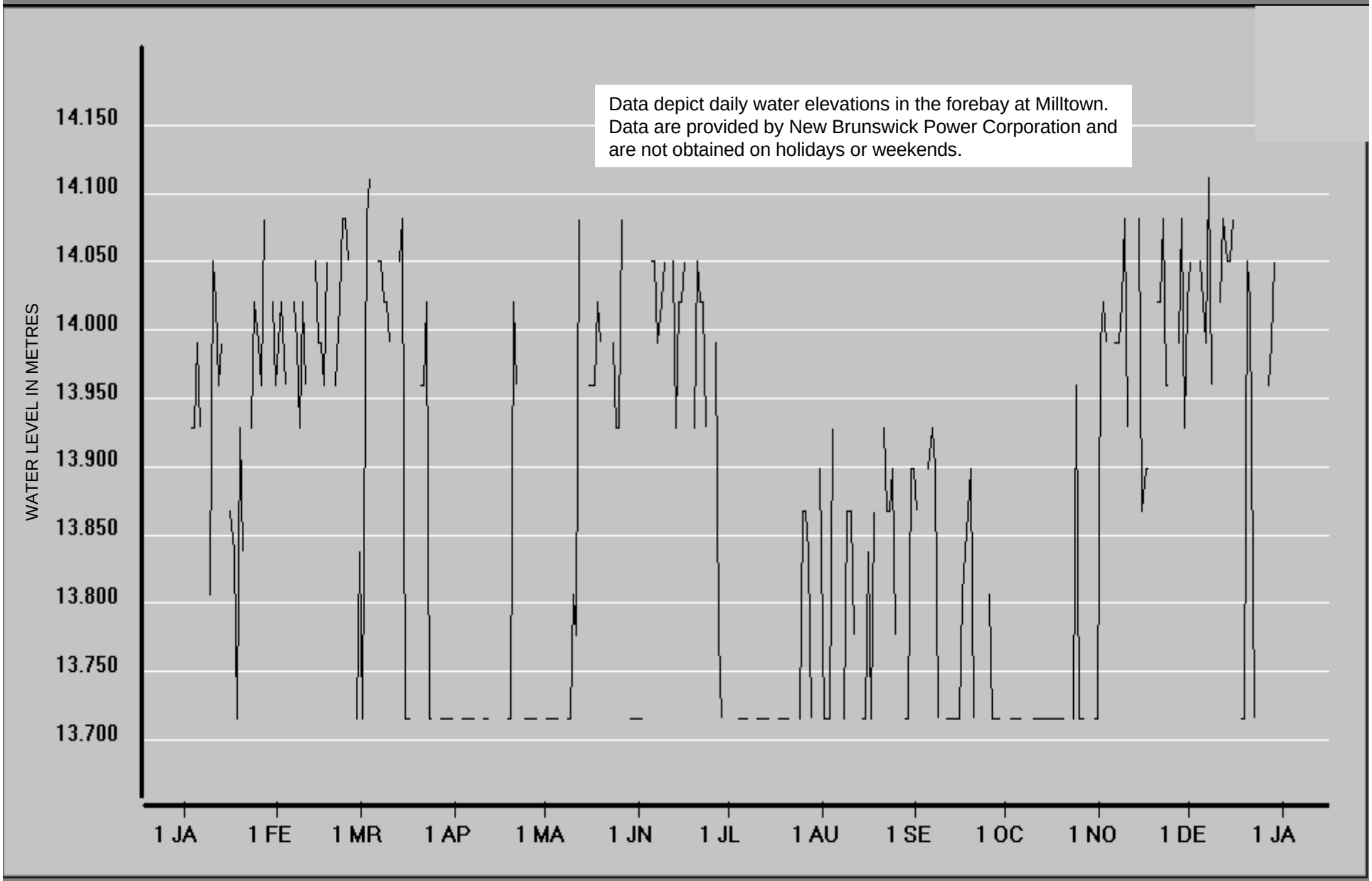
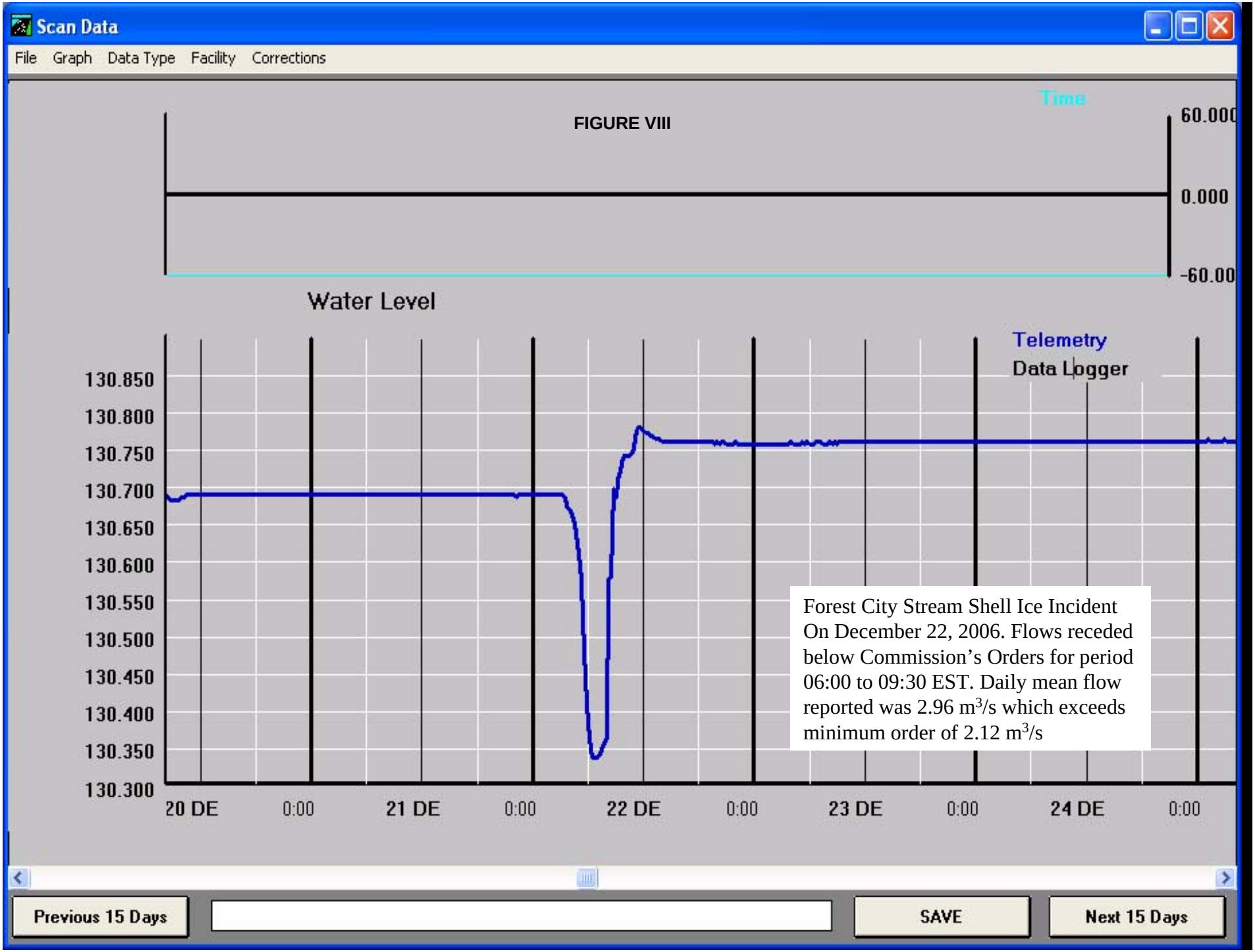


