2008 ANNUAL REPORT

of the

INTERNATIONAL ST. CROIX RIVER WATERSHED 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

and

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

SUBMITTED TO

THE INTERNATIONAL JOINT COMMISSION

by

THE INTERNATIONAL ST. CROIX RIVER WATERSHED BOARD

TABLE OF CONTENTS

1.0 GENERAL

1.1 Synopsis for 2008

For the fourth consecutive year, 2008 was a “good” water year on the St. Croix River system. Lake levels were maintained within normal levels and flows in the river provided satisfactory conditions for power generation, canoeing and kayaking, and support of aquatic life. During the year, flows and levels were maintained in accordance with IJC’s Orders.

Several Board study efforts were either completed or nearing completion in 2008 including the work on combined sewer overflows (CSOs), the watershed rainfall – runoff modeling study completed in June 2008 and the St. Croix River drainage area and stream network harmonization pilot project reported in August 2008.

A highlight of 2008 was the public release of the State of the St. Croix Watershed report in November. This culminated one of the Board’s long-standing objectives and was a significant accomplishment for the Board’s first year operating as a Watershed Board.

1.2 Board Membership

Canadian Membership

Bill Appleby
(Canadian Co-Chair)
Director, National Service Operations
Meteorological Services of Canada
Environment Canada
Dartmouth, NS

William Ayer
Advisor to New Brunswick Department of the Environment
Fredericton, NB

Jessie Davies
Resident
St. Andrews, NB

Charles LeBlanc
Environment Canada
Environmental Science and Technology Centre
Moncton, NB

Robert Stephenson, Ph.D.
Director, St. Andrews Biological Station
St. Andrews, NB

Peter Johnson
(Canadian Secretary)
Strategic Planning and Policy Division
Environment Canada, Atlantic Region
45 Alderney Dr.
Dartmouth, NS

U.S. Membership

Colonel Philip T. "Tom" Feir
(U.S. Co-Chair)
U.S. Army Corps of Engineers
New England District
Concord, MA

Carol Wood
Office of Administration and Resources Management
U.S. Environmental Protection Agency
New England Regional Office
Boston, MA

Edward Logue
Regional Director, Eastern Maine
Maine Dept. of Environmental Protection
Bangor, ME

Joan Garner Trial, Ph.D.
Senior Atlantic Salmon Biologist
Department of Marine Resources
Bureau of Sea Run Fisheries and Habitat
Bangor, ME

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

Barbara Blumeris
(U.S. Secretary)
U.S. Army Corps of Engineers
New England District
Concord, MA

1.3 Performance as a Watershed Board

In April, 2007, the St. Croix Board became the IJC's first designated International Watershed Board under the IJC's International Watersheds Initiative (IWI). The Board has been involved in workshop discussions with other IJC boards in 2008, contributing to the Third IWI Report that the IJC is preparing for governments. The IWI concept is to promote an integrated, ecosystem approach to issues arising in transboundary waters through enhanced local participation and strengthened local capacity. The approach recognizes the relationship between the watershed and the boundary waters. It also encourages a collaborative approach between Canada and the U.S. to prevent and resolve issues at the local level.

The Board embraces this ecosystem approach and will work to develop its long-term goals with the whole watershed in mind. In this regard, it will continue to work with local stakeholders to assist them in their efforts to balance competing water resource uses along the Boundary water with a viewpoint that incorporates the St. Croix watershed in Maine and New Brunswick and the St. Croix estuary.

With regard to the outer reaches of the St. Croix Estuary, the governance regime and ecosystem management effort underway in that transboundary area of the Gulf of Maine is of interest to the Board in light of the ecosystem/watershed approach upheld by the IJC. Since 1989, two Canadian provinces, three U.S. states, the U.S. and Canadian federal governments and several NGO and private sector partners have been working collaboratively in the shared waters of the Bay of Fundy and Gulf of Maine (GoM) through the Gulf of Maine Council on the Marine Environment (GOMC). The St. Croix River Watershed Board has, over the years, followed closely their efforts to achieve common ecosystem objectives for the Gulf of Maine through joint governance of this shared ecosystem.

The governance regime in the GoM, which can be described as a "soft" approach, is guided by a common set of principles, goals, objectives, priorities and actions which no one jurisdiction could achieve alone. The collegial and informal nature of the GoM Council has kept the many governmental agencies and partners at the table. Provincial and State leadership have been central to making this regime work and institutional flexibility has helped in addressing a common ecosystem agenda in this transboundary area. The Board will continue to follow integrated management initiatives in the St. Croix estuary and the Gulf of Maine transboundary area as these relate to IJC interests.

1.4 Annual Public / Stakeholder Meeting in Basin

The annual public meeting was held in McAdam, New Brunswick on the evening of August 19, 2008 at the historic McAdam Railway Museum. IJC Commissioners Sam Speck and Pierre Trepanier, along with IJC staff and St. Croix Board Members, attended the meeting. Invited presenters included Donna Adams (Domtar), Lee Sochasky (International Waterway Commission), Bill Richards (Environment Canada) and Forest Bell and Tricia Rouleau (FB Environmental), the latter presenting the Board's draft State of the Watershed Report. There were 28 people in attendance at the meeting, of which nine were members of the public.

After welcoming meeting participants and providing introductory comments, Bill Appleby introduced members of the Board, IJC staff and the two IJC Commissioners who acknowledged the work of the Board and the participation of local residents in their efforts and interest in protecting the health of the watershed. Bill Appleby elaborated on the work of the Board over the past year and its general oversight role in the Basin. He described several successfully completed projects and new projects being undertaken through the Board and with the support of the IJC. Project participants include federal, State and Provincial agencies and other organizations within the watershed.

Donna Adams, Hydro Superintendent for Domtar, provided information on Water Management during 2008. Lee Sochasky, St. Croix International Waterway Commission (SCIWC), provided an update and overview of the work of the International Waterway Commission in the areas of fisheries, water quality and recreational uses of the waterway. Bill Richards, Environment Canada, made a presentation on climate change scenarios for the St. Croix River basin from a meteorological perspective. Forest Bell and Tricia Rouleau, FB Environmental, provided a presentation on the recently completed draft of the *"St. Croix River: State of the Watershed Report"* which was well received by all. Meeting participants were generally pleased with the presentations as well as the work of the Board and role of the IJC over the past year.

1.5 Annual Site Visit of Facilities in the Basin

Board members met with NB Power officials early on the morning of August 20th to review the Milltown dam operations. Board members then met with Domtar officials in the Woodland Mill at Baileyville, Maine, later in the morning followed by a visit to the Forest City and Grand Falls dam sites. Visit notes and information describing the dams is provided in Appendix 2. The Board visits the dam sites annually to ensure the dams are operated in compliance with the IJC orders of approval for flows and levels. (See Section 2.) It is the responsibility of the dam owners, operators and appropriate jurisdictional agencies to conduct the necessary dam inspections and maintenance to ensure the safety and security of the dams.

1.6 Policy of the Board Regarding Dam Regulation

In accordance with its mandate from the IJC, the Board leaves the control of operation of the dams at Forest City, Vanceboro, and Grand Falls (owned and operated by Domtar, Inc.), and Milltown (owned and operated by New Brunswick Power) in the owners' hands.

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 New Brunswick Power indicating daily forebay elevations obtained during regular work days at the Milltown Dam and water level data from a continuous monitoring station in the head pond at Milltown operated by Environment Canada. Data are discussed in Section 2 of this report and summarized in Tables and Figures in the Appendices.

2.0 MANAGEMENT OF THE WATER LEVELS AND FLOWS

2.1 Summary

In 2008, the annual mean water level at East Grand Lake was 131.962 metres (432.95 feet), which is higher than the long term mean value of 131.793 metres (432.39 feet).

The annual mean flow from the lake at Forest City Stream was 8.26 m^3/s (292 cfs), 31% higher than the long term mean value of 6.31 m^3/s (223 cfs).

The annual mean water level for the year at Spednic Lake was 116.689 metres (382.84 feet), which is higher than the long term mean value of 116.284 metres (381.51 feet).

The annual mean flow as recorded at Vanceboro was 27.3 m^3/s (964 cfs), 34 % higher than the long term mean of 20.4 m^3/s (720 cfs).

The annual mean flow at Baring was 93.8 m^3/s (3310 cfs), which is 29% higher than the long term mean at Baring of 72.6 m^3/s (2560 cfs).

2.2 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 132.475 metres (434.63 feet) on 2nd of May and a minimum daily mean of 131.469 metres (431.33 feet) on 25th of 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 2008. The maximum daily mean for the reporting period was 27.4 m^3/s (968 cfs) on 14th of March and the minimum daily mean was 2.24 m^3/s (79.1 cfs) on 30th of July. The mean discharge for the year was 8.26 m^3/s (292 cfs). The Commission's Order of 2.12 m^3/s (75 cfs) as a minimum flow was maintained throughout the year.

2.3 Spednic Lake Reservoir and Discharges below Vanceboro Dam

During the year, levels in the Spednic Lake reservoir, ranged from a maximum daily mean of 117.529 metres (385.59 feet) on 5th of May, to a minimum daily mean of 115.705 metres (379.61 feet) on 7th of April.

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 81.3 m^3/s (2870 cfs) on 18th of March and the minimum daily mean discharge recorded was 6.37 m^3/s (225), on 26 of April. 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.

2.4 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 61.958 metres (203.27 feet) on 2nd of October and the minimum recorded elevation was 61.643 metres (202.24 feet) on 9th of December. 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.

2.5 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 93.8 m^3/s (3310 cfs). The maximum daily mean was 326 m^3/s (11500 cfs) on 13th of December. The minimum daily mean was 24.4 m^3/s (862 cfs) on 16th of July. Domtar met the systems historic minimum low flow target of 21.2 m^3/s (750 cfs).

2.6 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. In 2007, Environment Canada established this water-level and water quality continuous monitoring station. The supplied data for 2008 water levels was extracted from this gauging station located in the head pond.

3.0 WATER QUALITY

3.1 USGS Milltown Monitor

Water-quality values for the St. Croix River at the Milltown monitor were within the extreme values for the period of daily record during the summer of 2008 based on record since September 1969. Values were above the water-quality objectives for the river. The maximum dissolved oxygen value recorded was 9.3 mg/L on September 26 and 27; the minimum dissolved oxygen value recorded was 6.2 mg/L on July 18, and 20 (which correspond closely to the maximum and minimum water temperatures respectively). Minimum dissolved oxygen levels corresponded closely with the lowest flows during the summer. The USGS Milltown monitoring station is located at the international bridge crossing at Mill City, Maine about 3000 ft. (914 m) above the New Brunswick Power Milltown Dam.

St. Croix River at Milltown, Station # 01021050
Water-Quality Monitor, June – September 2008

Dissolved Oxygen (mg/L)
IJC objective = 5.0 mg/L minimum

	June	July	August	Sept.
Maximum	9.1	7.7	8.0	9.3
Minimum	6.6	6.2	6.5	7.4
Mean	8.1	7.0	7.4	8.3

Water Temperature (degrees centigrade)

	June	July	August	Sept.
Maximum	22.7	26.9	25.0	22.5
Minimum	15.3	21.0	19.9	15.0
Mean	19.5	24.4	21.7	18.5

pH (standard units)

	June	July	August	Sept.
Maximum	7.0	7.0	7.0	7.0
Minimum	6.6	6.8	6.6	6.5
Median	6.8	6.9	6.7	6.8

Specific conductance (microsiemens per centimeter at 25 C)

	June	July	August	Sept.
Maximum	101	122	94	83
Minimum	51	66	55	49
Mean	72	96	66	67

3.2 Environment Canada Monitoring Stations – Forest City and Milltown

Environment Canada, in partnership with the New Brunswick Department of the Environment, currently maintains two real-time water quality monitoring stations on the St. Croix River system. The first location is at the outlet of the East Grand Lake dam in Forest City, Maine, and the second is at the Milltown dam in Milltown (St. Stephen) New Brunswick. These real-time stations are visited at regular intervals (every 4-5 weeks) to re-calibrate the measuring devices and to collect a grab sample for surface water quality analysis. The real-time water quality parameters measured and reported are: Temperature, Dissolved Oxygen, pH, Specific Conductance, and Turbidity.

Real time monitoring allows an observer to assess several river water quality parameters quickly at any particular instant in time. This can alert managers to sudden changes in the characteristics of the river and relate them to particular events such as rapid spilling of water, accidental discharges from industry, severe weather events or remote introduction of atmospheric or other pollutants which might threaten the health of aquatic organisms or humans using the river. It could also allow responsible agencies to take rapid intervention to correct the problem.

3.2.1 Interpretation of Real-Time Monitoring Data

Monthly summaries of the data and yearly charts from these two stations for each parameter are presented in Appendix 5. The Environment Canada (EC) station is located just above the dam at a depth of 6 – 10 ft. The EC station and the USGS station reported in Section 3.1 above monitor water quality in the “urban” area below Baileyville but generally above St. Stephen/Calais.

During 2008, the real-time water quality parameters measured in one of the sources of the St. Croix River (Forest City, ME) are very similar to those measured just above the estuarine portion of the St. Croix River (Milltown, NB) for Temperature and Dissolved Oxygen. The values for pH are slightly lower at the Milltown station. The range of Specific Conductance values at Milltown is much larger (20 to 114 uS/cm) than at Forest City (28 to 36 uS/cm). There were a few high turbidity events at Milltown whereas turbidity values at Forest City remained below 5 throughout the year. The reasons for these differences could reflect the impact of tributaries draining into the St. Croix between the two stations, changes in the geology in the lower part of the St. Croix Watershed, industrial inputs, and an increase in urbanization in the lower part of the St.

Croix River Watershed. More than likely, the changes in water quality are the result of a combination of the above sources.

3.2.2 St. Croix River at Forest City, ME

The real-time water quality station operated without problems for most of the year except for most of April when the water level was dropped a few days after the station had been visited. This caused the monitoring probe to be out of the water until the next visit in early May. Data for April are therefore not available. The highest Dissolved Oxygen value was recorded on January 10 (14.1 mg/L) and the lowest value recorded on August 2 (7.6 mg/L). Dissolved Oxygen values for the entire year remained above the Canadian Water Quality Guideline for the Protection of Aquatic Life of 6.5 mg/L.

3.2.3 St. Croix River at Milltown, NB

The real-time water quality station operated without major problems for the entire year. The highest Dissolved Oxygen value was recorded on December 27 (14.9 mg/L) whereas the lowest value was recorded on July 18 (7.4 mg/L). All Dissolved Oxygen values for 2008 were above the Canadian Water Quality Guideline for the Protection of Aquatic Life of 6.5 mg/L.

