Report to

THE INTERNATIONAL JOINT COMMISSION

On

THE DIVISION OF THE WATERS OF

THE ST. MARY AND MILK RIVERS

2006

Cover Photo:

Frenchman River below Eastend Reservoir at Eastend, Saskatchewan, June, 1994.
Photo courtesy of Water Survey Division, Regina, Saskatchewan.

REPORT TO

THE INTERNATIONAL JOINT COMMISSION

ON

THE DIVISION OF THE WATERS OF

THE ST. MARY AND MILK RIVERS

FOR THE YEAR 2006

Submitted By

Timothy Goos

Representing Canada

And

William J. Carswell, Jr.

Representing the United States

March 2007

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

Commissioners:

In compliance with the provisions of Article VI of the Boundary Waters Treaty of 1909 and Clause VIII(c) of your order of October 4, 1921, directing the division of the waters of the St. Mary and Milk Rivers between the United States and Canada, we are transmitting herewith a report on the operations during the irrigation season ended October 31, 2006.

Respectfully submitted,

Timothy Goos
Accredited Officer of Her Majesty

William J. Carswell, Jr., for the
Accredited Officer of the United States

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SYNOPSIS

During the 2006 irrigation season, the natural flow of the St. Mary River was 92 percent of the long-term average.

The natural flow of the St. Mary River at the International Boundary during the irrigation season, April 1 to October 31, 2006, was 657 000 cubic decametres (dam^3) (533,000 acre-feet). Under the terms of the Boundary Waters Treaty, the Canadian allotment was 394 000 dam^3 (319,000 acre-feet). The total flow recorded at the International Boundary during the irrigation season was 110 percent of the Canadian allotment.

The natural flow of the Milk River during the 2006 irrigation season was 62 percent of the long-term average.

The natural flow of the Milk River at the Eastern Crossing of the International Boundary from March 1 to October 31, 2006, was 83 700 dam^3 (67,900 acre-feet). Under terms of the Treaty, the United States' allotment was 58 500 dam^3 (47,400 acre-feet). The United States received 105 percent of its allotment at Eastern Crossing, in addition to its share of St. Mary River water diverted into the Milk River through the St. Mary Canal.

The March to October natural flows of the three apportioned tributaries of the Milk River were 37 percent of the long-term average for Lodge Creek at the International Boundary, 39 percent for Battle Creek at the International Boundary, and 51 percent for Frenchman River at the International Boundary.

The annual meeting of the Field Representatives was held at Canmore, Alberta, on February 22, 2007. Mutual problems, future plans, and changes in computational procedures were discussed and a schedule of field operations for 2007 was adopted.

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TABLE OF CONTENTS

LIST OF TABLES

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TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES

ANNEX

MAP

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INTRODUCTION

The apportionment of the waters of the St. Mary and Milk Rivers is governed by Article VI of the Boundary Waters Treaty of 1909 between Great Britain and the United States. The terms of the Treaty were further clarified by the 1921 Order of the International Joint Commission. A copy of the 1921 Order, including Article VI, is contained in Annex A of this report.

To comply with this Treaty, staff of the United States Geological Survey and Environment Canada, Water Survey Division collected, compiled, verified, and tabulated hydrometric data at 36 international gauging stations on a cooperative basis, under the direction of the Field Representatives of the United States and Canada. An additional 30 gauging stations were operated independently by the United States and Canada to obtain data on diversions, reservoir contents, return flows and index runoff. Most of this additional information was used to improve the accuracy of natural-flow computations.

This report summarizes the year 2006 natural-flow computations, apportionment of the natural flow, unusual occurrences during the year, and procedural modifications designed to increase the accuracy of the natural-flow computations. Summary natural-flow tables are included. Detailed natural-flow computations are included in Appendix A. Daily discharge and other related data are included in Appendix B. Appendices A and B are submitted with this report under separate cover.

In accordance with the International System of Units (SI) conversion schedule adopted by the International Joint Commission, this report uses SI units first, followed by inch-pound units in parentheses. Data in tables are shown in SI units first, followed by the respective inch-pound units (for example, Tables 1 and 1A). The format for Appendices A and B of the report is SI units only. All Canadian data are collected, computed and published in SI units. The United States' data, which are collected and computed in inch-pound units, were converted to SI units using the appropriate conversions. A summary of the conversion factors is contained in Annex C.