FIGURE VII


Scan Data
File Graph Data Type Facility Corrections
FIGURE VIII
Time
60.000
0.000
-60.00
Water Level
Telemetry
Data Logger
130.850
130.800
130.750
130.700
130.650
130.600
130.550
130.500
130.450
130.400
130.350
130.300
20 DE
0:00
21 DE
0:00
22 DE
0:00
23 DE
0:00
24 DE
0:00
Forest City Stream Shell Ice Incident On December 22, 2006. Flows receded below Commission's Orders for period 06:00 to 09:30 EST. Daily mean flow reported was 2.96 m3/s which exceeds minimum order of 2.12 m3/s
Previous 15 Days
SAVE
Next 15 Days

APPENDIX 4

WATER LEVELS AND FLOWS

GRAND LAKE AT FOREST CITY
DAILY MEAN WATER LEVEL IN METRES FOR 2006

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	131.954	132.183	131.819	131.636	131.885	132.314	132.341	132.336	131.764	131.372	131.327	131.893	1
2	131.943	132.175	131.802	131.649	131.922	132.304	132.335	132.335	131.745	131.373	131.335	131.919	2
3	131.933	132.172	131.784	131.653	131.946	132.301	132.339	132.320	131.728	131.359	131.338	131.921	3
4	131.930	132.174	131.766	131.660	131.959	132.330	132.342	132.296	131.736	131.348	131.340	131.932	4
5	131.925	132.184	131.748	131.676	131.971	132.346	132.368	132.283	131.727	131.354	131.338	131.936	5
6	131.924	132.194	131.730	131.697	131.980	132.343	132.371	132.253	131.716	131.334	131.339	131.929	6
7	131.917	132.197	131.718	131.700	131.993	132.341	132.367	132.223	131.702	131.317	131.338	131.934	7
8	131.911	132.199	131.705	131.720	131.993	132.353	132.361	132.210	131.687	131.303	131.342	131.950	8
9	131.907	132.193	131.692	131.725	131.995	132.351	132.353	132.182	131.675	131.288	131.374	131.939	9
10	131.902	132.186 A	131.684	131.732	132.009	132.364	132.351	132.157	131.664	131.275	131.393	131.938	10
11	131.895	132.177 E	131.676	131.737	132.023	132.383	132.348	132.138	131.642	131.256	131.395	131.941	11
12	131.902	132.168 E	131.666	131.738	132.059	132.392	132.352	132.117	131.626	131.247	131.416	131.940	12
13	131.900	132.160 A	131.659	131.741	132.075	132.398	132.349	132.092	131.608	131.248	131.454	131.936	13
14	131.915	132.133	131.663	131.752	132.088	132.399	132.340	132.064	131.593	131.240	131.533	131.948	14
15	132.035	132.107	131.668	131.762	132.096	132.397	132.328	132.043	131.581	131.237	131.620	131.951	15
16	132.079	132.086	131.665	131.793	132.111	132.387	132.322	132.028	131.570	131.232	131.663	131.961	16
17	132.103	132.066	131.663	131.820	132.123	132.377	132.316	132.009	131.557	131.220	131.709	131.962	17
18	132.125	132.049	131.659	131.838	132.150	132.365	132.309	131.987	131.543	131.224	131.767	131.968	18
19	132.163	132.028	131.654	131.850	132.184	132.356	132.304	131.969	131.525	131.229	131.804	131.974	19
20	132.181	132.005	131.650	131.855	132.225	132.365	132.287	131.959	131.521	131.233	131.825	131.970	20
21	132.194	131.982	131.643	131.861	132.255	132.382 A	132.327	131.960	131.511	131.273	131.840	131.974	21
22	132.202	131.961	131.640	131.865	132.298	132.370	132.341	131.945	131.490	131.261	131.848	131.969	22
23	132.206	131.939	131.639	131.868	132.322	132.369	132.356	131.927	131.472	131.258	131.857	131.976	23
24	132.211	131.923	131.635	131.872	132.338	132.366	132.351	131.904	131.464	131.268	131.866	131.996	24
25	132.211	131.900	131.633	131.881	132.347	132.359	132.343	131.882	131.453	131.272	131.861	131.999	25
26	132.208	131.879	131.631	131.882	132.350	132.352	132.337	131.865	131.436	131.270	131.863	132.008	26
27	132.201	131.859	131.628	131.885	132.352	132.344	132.323	131.842	131.416	131.259	131.871	132.021	27
28	132.196	131.839	131.626	131.885	132.348	132.340	132.329	131.828	131.402	131.252	131.876	132.020	28
29	132.191		131.627	131.885	132.344	132.338	132.371	131.816 A	131.390	131.303	131.873	132.022	29
30	132.194		131.627	131.885	132.335	132.341	132.366	131.802	131.387	131.321	131.878	132.014	30
31	132.189		131.631		132.320		132.351	131.784		131.316		132.013	31
TOTAL	4093.747	3698.118	4082.031	3953.503	4096.396	3970.727	4102.578	4093.556	3947.331	4069.742	3948.283	4090.854	TOTAL
MEAN	132.056	132.076	131.678	131.783	132.142	132.358	132.341	132.050	131.578	131.282	131.609	131.963	MEAN
MAX	132.211	132.199	131.819	131.885	132.352	132.399	132.371	132.336	131.764	131.373	131.878	132.022	MAX
MIN	131.895	131.839	131.626	131.636	131.885	132.301	132.287	131.784	131.387	131.220	131.327	131.893	MIN

SUMMARY FOR THE YEAR 2006
Mean water level, 131.909 Metres
Maximum daily water level, 132.399 Metres On 2006-06-14
Minimum daily water level, 131.220 Metres On 2006-10-17

NOTES: THE DISCHARGE ARE PROVISIONAL AND ARE SUPPLIED BY
ENVIRONMENT CANADA IN COOPERATION WITH DOMTAR.
A - PARTIAL DAY
E - ESTIMATED