3.2.4 Interpretation of Monthly Grab Samples

Staff from Environment Canada’s Water Quality Monitoring Group along with staff from the New Brunswick Department of the Environment visited each real-time monitoring location on a monthly basis. During each of these visits, the multi-parameter sonde was removed from the water and taken off-site for cleaning and calibration. The following day, the newly calibrated sonde was re-deployed at the site and grab samples were collected for analysis at Environment Canada’s Atlantic Environmental Testing Laboratory located in Moncton, NB. This laboratory is accredited by the Canadian Association for Environmental Analytical Laboratories (CAEAL) for all parameters reported here.

St. Croix River at Forest City, ME

The range of results for each parameter measured is shown in the Appendix 5 alongside their applicable guideline for the protection of aquatic life· No parameter exceeded their applicable guideline during the year 2008.

St. Croix River at Milltown, NB

The range of concentrations for each parameter measured is shown in the Appendix 5 alongside their applicable guideline for the protection of aquatic life. Three parameters exceeded their applicable guideline.

- Extractable Aluminum exceeded the CCME (Council of Canadian Ministers of the Environment) guideline of 100 ug/L in 7 out of 10 samples collected in 2008 whereas Dissolved Aluminum exceeded the CCME guideline of 100 ug/L in 5 out of 9 samples. Elevated levels of Aluminum are fairly common in areas of Atlantic Canada although the aquatic life seems to be in good health. This is believed to be because most of the Aluminum in Atlantic Canada rivers is complexed and therefore not bio-available to aquatic life. Preliminary work currently being conducted by Environment Canada supports this theory and in fact, for the few samples collected from the St. Croix River, the concentration of free Aluminum was below 10 ug/L.
- Phosphorous; one result was above the BC MOE (British Columbia Ministry of the Environment) guideline on July 7, 2008.
- Dissolved Zinc concentration exceeded the Dodds et.al. guideline on April 29, 2008.
- Extractable Zinc concentrations exceeded the Dodds et.al. guideline on January 9 and September 24, 2008.

4.0 STATUS OF POLLUTION ABATEMENT

4.1 Combined Sewer Overflows

Combined sewer systems are designed to transport both sanitary sewage and storm water in a single pipe to treatment facilities. The capacity of these systems may be exceeded in periods of heavy rainfall or wet weather resulting in direct discharges of untreated wastewater into receiving environments. These overflows are referred to as combined sewer overflows (CSOs) and have occurred on the St. Croix River from time to time leading to bacterial contamination and health concerns. The International St. Croix River Watershed Board has encouraged State, Provincial and municipal officials to address such problems and is generally pleased with progress over the past several years. A workshop on CSOs in May, 2008, helped to inform both Canadian and U.S. agencies on shared interests and ideas for solving this problem.

The City of Calais, which has 5 combined sewer outfalls, has embarked upon a 10 year plan, begun in 1997, to eliminate these CSOs. As a result, there has been an approximate reduction of CSO events from pump stations of 89% since 2003.

The Town of St. Stephen currently has 28 combined sewer outfalls with 11 located along the riverfront. The town also has a plan, which is being carried out as resources become available, to eliminate CSOs from their sewer system. Given the high costs associated with the elimination of CSOs, efforts to deal with this issue are, of necessity, being made over a long term planning horizon.

4.2 Maine

The Board is pleased to report that the Town of Baileyville continues to work on their inflow and infiltration plan approved by the Maine DEP. No bypasses were reported during the last year, 2008.

The City of Calais continues to work on their long-term Combined Sewer Overflow Reduction Plan. Domtar continues to manufacture pulp, but is not making paper which has reduced their discharge flow to the River. Their wastewater discharge remained within their licensed limits.

4.3 New Brunswick

Wastewater treatment upgrading in communities along the New Brunswick side of the St. Croix River has been stimulated by the advancement of the NB Water Classification Program which has focused government efforts in meeting high provincial standards for water quality.

McAdam: The McAdam waste-water treatment plant continues to meet the effluent requirements of the Province of New Brunswick. Nevertheless, the town system bypasses approximately 48 million gallons each year due to infiltration which threatens water quality in the receiving waters of Waklehegan Lake. The town has hired a consultant to identify problem areas which the town can then start to address.

St. Stephen: The new aerated lagoon along Dennis Stream operates within the annual effluent limits of 20 mg/l L for BOD (biological oxygen demand) and SS (suspended solids) and is equipped with disinfection which is effective in treating the municipal and industrial wastewater. The town has a progressive plan underway to address the remaining problems with their system.

Champlain Industrial Park: The extended aeration facility treats the domestic wastewater of approximately 85 employees as well as the industrial wastewater from the industrial park. At its current capacity, it continues to meet provincial requirements.

East Coast Village Mobile Home Park: The facultative lagoon treats the domestic wastewater of the 58 mobile homes in the park. The facility discharges treated effluent to the marshy headwaters of Meadow Brook. This current situation will eventually be resolved by extending the services from the town of St. Stephen.

DFO Biological Station: Fisheries and Oceans Canada (DFO) has been planning for some time a replacement of the main laboratory and office space at the site which will also include connection to the services from the municipality of St. Andrews. There has been no change in the status of this situation.

Huntsman Marine Science Centre: The Huntsman Marine Science Centre has a trickling filter wastewater treatment system to service the laboratory and office complex. Connection to St. Andrews would coincide with any such change to the DFO station.

Oak Bay Park: The Oak Bay Campground uses a trickling filter system to treat the domestic wastewater from 110 campsites prior to discharging the treated disinfected effluent to Oak Bay. It is expected that this establishment will be decommissioned in the near future.

5.0 FISHERIES

5.1 Anadromous Fisheries

The St. Croix Fisheries Steering Committee, established in 1983 to provide a forum for inter-agency collaboration on the management and restoration of diadromous fisheries in the watershed, continues to provide international oversight among fisheries agencies on anadromous and other fisheries in the system. The Board is an observer on this committee.

Alewives (Alosa pseudoharengus) and Atlantic salmon (Salmo salar) entering the St. Croix River have been monitored at a research trap at the Milltown dam since 1981. This head-of-tide dam is owned by the New Brunswick Power Corporation (NB Power). The fishway and research trap are located on the New Brunswick side of the structure and are under the jurisdiction of the Canada Department of Fisheries & Oceans (DFO).

Since 2007, due to funding constraints, the Milltown research trap has been operated only during the alewife spawning run. The St. Croix International Waterway Commission (SCIWC) conducts this assessment under cooperative agreements and/or partnerships with DFO, NB Power, the U.S. Fish & Wildlife Service (USFWS), the Maine Department of Marine Resources (DMR), the New Brunswick Department of Natural Resources and the Atlantic Salmon Federation.

In 2008, the Milltown fishway and research trap were activated on May 6 and the research trap was operated until July 3. During these nine weeks, a total of 12,261 alewives were recorded, including 11,162 of these in a six hour period on June 5. This was the largest return of that species since 1999. In 2007, only 1,294 alewives were counted. No Atlantic salmon were recorded at the trap during this period in 2008, however, five other fish species were counted in small numbers. These included: 21 white suckers, 7 smallmouth bas, 4 brook trout, 1 landlocked salmon and 1 American eel. After July 3, the Milltown fishway remained open to undocumented fish passage and was operated under the management of NB Power.

The 2008 St. Croix alewife run of 12,261 fish was the highest since 1999, although returns in 2005-2006 approached this number. Factors that may have contributed to the higher 2008 return, relative to the last decade, are the influence of DFO's trucking of alewives from Milltown to spawning habitat in Woodland Flowage (2001-2007) and a relatively strong alewife return five years earlier in 2003 (five-year old fish typically make up the majority of the St. Croix spawning run). The size of the St. Croix alewife run declined incrementally from the mid-1990s to the early 2000s, following Maine's closure of the St. Croix's Woodland dam fishway to migrating alewives in 1995. The lowest return, in 2002, was 900 fish. Since then, with the exception of 2004 (1299 fish) and 2007 (1294 fish), the run has increased, presumably due to DFO's trucking of fish to the Woodland Flowage. It should be noted that the Board identified alewives as one of its major environmental health indicators in its 2008 State of the St. Croix Watershed report.

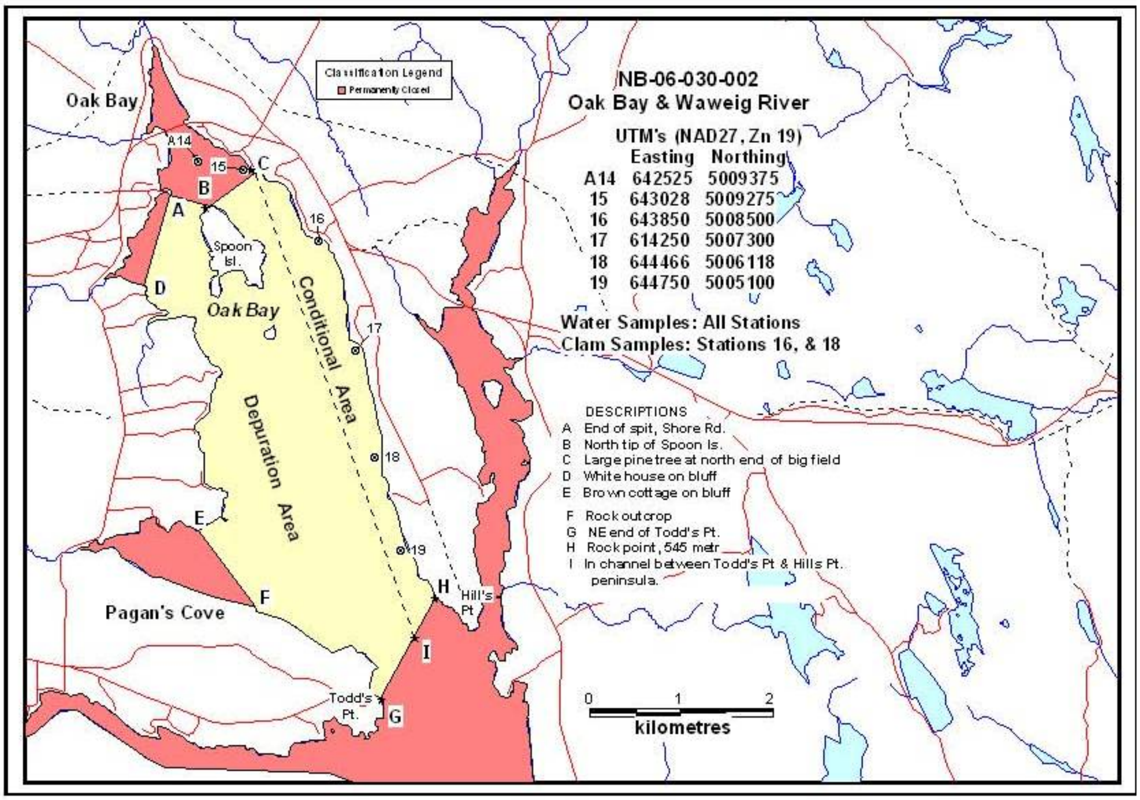
During 2008, some progress was made toward addressing a 13-year dispute over the passage of sea-run alewives through Maine fishways at the Woodland and Grand Falls dams to historic spawning grounds upstream. In April 2008, the Maine Legislature voted to remove the state's alewife passage barrier at Woodland (this was done in time for the 2008 alewife run) and the Legislature's Marine Resources Committee directed state agencies to work with the Passamaquoddy Tribe to resolve outstanding issues regarding fish passage at Grand Falls. At year end, the Tribe has yet to respond to repeated agency requests to meet on this issue. While some progress has been achieved, the Board is disappointed with the current impasse and will continue to support the restoration of alewife access to the mid portion of the St. Croix watershed.

5.2 Shellfish Harvesting

Since briefly being opened to shellfishing under a conditional harvest plan in 1999, Oak Bay was not reopened until a three year agreement (2005-2008) was signed in November, 2005 with a view to reactivate a conditionally approved shellfishery along the eastern portion of the bay beginning in 2006. The latter area was opened for harvesting the first week of March, 2006 but was closed soon after due to excessive rainfall and/or elevated bacterial densities in clams.

Depuration harvesting began in 2005 within the western portion of the Bay and continued into 2006. Although permission was granted for depuration harvesting in much of Oak Bay in 2007 and 2008, there was no commercial uptake of the option to carry out depuration harvesting at that time. The area was last surveyed by

Environment Canada for bacterial contamination in 2007 (3 runs). Subsequent monitoring may be required to delineate "prohibited" zones depending on the status of sewage treatment plants in the area. Classification of Oak Bay may change with the projected closure of the Oak Bay campground and decommissioning of the treatment plant there.



Shell Fish Harvesting – Figure showing how area was managed by DFO under MOU (2005-2008)

6.0 WATERSHED INITIATIVES

6.1 Work Plan 2009 – 2013

The Board is considering a number of potential projects to be included in a 5 year work plan. Projects considered at the Board's meeting in November 2008 included:

- Study of extent of impervious surfaces in the watershed.
- Bathymetry of impoundments and/or estuary.
- Develop Stream Stats Application for the St. Croix Watershed.
- St. Croix Science Forum - Contractor for logistics & workshop report.
- Analysis and Interpretation of existing lake waters quality data.
- Recreational user survey.
- Continue modeling efforts.
- Create GIS map of all point discharges and non-point sources in the watershed.

The Board plans to review the five year work plan in spring 2009 and finalize it at the June 2009 Board meeting. Performance of projects will be dependent on availability of resources to conduct the projects.

6.2 Special Study Efforts - 2008

The Board conducted a special meeting/workshop on Combined Sewage Outflows (CSO) and appropriate follow up in May 2008. This resulted in a fruitful exchange of information, ideas and methodologies for addressing this serious cause of pollution to the River.

The Board was pleased to release the St. Croix River: State of the Watershed Report in November 2008. This report, prepared for the International St. Croix Watershed Board and the International Joint Commission by FB Environmental of Portland, Maine, represents the completion of a major long-term objective of the board. It is designed around a specific set of watershed indicators which illustrate the quality of various environmental components such as water, land, fisheries, wildlife and plants and social and economic elements within the watershed. It deals with various factors that influence the state of the watershed and the governance structures and local activities aimed at protecting the state of the watershed. The State of the Watershed report was made possible through the cooperation of a wide range of contributions from various organizations and agencies in Canada and the U.S. Of particular mention is the St. Croix International Waterway Commission which worked closely with the board and FB Environmental to bring data and other material together, and the IJC which helped fund the project. The efforts of all the St. Croix Board members and some 38 individual contributors are acknowledged.

In addition, a watershed rainfall – runoff modeling final report was completed in June 2008. A final report for the St Croix River drainage area and stream network harmonization pilot project was completed in August 2008.