Mr. Timothy Goos, as the Accredited Officer of Her Majesty, was represented in the field by Mr. R.G. Boals, Environment Canada, Water Survey Division, Regina, Saskatchewan. Mr. Robert M. Hirsch, United States Geological Survey, as the Accredited Officer of the United States, was represented in the field by Mr. R.E. Davis, United States Geological Survey, Helena, Montana. In February 2002, Mr. Hirsch designated Mr. William J. Carswell, Jr., United States Geological Survey, as his alternate as Accredited Officer of the United States. This report was prepared

jointly by personnel of Environment Canada, Water Survey Division, and the United States Geological Survey, under the supervision of Messrs. Boals and Davis.

The annual meeting of the Field Representatives was held in Canmore, Alberta, on February 22, 2007. Mutual concerns, future plans, and changes in computational procedures were discussed and a schedule of field operations for 2007 was adopted.

ST. MARY RIVER

During the irrigation season, April 1 to October 31, Canada's share of the natural flow of the St. Mary River at the International Boundary, as stipulated by the 1921 Order, is three-fourths of the natural flow when that flow is 666 cubic feet per second (18.86 cubic metres per second) or less. Flow in excess of that quantity is divided equally between Canada and the United States. During the non-irrigation season, November 1 to March 31, the flow is divided equally between the two countries.

To comply with the above Order, representatives of both countries make twice-monthly computations of the daily natural flow of the St. Mary River during the irrigation season. If use by the United States is in excess of its share, then a delivery of an equivalent quantity of water is normally made to Canada at the earliest opportunity. Regular interim reports of these computations are sent to all agencies involved in the water use and management of the flow of the St. Mary River. The interim reports keep these agencies informed as to the quantity of water that is available and the status of apportionment.

Tentative computations and interim reports are not made during the non-irrigation season when use by the United States is limited to storage in Lake Sherburne. The flow into Lake Sherburne is considerably less than 50 percent of the natural flow. Occasionally, water is diverted into the St. Mary Canal during the non-irrigation season, necessitating additional computations.

Lake Sherburne, the only storage reservoir within the St. Mary River basin in the United States, is used to store part of the United States' share of flow for later diversion to the Milk River. This water, which passes through Canada, is used by the United States for irrigation in the eastern portion of the Milk River basin.

Storage in Lake Sherburne (station 05AE036) was 37 900 dam^3 (30,700 acre-feet) on October 31, 2005. Storage increased to 60 300 dam^3 (48,900 acre-feet) on March 2, 2006, when the 2006 irrigation-season releases began. Maximum storage was 84 200 dam^3 (68,300 acre-feet) on June 30, 2006 and storage decreased to 14 900 dam^3 (12,100 acre-feet) by the end of the irrigation season on October 31, 2006. Minimum storage during the reporting period was 10 200 dam^3 (8,270 acre-feet) and occurred on September 23, 2006.

Water was diverted from the St. Mary River into the Milk River via the St. Mary Canal beginning on March 7, 2006 and continued through September 25, 2006. The total flow recorded at the gauging station on the St. Mary Canal at St. Mary Crossing (station 05AE029) was 269 000 dam^3 (218,000 acre-feet). Any seepage from the canal between the point of diversion and the crossing of the St. Mary River is assumed to return to the river and eventually become available to Canada.

The computed natural flow of the St. Mary River at the International Boundary from November 1, 2005 to October 31, 2006 was 764 000 dam^3 (619,000 acre-feet) of which 657 000 dam^3 (533,000 acre-feet) occurred during the irrigation season, April 1 to October 31, 2006. For the irrigation season, Canada's share was 394 000 dam^3 (319,000 acre-feet) and the United States' share was 263 000 dam^3 (213,000 acre-feet). During the irrigation season, a total discharge of 434 000 dam^3 (352,000 acre-feet) was recorded at the International Boundary, which was 110 percent of the Canadian share. The computed natural flow during the irrigation season was 92 percent of the average of the previous 103 years of record.