TABLE I

FOREST CITY STREAM BELOW FOREST CITY DAM
DAILY MEAN DISCHARGE IN CUBIC METRES PER SECOND FOR 2006

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	19.5	9.24	16.3	2.53	2.67	12.4	5.50	11.8	11.4	8.42	2.72	2.73	1
2	19.3	9.24	15.9	2.53	2.74	12.3	5.48	11.7	11.2	8.45	2.74	2.76	2
3	15.1	9.24	15.6	2.53	2.76	12.2	5.48	15.3	11.0	8.26	2.50	2.75	3
4	9.71	9.20	15.2	2.58	2.76	12.5	5.50	17.3	11.1	8.12	2.35	2.75	4
5	9.71	9.26	14.9	2.58	2.78	12.7	5.52	17.2	11.0	9.15	2.35	2.75 A	5
6	9.71	9.26	12.5	2.60	2.80	12.7	5.52	16.9	10.9	9.67	2.35	2.75	6
7	9.66	9.27	10.9	2.63	2.81	11.2	5.52	16.6	10.7	9.38	2.35	2.75	7
8	9.64	11.0	10.7	2.64	2.84	9.73	5.52	16.4	10.6	9.12	2.35	2.76	8
9	9.63	12.4	10.6	2.65	2.85	9.73	5.52	16.1	10.5	8.89	2.46	2.75	9
10	9.62	12.2	10.6	2.67	2.86	9.81	5.52	15.9	10.4	8.66	2.45	2.75	10
11	9.56	12.2	10.4	2.67	2.57	9.90	5.53	15.6	10.1	8.36	2.47	2.75	11
12	9.68	12.2	10.3	2.67	2.50	9.92	5.52	15.4	9.93	7.43	2.54	2.75	12
13	9.67	17.3	8.47	2.69	2.50	9.94	5.52	15.1	9.73	5.33	2.64	2.75	13
14	9.81	22.1	7.21	2.70	2.50	9.95	5.52	14.8	9.54	4.25	2.90	2.77	14
15	10.8	21.6	6.41	2.73	2.50	9.92	5.52	14.6	9.43	4.19	2.96	2.79	15
16	11.2	21.3	5.48	2.76	2.53	8.89	5.52	14.4	9.27	3.35	3.04	2.79	16
17	11.4	21.1	5.47	2.77	2.61	8.05	5.52	14.2	9.16	2.62	2.82	2.79	17
18	9.94	20.8	5.47	2.81	2.63	8.02	5.51	14.0	8.99	2.47	2.54	2.79	18
19	9.04	20.4	5.43	2.83	2.71	6.69	5.49	13.7	8.84	2.47	2.58	2.79	19
20	9.11	19.9	5.42	2.72	2.76	5.58	5.48	13.6	8.81	2.49	2.62	2.79	20
21	9.17	19.3	5.39	2.63	2.77	5.59	7.67	13.6	8.71	2.58	2.64	2.79	21
22	9.20	18.8	5.37	2.63	2.84	5.59	9.60	13.5	8.51	2.52	2.67	2.96	22
23	9.24	18.4	5.36	2.65	2.85	5.59	9.66	13.2	8.33	2.54	2.67	3.65	23
24	9.26	18.2	5.35	2.67	2.85	5.57	9.62	13.0	8.24	2.55	2.68	3.66	24
25	9.27	17.9	5.35	2.67	2.85	5.52	9.60	12.7	9.01	2.53	2.69	3.67 A	25
26	9.27	17.5	5.33	2.67	6.23	5.52	9.60	12.6	9.29 A	2.52	2.69	3.71	26
27	9.27	17.1	5.31	2.67	8.91	5.52	9.57	12.3	9.08	2.52	2.70	3.71	27
28	9.22	16.7	4.08	2.67	8.90	5.52	9.57	12.1	8.90	2.57	2.70	4.01	28
29	9.22		2.83	2.67	8.87	5.52	9.71	11.9	8.79	2.73	2.70	3.72	29
30	9.26		2.53	2.67	8.87	5.52	9.71	11.8	8.67	2.70	2.70	3.76	30
31	9.25		2.53		10.9		10.9	11.6		2.70		3.74	31
TOTAL	323.42	433.11	252.69	79.89	120.52	257.59	215.42	438.9	290.13	159.54	78.57	94.64	TOTAL
MEAN	10.4	15.5	8.15	2.66	3.89	8.59	6.95	14.2	9.67	5.15	2.62	3.05	MEAN
DAM3	27900	37400	21800	6900	10400	22300	18600	37900	25100	13800	6790	8180	DAM3
MAX	19.5	22.1	16.3	2.83	10.9	12.7	10.9	17.3	11.4	9.67	3.04	4.01	MAX
MIN	9.04	9.20	2.53	2.53	2.50	5.52	5.48	11.6	8.24	2.47	2.35	2.73	MIN

SUMMARY FOR THE YEAR 2006
Total discharge, 237000 DAM3
Mean discharge, 7.52 M3/S
Maximum daily discharge, 22.1 M3/S On 2006-02-14
Minimum daily discharge, 2.35 M3/S On 2006-11-04