7.0 OTHER DEVELOPMENTS IN THE WATERSHED

7.1 Maine FERC dam re-licensing

Domtar Maine Corp. is the owner of the Forest City Dam (Forest City Project) and the West Grand Lake and Sysladobsis Dams (West Branch Project) on the St. Croix River system, which are currently undergoing U.S. Federal Energy Regulatory Commission re-licensing. The Forest City Dam crosses the international boundary. The West Grand and Sysladobsis Dams are located entirely in Maine. Both projects are non-generating water storage dams and are licensed with U.S. Federal Energy Regulatory Commission (FERC). These FERC 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. In 2007, Domtar worked on studies related to the re-licensing efforts. In 2008, Domtar filed the draft licences and met with stakeholders to discuss the Draft License applications. Final license applications will be filed on or before March 19, 2009. It is anticipated that a FERC license could be issued before the end of 2009 or early 2010.

7.2 Maine LNG Facilities Proposals

Two proposals to develop LNG terminals on the U.S. side of the St. Croix River Estuary have advanced within the U.S. Federal Energy Regulatory Commission (FERC) regulatory process. They include a proposal by Downeast LNG Inc of New York for a terminal at Robbinston, Maine, and a proposal by Calais LNG Project to establish a

LNG terminal at Red Beach, Maine. Robbinston is located near the mouth of the St. Croix River and across the river from St. Andrews, New Brunswick while Red Beach is approximately 5 km upstream opposite Bayside, NB. A recent report by the U.S. Coast Guard has approved the tanker shipping route proposed by Downeast LNG with stringent recommendations for risk mitigation measures. Canada has stated that it will not permit LNG traffic through the Canadian waters of Head Harbor Passage. A proposal by a third LNG proponent has recently been withdrawn. The Board will follow further U.S. federal and state permitting activities by the remaining two LNG proponents.

Concerns associated with these proposals include environmental and human health risks, ecological impacts from construction activities, increased ship activity, interference with traditional fishing (these are particularly rich and productive marine waters) and recreational use of this busy and active waterway. Fog is frequently a navigational hazard in this area. In a letter dated April 7, 2006, the Canadian Ambassador to the U.S. conveyed his country's strong concerns with any passage of LNG vessels through Head Harbor Passage to access either LNG site. The Board will maintain an informal watching brief on this issue.

7.3 Bayside Quarry

Since 1998, Jamer Materials Ltd. has, under contract to the Province of New Brunswick, been extracting rock from the province's Champlain Industrial Park at Bayside to create new lots for industrial and port development. Jamer is owned in part by Vulcan Materials Ltd., one of the largest construction aggregate companies in the United States. The rock quarried at Bayside is shipped from the Bayside port to U.S. markets. In late 2008, the company applied to the Province of New Brunswick for re-zoning of 150 acres of land it has acquired across the highway from its current operation in order to develop a new, long-term quarry at that location.

It plans to move rock from the new site via a road tunneled under Highway 127 to a new rock crushing and export facility it would construct in the current industrial park. While assurances have been made by the Company to protect the St. Andrews water supply and to install state-of-the art treatment facilities to prevent runoff issues, there is still a great deal of concern by local residents. The new quarry is proposed to operate for a period of 30 – 50 years.

Of concern to the IJC Board, are recent reports that the current operation has had a negative affect on the local fish habitat by causing a build-up of siltation in the River adjacent to the quarry and port facility. In 2001, the Board had raised concerns over these kinds of issues and asked the Province that they and the company monitor the situation closely. Over its ten years of operation, however, there have been complaints of noise, dust and affected property values in addition to the loss of local scallop grounds. These continue to be a concern of residents on both the Canadian and U.S. sides of the River. Expansion of the current operation and development of a new quarry could exacerbate the situation. The International Waterway Commission has been particularly instrumental in working with the Province, local action groups and the company to address problems and institute appropriate planning for future development. The Board will maintain a close watch on further developments and discuss options it might take to ease conflicting outcomes at its meeting in June.

7.4 Navigable Waters Protection Act (NWPA) Revision

The Canadian Navigable Waters Protection Act (NWPA) of 1882 mandates the Government of Canada to undertake an assessment of the impacts on navigation and an environmental assessment of any structure or development proposed for a navigable waterway. The Government of Canada has been working to revise the NWPA over the past few years in order to remove regulatory impediments to development on or near such waters. The revised legislation could result in many smaller waterways being removed from "navigable" status. Proposed changes could have implications for boundary waters, such as those of the St. Croix River watershed, which could lose the important legislative protection from inappropriate development currently afforded by the NWPA regulations. While the NWPA is one of Canada's oldest pieces of legislation and may need revision, the Board is concerned that environmental protection of the St. Croix Watershed is not compromised in this process.

ACKNOWLEDGEMENTS

The International St. Croix River Watershed 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
Stephen Drost - New Brunswick Department of the Environment
Ed Logue - Maine Department of Environmental Protection
Paul Noseworthy - Environment Canada
James Caldwell - U.S. Geological Survey
Donald Bourgeois - Environment Canada
Don Walter - Environment Canada
Jay Beaudoin - Domtar Maine Corp.
Peter Johnson - Environment Canada
Peter Eaton - 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.

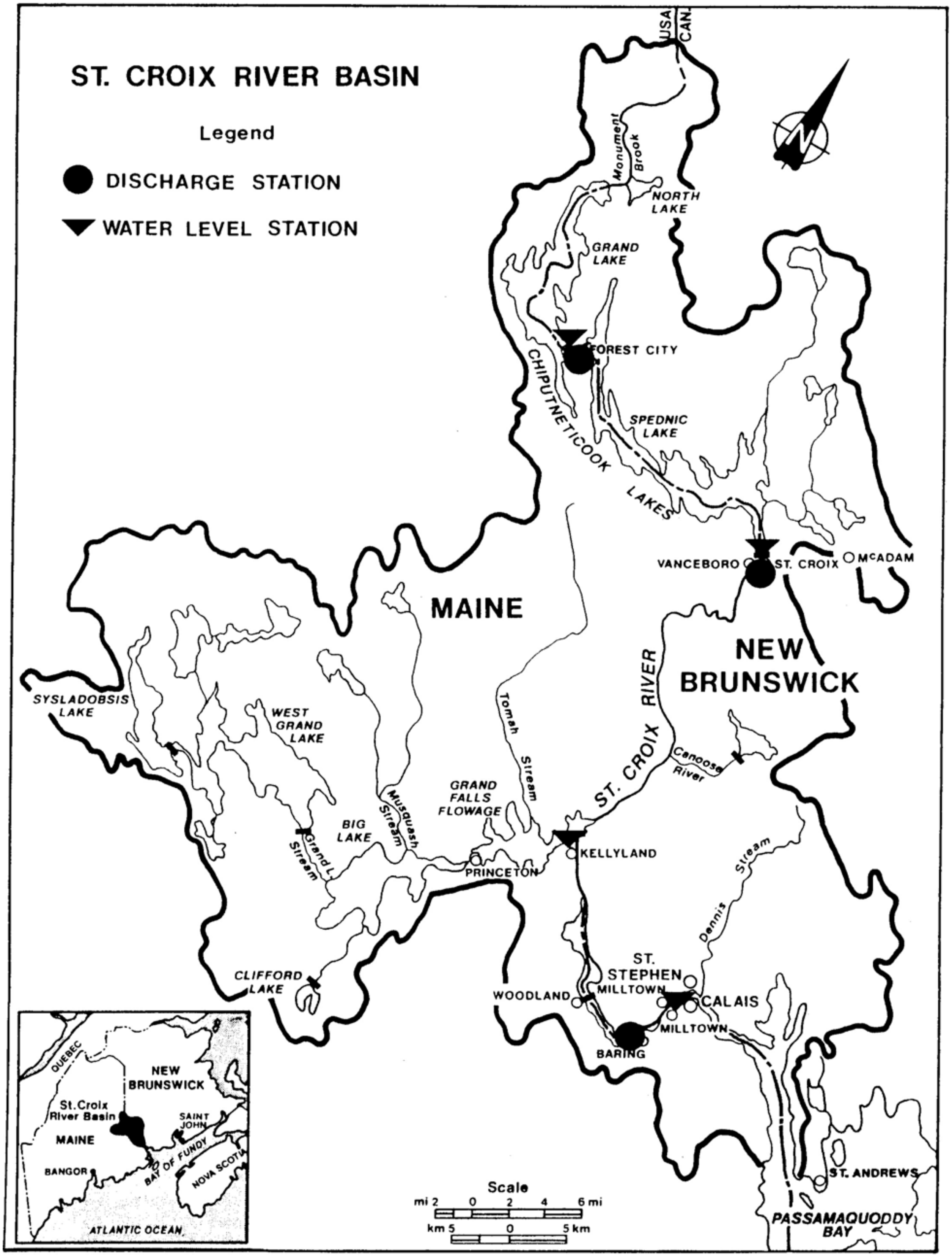
6 October, 1931- For the obstructions of the waters of the St. Croix River at Grand Falls in the State of Maine and the Province of New Brunswick. Increase in elevation to 203.5 feet m.s.l.

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
BIG LAKE
Musquash Stream
Grand L. Stream
PRINCETON
KELLYLAND
Dennis Stream
CLIFFORD LAKE
ST. STEPHEN
MILLTOWN
CALAIS
WOODLAND
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
MAINE
SAINT JOHN
BANGOR
BAY OF FUNDY
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 (installed capacity is 3.96 MW), an upstream fish passage facility that goes from the lower pool around the left side of the powerhouse (looking downstream) 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 2008

Board members met with New Brunswick Power officials on the morning of August 20th at the Milltown Dam in New Brunswick and participated in a site visit of the facility.

Board members met with Domtar Officials on August 20th at the Woodland Mill at Baileyville, Maine and then Board members participated in site visits at Grand Falls and Forest City Dam sites. (Vanceboro Dam was not visited in 2008.)

Participants included in the Domtar meeting and facilities visits are shown below:

Name	Position/Representing
Pierre Trepanier*	IJC Commissioner/ Canadian Section
Sam Speck*	IJC Commissioner/ U.S. Section
Murray Clamen*	IJC staff
Tom McAuley*	IJC staff
Charles Lawson*	IJC staff
Willem Brakel	IJC Staff
Bill Appleby	St. Croix Board, Co-Chair, Canadian Section
Bill Ayer	St. Croix Board, Canadian Section
Charles LeBlanc	St. Croix Board, Canadian Section
Peter Johnson	Secretary, St Croix Board, Canadian Section
LTC Stephan Lefebvre	Representing COL Feir, Co-Chair, U.S. Section
Carol Wood	St. Croix Board, U.S. Section
Bob Lent *	St. Croix Board, U.S. Section
Barbara Blumeris	Secretary, St. Croix Board, U.S. Section
Jeff Babcock	New Brunswick Power Co.
Glen Hanscom	New Brunswick Power Co.
Donna Adams	Domtar Industries, Inc.
Jay Beaudoin	Domtar Industries, Inc

* Attendees that did not attend facility site visits at Grand Falls Dam and Forest City Dam

General Comments on Facilities

August 2008

Forest City Dam. Domtar reported that they continue to monitor the wooden fishway where some repairs were made in 2007. In 2007 these repairs included adding a dead man to prevent leaning of fish way and providing a new trash rack at the inlet to the fishway.

Photographs from August 2007

<u>Vanceboro Dam</u>. The Board did not visit Vanceboro Dam in 2008. Above are photographs from 2007 provided for general information purposes.

August 2008

Grand Falls Dam. The Board visited the Grand Falls Dam and viewed the Dam and associated facilities. During the Board site visit work was on-going by Domtar's contractor to maintain the trash racks and gates at the head pond to the hydropower facility. Domtar noted additional work is planned for Fall 2008 at the enclosed Bays - downstream face of the spillway on the Canadian side and at the fishway adjacent to the hydropower facility.

August 2008

Milltown Dam. During the Board's annual site visits, it has been observed that there is a crack in the floor of the powerhouse near units 5/6/7. This is not a new issue as the crack has been apparent since the 1980s. However, about five years ago NB Power reported to the Board that there was increased movement in the crack. At that time (2003) 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 outside face of the wall to prevent freezing and thawing action and has continued to use this method in 2008 . NB power will continue to monitor movement of the downstream wall and plans to have Acres International provide an inspection in Fall 2008 with particular attention to the stability of the wall.