Deficit deliveries were recorded in 5 of the 16 division periods during the 2006 irrigation season. In accordance with the 2001 Letter of Intent respecting the St. Mary and Milk Rivers streamflow transfers (a copy is available in Annex B of this report), the United States is allowed to accumulate deficits on the St. Mary River of up to 4,000 cfs-days (9 800 dam^3) (7,940 acre-feet) between March 1 and May 31 of each year. At the discretion of the United States, the deficits may be reduced to no less than 2,000 cfs-days (4 900 dam^3) (3,970 acre-feet) between June 1 and July 15 of each year with surplus deliveries of St. Mary River water. The remaining deficits incurred by the United States on the St. Mary River may be offset by deficits incurred by Canada on the Milk River from June 1 through September 15. Any outstanding deficits remaining on September 15 are to be equalized by October 31 of each year.

For the year 2006, the United States accumulated a deficit on the St. Mary River of 9 800 dam^3 (7,940 acre-feet) as of May 31 which was later reduced to 4 900 dam^3 (3,970 acre-feet) by July 15. No other outstanding deficits remained on the St. Mary River as of September 15. During the period September 16-30, the 4 900 dam^3 (3,970 acre-feet) deficit was offset by surplus deliveries on the St. Mary River and deficits accumulated by Canada on the Milk River.

The division of St. Mary River natural flow is summarized in Tables 1 and 1A and Figure 1, which follow. The detailed computation of the natural flow is given in Table 6 and the historical summary is given in Table 7 of Appendix A.

Table 1: Summary of St. Mary River Division for 2006*
Quantities in Cubic Decametres

DIVISION PERIOD AT INTERNATIONAL BOUNDARY	NATURAL FLOW	CANADA'S SHARE	RECEIVED BY CANADA	RECEIVED BY CANADA	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 15	4,887	2,443	6,960	4,517	
MAR 16 - MAR 31	8,643	4,322	6,119	1,797	
APR 1 - APR 15	20,907	15,549	12,350		3,199
APR 16 - APR 30	30,072	21,146	14,587		6,559
MAY 1 - MAY 15	47,847	30,032	29,431		601
MAY 16 - MAY 31	132,912	72,972	79,215	6,243	
JUNE 1 - JUNE 15	136,816	74,515	85,115	10,600	
JUNE 16 – JUNE 30	126,449	69,333	93,680	24,347	
JULY 1 - JULY 15	61,422	36,819	39,580	2,761	
JULY 16 – JULY 31	33,385	23,170	22,889		281
AUG 1 - AUG 15	16,980	12,735	13,660	925	
AUG 16 - AUG 31	12,666	9,502	8,575		927
SEP 1 - SEP 15	7,566	5,673	7,118	1,445	
SEP 16 - SEP 30	11,312	8,487	11,932	3,445	
OCT 1 - OCT 15	10,364	7,773	8,458	685	
OCT 16 - OCT 31	8,626	6,470	7,049	579	
TOTAL	670,854	400,941	446,718		

* This is a summary of data from Table 6, Appendix A.

Note:
Canadian share of St. Mary R. waters deficit outstanding
as of May 31, 2006: 9 800 dam^3 (7,940 acre-feet) (4,000 cfs-days)
as of July 15, 2006: 4 900 dam^3 (3,970 acre-feet) (2,000 cfs-days)
as of September 15, 2006: 0 dam^3 (0 acre-feet) (0 cfs-days)

U.S.A. share of Milk River waters outstanding as of September 15, 2006: 1 910 dam^3 (1,548 acre-feet) (781 cfs-days)

Allowable deficit carryovers, as per 2001 Letter of Intent respecting St. Mary-Milk Rivers streamflow transfers, are:
as of May 31, 2006: 9 800 dam^3 (7,940 acre-feet) (4,000 cfs-days)
as of July 15, 2006: 4 900 dam^3 (3,970 acre-feet) (2,000 cfs-days).

Any deficits outstanding as of September 15 are to be equalized by October 31 of each year.