NOTES: THE DISCHARGE ARE PROVISIONAL AND ARE SUPPLIED BY
ENVIRONMENT CANADA IN COOPERATION WITH DOMTAR.
A - PARTIAL DAY

TABLE II

SPEDNIC LAKE AT ST. CROIX
DAILY MEAN WATER LEVELS IN METRES FOR 2006

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	116.980	116.959	116.048	115.675	116.126	117.184	117.176	117.014	116.268	115.505	115.571	116.810	1
2	116.985	116.943	116.012	115.723	116.166	117.193	117.146	117.040	116.233	115.523	115.590	116.848	2
3	116.990	116.931	115.979	115.694	116.213	117.203	117.135	117.032	116.199	115.514	115.609	116.850	3
4	116.985	116.934	115.943	115.667	116.244	117.255	117.101	117.017	116.201	115.503	115.622	116.855	4
5	116.972	116.942	115.907	115.701	116.265	117.334	117.098	117.011	116.186	115.525	115.630	116.859	5
6	116.965	116.958	115.875	115.741	116.279	117.378	117.082	116.979	116.159	115.501	115.636	116.842	6
7	116.950	116.971	115.853	115.740	116.311	117.412	117.058	116.946	116.132	115.494	115.643	116.837	7
8	116.935	116.967	115.829	115.778	116.309	117.449	117.030	116.941	116.100	115.489	115.656	116.850	8
9	116.922	116.944	115.795	115.784	116.312	117.490	117.000	116.912	116.076	115.486	115.708	116.818	9
10	116.908	116.918	115.777	115.800	116.337	117.511	116.975	116.885	116.059	115.481	115.763	116.806	10
11	116.889	116.880	115.789	115.807	116.365	117.544	116.960	116.865	116.021	115.457	115.780	116.794	11
12	116.884	116.846	115.780	115.809	116.420	117.559	116.954	116.838	115.989	115.447	115.815	116.781	12
13	116.874	116.800	115.782	115.818	116.465	117.543	116.944	116.806	115.957	115.462	115.869	116.760	13
14	116.875	116.729	115.787	115.845	116.504	117.519	116.937	116.767	115.922	115.444	115.983	116.747	14
15	117.066	116.665	115.804	115.855	116.531 A	117.494	116.913	116.739	115.894	115.437	116.188	116.707	15
16	117.187	116.607	115.802	115.902	116.559	117.464	116.896	116.716	115.868	115.420	116.307	116.681	16
17	117.243	116.546	115.793	115.946	116.631	117.442	116.878	116.688	115.838 A	115.402	116.398	116.638	17
18	117.275	116.503	115.782	115.975	116.687	117.417	116.864	116.653	115.790 A	115.400	116.509	116.608	18
19	117.341	116.440	115.769	116.002	116.735	117.395	116.847	116.623	115.766	115.402	116.577	116.586	19
20	117.361	116.373	115.764	116.014	116.820	117.392	116.815	116.604	115.752	115.391	116.634	116.552	20
21	117.360	116.319	115.747	116.032	116.888	117.386	116.840	116.596	115.733	115.461	116.676	116.528	21
22	117.351	116.285	115.737	116.048	116.959	117.355	116.867	116.574	115.691	115.438	116.697	116.497	22
23	117.322	116.251	115.732	116.055	117.013	117.343	116.897	116.547	115.645	115.423	116.724	116.483	23
24	117.286	116.228	115.721	116.064	117.051	117.330	116.910	116.510	115.624	115.437	116.758	116.498	24
25	117.245	116.198	115.711	116.094	117.084	117.308	116.915	116.478	115.608	115.453	116.765	116.489	25
26	117.204	116.164	115.706	116.104	117.105	117.288	116.924	116.446	115.578	115.456	116.779	116.481	26
27	117.148	116.122	115.702	116.115	117.133	117.264	116.926	116.408	115.541	115.446	116.799	116.487	27
28	117.091	116.081	115.693	116.120	117.150	117.238	116.938	116.382	115.516	115.415	116.809	116.474	28
29	117.039		115.690	116.121	117.162	117.214	116.989	116.358	115.513	115.500	116.805	116.466	29
30	116.997		115.687	116.127	117.167	117.192	117.009	116.333	115.525	115.562	116.806	116.455	30
31	116.967		115.681		117.170		117.014	116.308		115.550		116.447	31
TOTAL	3629.597	3265.504	3589.677	3477.156	3616.161	3521.096	3626.038	3618.016	3476.384	3579.424	3486.106	3616.534	TOTAL
MEAN	117.084	116.625	115.796	115.905	116.650	117.370	116.969	116.710	115.879	115.465	116.204	116.662	MEAN
MAX	117.361	116.971	116.048	116.127	117.170	117.559	117.176	117.040	116.268	115.562	116.809	116.859	MAX
MIN	116.874	116.081	115.681	115.667	116.126	117.184	116.815	116.308	115.513	115.391	115.571	116.447	MIN

SUMMARY FOR THE YEAR 2006
Mean water level, 116.443 Metres
Maximum daily water level, 117.559 Metres On 2006-06-12
Minimum daily water level, 115.391 Metres On 2006-10-20

NOTES: WATER LEVELS ARE IN METRES AND ARE REFERENCED TO GEODETIC SURVEY OF CANADA DATUM. THE WATER LEVEL DATA ARE PROVISIONAL AND ARE SUPPLIED BY ENVIRONMENT CANADA IN COOPERATION WITH DOMTAR.
A - PARTIAL DAY

TABLE III

ST. CROIX RIVER AT VANCEBORO
DAILY MEAN DISCHARGE IN CUBIC METRES PER SECOND FOR 2006

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	34.3	28.9	47.3	12.4	6.71	14.1	35.4	16.5	37.1	14.0	6.20	18.2	1
2	34.6	28.9	46.7	12.5	6.82	14.1	35.1	21.5	36.8	14.1	6.23	18.4	2
3	34.6	28.9	46.4	10.7	6.85	14.2	35.1	26.8	36.5	14.0	6.26	18.4	3
4	34.3	28.9	46.2	9.46	6.88	14.3	34.8	37.1	36.5	14.0	6.29	18.4	4
5	34.3	28.9	45.9	9.57	6.91	14.5	34.8	43.0	36.5	14.1	6.29	18.4	5
6	34.3	28.9	39.4	9.66	6.94	14.6	34.8	42.8	36.3	14.0	6.31	21.6	6
7	34.3	29.2	33.4	9.66	7.02	14.7	34.6	42.8	36.0	13.9	6.31	24.4	7
8	34.3	42.5	33.4	9.74	6.99	14.9	34.3	42.5	35.7	13.9	6.34	24.5	8
9	34.0	50.4	33.1	9.74	6.97	23.2	34.3	42.2	35.4	13.9	6.43	24.4	9
10	33.7	53.5	25.2	9.09	6.99	38.5	34.0	42.2	35.4	13.9	6.51	24.3	10
11	33.7	55.8	18.2	8.47	6.51	43.3	34.0	41.9	34.8	13.8	6.54	24.2	11
12	33.7	55.5	18.2	7.73	6.12	59.5	30.3	41.9	34.6	13.7	6.63	24.2	12
13	33.7	68.2	18.2	7.19	6.14	69.7	25.9	41.6	34.3	13.8	6.71	24.1	13
14	33.7	83.3	18.3	7.22	6.17	69.4	25.9	41.3	34.0	13.7	6.94	38.8	14
15	35.1	82.1	18.4	7.25	6.20	68.8	25.8	41.1	33.7	13.7	7.22	48.1	15
16	35.7	81.0	18.3	7.31	6.23	53.8	25.7	40.8	33.4	13.6	7.08	47.9	16
17	36.3	80.1	18.3	7.39	6.31	42.2	25.6	40.5	33.1	13.6	6.37	47.3	17
18	36.3	79.3	18.2	7.42	6.40	41.9	25.6	40.2	32.9	13.6	6.51	40.8	18
19	49.3	78.2	18.2	7.45	10.1	37.1	25.5	40.2	32.6	13.5	6.60	36.3	19
20	62.9	76.7	18.1	7.05	13.2	31.2	25.3	39.9	32.6	13.5	6.68	36.0	20
21	66.0	67.1	18.0	6.60	13.3	31.2	25.5	39.9	32.3	13.8	6.71	36.0	21
22	66.0	54.7	18.0	6.63	11.4	30.9	25.6	39.6	32.0	13.7	6.74	30.9	22
23	70.8	49.6	18.0	6.63	7.28	30.9	25.8	39.4	31.4	11.9	6.77	27.0	23
24	76.5	49.3	17.9	6.65	6.20	30.9	22.1	39.1	31.2	9.46	6.82	27.1	24
25	75.9	49.0	17.9	6.71	6.23	30.9	19.7	39.1	29.2	7.22	6.85	27.0	25
26	75.3	48.7	17.8	6.71	10.8	30.9	17.7	38.8	27.4	6.00	6.85	27.0	26
27	74.2	48.1	17.8	6.71	14.0	33.1	16.3	38.5	27.2	5.97	6.88	23.6	27
28	73.6	47.6	14.8	6.74	14.0	35.7	16.3	38.2	23.5	5.95	13.6	21.7	28
29	72.8		12.4	6.71	14.0	35.7	16.5	37.9	16.2	6.12	18.2	21.7	29
30	62.9		12.4	6.71	14.1	35.4	16.5	37.7	14.1	6.20	18.2	21.6	30
31	41.9		12.4		14.1		16.5	37.7		6.14		21.6	31
TOTAL	1489.0	1503.3	756.8	243.80	267.87	1019.6	835.3	1192.7	962.7	368.76	228.07	863.9	TOTAL
MEAN	48.0	53.7	24.4	8.13	8.64	34.0	26.9	38.5	32.1	11.9	7.60	27.9	MEAN
DAM3	129000	130000	65400	21100	23100	88100	72200	103000	83200	31900	19700	74600	DAM3
MAX	76.5	83.3	47.3	12.5	14.1	69.7	35.4	43.0	37.1	14.1	18.2	48.1	MAX
MIN	33.7	28.9	12.4	6.60	6.12	14.1	16.3	16.5	14.1	5.95	6.20	18.2	MIN