APPENDIX 3

HYDROGRAPHS

YEAR: 2008 STATION: 01AR009 - GRAND LAKE AT FOREST CITY

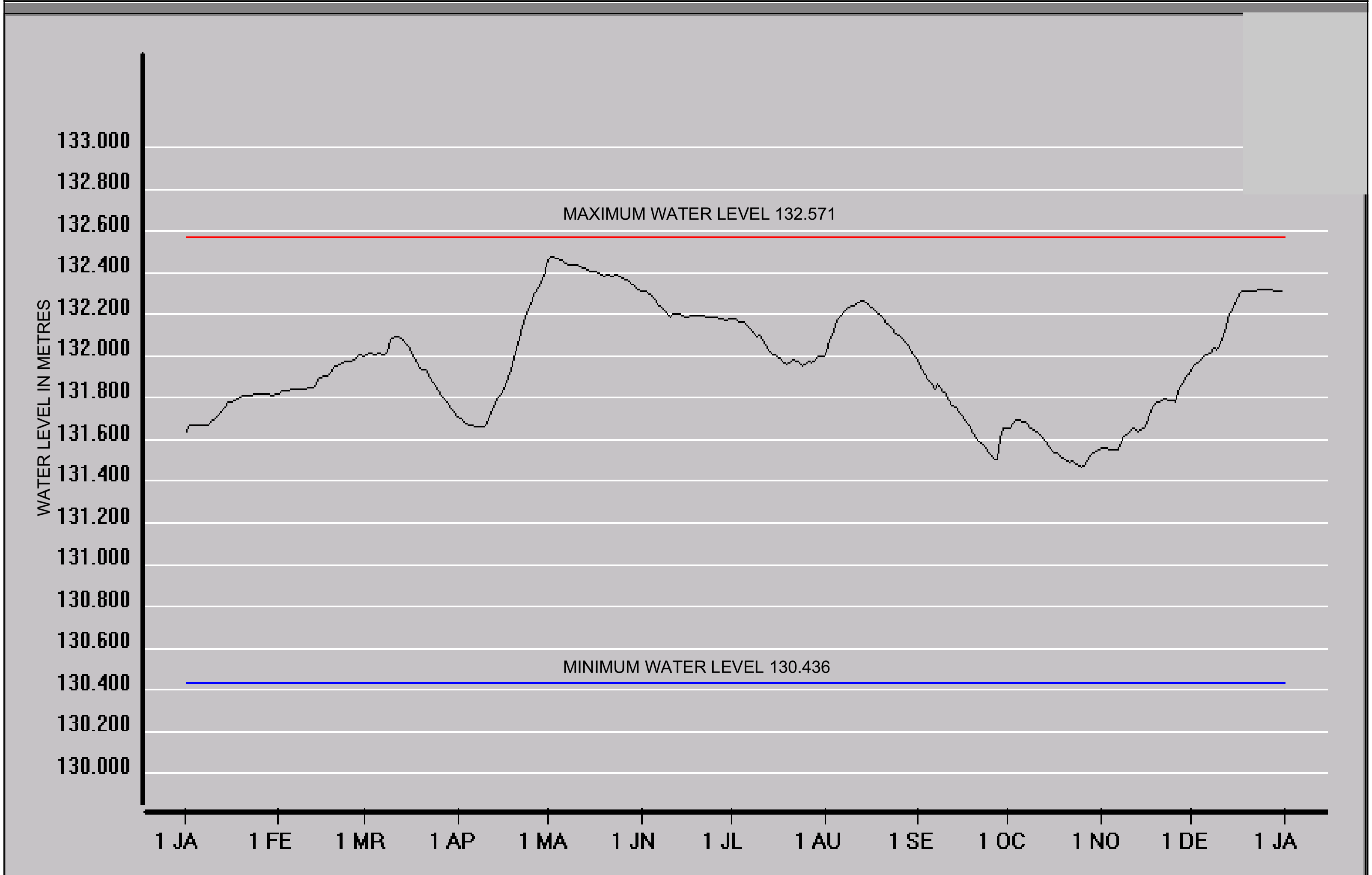
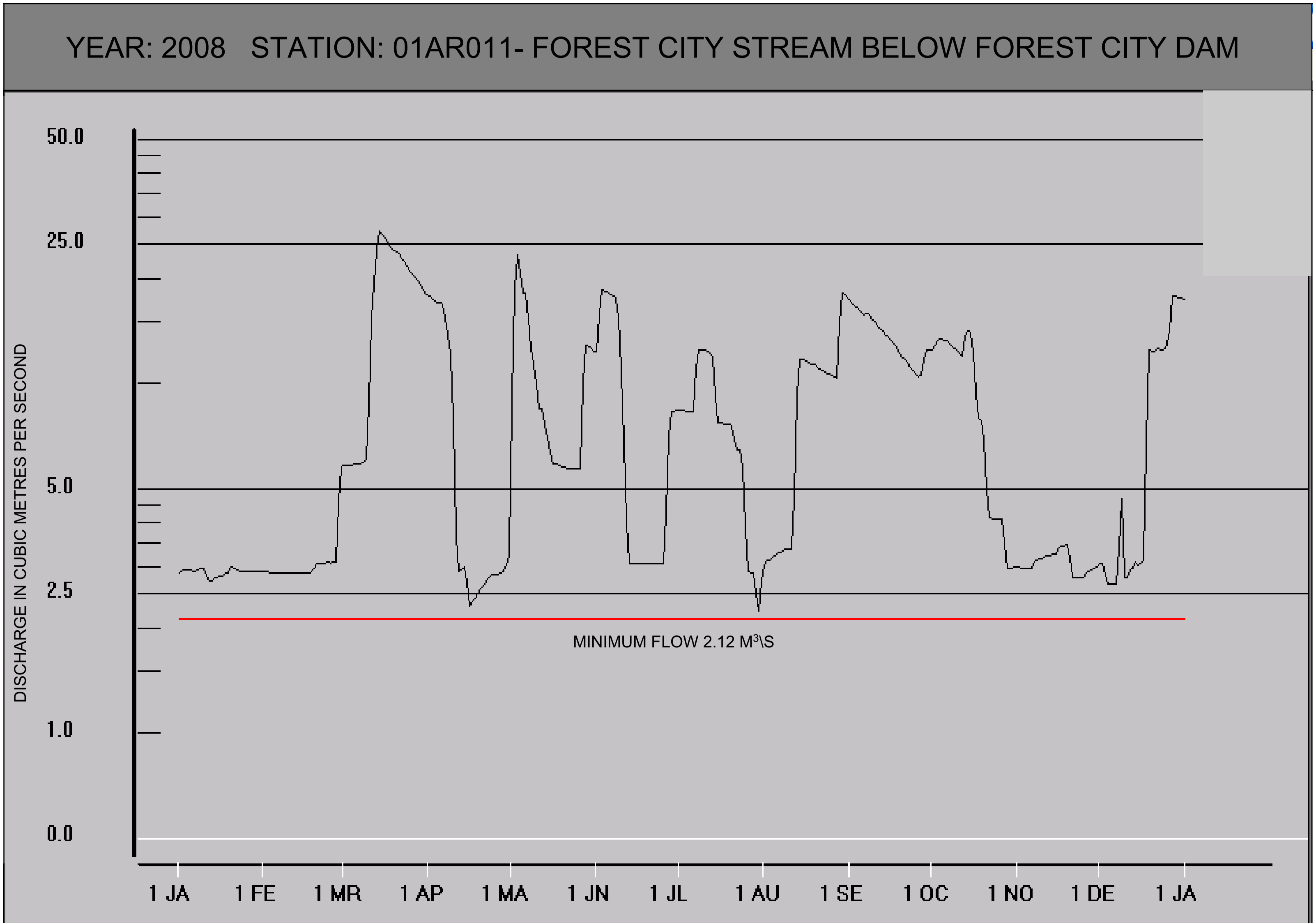


FIGURE I



YEAR: 2008 STATION: 01AR011- FOREST CITY STREAM BELOW FOREST CITY DAM
DISCHARGE IN CUBIC METRES PER SECOND
50.0
25.0
5.0
2.5
1.0
0.0
MINIMUM FLOW 2.12 M³\S
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 II

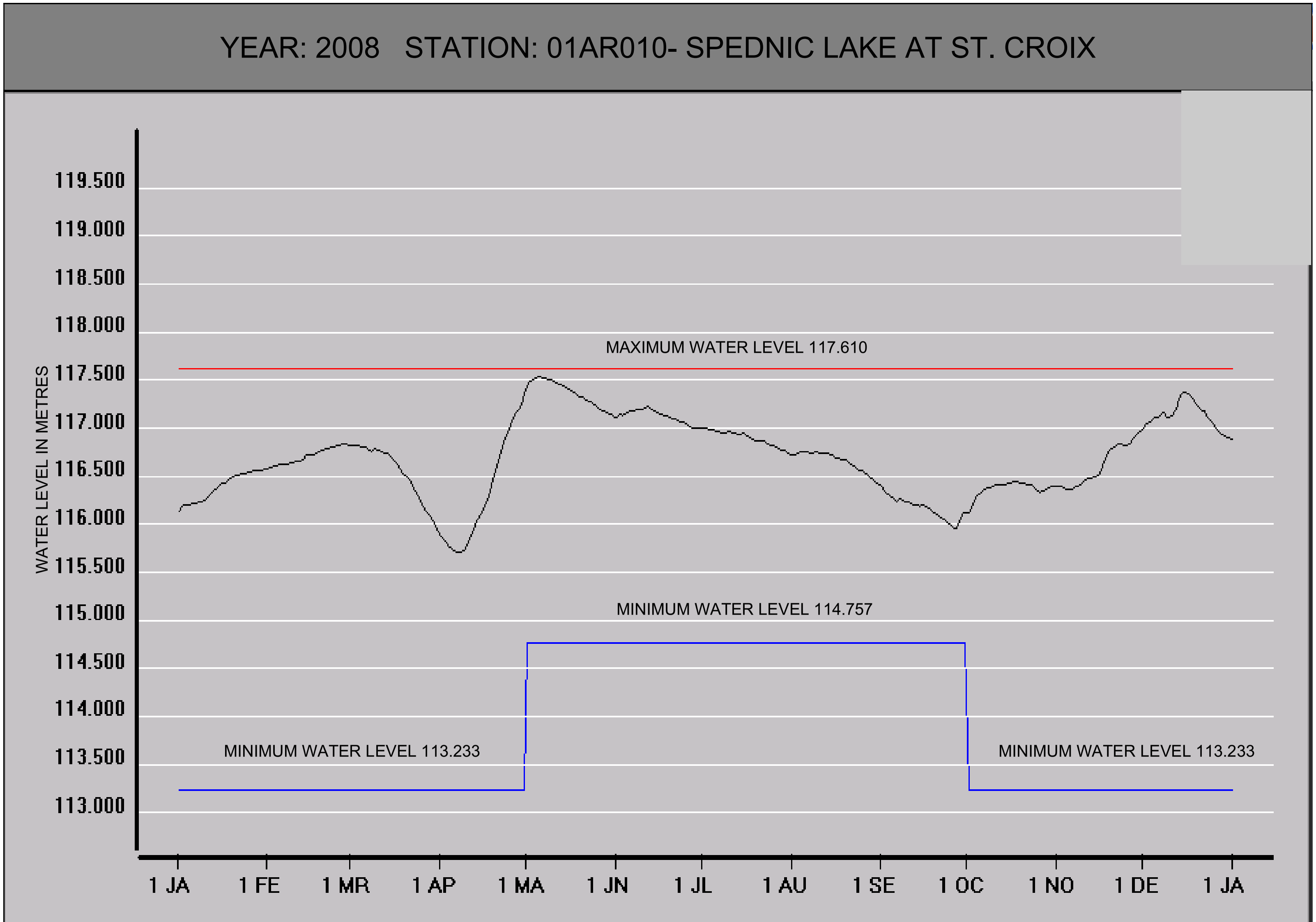

YEAR: 2008 STATION: 01AR010- SPEDNIC LAKE AT ST. CROIX
WATER LEVEL IN METRES
119.500
119.000
118.500
118.000
117.500
117.000
116.500
116.000
115.500
115.000
114.500
114.000
113.500
113.000
MAXIMUM WATER LEVEL 117.610
MINIMUM WATER LEVEL 114.757
MINIMUM WATER LEVEL 113.233
MINIMUM WATER LEVEL 113.233
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

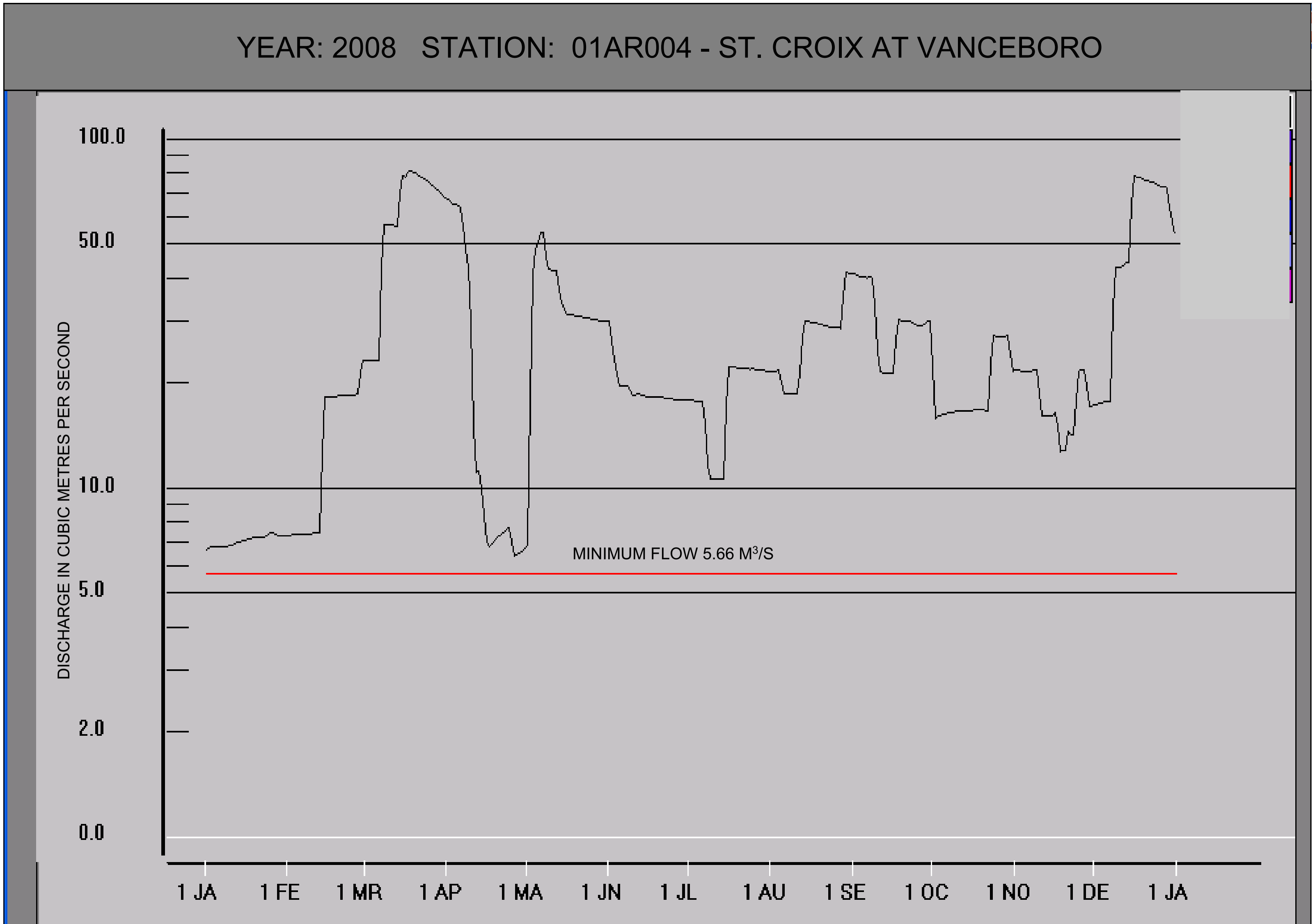

YEAR: 2008 STATION: 01AR004 - ST. CROIX AT VANCEBORO
DISCHARGE IN CUBIC METRES PER SECOND
100.0
50.0
10.0
5.0
2.0
0.0
MINIMUM FLOW 5.66 M3/S
1 JA
1 FE
1 MR
1 AP
1 MA
1 JN
1 JL
1 AU
1 SE
1 OC
1 NO
1 DE
1 JA