Table 1A Summary of St. Mary River Division for 2006*
Quantities in Acre-Feet

DIVISION PERIOD AT INTERNATIONAL BOUNDARY	NATURAL FLOW	CANADA'S SHARE	RECEIVED BY CANADA	RECEIVED BY CANADA	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 15	3,962	1,981	5,642	3,662	
MAR 16 - MAR 31	7,007	3,504	4,961	1,457	
APR 1 - APR 15	16,949	12,606	10,012		2,593
APR 16 - APR 30	24,379	17,143	11,826		5,317
MAY 1 - MAY 15	38,790	24,347	23,860		487
MAY 16 - MAY 31	107,752	59,158	64,220	5,061	
JUNE 1 - JUNE 15	110,917	60,409	69,003	8,593	
JUNE 16 – JUNE 30	102,512	56,208	75,946	19,738	
JULY 1 - JULY 15	49,795	29,849	32,088	22,238	
JULY 16 – JULY 31	27,065	18,784	18,556		228
AUG 1 - AUG 15	13,766	10,324	11,074	750	
AUG 16 - AUG 31	10,268	7,703	6,952		752
SEP 1 - SEP 15	6,134	4,599	5,771	1,171	
SEP 16 - SEP 30	9,171	6,880	9,673	2,793	
OCT 1 - OCT 15	8,402	6,302	6,857	555	
OCT 16 - OCT 31	6,993	5,245	5,715	469	
TOTAL	543,862	325,043	362,155		

* All values are conversions of data from Table 1. Totals and shares may not add or subtract exactly as a result of rounding.

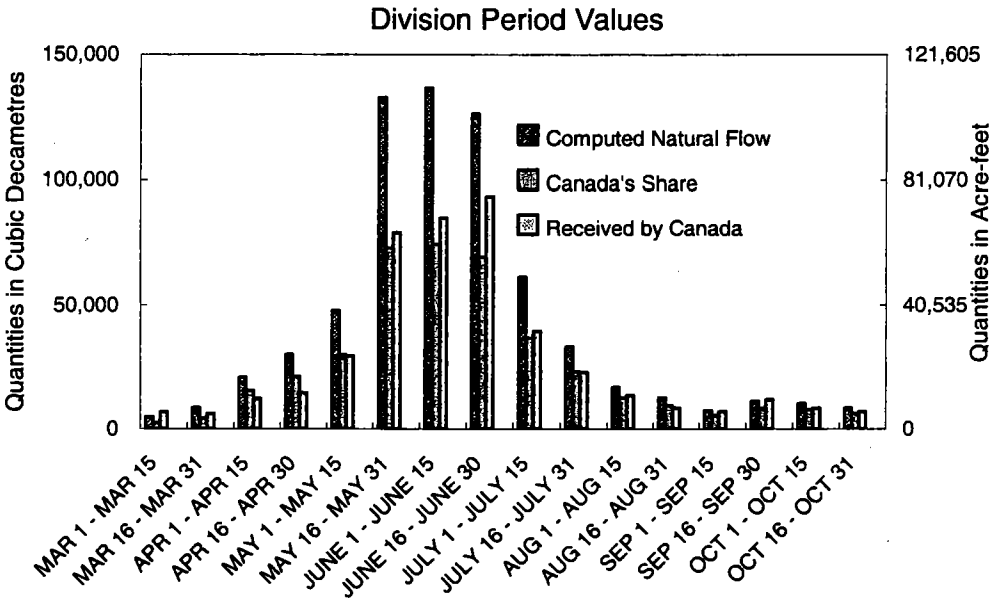
Note: Canadian share of St. Mary R. waters deficit outstanding
as of May 31, 2006: 7,940 acre-feet (9 800 dam^3) (4,000 cfs-days)
as of July 15, 2006: 3,970 acre-feet (4 900 dam^3) (2,000 cfs-days)
as of September 15, 2006: 0 acre-feet (0 dam^3) (0 cfs-days)