SUMMARY FOR THE YEAR 2006
Total discharge, 841000 DAM3
Mean discharge, 26.7 M3/S
Maximum daily discharge, 83.3 M3/S On 2006-02-14
Minimum daily discharge, 5.95 M3/S On 2006-10-28

NOTES: DATA ARE SUPPLIED BY THE UNITIED STATES GEOLOGICAL SURVEY
AND ARE PROVISIONAL

TABLE IV

GRAND FALLS FLOWAGE AT GRAND FALLS
DAILY MEAN WATER LEVELS IN METRES FOR 2006

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	61.923	61.792	61.890	61.658	61.621	61.806	61.813	61.802	61.795	61.726	61.879	61.690	1
2	61.947	61.813	61.882	61.682	61.673	61.778	61.829	61.801	61.799	61.742	61.868	61.722	2
3	61.948	61.869	61.884	61.675	61.766	61.743	61.854	61.779	61.804	61.758	61.859	61.755	3
4	61.939	61.875	61.883	61.652	61.834	61.788	61.862	61.731	61.819	61.767	61.854	61.775	4
5	61.932	61.872	61.881	61.671	61.867	61.871	61.870	61.730	61.824	61.774	61.847	61.783	5
6	61.929	61.933	61.877	61.714	61.867	61.879	61.879	61.747	61.825	61.774	61.823	61.766	6
7	61.925	61.921	61.861	61.753	61.852	61.854	61.870	61.770	61.812	61.770	61.806 A	61.765	7
8	61.913	61.890	61.828	61.796	61.851	61.804	61.871	61.771	61.815	61.771	61.804	61.772	8
9	61.896	61.886	61.799	61.829	61.826	61.817	61.863	61.767	61.825	61.777	61.822	61.772	9
10	61.883	61.879	61.799	61.855	61.792	61.831	61.854	61.772	61.837	61.773	61.853	61.771	10
11	61.872	61.843	61.791	61.863	61.794	61.895	61.845	61.775	61.829	61.768	61.797	61.767	11
12	61.875	61.800	61.746	61.863	61.861	61.861	61.855	61.774	61.827	61.766	61.833	61.753	12
13	61.886	61.747	61.713	61.860	61.896	61.813	61.824	61.771	61.830	61.780	61.843	61.729	13
14	61.893	61.775	61.717	61.831	61.856	61.782	61.832	61.766	61.830	61.769	61.893	61.706	14
15	61.971	61.849	61.779	61.803	61.775	61.771	61.825	61.766	61.828	61.770	61.951	61.711	15
16	61.973	61.882	61.804	61.801	61.720	61.805	61.819	61.778	61.822	61.757	61.956	61.751	16
17	61.919	61.856	61.809	61.801	61.829	61.788	61.817	61.784	61.811	61.752	61.854	61.780	17
18	61.838	61.878	61.783	61.799	61.861	61.736	61.810	61.768	61.808	61.763	61.774	61.811	18
19	61.803	61.841	61.757	61.798	61.877	61.758	61.809	61.767	61.801	61.791	61.772	61.822	19
20	61.777	61.870	61.737	61.768	61.893	61.803	61.800	61.789	61.782	61.804	61.763	61.839	20
21	61.780	61.923	61.710	61.752	61.878	61.800	61.804	61.818	61.777	61.851	61.728	61.823	21
22	61.808	61.924	61.697	61.738	61.859	61.787	61.816	61.844	61.764	61.863	61.757	61.836	22
23	61.769	61.887	61.693	61.716	61.845	61.784	61.853	61.850	61.752	61.879	61.783	61.854	23
24	61.732	61.888	61.684	61.689	61.816	61.780	61.873	61.832	61.754	61.887	61.810	61.878	24
25	61.743	61.892	61.689	61.675	61.832	61.755	61.876	61.807	61.746	61.892	61.806	61.900	25
26	61.762	61.887	61.685	61.700	61.848	61.729	61.860	61.799	61.743	61.870	61.786	61.903	26
27	61.763	61.870	61.674	61.702	61.853	61.728	61.851	61.786	61.743	61.840	61.772	61.911	27
28	61.791	61.880	61.659	61.658	61.852	61.723	61.847	61.787	61.739	61.794	61.743	61.905	28
29	61.794		61.635	61.621 A	61.843	61.746	61.875	61.803	61.739	61.850	61.722	61.886	29
30	61.804		61.636	61.623	61.836	61.782	61.842	61.805	61.747	61.882	61.710	61.856	30
31	61.841		61.652		61.831		61.813	61.804		61.868		61.824 A	31
TOTAL	1917.629	1732.222	1914.634	1852.346	1916.604	1853.797	1917.111	1915.343	1853.827	1915.828	1854.468	1915.816	TOTAL
MEAN	61.859	61.865	61.762	61.745	61.826	61.793	61.842	61.785	61.794	61.801	61.816	61.801	MEAN
MAX	61.973	61.933	61.890	61.863	61.896	61.895	61.879	61.850	61.837	61.892	61.956	61.911	MAX
MIN	61.732	61.747	61.635	61.621	61.621	61.723	61.800	61.730	61.739	61.726	61.710	61.690	MIN

SUMMARY FOR THE YEAR 2006
Mean water level, 61.807 Metres
Maximum daily water level, 61.973 Metres On 2006-01-16
Minimum daily water level, 61.621 A Metres On 2006-04-29

NOTES: WATER LEVELS ARE IN METRES AND ARE REFERENCED TO GEODETIC SURVEY OF CANADA DATUM. THE WATER LEVELS ARE PROVISIONAL AND ARE SUPPLIED BY ENVIRONMENT CANADA IN COOPERATION WITH DOMTAR.
A - PARTIAL DAY