FIGURE IV

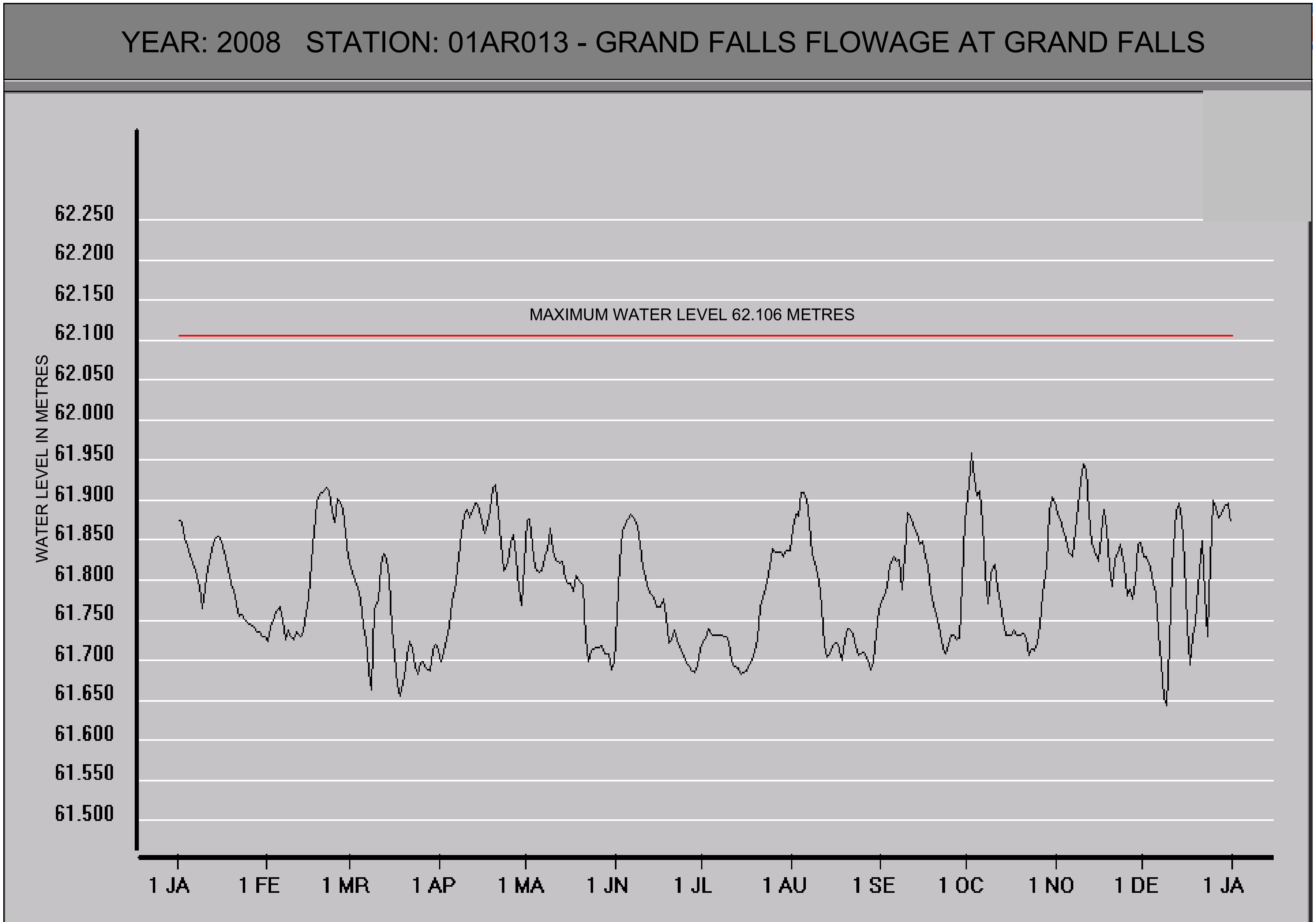

YEAR: 2008 STATION: 01AR013 - GRAND FALLS FLOWAGE AT GRAND FALLS
WATER LEVEL IN METRES
62.250
62.200
62.150
62.100
62.050
62.000
61.950
61.900
61.850
61.800
61.750
61.700
61.650
61.600
61.550
61.500
MAXIMUM WATER LEVEL 62.106 METRES
1 JA
1 FE
1 MR
1 AP
1 MA
1 JN
1 JL
1 AU
1 SE
1 OC
1 NO
1 DE
1 JA

FIGURE V

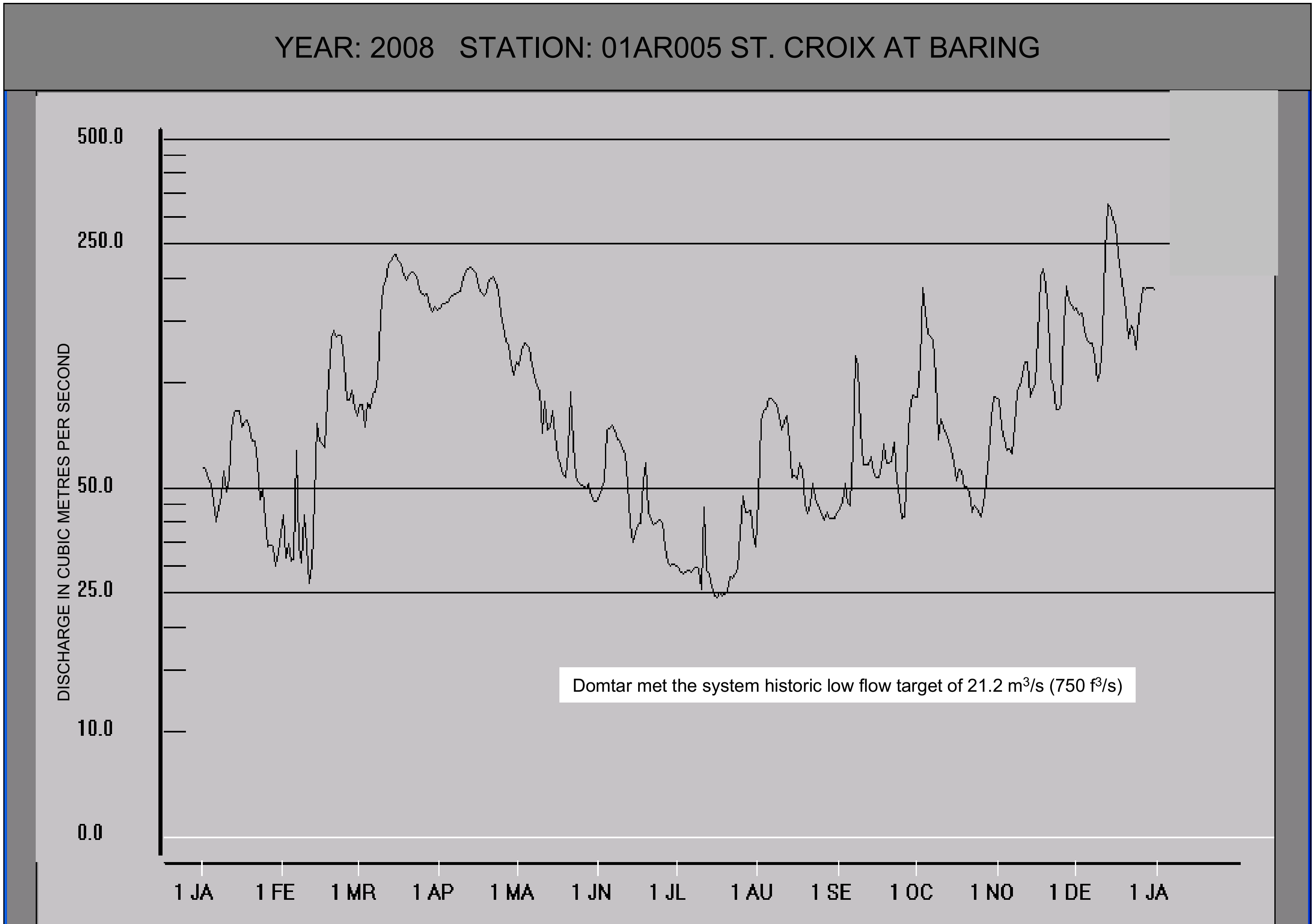
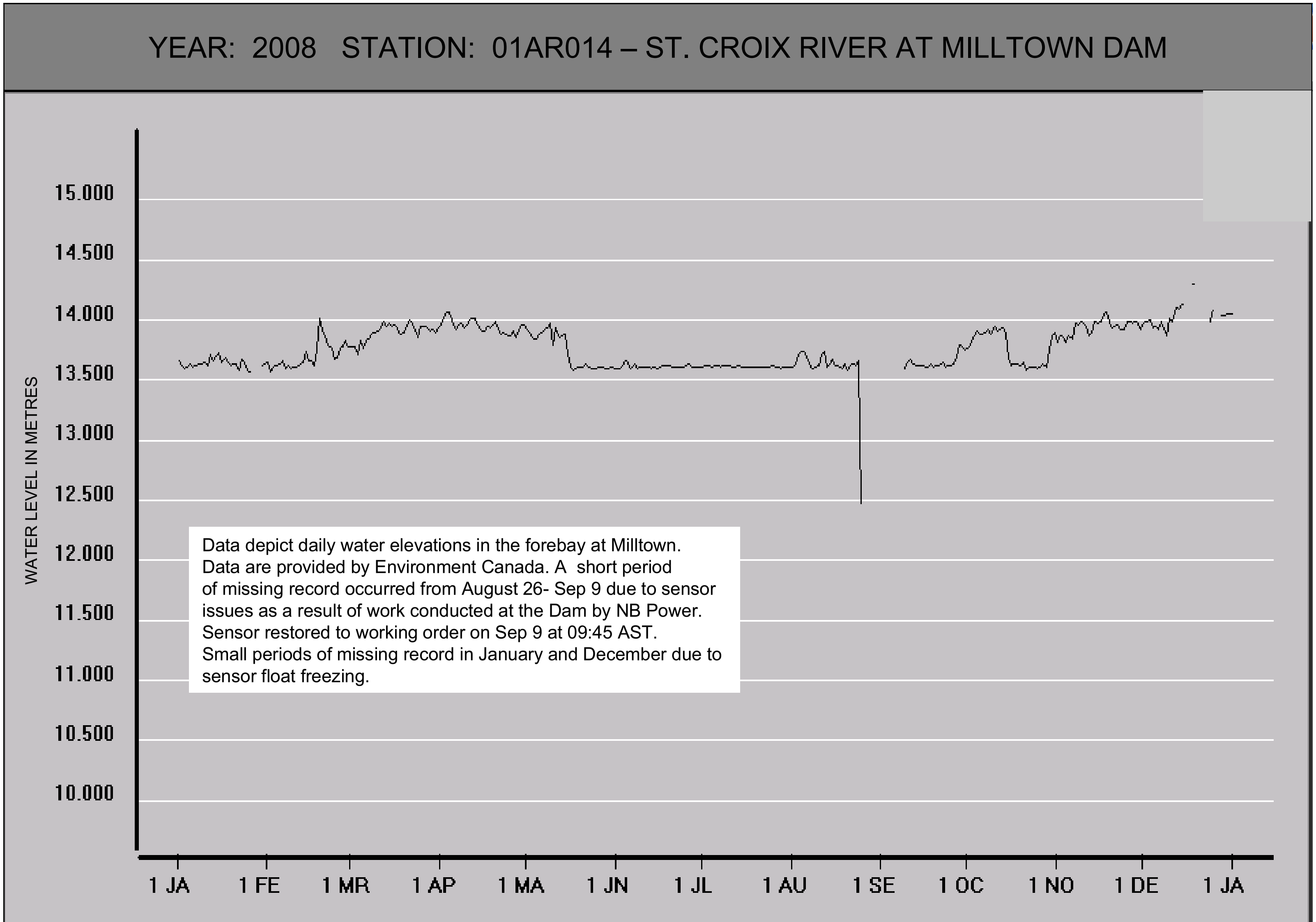

YEAR: 2008 STATION: 01AR005 ST. CROIX AT BARING
DISCHARGE IN CUBIC METRES PER SECOND
500.0
250.0
50.0
25.0
10.0
0.0
1 JA
1 FE
1 MR
1 AP
1 MA
1 JN
1 JL
1 AU
1 SE
1 OC
1 NO
1 DE
1 JA
Domtar met the system historic low flow target of 21.2 m3/s (750 f3/s)

FIGURE VI



YEAR: 2008 STATION: 01AR014 – ST. CROIX RIVER AT MILLTOWN DAM
WATER LEVEL IN METRES
15.000
14.500
14.000
13.500
13.000
12.500
12.000
11.500
11.000
10.500
10.000
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
Data depict daily water elevations in the forebay at Milltown. Data are provided by Environment Canada. A short period of missing record occurred from August 26- Sep 9 due to sensor issues as a result of work conducted at the Dam by NB Power. Sensor restored to working order on Sep 9 at 09:45 AST. Small periods of missing record in January and December due to sensor float freezing.