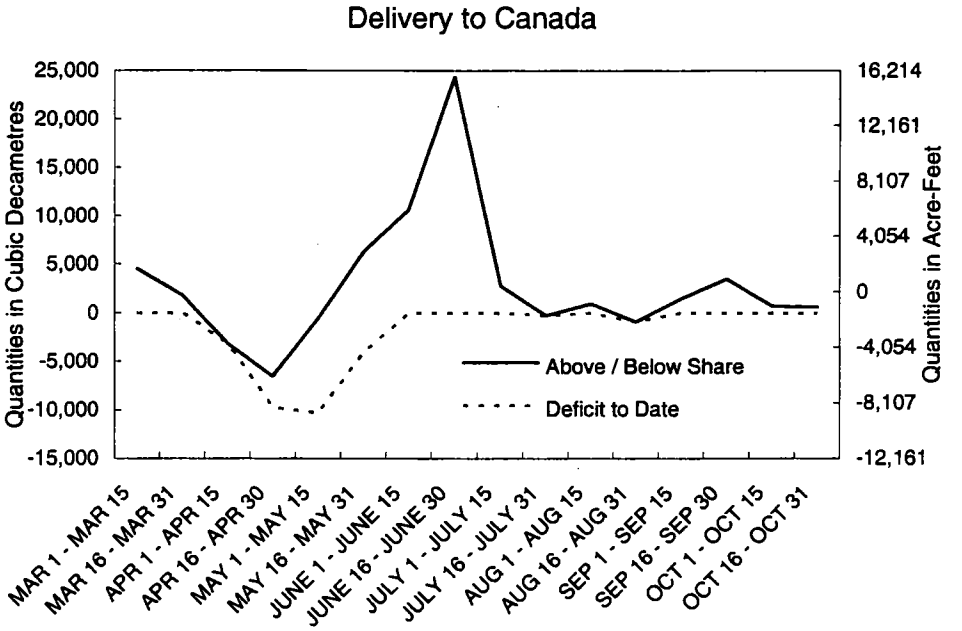
U.S.A. share of Milk River waters outstanding as of September 15, 2006:
1,548 acre-feet (1 910 dam^3) (781 cfs-days)

Allowable deficit carryovers, as per 2001 Letter of Intent respecting St. Mary-Milk Rivers streamflow transfers, are:
as of May 31, 2006: 8,770 acre-feet (9,800 dam^3) (4,000 cfs-days)
as of July 15, 2006: 3,970 acre-feet (4,900 dam^3) (2,000 cfs-days).

Any deficits outstanding as of September 15 are to be equalized by October 31 of each year.

Figure 1. St. Mary River Division, 2006





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MILK RIVER

During the irrigation season, April 1 to October 31, the United States' share of the natural flow of the Milk River at the Eastern Crossing of the International Boundary, as stipulated by the 1921 Order, is three-fourths of the natural flow when that flow is 666 cubic feet per second (18.86 cubic metres per second) or less. Flows in excess of that quantity are divided equally between the United States and Canada. During the non-irrigation season, November 1 to March 31, the entire flow is divided equally between the two countries.

Prior to the mid 1970's, uses of the natural flow of the Milk River by Canada and the United States upstream from Eastern Crossing were assumed to be less than their respective shares and no formal apportionment was made. By 1977, it became apparent that the increasing numbers of irrigation systems were capable of using all of the natural flow for long periods of time. Consequently, a more comprehensive natural-flow computation and water-division procedure was developed and has been used since 1985. The revised computation procedure includes an approximate accounting of irrigation consumptive uses in both countries, and the inter-basin transfer of water in Canada. An additional refinement was made in 1988 when F.I. Morton's evapo-transpiration model replaced the adjusted pan evaporation method in the natural flow computations.

Data required for Morton's model is resource intensive. The equipment used to collect the data is highly specialized, less than robust, and located in a remote area. Data collected at the evapo-transpiration monitoring site near Milk River, Alberta needed frequent supplementation from the Onefour, Alberta pan evaporation site due to equipment malfunction. This coupled with the fact that the analysis program required extensive re-writing to port it from the obsolete DEC-VMS computer operating system suggested that an alternative needed to be investigated.

Data from the results of Morton's model were found to have a strong linear correlation with the Onefour, Alberta Class A evaporation pan results. Therefore, again for the year 2006, evapo-transpiration was estimated using the Onefour pan evaporation data as an index of Morton's model results.

During 2006, the United States' estimated consumptive use was 5 050 dam^3 (4,090 acre-feet) and Canada's estimated consumptive use was 5 160 dam^3 (4,180 acre-feet). No inter-basin transfers from Verdigris Coulee near the Mouth (station 11AA038) were credited to the Canadian consumptive use.

The computed natural flow of the Milk River at the Eastern Crossing of the International Boundary from March 1 to October 31, 2006 was 83 700 dam^3 (67,900 acre-feet). This flow was 62 percent of the average computed natural flow of the previous 94 years of record. It is important to note, however, that natural-flow computations prior to 1985 did not account for consumptive use. Consequently, natural-flow values after 1985 are not directly comparable with natural-flow values of previous years. For the period March 1 to October 31, 2006, the United States' share was 58 500 dam^3 (47,400 acre-feet) and Canada's share was 25 300 dam^3 (20,500 acre-feet). The United States received 105 percent of its allotment at Eastern Crossing, in addition to its share of St. Mary River water diverted into the Milk River through the St. Mary Canal.