ST. CROIX RIVER AT BARING
DAILY MEAN DISCHARGE IN CUBIC METRES PER SECOND FOR 2006

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	102	133	73.6	32.3	30.3	60.0	38.2	62.0	56.4	43.9	95.2	85.2	1
2	102	79.0	82.7	32.3	42.2	62.6	41.6	61.5	53.0	34.6	92.9	82.4	2
3	104 B	82.4	79.9 B	32.9	50.4	62.9	39.4	72.8	48.7	34.0	86.4	73.1	3
4	103 B	113	77.9	40.5	46.7	80.0	48.4	84.7	55.8	32.9	73.9	70.5	4
5	101	129	81.3	41.9	58.1	156	60.0	71.6	59.8	37.4	68.0	71.4	5
6	100	136	81.6	41.9	67.4	180	61.2	66.0	59.5	35.4	66.5	72.2	6
7	98.3	167	79.0	38.8	77.3	174	62.0	62.6	61.5	40.8	63.2	71.4	7
8	97.1 B	146	78.7	48.7	49.0	161	62.3	70.5	63.7	39.4	52.4	69.9	8
9	95.7	136	78.2	43.9	48.1	162	62.9	70.8	59.8 E	34.6	109	62.6	9
10	94.3	136	69.4	45.0	67.4	168	62.6	64.9	60.3 E	34.0	121	60.9	10
11	87.5 B	131	75.6	44.2	70.5	176	65.4	67.4	62.0 E	32.0	132	62.9	11
12	85.8	130	71.9	43.9	120	222	55.8	64.6	62.0 E	34.8	108	63.4	12
13	92.3	116	71.9	55.2	158	212	71.6	67.1	61.7	37.1	129	67.4	13
14	116	108	65.4	62.9	177	208	56.1	66.8	55.8	39.9	191	76.2	14
15	279	122	59.2	69.9	174	180	55.2	63.2	55.8	39.4	320	75.6	15
16	357	147	58.6	71.6	146	161	52.4	54.4	62.0	35.4	343	68.2	16
17	345	145	61.7	77.0	124	159	56.1	58.3	62.0	39.9	323	58.3	17
18	300	140	68.0	66.8	140	141	53.2	64.6	60.3	37.4	268	55.2	18
19	306	116 B	67.4	66.8	132	105	50.4	58.6	61.7	34.3	217	60.9	19
20	283	100	64.9	80.7	182	87.0	51.0	57.2	58.3	34.3	192	52.4	20
21	262	114	63.2	70.8	186	75.0	53.0	64.3	63.7	61.7	159	78.2	21
22	242	125	51.8	71.4	170	81.0	43.9	64.3	56.9	57.8	125	41.9	22
23	227	117	56.4	68.0	157	68.8	56.9	74.5	61.2	50.4	102	59.2	23
24	214	93.7	58.1	69.9	141	76.7	63.7	78.4	61.7	56.4	82.1	97.1	24
25	196	83.5 B	54.1	56.9	92.3	79.9	68.5	74.5	57.8	54.1	79.0	94.0	25
26	189	85.2 B	50.4	34.8	81.3	77.9	69.7	73.6	51.0	62.0	79.6	96.0	26
27	179 B	88.1 B	56.6	35.4	72.2	71.6	68.5	66.3	45.9	56.1	67.1	96.0	27
28	168	82.7	59.2	71.1	67.4	71.4	55.5	64.6	50.7	65.4	71.4	77.9	28
29	169		54.4	45.9	56.9	48.4	64.9	52.7	49.0	125	77.0	82.7	29
30	146		41.1	37.4	58.3	42.8	75.6	57.8	43.9	125	85.0	79.3	30
31	152		34.3		57.8		67.4	59.2		108		77.0	31
TOTAL	5393.0	3301.6	2026.5	1598.8	3100.6	3611.0	1793.4	2039.8	1721.9	1553.4	3978.7	2239.4	TOTAL
MEAN	174	118	65.4	53.3	100	120	57.9	65.8	57.4	50.1	133	72.2	MEAN
DAM3	466000	285000	175000	138000	268000	312000	155000	176000	149000	134000	344000	193000	DAM3
MAX	357	167	82.7	80.7	186	222	75.6	84.7	63.7	125	343	97.1	MAX
MIN	85.8	79.0	34.3	32.3	30.3	42.8	38.2	52.7	43.9	32.0	52.4	41.9	MIN

SUMMARY FOR THE YEAR 2006
Total discharge, 2800000 DAM3
Mean discharge, 88.7 M3/S
Maximum daily discharge, 357 M3/S On 2006-01-16
Minimum daily discharge, 30.3 M3/S On 2006-05-01

NOTES: DATA ARE SUPPLIED BY THE UNITED STATES GEOLOGICAL SURVEY
AND ARE PROVISIONAL.
B - ICE CONDITIONS
E - ESTIMATED

MILLTOWN
DAILY MEAN WATER LEVELS IN METRES FOR 2006

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	---	13.990	13.716	---	13.716	13.716	---	13.716	13.868	---	13.990	14.051	1
2	---	14.021	14.082	---	13.716	13.716	---	13.716	---	13.716	14.021	---	2
3	13.929	13.960	14.112	13.716	13.716	---	---	13.716	---	13.716	13.990	---	3
4	13.929	---	---	13.716	13.716	---	13.716	13.929	---	13.716	---	14.051	4
5	13.990	---	---	13.716	13.716	14.051	13.716	---	13.899	13.716	---	14.021	5
6	13.929	14.021	14.051	13.716	---	14.051	13.716	---	13.929	13.716	13.990	13.990	6
7	---	13.990	14.051	13.716	---	13.990	13.716	---	13.899	---	13.990	14.112	7
8	---	13.929	14.021	---	13.716	14.021	---	13.716	13.716	---	14.021	13.960	8
9	13.807	14.021	14.021	---	13.716	14.051	---	13.868	---	---	14.082	---	9
10	14.051	13.960	13.990	13.716	13.807	---	13.716	13.868	---	13.716	13.929	---	10
11	14.021	---	---	13.716	13.777	---	13.716	13.777	13.716	13.716	---	14.021	11
12	13.960	---	---	13.716	14.082	14.051	13.716	---	13.716	13.716	---	14.082	12
13	13.990	14.051	14.051	---	---	13.929	13.716	---	13.716	13.716	---	14.051	13
14	---	13.990	14.082	---	---	14.021	13.716	13.716	13.716	13.716	14.082	14.051	14
15	---	13.990	13.716	---	13.960	14.021	---	13.716	13.716	13.716	13.868	14.082	15
16	13.868	13.960	13.716	---	13.960	14.051	---	13.838	13.807	13.716	13.899	---	16
17	13.838	14.051	13.716	---	13.960	---	13.716	13.716	13.838	13.716	13.899	---	17
18	13.716	---	---	13.716	14.021	---	13.716	13.868	13.868	13.716	---	13.716	18
19	13.929	---	---	13.716	13.990	13.929	13.716	---	13.899	13.716	---	13.716	19
20	13.838	13.960	13.960	14.021	---	14.051	13.716	---	13.716	13.716	14.021	14.051	20
21	---	14.021	13.960	13.960	---	14.021	13.716	13.929	---	---	14.021	14.021	21
22	---	14.082	14.021	---	---	14.021	---	13.868	---	---	14.082	13.716	22
23	13.929	14.082	13.716	---	13.990	13.929	---	13.868	---	13.716	13.960	---	23
24	14.021	14.051	13.716	13.716	13.929	---	13.716	13.899	---	13.960	13.960	---	24
25	13.990	---	---	13.716	13.929	---	13.868	13.777	13.807	13.716	---	---	25
26	13.960	---	---	13.716	14.082	13.990	13.868	---	13.716	13.716	---	---	26
27	14.082	13.716	13.716	13.716	---	13.777	13.838	---	13.716	13.716	13.990	13.960	27
28	---	13.838	13.716	13.716	---	13.716	13.716	13.716	13.716	---	14.082	13.990	28
29	---		13.716	---	13.716	---	---	13.716	13.716	---	13.929	14.051	29
30	14.021		13.716	---	13.716	---	---	13.899	---	13.716	14.021	---	30
31	13.960		13.716		13.716		13.899	13.899		13.716		---	31