FIGURE VII

APPENDIX 4

WATER LEVELS AND FLOWS

GRAND LAKE AT FOREST CITY
DAILY MEAN WATER LEVEL IN METRES FOR 2008

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	131.642	131.818	132.004	131.702	132.468	132.312	132.181	132.024	131.963	131.651	131.560	131.941	1
2	131.667	131.834	132.012	131.695	132.475	132.308	132.176	132.074	131.933	131.678	131.557	131.961	2
3	131.669	131.836	132.007	131.680	132.470	132.292	132.165	132.098	131.909	131.695	131.548	131.976	3
4	131.669	131.836	132.005	131.670	132.461	132.287	132.162	132.146	131.887	131.693	131.550	131.988	4
5	131.667	131.838	132.011	131.670	132.457	132.273	132.151	132.174	131.865	131.688	131.550	132.002	5
6	131.668	131.842	132.010	131.664	132.447	132.250	132.137	132.193	131.844	131.683	131.552	132.004	6
7	131.667	131.841	132.006	131.663	132.438	132.230	132.123	132.211	131.864	131.674	131.595	132.017	7
8	131.673	131.840	132.024	131.662	132.437	132.214	132.108	132.224	131.850	131.657	131.611	132.034	8
9	131.681	131.840	132.077	131.665	132.437	132.202	132.090	132.242	131.827	131.643	131.624	132.028	9
10	131.691	131.841	132.089	131.680	132.433	132.188	132.097	132.241	131.815	131.636	131.638	132.044	10
11	131.704	131.851 A	132.092	131.705	132.429	132.198	132.074	132.245	131.789	131.620	131.651	132.073	11
12	131.726	131.850	132.087	131.741	132.422	132.205	132.054	132.256	131.767	131.603	131.646	132.137	12
13	131.738	131.866	132.079	131.773	132.415	132.199	132.024	132.263	131.752	131.591	131.640	132.202	13
14	131.755	131.896	132.060	131.802	132.409	132.193	132.008	132.254	131.729	131.569	131.648	132.214	14
15	131.775	131.899	132.042	131.828	132.404	132.188	132.003	132.249	131.715	131.555	131.661	132.250	15
16	131.782	131.903	132.018	131.857	132.401	132.186	131.992	132.234	131.696	131.540	131.700	132.282	16
17	131.788	131.904	131.992	131.893	132.395	132.193	131.980	132.222	131.676	131.536	131.740	132.299	17
18	131.797	131.922	131.965	131.938	132.388	132.196	131.969	132.204	131.660	131.522	131.760	132.312	18
19	131.806	131.941	131.939	131.986	132.385	132.196	131.962	132.196	131.632	131.508	131.782	132.315	19
20	131.809	131.950	131.936	132.035	132.389	132.195	131.968	132.179	131.608	131.498	131.783	132.315	20
21	131.809	131.958	131.924	132.087	132.383	132.191	131.982	132.158	131.594	131.491	131.784	132.315	21
22	131.811	131.964	131.900	132.136	132.384	132.188	131.975	132.143	131.576	131.494	131.795	132.315	22
23	131.814	131.972	131.876	132.185	132.389	132.187	131.966	132.129	131.557	131.484	131.790	132.319	23
24	131.815	131.976	131.854	132.233	132.382	132.187	131.951	132.110	131.540	131.475	131.785	132.319	24
25	131.815	131.978	131.831	132.273	132.375	132.183	131.962	132.100	131.522	131.469	131.782	132.318 E	25
26	131.814	131.981	131.811	132.304	132.368	132.176	131.973	132.089	131.505	131.473	131.822	132.317 E	26
27	131.815	132.001	131.791	132.330	132.366	132.174	131.967	132.067	131.506	131.496	131.856	132.316 E	27
28	131.816	132.004	131.772	132.348	132.354	132.174	131.976	132.050	131.606	131.526	131.873	132.315 E	28
29	131.813	132.001	131.751	132.379	132.334	132.169	131.992	132.029	131.653	131.534	131.904	132.314 E	29
30	131.814		131.731	132.436	132.316	132.181	131.996	132.004	131.655	131.547	131.916	132.314 E	30
31	131.817		131.712		132.307		131.997	131.986		131.552		132.314 E	31
TOTAL	4084.327	3825.183	4090.408	3958.020	4104.518	3966.315	4093.161	4096.794	3951.495	4078.781	3951.103	4097.870	TOTAL
MEAN	131.752	131.903	131.949	131.934	132.404	132.210	132.037	132.155	131.717	131.574	131.703	132.189	MEAN
MAX	131.817	132.004	132.092	132.436	132.475	132.312	132.181	132.263	131.963	131.695	131.916	132.319	MAX
MIN	131.642	131.818	131.712	131.662	132.307	132.169	131.951	131.986	131.505	131.469	131.548	131.941	MIN

SUMMARY FOR THE YEAR 2008
Mean water level, 131.962 Metres
Maximum daily water level, 132.475 Metres On 2008-05-02
Minimum daily water level, 131.469 Metres On 2008-10-25

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

TABLE I

FOREST CITY STREAM BELOW FOREST CITY DAM
DAILY MEAN DISCHARGE IN CUBIC METRES PER SECOND FOR 2008

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	2.88	2.92	5.85	17.8	8.81	12.4	8.40	3.01	17.3	12.5	2.99	3.06	1
2	2.92	2.90	5.82	17.7	18.8	15.7	8.39	3.13	16.9	12.9	2.98	3.06	2
3	2.92	2.87	5.86	17.3	23.3	18.5	8.35	3.13	16.6	13.3	2.98	2.84	3
4	2.94	2.87	5.86	17.1	20.8	18.4	8.34	3.19	16.4	13.4	2.98	2.66	4
5	2.92	2.87	5.90	17.1	18.2	18.3	8.34	3.23	16.0	13.3	2.98	2.66	5
6	2.92	2.87	5.88	16.9	18.2	18.0	8.29	3.28	15.6	13.3	2.98	2.66	6
7	2.92	2.87	5.88	15.5	15.4	17.9	11.1	3.29	15.9	13.1	3.09	2.66	7
8	2.92	2.87	5.94	13.8	12.6	17.7	12.5	3.31	15.6	12.9	3.12	3.38	8
9	2.96	2.87	6.09	12.1	11.4	15.5	12.4	3.34	15.3	12.6	3.15	4.68	9
10	2.96	2.87	8.76	7.87	9.96	10.9	12.5	3.34	15.1	12.5	3.17	2.77	10
11	2.85	2.87	15.4	3.66	8.52	6.72	12.4	3.34	14.6	12.3	3.21	2.77	11
12	2.73	2.87	19.3	2.90	8.50	4.02	12.2	4.71	14.3	12.0	3.21	2.93	12
13	2.74	2.87	24.1	2.94	7.63	3.05	12.0	9.31	14.1	13.6	3.21	2.97	13
14	2.78	2.87	27.4	2.98	7.04	3.05	9.20	11.8	13.7	14.2	3.25	3.10	14
15	2.79	2.87	26.8	2.71	6.34	3.05	7.74	11.7	13.6	13.9	3.27	3.04	15
16	2.83	2.87	26.1	2.31	5.88	3.05	7.72	11.6	13.3	12.4	3.38	3.07	16
17	2.80	2.87	25.4	2.37	5.88	3.05	7.68	11.5	13.0	9.44	3.41	3.12	17
18	2.86	2.88	24.7	2.44	5.83	3.05	7.65	11.4	12.7	7.95	3.44	6.71	18
19	2.87	2.97	24.1	2.51	5.80	3.05	7.61	11.4	12.3	7.84	3.48	12.4	19
20	2.99	3.07	23.9	2.59	5.77	3.05	7.61	11.2	11.9	7.00	3.20	12.4	20
21	2.96	3.07	23.7	2.67	5.74	3.05	6.93	11.0	11.7	5.00	2.79	12.4	21
22	2.93	3.07	23.0	2.75	5.74	3.05	6.48	10.9	11.4	4.14	2.79	12.6	22
23	2.92	3.07	22.3	2.82	5.73	3.05	6.48	10.8	11.2	4.09	2.79	12.5	23
24	2.92	3.08	21.7	2.85	5.72	3.05	5.78	10.6	10.9	4.09	2.79	12.5	24
25	2.92	3.07	21.1	2.83	5.69	3.05	3.90	10.6	10.7	4.07	2.79	12.6	25
26	2.92	3.10	20.6	2.86	5.69	4.22	2.89	10.5	10.5	4.10	2.88	14.2	26
27	2.92	3.10	20.2	2.88	10.1	7.13	2.89	10.3	10.5	3.51	2.89	17.8	27
28	2.92	4.61	19.7	2.92	12.9	8.36	2.88	15.0	11.8	2.96	2.93	17.7	28
29	2.92	5.79	19.2	3.04	12.8	8.34	2.51	18.2	12.4	2.98	2.96	17.7	29
30	2.92		18.5	3.22	12.6	8.41	2.24	17.9	12.5	2.98	2.99	17.6	30
31	2.92		18.1		12.4		2.72	17.7		2.99		17.5	31
TOTAL	89.67	89.75	527.14	209.42	319.77	250.15	236.12	273.71	407.8	281.34	92.08	248.04	TOTAL
MEAN	2.89	3.09	17.0	6.98	10.3	8.34	7.62	8.83	13.6	9.08	3.07	8.00	MEAN
DAM3	7750	7750	45500	18100	27600	21600	20400	23600	35200	24300	7960	21400	DAM3
MAX	2.99	5.79	27.4	17.8	23.3	18.5	12.5	18.2	17.3	14.2	3.48	17.8	MAX
MIN	2.73	2.87	5.82	2.31	5.69	3.05	2.24	3.01	10.5	2.96	2.79	2.66	MIN

SUMMARY FOR THE YEAR 2008
Total discharge, 261000 DAM3
Mean discharge, 8.26 M3/S
Maximum daily discharge, 27.4 M3/S On 2008-03-14
Minimum daily discharge, 2.24 M3/S On 2008-07-30

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

TABLE II

SPEDNIC LAKE AT ST. CROIX
DAILY MEAN WATER LEVEL IN METRES FOR 2008

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	116.142	116.577	116.819	115.872	117.432	117.119	117.002	116.718	116.388	116.116	116.401	117.000	1
2	116.184	116.596	116.826	115.842	117.480	117.141	116.991	116.727	116.344	116.168	116.394	117.042	2
3	116.194	116.604	116.814	115.801	117.507	117.128	116.989	116.730	116.315	116.242	116.375	117.070	3
4	116.198	116.609	116.804	115.760	117.520	117.147	116.984	116.752	116.292	116.298	116.368	117.088	4
5	116.206	116.615	116.804	115.740	117.529	117.160	116.969	116.757	116.264	116.322	116.359	117.114	5
6	116.214	116.625	116.800	115.713	117.521	117.170	116.958	116.751	116.238	116.346	116.356	117.115	6
7	116.220	116.630	116.777	115.705	117.514	117.177	116.948	116.743	116.264	116.368	116.389 A	117.140	7
8	116.228	116.631	116.749	115.713	117.502	117.188	116.944	116.736	116.252	116.372	116.393	117.156	8
9	116.237	116.636	116.778	115.729	117.505	117.200	116.941	116.747	116.224	116.378	116.416	117.114	9
10	116.256	116.642	116.765	115.771	117.488	117.193	116.959	116.744	116.235	116.405	116.437	117.117	10
11	116.277	116.655	116.750	115.839	117.475	117.214	116.953	116.738	116.216	116.408	116.467	117.136	11
12	116.311	116.657	116.744	115.913	117.452	117.223	116.947	116.737	116.203	116.408	116.478	117.199	12
13	116.338	116.675	116.743	115.987	117.434	117.199	116.932	116.734	116.201	116.411	116.480	117.310	13
14	116.368	116.723	116.725	116.054	117.419	117.175	116.939	116.720	116.188	116.410	116.488	117.354	14
15	116.401	116.721	116.692	116.115	117.402	117.158	116.940	116.714	116.195	116.420	116.504	117.369	15
16	116.419	116.722	116.656	116.180	117.389	117.142	116.920	116.696	116.185	116.425	116.565	117.362	16
17	116.434	116.719	116.620	116.256	117.367	117.136	116.905	116.692	116.168	116.447	116.657	117.334	17
18	116.454	116.732	116.569	116.353	117.350	117.128	116.887	116.669	116.157	116.438	116.709	117.301	18
19	116.476	116.755	116.516	116.454	117.330	117.115	116.874	116.667	116.120	116.428	116.774	117.261	19
20	116.490	116.769	116.486	116.555	117.321	117.103	116.865	116.658	116.094	116.424	116.789	117.224	20
21	116.501	116.782	116.454	116.659	117.292	117.091	116.874	116.626	116.078	116.418	116.801	117.183	21
22	116.510	116.792	116.404	116.757	117.276	117.072	116.860	116.606	116.055	116.414	116.835	117.169	22
23	116.523	116.804	116.352	116.853	117.273	117.059	116.841	116.586	116.031	116.407	116.838	117.119	23
24	116.533	116.808	116.298	116.951	117.247	117.056	116.817	116.565	116.008	116.376	116.824	117.072	24
25	116.540	116.810	116.245	117.031	117.223	117.041	116.819	116.555	115.981	116.347	116.812	117.042	25
26	116.547	116.812	116.190	117.098	117.197	117.018	116.808	116.544	115.960	116.324	116.838	117.002	26
27	116.553	116.829	116.137	117.155	117.185	117.006	116.785	116.512	115.952	116.350	116.886	116.962	27
28	116.563	116.830	116.086	117.200	117.169	116.998	116.772	116.479	116.016	116.357	116.911	116.935	28
29	116.562	116.822	116.033	117.243	117.148	116.993	116.766	116.452	116.095	116.372	116.950	116.913	29
30	116.563		115.979	117.356	117.141	117.001	116.751	116.426	116.112	116.394	116.970	116.898	30
31	116.572		115.918		117.111		116.726	116.414		116.393		116.884	31
TOTAL	3608.014	3384.582	3612.533	3489.655	3638.199	3513.551	3623.666	3616.195	3484.831	3607.386	3498.464	3630.985	TOTAL
MEAN	116.388	116.710	116.533	116.322	117.361	117.118	116.892	116.651	116.161	116.367	116.615	117.129	MEAN
MAX	116.572	116.830	116.826	117.356	117.529	117.223	117.002	116.757	116.388	116.447	116.970	117.369	MAX
MIN	116.142	116.577	115.918	115.705	117.111	116.993	116.726	116.414	115.952	116.116	116.356	116.884	MIN

SUMMARY FOR THE YEAR 2008
Mean water level, 116.689 Metres
Maximum daily water level, 117.529 Metres On 2008-05-05
Minimum daily water level, 115.705 Metres On 2008-04-07

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 2008

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	6.68	7.31	23.3	67.1	6.85	30.3	17.8	21.6	41.1	22.3	21.7	17.3	1
2	6.74	7.33	23.3	66.3	17.8	26.4	17.8	21.6	40.8	15.8	21.7	17.4	2
3	6.80	7.36	23.2	65.4	40.8	23.5	17.8	21.6	40.5	16.1	21.6	17.5	3
4	6.80	7.36	23.2	64.9	48.4	21.1	17.8	21.8	40.2	16.2	21.6	17.5	4
5	6.77	7.36	23.2	64.3	51.0	19.7	17.8	20.1	40.2	16.3	21.6	17.6	5
6	6.77	7.36	23.1	63.7	53.8	19.7	17.7	18.7	39.9	16.4	21.6	17.6	6
7	6.77	7.39	43.1	56.6	53.8	19.7	15.4	18.6	40.2	16.5	21.7	17.7	7
8	6.77	7.39	56.9	48.7	46.4	19.7	11.7	18.6	39.9	16.5	21.8	32.9	8
9	6.80	7.39	57.2	43.1	42.5	19.0	10.6	18.6	33.4	16.5	21.9	42.8	9
10	6.85	7.39	56.9	29.7	42.2	18.5	10.6	18.6	24.8	16.6	18.7	42.8	10
11	6.88	7.45	56.9	15.0	42.2	18.5	10.6	18.6	21.5	16.6	16.1	42.8	11
12	6.94	7.45	56.6	11.1	41.9	18.6	10.6	21.4	21.4	16.6	16.1	43.3	12
13	6.97	7.45	56.6	11.2	37.1	18.5	10.6	27.3	21.4	16.6	16.1	44.2	13
14	7.02	12.7	70.2	10.0	34.0	18.4	10.6	30.0	21.3	16.6	16.1	44.5	14
15	7.08	18.2	78.5	8.41	32.6	18.4	17.1	30.0	21.4	16.7	16.2	64.9	15
16	7.11	18.2	77.9	7.02	31.4	18.3	22.3	29.7	21.3	16.7	16.5	78.5	16
17	7.14	18.2	80.2	6.80	31.4	18.3	22.3	29.7	26.5	16.8	15.2	77.9	17
18	7.16	18.2	81.3	6.94	31.4	18.3	22.2	29.7	30.6	16.8	12.6	77.6	18
19	7.19	18.3	80.4	7.08	31.2	18.2	22.1	29.5	30.3	16.8	12.8	77.0	19
20	7.22	18.4	79.9	7.22	31.2	18.2	22.1	29.5	30.0	16.8	12.9	76.5	20
21	7.25	18.4	79.0	7.36	31.2	18.2	22.1	29.2	30.0	16.7	14.5	75.9	21
22	7.25	18.5	78.2	7.48	30.9	18.1	22.1	29.2	30.0	16.7	14.2	75.6	22
23	7.25	18.5	77.0	7.59	30.9	18.1	22.0	28.9	29.7	22.7	14.2	75.1	23
24	7.28	18.5	76.2	7.73	30.9	18.0	21.9	28.9	29.5	27.4	17.8	74.5	24
25	7.45	18.5	75.1	7.02	30.6	18.0	22.0	28.9	29.2	27.2	21.6	73.9	25
26	7.45	18.5	73.9	6.37	30.6	17.9	21.9	28.9	29.2	27.1	21.7	73.3	26
27	7.39	18.6	72.8	6.43	30.6	17.9	21.8	28.6	29.2	27.2	21.9	72.8	27
28	7.33	21.3	71.7	6.49	30.3	17.9	21.7	35.7	29.5	27.2	19.7	72.5	28
29	7.28	23.3	70.5	6.57	30.3	17.8	21.7	41.6	30.0	27.4	17.1	64.0	29
30	7.28		69.4	6.71	30.3	17.9	21.7	41.4	30.3	24.2	17.2	58.3	30
31	7.31		68.0		30.0		21.6	41.4		21.7		53.2	31
TOTAL	218.98	392.29	1883.7	730.32	1084.55	581.1	566.0	837.9	923.3	601.7	544.4	1637.4	TOTAL
MEAN	7.06	13.5	60.8	24.3	35.0	19.4	18.3	27.0	30.8	19.4	18.1	52.8	MEAN
DAM3	18900	33900	163000	63100	93700	50200	48900	72400	79800	52000	47000	141000	DAM3
MAX	7.45	23.3	81.3	67.1	53.8	30.3	22.3	41.6	41.1	27.4	21.9	78.5	MAX
MIN	6.68	7.31	23.1	6.37	6.85	17.8	10.6	18.6	21.3	15.8	12.6	17.3	MIN