Deficit deliveries were recorded in 4 of the 16 division periods during the irrigation season. At present, Canada does not have facilities to store and release water into the Milk River Basin. Deficits are made up by transfer of Canada's share of St. Mary River water if excess capacity exists both in the stream and in the American St. Mary Canal, or as allowed by the 2001 Letter of Intent respecting the St. Mary and Milk Rivers streamflow transfers (a copy of which is available in Annex B of this report) whereby Canada is allowed to accumulate a deficit on the Milk River of up to 2,000 cfs-days (4 900 dam^3) (3,970 acre-feet) between June 1 and September 15 of each year. The incurred deficits on the St. Mary and Milk Rivers may be offset and the outstanding deficits as of September 15 are to be equalized by October 31 of each year.

For the year 2006, Canada accumulated deficit on the Milk River of 1 910 dam^3 (1,550 acre-feet) as of September 15. This deficit partially offset the 4 900 dam^3 (3,970 acre-feet) deficit accumulated by the United States on the St. Mary River.

The division of Milk River natural flow is summarized in Table 2 and 2A and Figure 2, which follow. The detailed computation of the natural flow is given in Table 8 and the historical summary is given in Table 9 of Appendix A.

Table 2: Summary of Milk River Division for 2006* Quantities in Cubic Decametres

DIVISION PERIOD AT INTERNATIONAL BOUNDARY	NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 15	1,425	712	1,424	712	
MAR 16 - MAR 31	14,463	7231	14,462	7,231	
APR 1 - APR 15	18,351	13,581	18,351	4,770	
APR 16 - APR 30	9,515	7136	9,515	2,379	
MAY 1 - MAY 15	4,018	3,014	4,018	1,004	
MAY 16 - MAY 31	5,150	3,863	4,170	307	
JUNE 1 - JUNE 15	9,080	6,797	8,122	1,325	
JUNE 16 – JUNE 30	10,492	7,709	10,129	2,420	
JULY 1 - JULY 15	3,772	2,829	3,111	282	
JULY 16 – JULY 31	188	141	0		658
AUG 1 - AUG 15	89	67	0		522
AUG 16 - AUG 31	781	586	201		385
SEP 1 - SEP 15	71	53	0		345
SEP 16 - SEP 30	898	673	897	224	
OCT 1 - OCT 15	2,893	2,170	2,893	723	
OCT 16 - OCT 31	2,561	1,921	2,561	640	
TOTAL	83,747	58,483	79,854		

* This is a summary of data from Table 8, Appendix A.

Note:
U.S.A. share of Milk River waters deficit outstanding
as of September 15, 2006: 1 910 dam^3 (1,548 acre-feet) (781 cfs-days)

Canadian share of St. Mary R. waters deficit outstanding
as of May 31, 2006: 10 381 dam^3 (5,234 acre-feet) (4,243 cfs-days)

Allowable deficit carryover from June 1 and September 15 as per 2001 Letter of Intent respecting St. Mary - Milk River streamflow transfers can not be less than the outstanding deficit to Canada on St. Mary River Division as of May 31st, nor exceeding 4,900 dam^3 (2,000 cfs-days) (3,970 acre-feet), whichever is less.

Table 2A: Summary of Milk River Division for 2006*
Quantities in Acre-Feet

DIVISION PERIOD AT INTERNATIONAL BOUNDARY	NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 15	1,155	577	1,154	577	
MAR 16 - MAR 31	11,725	5,862	11,724	5,862	
APR 1 - APR 15	14,877	11,010	14,877	3,867	
APR 16 - APR 30	7,714	5,785	7,714	1,929	
MAY 1 - MAY 15	3,257	2,443	3,257	814	
MAY 16 - MAY 31	4,175	3,132	3,381	249	
JUNE 1 - JUNE 15	7,361	5,510	6,585	1,074	
JUNE 16 - JUNE 30	8,506	6,250	8,212	1,962	
JULY 1 - JULY 15	3,058	2,293	2,522	229	
JULY 16 - JULY 31	152	114	0		533
AUG 1 - AUG 15	72	54	0		423
AUG 16 - AUG 31	633	475	163		312
SEP 1 - SEP 15	58	43	0		280
SEP 16 - SEP 30	728	546	727	182	
OCT 1 - OCT 15	2,345	1,759	2,345	586	
OCT 16 - OCT 31	2,076	1,557	2,076	519	
TOTAL	67,894	47,412	64,738		