NOTES: THE WATER LEVELS ARE SUPPLIED BY NB POWER CORPORATION

APPENDIX 5

BOARD MEETING NOTES

Highlights and Meeting Notes
International St. Croix River Board

August 29, 2006-09-07
Downeast Heritage Museum
Calais, Maine

Meeting Participants

Jack Blaney	IJC Commissioner - Canadian Section
Allen Olson	IJC Commissioner – U.S. Section
Irene Brooks	IJC Commissioner – U.S. Section
Tom McAuley	Engineering Advisor – IJC Staff, Canadian Section
Stephen Keat	Senior Advisor – IJC Staff, U.S. Section
Bill Appleby	Canadian Co-Chair – International St. Croix River Board
Colonel Curtis Thalken	U.S. Co-Chair – International St. Croix River Board
Jesse Davies	Canadian Board Member
Bill Ayer	Canadian Board Member
Joe Kozak	Canadian Board Member
Joe Arbour	Canadian Board Member
Joan Trial	U.S. Board Member
Ed Logue	U.S. Board Member
Bob Lent	U.S. Board Member
Carol Wood	U.S. Board Member
Barbara Blumeris	Board Secretary – U.S. Section
Peter Johnson	Board Secretary – Canadian Section

Guests:

Townsend Barker	U.S. Army Corps of Engineers
Greg Stewart	U.S. Geological Survey
Bill MacDonald	Maine Rivers
Curtis Bohlen	Maine Rivers

Meeting Highlights

Review of Work Plan Projects

GIS Project

- Phase 1, part 1 will be completed by the end of 2006, after final review and Hydrology Mapping Harmonization completed.
- Funding for further work on the GIS atlas project is pending and a request for additional funding was submitted to the IJC as part of the Board's work plan.

Reservoir Simulation Model

- Townsend Barker a Hydrologist with the U.S. Army Corps of Engineers gave a presentation re: progress to-date on the model for the St. Croix River Basin reservoirs.
- This model is based on the ResSim model platform.
- The objective of this work is to develop an integrated watershed modeling system using real-time precipitation data to generate runoff that is routed through the reservoir system. The ResSim model is the first part of this effort.
- The project is proceeding well and the ResSim model will be complete prior to the end of 2006.

State of the Environment (Watershed) Report

- This project will now proceed.
- Title changes to State of the Watershed Report.
- Board subcommittee to further develop project proposal in the coming weeks for discussion with the Board**.**

Alewife Study (by Maine Rivers)

- in terms of *size and condition,* there is *no evidence* from historical data to suggest that alewives have systematically harmed smallmouth bass.
- the data suggest that the smallmouth bass grew faster in the presence of anadromous alewife.
- the alewife diet is different from that of smallmouth bass.
- 2-3 year old bass may be feeding on alewives.
- fishing tournament returns which suggests that there is no difference between the weights of smallmouth bass from lakes which had alewives to those that didn't.
- Alewives from the St. Croix River system were *genetically distinct* from those found in other watersheds, indicating that these alewives are returning to the streams where they were born.

- *Anadromous* alewives are a food source for eagles, osprey, cormorants and seals. Since alewives enter the river to spawn at the same time salmon smolts are leaving, barring alewives from entering the river could potentially expose salmon smolts to increased predation.
- *Landlocked alewives* may be harming the smallmouth bass population. These landlocked alewives were been introduced to the system and evidence based on work elsewhere suggests that these landlocked alewives may be a significant threat to fisheries in the St. Croix River system.

Grand Falls – Saint John River

- IJC has requested the Board consider an oversight role for the 1926 Order of Approval for the Grand Falls dam in the Saint John River.
- Board will visit Grand Falls dam on the St. John River during the annual August dam tour.
- The visit is intended to familiarize the Board and IJC staff with the dam and power house and to make initial contact with NB Power officials who are responsible for the dam.

Status of Other Issues/Initiatives in the Watershed

LNG Proposals

- The Board will continue to track this issue and will assist the Commission, in an advisory capacity, aimed at preventing or resolving any disputes that might arise in the boundary waters of the St. Croix River.

International Bridge

- Permits are now in place and it appears that the project will proceed.
- However, final decisions regarding funding and routing of the approach road on the Maine side have not yet been made and the project will not proceed until these matters have been resolved.

Milltown Dam

- The Board has expressed concerns regarding the movement of the downstream wall of the powerhouse as observed by a crack in the powerhouse floor. This is not a new issue as the crack has been apparent since the 1980s. However, in the last couple of years NB Power has had to implement a new mitigation action of covering the wall with hoarding to prevent freezing and thawing thought to contribute to wall movement.
- The IJC has brought the structural issues at the dam by letter to the attention of the Canadian and U.S. governments.
- As of this writing, copies of recent Inspection Reports for Milltown dam were forwarded to the Board Secretaries and were distributed on that date to Board members for their information and review on September 12, 2006.

Watershed Board Discussion

The Board asked to become a full Watershed Board under the IJC's International watersheds Initiative.

- Co-Chairs and Board will consider a formal request from the Board to the IJC
- If name change is agreed to by IJC and Governments could be announced at a stakeholder workshop in the Basin in Spring 2007.

Meeting Notes

Status of Work Plan Projects

The IJC indicated that funding will likely be provided to support major projects on the Board's 2004-2007 Work Plan (i.e., Additional work on the GIS Project, further development of the Hydrology Model and the State of the Environment [now Watershed] Project).

GIS Project

Phase 1, part 1 of the project is nearing completion by the Corps. The maps have been out for review to Board Members and key stakeholders since early summer and will be finalized once review comments are addressed after the conclusion of a USGS-led project to harmonize hydrology mapping data along the international border in the St. Croix River. This project is to be concluded prior to the end of 2006 and will be launched at a stakeholder workshop to be held in the Basin in Spring 2007.

An *initial review draft* of the maps can be viewed in PDF via the following URL:

ftp://ftp.usace.army.mil/pub/nae/IJC_StCroixRiverMaps/

ResSim Model

Townsend Barker, a hydrologist with the U.S. Army Corps of Engineers, presented the results of his work to-date in developing a reservoir model for the St. Croix River Watershed. This model is based on the ResSim model platform. The objective of this work is to develop an integrated watershed modeling system using real-time precipitation data to generate runoff that is routed through the reservoir system. This model is the first part of that effort.