SUMMARY FOR THE YEAR 2008
Total discharge, 864000 DAM3
Mean discharge, 27.3 M3/S
Maximum daily discharge, 81.3 M3/S On 2008-03-18
Minimum daily discharge, 6.37 M3/S On 2008-04-26

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

TABLE IV

GRAND FALLS FLOWAGE AT GRAND FALLS
DAILY MEAN WATER LEVEL IN METRES FOR 2008

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	61.874	61.724	61.809	61.697	61.874	61.756	61.723	61.865	61.774	61.919	61.884	61.830	1
2	61.872	61.742	61.800	61.710	61.877	61.822	61.727	61.883	61.780	61.958	61.876	61.829	2
3	61.853	61.755	61.790	61.725	61.827	61.860	61.739	61.880	61.792	61.927	61.863	61.816	3
4	61.843	61.762	61.776	61.742	61.812	61.870	61.732	61.910	61.819	61.906	61.852	61.796	4
5	61.832	61.766	61.744	61.772	61.809	61.876	61.731	61.910	61.829	61.911	61.836	61.784	5
6	61.822	61.751	61.727	61.798	61.811	61.882	61.731	61.901	61.823	61.872	61.829	61.736	6
7	61.811	61.725	61.687	61.828	61.828	61.875	61.731	61.872	61.825	61.807	61.861	61.697	7
8	61.792	61.736	61.663	61.859	61.837	61.867	61.730	61.833	61.789	61.770	61.891	61.653	8
9	61.765	61.728	61.764	61.879	61.865	61.845	61.729	61.816	61.832	61.808	61.924	61.643	9
10	61.790	61.725	61.775	61.888	61.837	61.816	61.724	61.800	61.884	61.819	61.945	61.719	10
11	61.815	61.736	61.817	61.878	61.825	61.803	61.701	61.766	61.880	61.791	61.939	61.816	11
12	61.830	61.730	61.834	61.886	61.821	61.788	61.693	61.720	61.871	61.770	61.886	61.886	12
13	61.845	61.736	61.827	61.897	61.824	61.783	61.691	61.704	61.858	61.748	61.846	61.896	13
14	61.852	61.760	61.802	61.893	61.802	61.778	61.683	61.708	61.844	61.731	61.837	61.876	14
15	61.854	61.779	61.742	61.875	61.796	61.767	61.685	61.718	61.848	61.732	61.824	61.824	15
16	61.848	61.821	61.706	61.858	61.795	61.767	61.686	61.721	61.829	61.731	61.857	61.744	16
17	61.829	61.860	61.670	61.870	61.786	61.776	61.694	61.719	61.817	61.738	61.887	61.695	17
18	61.813	61.898	61.655	61.887	61.805	61.756	61.700	61.700	61.786	61.731	61.864	61.729	18
19	61.796	61.908	61.679	61.915	61.799	61.722	61.713	61.723	61.768	61.732	61.818	61.747	19
20	61.788	61.910	61.705	61.918	61.794	61.725	61.725	61.739	61.758	61.734	61.793	61.793	20
21	61.770	61.915	61.724	61.885	61.727	61.737	61.767	61.737	61.742	61.727	61.825	61.848	21
22	61.756	61.912	61.713	61.846	61.697	61.725	61.784	61.733	61.715	61.705	61.834	61.783	22
23	61.757	61.888	61.693	61.812	61.711	61.716	61.797	61.718	61.709	61.714	61.845	61.730	23
24	61.751	61.872	61.682	61.821	61.714	61.710	61.817	61.705	61.720	61.712	61.818	61.822	24
25	61.745	61.901	61.697	61.847	61.716	61.695	61.838	61.708	61.732	61.719	61.780	61.899	25
26	61.743	61.898	61.697	61.857	61.715	61.692	61.834	61.710	61.731	61.745	61.788	61.890	26
27	61.741	61.889	61.690	61.829	61.718	61.686	61.834	61.700	61.726	61.782	61.777	61.879	27
28	61.736	61.859	61.686	61.791	61.708	61.685	61.835	61.688	61.727	61.820	61.798	61.881	28
29	61.735 A	61.830	61.712	61.768	61.708	61.694	61.829	61.699	61.796	61.887	61.845	61.893	29
30	61.730		61.720	61.819	61.689	61.714	61.836	61.734	61.874	61.905	61.847	61.896	30
31	61.729		61.713		61.695		61.836	61.763		61.898		61.873	31
TOTAL	1915.717	1792.516	1913.699	1855.050	1915.222	1853.188	1914.275	1914.783	1853.878	1915.749	1855.469	1915.903	TOTAL
MEAN	61.797	61.811	61.732	61.835	61.781	61.773	61.751	61.767	61.796	61.798	61.849	61.803	MEAN
MAX	61.874	61.915	61.834	61.918	61.877	61.882	61.838	61.910	61.884	61.958	61.945	61.899	MAX
MIN	61.729	61.724	61.655	61.697	61.689	61.685	61.683	61.688	61.709	61.705	61.777	61.643	MIN

SUMMARY FOR THE YEAR 2008
Mean water level, 61.791 Metres
Maximum daily water level, 61.958 Metres On 2008-10-02
Minimum daily water level, 61.643 Metres On 2008-12-09

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

TABLE V

ST. CROIX RIVER AT BARING
DAILY MEAN DISCHARGE IN CUBIC METRES PER SECOND FOR 2008

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	56.9	41.9	86.9	164	113	47.3	29.7	47.0	43.6	90.9	89.2	164	1
2	56.6	31.4 B	86.4	170	123	50.1	28.6	78.5	45.9	115	75.1	157	2
3	53.0 B	34.8	74.8	170	131	52.1	28.3	83.5	51.3	187	68.8	158	3
4	51.3 B	30.9	87.5	171	128	73.6	28.6	83.8	45.6	161	64.0	142	4
5	45.9 B	31.2	85.0	176	127	74.2	28.9	90.3	44.5	139	64.6	132	5
6	40.2	64.0	93.2	178	113	75.6	28.6	90.3	64.9	136	62.9	130	6
7	43.6	34.0	94.0	179	105	73.1	29.2	88.4	120	133	75.6	130	7
8	47.9	30.6	104	182	98.3	68.8	29.7	86.9	113	105	94.3	118	8
9	55.8	41.6	155	184	95.2	68.5	29.2	80.7	73.4	68.8	98.6	102	9
10	48.7	34.3	187	201	71.9	64.6	25.7	73.6	58.3	79.0	106	108	10
11	53.8	26.6 B	195	210	88.1	62.9	44.2	77.0	58.3	75.0	116	136	11
12	74.5	30.0 B	220	213	73.6	51.5	28.9	80.2	58.3	72.2	115	239	12
13	82.7	46.7	223	215	75.3	39.9	28.3	67.7	61.5	68.0	90.9	326	13
14	83.0	76.8	230	211	83.0	35.1	26.2	53.8	55.2	64.9	96.0	320	14
15	83.0	68.5	233	205	70.8	37.4	24.6	54.1	53.8	59.2	99.7	297	15
16	75.3	66.8 B	225	187	61.5	39.4	24.4	53.0	53.8	52.7	137	283	16
17	77.0	65.4 B	220	181	58.6	39.7	25.2	58.9	57.5	56.4	202	236	17
18	78.5	89.2	204	178	54.9	52.7	24.5	56.6	66.8	55.8	212	206	18
19	74.5	135	198	181	53.5	58.9	24.9	44.8	58.9	50.1	192	185 B	19
20	68.3	141	204	198	64.0	42.5	25.4	42.2	58.9	50.4	154	161 B	20
21	68.3 B	137	208	201	94.0	41.1	27.8	45.0	59.8	49.0	104	135 B	21
22	59.2	137	205	196	66.6	39.4	27.7	51.5	67.7	42.5	99.7	147 B	22
23	46.4	137	202	184	54.1	40.2	28.3	47.0	52.4	44.5	84.1	141 B	23
24	50.1	115	187	159	51.8	40.5	29.2	43.6	46.7	43.6	83.8	124 B	24
25	40.5 B	89.5	180	146	51.0	39.7	37.4	42.2	41.1	41.4	87.2	153 B	25
26	34.0 B	89.2	178	132	50.7	34.0	47.3	40.5	41.4	44.8	145	188 B	26
27	34.3 B	94.9	180	129	49.8	30.6	42.8	42.5	61.5	52.1	190	186	27
28	34.0 B	84.7	168	114	51.3	30.0	42.8	40.8	83.5	62.6	175	188	28
29	30.0	81.0	160	106	47.3	30.3	43.3	40.8	92.0	79.9	167	187	29
30	32.6		165	115	45.9	30.0	36.8	41.1	90.9	91.2	162	187	30
31	37.4		162		45.9		34.0	42.8		90.6		183 B	31
TOTAL	1717.3	2086.0	5200.8	5236	2397.1	1463.7	960.5	1869.1	1880.5	2461.6	3511.5	5549	TOTAL
MEAN	55.4	71.9	168	175	77.3	48.8	31.0	60.3	62.7	79.4	117	179	MEAN
DAM3	148000	180000	449000	452000	207000	126000	83000	161000	162000	213000	303000	479000	DAM3
MAX	83.0	141	233	215	131	75.6	47.3	90.3	120	187	212	326	MAX
MIN	30.0	26.6	74.8	106	45.9	30.0	24.4	40.5	41.1	41.4	62.9	102	MIN

SUMMARY FOR THE YEAR 2008
Total discharge, 2970000 DAM3
Mean discharge, 93.8 M3/S
Maximum daily discharge, 326 M3/S On 2008-12-13
Minimum daily discharge, 24.4 M3/S On 2008-07-16

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

TABLE VI

ST CROIX RIVER AT MILLTOWN DAM
DAILY MEAN WATER LEVEL IN METRES FOR 2008

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	13.657	13.645	13.780	13.966	13.916	13.597	13.607	13.602	---	13.781	13.814	13.973	1
2	13.624	13.574	13.778	14.018	13.890	13.590	13.617	13.635	---	13.813	13.861	13.985	2
3	13.591	13.615	13.711	14.066	13.848	13.614	13.614	13.715	---	13.871	13.849 A	14.003	3
4	13.611	13.626	13.823	14.067	13.838	13.659	13.612	13.739	---	13.912	13.813	13.932	4
5	13.628	13.631	13.764	13.999	13.880	13.648	13.615	13.738	---	13.877	13.867	13.945	5
6	13.610	13.658	13.824	13.923	13.897	13.600	13.614	13.692	---	13.883	13.842	13.917 A	6
7	13.615	13.593	13.836	13.958	13.924	13.630	13.612	13.628	---	13.889	13.969 A	13.979 A	7
8	13.628	13.621	13.883	13.978	13.928	13.600	13.620	13.600	---	13.919	13.964	13.928	8
9	13.632	13.600	13.893	13.932	13.970	13.605	13.616	13.609	13.593 A	13.880	13.981	13.865	9
10	13.652	13.606	13.908	13.966	13.793	13.609	13.614	13.625	13.642	13.948	13.973	14.009	10
11	13.619	13.613	13.931	14.000	13.927	13.612	13.607	13.710	13.672 A	13.909	13.945	13.982 A	11
12	13.705	13.632	13.984	14.014	13.850	13.609	13.612	13.733	13.635	13.925	13.861	14.103	12
13	13.655	13.647	13.942	14.009	13.864	13.598	13.617	13.612	13.618	13.929	13.893	14.092	13
14	13.701	13.731	13.973	13.965	13.885	13.613	13.603	13.628	13.620	13.894	13.982	14.129	14
15	13.729	13.656	13.941	13.908	13.725	13.599	13.610	13.669	13.618	13.682	13.976	14.124	15
16	13.645	13.664	13.957	13.907	13.606	13.603	13.612	13.619	13.611	13.621	13.979	---	16
17	13.691	13.616	13.931	13.952	13.586	13.615	13.609	13.619	13.610	13.630	14.045	---	17
18	13.647	13.745	13.886	13.927	13.594	13.614	13.605	13.594	13.628	13.639	14.059	14.293	18
19	13.620	14.011	13.892	13.966	13.602	13.617	13.605	13.630	13.606 A	13.626 A	13.980	14.287 A	19
20	13.628	13.917	13.951	13.980	13.602	13.603	13.605	13.578	13.623	13.645	13.935	---	20
21	13.630	13.827	13.993	13.924	13.639	13.612	13.611	13.623	13.617	13.582 A	13.944	---	21
22	13.583	13.772	13.972	13.886	13.605	13.603	13.612	13.629	13.644	13.603	13.960	---	22
23	13.668	13.761	13.918	13.890	13.596	13.602	13.613	13.622	13.610	13.604	13.923	---	23
24	13.643	13.673	13.860	13.874	13.597	13.607	13.611	13.665	13.623	13.609	13.916	13.984	24
25	13.569	13.685	13.947	13.875	13.600	13.623	13.616	12.463	13.623	13.592	13.980	14.094	25
26	13.556	13.759	13.950	13.908	13.603	13.633	13.602	---	13.628	13.610	13.979	---	26
27	---	13.782	13.950	13.852	13.606	13.608	13.607	---	13.689	13.633	13.971	---	27
28	---	13.824	13.901	13.915	13.598	13.608	13.596	---	13.794	13.610	13.983	14.035	28
29	---	13.779	13.914	13.955	13.591	13.606	13.612	---	13.782	13.752	13.970 A	14.040	29
30	13.614		13.898	13.963	13.606	13.604	13.603	---	13.749	13.872	13.925	14.048	30
31	13.633		13.936		13.596		13.609	---		13.898		14.054	31
TOTAL		397.263	430.827	418.543	425.762	408.341	421.918			426.638	418.139		TOTAL
MEAN		13.699	13.898	13.951	13.734	13.611	13.610			13.763	13.938		MEAN
MAX		14.011	13.993	14.067	13.970	13.659	13.620			13.948	14.059		MAX
MIN		13.574	13.711	13.852	13.586	13.590	13.596			13.582	13.813		MIN