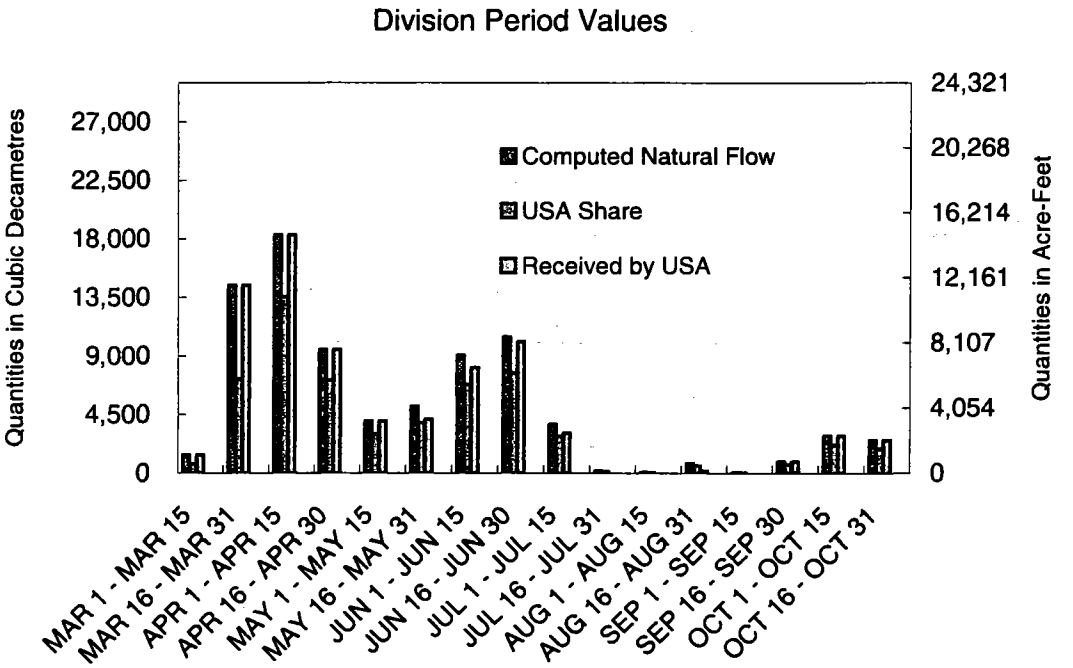
* All values are conversions of data from Table 2. Totals and shares may not add or subtract exactly as a result of rounding.

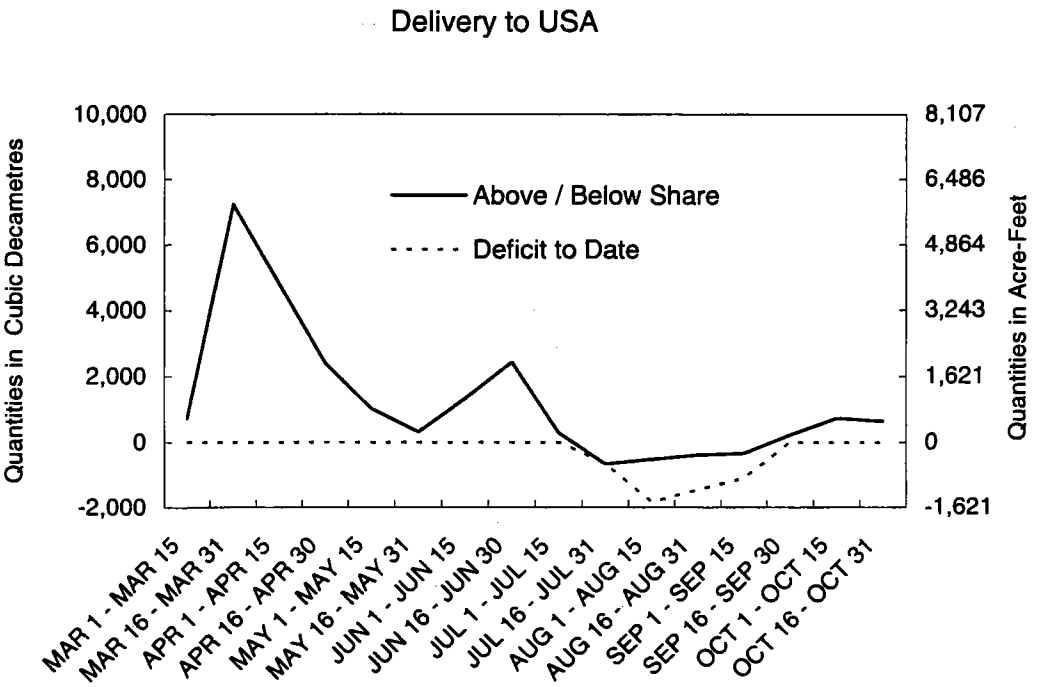
Note:
U.S.A. share of Milk River waters deficit outstanding
as of September 15, 2006: 1,548 acre-feet (1 910 dam^3) (4,243 cfs-days)