This model offers several advantages over some other models that are available. For example, the model was developed and is supported by the Corps. The model is non-proprietary and is capable of modeling complex systems. The project is due for completion and a final report will be produced by December 2006.

State of the Environment (Watershed) Report

This project had been on hold until recently but has now been reactivated as a result of funding becoming available.

A small subcommittee consisting of three Board members and the two Board secretaries was established to begin thinking about how to approach this project. The Board was briefed regarding the results of this work to-date at the meeting. The subcommittee had developed a draft proposal describing an approach that could be taken for the preparation of this report. The draft proposal document also explored the potential scope of the report (e.g., pollution sources, water quantity and quality, natural resources, air quality, socio-economic environment).

The sub-committee recommended that a contractor be hired to perform the work (i.e., data gathering, synthesis, analysis and preparation of the report) and that the sub-committee would manage the contract on behalf of the Board. Timelines and reporting requirements were also specified in the proposal.

The IJC will be providing $50K U.S. to the Board for this project. Commissioners and Board members agreed that work will need to be focused and that care must be taken to complete this project on budget.

The Commission also requested the title of this report be changed to State of the “Watershed” Report.

Actions:

1. The subcommittee (Bill Ayer, Carol Wood, Joan Trial, Jessie Davies, Barbara Blumeris and Peter Johnson) will revise the Draft State of the Watershed Proposal document in the coming weeks to reflect the discussion at the meeting and will submit the amended document for consideration by the Board.

2. Secretaries to organize a working meeting of the subcommittee in Boston or Fredericton over the next few weeks to further consider the parameters and approach for this project.

Alewife Study

The Commission has contributed funding to a research project conducted by Maine Rivers on Alewife in the St. Croix. There is an ongoing debate in the Basin concerning the claim that anadromous alewives have a negative impact on the smallmouth bass population in the St. Croix River and headwater lakes. This research project was intended to provide scientific analysis of the issue. Maine Rivers is an independent organization whose mission is to protect, restore and enhance the health and vitality of Maine's Rivers. The study was coordinated by Dr. Curtis Bohlen, a Board member of Maine Rivers. Dr. Bohlen was on hand, along with Bill MacDonald, Executive Director of Maine Rivers, to present the findings of this most recent research to the Board and IJC Commissioners who were present at the meeting.

Throughout the presentation, Dr. Bohlen stressed that this study focused on only a small number of lakes and a limited number of years. He also cautioned that conditions vary from year to year and from lake to lake. However, the study has shed new light on the dynamics and interactions between these two fish species. Some of the key findings of the study include:

- in terms of *size and condition,* there is *no evidence* from historical data to suggest that alewives have systematically harmed smallmouth bass.
- the data suggest that the smallmouth bass grew faster in the presence of anadromous alewife.
- the alewife diet is different from that of smallmouth bass.
- 2-3 year old bass may be feeding on alewives.
- fishing tournament returns which suggests that there is no difference between the weights of smallmouth bass from lakes which had alewives to those that didn't.
- Alewives from the St. Croix River system were *genetically distinct* from those found in other watersheds, indicating that these alewives are returning to the streams where they were born.
- *Anadromous* alewives are a food source for eagles, osprey, cormorants and seals. Since alewives enter the river to spawn at the same time salmon smolts are leaving, barring alewives from entering the river could potentially expose salmon smolts to increased predation.
- *Landlocked alewives* may be harming the smallmouth bass population. These landlocked alewives were been introduced to the system and evidence based on work elsewhere suggests that these landlocked alewives may be a significant threat to fisheries in the St. Croix River system.

Grand Falls – Saint John River

A brief discussion was held concerning the Board's planned visit to the Grand Falls dam on the Saint John River at the end of the week. Plans for the visit resulted from a request made by the Commission for the Board to consider taking on a limited oversight role in respect to the 1926 Order of Approval for the Grand Falls dam. This visit is intended to familiarize the Board and IJC

staff with the dam and power house and to make initial contact with NB Power officials who are responsible for the dam.

Status of Other Issues/Initiatives in the Watershed

LNG Proposals

The Board recognizes that federal, provincial/state agencies, and local governments have appropriate regulatory processes in place concerning these proposed projects. As such, the Board will continue to track this issue and will assist the Commission, in an advisory capacity, aimed at preventing or resolving any disputes that might arise in the boundary waters of the St. Croix River.

International Bridge

Construction of international bridge between Canada and the U.S. require approval by the two Federal and Provincial Governments under the Boundary Waters Treaty. Approval for this project was provided by the two governments through the exchange of diplomatic notes earlier this year. This constitutes the required exchange of diplomatic notes under Article 16 of the U.S. Presidential Permit. These notes also state the two governments' conclusion that there is no requirement under the Boundary Waters Treaty to obtain an Order of Approval from the IJC since neither construction, nor operation of the bridge, will affect the natural levels or flows on either side of the international boundary. Permits are now in place and it appears that the project will proceed. However, final decisions regarding funding and routing of the approach road on the Maine side have not yet been made and the project will not proceed until these matters have been resolved.

Milltown Dam

In recent years, the Board has expressed concerns regarding the movement of the downstream wall of the powerhouse as observed by a crack in the powerhouse floor of the Milltown Dam. The Board has requested copies of reports from NB Power concerning the condition of the dam and powerhouse floor from NB Power. Copies of correspondence from a consultant who examined the dam were provided, however, the Board had the impression from a previous discussion with NB Power officials, that additional Inspection Reports for the dam were available.

During the Board's August 29, 2006 visit to the Milltown dam, it was learned that NB Power had been sending the requested Inspection Reports to the IJC, however, they were not reaching the Board. This issue has now been resolved and NB Power indicated that they would re-send the

Inspection Reports to the Board Secretaries

> **Note:** as of this writing, copies of recent Inspection Reports for Milltown dam were forwarded to the Board Secretaries and were distributed on that date to Board members for their information and review on September 12, 2006.

It should also be noted that the IJC has brought the structural issues at the dam by letter to the attention of the Canadian and U.S. governments.

Watershed Board Discussion

The Board Co-Chairs were asked by IJC staff during the June 8, 2006 meeting of IJC Commissioners in Windsor, if the International St. Croix River Board would consider becoming a full Watershed Board under the IJC's International Watersheds Initiative. The Co-Chairs were open to this idea and IJC staff suggested that an announcement of this change could be made at a special ceremony in the basin or at other suitable location, Co-Chairs suggested making this announcement at a lower key meeting in the Basin, perhaps at a GIS / hydrology model workshop.

The Board also noted the importance of engaging the Provincial and State governments and key stakeholders to obtain their buy-in for the Watershed Board concept. It is important that the Board send a clear message that its role will not change if it becomes a watershed Board, i.e., the Board has no intention of seeking to play a management role in the Basin. The intent of becoming a Watershed Board is to work with the IJC to further implement their International Watersheds Initiative. The Board will also be bringing significant new resources to the Basin for the development of tools that will be of assistance to individuals and organizations in the watershed in meeting their own planning and information needs.