SUMMARY FOR THE YEAR 2008
Maximum daily water level, 14.293 Metres On 2008-12-18
Minimum daily water level, not valid

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.
A - PARTIAL DAY

TABLE VII

APPENDIX 5

WATER QUALTIY DATA

Results from 2008 Monthly Grab Samples

Parameter	Units	Forest City, ME	St. Stephen, NB	Aquatic Life Guidelines[1]
ALKALINITY TOTAL CACO3	MG/L	<20 - <20	<20 - <20	
ALUMINUM Diss.	UG/L	6 - 17	56 - **162**	100
ALUMINUM Extr.	UG/L	6 - 20	74 - **197**	100
ANTIMONY Diss.	UG/L	<0.1 - <0.1	<0.1 - <0.1	
ANTIMONY Extr.	UG/L	<0.1 - <0.1	<0.1 - <0.1	
ARSENIC Diss.	UG/L	0.2 - 0.3	0.3 - 0.6	5
ARSENIC Extr.	UG/L	0.2 - 0.4	0.3 - 0.7	5
BARIUM Diss.	UG/L	2 - 2	4 - 13	
BARIUM Extr.	UG/L	2 - 3	5 - 15	
BERYLLIUM Diss.	UG/L	<1 - <1	<1 - <1	
BERYLLIUM Extr.	UG/L	<1 - <1	<1 - <1	
CADMIUM Diss.	UG/L	<1 - <3	<1 - <3	calculated
CADMIUM Extr.	UG/L	<1 - <3	<1 - <3	calculated
CALCIUM Diss.	MG/L	3.81 - 4.54	3.01 - 5.73	
CALCIUM Extr.	MG/L	3.68 - 4.95	2.91 - 6.14	
CARBON DISSOLVED ORGANIC	MG/L	3.9 - 4.5	7 - 12.8	
CARBON, TOTAL IN-ORG	MG/L	2.5 - 3	1.6 - 3.7	
CARBON, TOTAL ORGANIC	MG/L	3.5 - 5.9	6.7 - 11.3	
CHLORIDE	MG/L	1.43 - 1.76	2.84 - 7.84	150[2]
CHROMIUM Diss.	UG/L	<2 - <2	<2 - <2	8.9
CHROMIUM Extr.	UG/L	<2 - <2	<2 - <2	8.9
COBALT Diss.	UG/L	<3 - <5	<3 - <5	
COBALT Extr.	UG/L	<3 - <5	<3 - <5	
COLOUR	HAZENUNI	7 - 9	32 - 68	
COPPER Diss.	UG/L	<1 - <2	<1 - <2	2
COPPER Extr.	UG/L	<1 - <2	<1 - <2	2
GRAN ALKALINITY	MG/L	9.38 - 11.37	7.26 - 15.11	
IRON Diss.	MG/L	<0.01 - 0.01	0.06 - 0.19	0.3
IRON Extr.	MG/L	<0.01 - 0.02	0.08 - 0.3	0.3
LEAD Diss.	UG/L	<10 - <10	<10 - <10	1
LEAD Extr.	UG/L	<10 - <15	<10 - <10	1
MAGNESIUM Diss.	MG/L	0.57 - 0.66	0.54 - 0.97	
MAGNESIUM Extr.	MG/L	0.57 - 0.72	0.53 - 1.05	
MANGANESE Diss.	UG/L	<2 - 2	18 - 74	
MANGANESE Extr.	UG/L	1 - 7	19 - 84	
MOLYBDENUM Diss.	UG/L	<3 - <5	<3 - <5	73
MOLYBDENUM Extr.	UG/L	<3 - <5	<3 - <5	73
NICKEL Diss.	UG/L	<4 - <6	<4 - <6	calculated
NICKEL Extr.	UG/L	<4 - <6	<4 - <6	calculated
NITRATE-NITROGEN	MG/L	<0.02 - <0.02	<0.02 - 0.08	
NITROGEN TOTAL	MG/L	0.14 - 0.19	0.22 - 0.41	
NITROGEN TOTAL Diss.	MG/L	0.13 - 0.18	0.24 - 0.42	
PH	PH UNITS	7.33 - 7.47	7.09 - 7.49	6.5-9
PHOSPHOROUS	MG/L	0.004 - 0.008	0.012 - **0.035**	0.03[3]
POTASSIUM Diss.	MG/L	0.31 - 0.37	0.4 - 1.44	
POTASSIUM Extr.	MG/L	0.2 - 0.38	0.4 - 1.48	
SELENIUM DISSOLVED	UG/L	<0.1 - <0.1	<0.1 - 0.1	
SELENIUM EXTRACTABLE - ICP/MS	UG/L	<0.1 - <0.1	<0.1 - 0.1	

Results from 2008 Monthly Grab Samples				
Parameter	Units	Forest City, ME	St. Stephen, NB	Aquatic Life Guidelines[1]
SILVER Diss.	UG/L	<1 - <2	<1 - <2	0.05
SILVER Extr.	UG/L	<1 - <2	<1 - <2	0.05
SODIUM Diss.	MG/L	1.33 - 1.5	3.51 - 11.02	
SODIUM Extr.	MG/L	1.33 - 1.68	3.44 - 11.73	
SPECIFIC CONDUCTANCE	US/CM	31.2 - 36.5	37.9 - 88.4	
STRONTIUM Diss.	UG/L	19 - 23	14 - 26	
STRONTIUM Extr.	UG/L	20 - 25	14 - 28	
SULPHATE	MG/L	2.11 - 2.41	3.91 - 11.57	
THALLIUM Diss.	UG/L	<0.1 - <0.1	<0.1 - <0.1	
THALLIUM Extr.	UG/L	<0.1 - <0.1	<0.1 - <0.1	
TIN Diss.	UG/L	<0.1 - <0.1	<0.1 - <0.1	
Tin Extr.	UG/L	<0.1 - <0.2	<0.1 - <0.1	
TITANIUM Diss.	UG/L	<1 - <1	<1 - 1	
TITANIUM Extr.	UG/L	<1 - <1	<1 - 2	
TOTAL SUSPENDED SOLIDS	MG/L	<2 - 5.1	2.1 - 4.2	
TURBIDITY	NTU	0.2 - 0.5	0.8 - 2.4	
URANIUM Diss.	UG/L	<0.1 - <0.1	<0.1 - <0.1	
URANIUM Extr.	UG/L	<0.1 - <0.1	<0.1 - <0.1	
VANADIUM Diss.	UG/L	<2 - <4	<2 - <4	
VANADIUM Extr.	UG/L	<2 - <4	<2 - <4	
ZINC Diss.	UG/L	<1 - <2	<2 - **11**	7.5
ZINC Extr.	UG/L	<1 - <2	2 - **33**	7.5

1 - All values refer to the Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Aquatic Life unless otherwise indicated.

2 - BC MOE - British Columbia Ministry of Environment. 2001. British Columbia Approved Water Quality Guidelines (criteria) 1998 Editior Environmental Protection Division, British Columbia Ministry of Environment, Victoria, British Columbia. Updated August 24, 2001 (www.env.gov.bc.ca/wat/wq/BCguidelines/approv_wq_guide/approved.html).

3 - Dodds et al -Dodds, W.K., J.R. Jones, and E. Welch. 1998. "Suggested classification of stream trophic state: distributions of temperate stream types by chlorophyll, total nitrogen, and phosphorus." Water Research, 32: 1455-1462.

St. Croix River at Milltown, NB

Temperature (°C)

	January	February	March	April	May	June	July	August[1]	September	October	November	December
Max	1.0	1.2	2.9	11.6	17.9	22.6	26.8	24.9	22.5	16.9	8.6	2.3
Min	-0.1	-0.1	-0.1	1.2	9.2	15.3	21.1	19.9	15.2	7.5	0.0	-0.2
Mean	0.0	0.1	0.6	5.7	13.9	19.5	24.4	21.7	18.5	11.5	1.7	0.4
% of monthly data used	100	100	100	100	100	100	100	90	100	100	100	100

1 Data for August are partial month results because of station maintenance

Dissolved Oxygen (mg/L)

	January	February	March	April	May	June	July	August[1]	September	October	November	December
Max	14.2	14.4	14.7	14.1	11.2	9.5	8.6	8.9	9.9	11.6	14.0	14.9
Min	13.2	13.1	13.3	10.6	9.0	7.7	7.4	7.8	8.6	9.4	10.9	13.3
Mean	13.7	13.8	14.0	12.5	10.0	8.4	7.9	8.5	9.2	10.5	13.4	14.2
% of monthly data used	100	100	100	100	100	100	100	90	100	100	100	100

1 Data for August are partial month results because of station maintenance

pH (std units)

	January	February	March	April	May	June	July	August[1]	September	October	November	December[2]
Max	6.8	6.9	6.7	7.2	7.2	7.5	7.6	7.2	7.4	7.3	7.1	7.1
Min	6.3	6.2	6.2	6.5	6.7	6.9	7.0	6.7	6.8	6.7	6.8	6.8
Mean	6.6	6.5	6.4	6.8	7.0	7.3	7.2	6.9	7.1	7.0	6.9	6.9
% of monthly data used	100	100	100	100	100	100	100	90	100	100	100	71

1 Data for August are partial month results because of station maintenance

2 pH sensor malfunction - data unuseable after December 25

Specific Conductance (uS/cm)

	January	February	March	April	May	June	July	August[1]	September	October	November	December
Max	86.1	104.0	56.1	42.6	73.1	88.5	114.4	87.6	74.8	76.4	62.0	40.9
Min	33.4	33.6	27.2	29.4	20.6	41.3	65.1	47.2	42.2	39.4	34.3	25.2
Mean	62.8	61.5	40.3	34.5	46.6	62.4	90.3	58.5	58.2	55.4	40.0	31.3
% of monthly data used	100	100	100	100	100	100	100	90	100	100	100	100

1 Data for August are partial month results because of station maintenance

Turbidity (NTU)

	January	February	March	April	May	June	July	August[1]	September	October	November	December[2]
Max	27	586	32	73	148	658	7	11	736	155	1221	2950
Min	0	0	0	0	1	0	0	0	0	0	0	0
Mean	2	6	2	2	5	54	1	1	11	12	15	27
% of monthly data used	50	87	40	100	50	65	77	90	100	65	100	43

1 Data for August are partial month results because of station maintenance

2 Turbidity sensor malfunction - data unuseable after December 14

St. Croix River at Milltown, NB

St. Croix River at Forest City, ME

Temperature (°C)

	January	February	March	April[1]	May	June	July	August	September	October	November	December
Max	1.1	1.4	1.6	5.9	14.3	21.5	25.6	23.3	21.0	16.6	9.2	2.6
Min	0.8	0.9	1.2	1.2	4.0	12.3	18.2	19.2	15.4	7.6	0.0	-0.1
Mean	1.0	1.1	1.4	2.0	10.0	17.3	23.3	21.3	18.2	11.4	5.9	0.7
% of monthly data used	85	80	90	22	100	100	98	100	100	100	90	80

1 Probe was out of the water for part of the month - no data.

Dissolved Oxygen (mg/L)

	January	February	March	April[1]	May	June	July	August	September	October	November	December
Max	14.1	14.0	13.5	13.8	12.5	10.7	9.4	8.7	9.4	11.1	13.4	13.8
Min	13.1	13.4	13.2	12.3	10.2	8.9	7.7	7.6	8.3	9.0	10.7	12.6
Mean	13.7	13.7	13.4	13.5	11.4	9.6	8.3	8.3	8.8	10.2	11.7	13.2
% of monthly data used	85	90	100	22	100	100	100	100	100	100	90	80

1 Probe was out of the water for part of the month - no data.

pH (std units)

	January	February	March	April[1]	May	June	July	August	September	October	November	December
Max	7.2	7.3	7.3	7.5	7.3	7.4	7.5	7.6	7.5	7.4	7.5	7.6
Min	6.9	7.0	7.1	6.7	7.0	7.0	7.0	6.9	7.2	7.2	7.2	7.1
Mean	7.1	7.2	7.2	7.1	7.2	7.2	7.3	7.3	7.4	7.3	7.3	7.3
% of monthly data used	85	80	90	50	100	100	100	100	100	100	90	80

1 Probe was out of the water for part of the month - no data.

Specific Conductance (uS/cm)

	January	February	March	April[1]	May	June	July	August	September	October	November	December
Max	33.6	34.0	33.6	34.0	31.8	33.0	36.3	36.0	36.0	35.0	33.3	33.5
Min	31.6	33.0	32.0	27.9	28.1	31.0	32.2	33.0	32.0	31.2	30.6	28.7
Mean	32.7	33.1	32.7	32.9	30.7	31.9	33.9	33.4	33.6	32.8	31.5	30.8
% of monthly data used	100	100	100	40	100	100	100	100	100	100	90	80

1 Data for August are partial month results because of station maintenance

Turbidity (NTU)

	January	February	March	April[1]	May	June	July	August[2]	September[2]	October	November	December
Max	24	10	24	17	15	13	10	-	8	12	16	11
Min	0	0	1	0	1	0	0	-	0	0	0	0
Mean	0	2	3	3	3	4	2	-	0	0	0	0
% of monthly data used	100	100	100	40	100	100	100	-	5	100	90	80

1 Data for August are partial month results because of station maintenance

2 Sensor malfunction in August and September- no data

St. Croix River at Forest City, ME