Canadian share of St. Mary R. waters deficit outstanding
as of May 31, 2006: 5,234 acre-feet (10 381 dam^3) (4,243 cfs-days)

Allowable deficit carryover from June 1 and September 15 as per 2001 Letter of Intent respecting St. Mary - Milk River streamflow transfers can not be less than the outstanding deficit to Canada on St. Mary River Division as of May 31st, nor exceeding 4,900 dam^3 (2,000 cfs-days) (3,970 acre-feet), whichever is less.

Figure 2. Milk River Division, 2006





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SOUTHERN TRIBUTARIES OF THE MILK RIVER

Responding to concerns expressed by Canadian water users, the International Joint Commission at its executive session on December 8, 1986, agreed in principle that the issue of utilization of the southern tributaries should be addressed in an informal, pragmatic manner. The Commission instructed the Accredited Officers to proceed with discussion to resolve Canadian concerns. To assist them in implementing the Commission's instructions, the Accredited Officers established a four-member ad hoc task force composed of officials from the State of Montana and the Province of Alberta water-management agencies and the United States and Canadian field representatives for the St. Mary and Milk Rivers.

The task force met with United States and Canadian water users, conducted public meetings, toured water-use projects, compiled information on water availability and use, investigated ground-water supplies, and considered various options for resolving issues. The task force determined that United States water users were reluctant to participate in options that might limit their use of water and jeopardize their water claims in future adjudication of water rights. They also determined that basic Canadian water-user needs for domestic and stock-water use were being satisfied with wells and dugouts. Solutions to water-utilization problems were limited because the cost of storage facilities, pumpage from the Milk River, and formal apportionment of southern tributary waters would not be cost effective.

In September 1991, the Montana Department of Natural Resources and Conservation, in response to requests from the task force and others, issued an Order to close the southern tributaries to issuance of additional water permits.

The final report was forwarded to the International Joint Commission in May 1994. At its executive session on September 21, 1994, the Commission agreed that the task force should be terminated as recommended. The Commission also agreed not to act at that time on the three recommendations related to the adjudication process, but requested that the Accredited Officers continue to monitor the situation and report annually, or more frequently if appropriate, on such matters as complaints by Canadian ranchers and changes in the status of basin adjudication.

No Canadian complaints or changes in the Montana adjudication process were noted in 2006.

Flows for March through October 2006 for the southern tributaries were as follows:

- Bear Creek near International Boundary – 584 dam^3 (473 acre-feet).
- Miners Coulee near International Boundary – 262 dam^3 (212 acre-feet).

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EASTERN TRIBUTARIES OF THE MILK RIVER

The waters of the eastern tributaries of the Milk River are divided in accordance with the 1921 Order of the International Joint Commission, which stipulates under Rule III that "The natural flow of the eastern (otherwise known as the Saskatchewan or northern) tributaries of the Milk River at the points where they cross the International Boundary shall be divided equally between the two countries." This order might well be interpreted as requiring that the division of water be made on a continuing basis; however, the physical limitation due to transit time in the flow system was recognized. Further analysis showed that the minimum practical time frame for compilation of the natural flows at the International Boundary was every ten days. In 1994 the time frame was increased to twice monthly to reduce lag-time anomalies, reduce costs, and conform to St. Mary and Milk Rivers computation periods.

Prior to 1937, Canadian use along the eastern tributaries consisted of domestic projects, and the Canadian share of the natural flow was not fully used. In the late 1930's, the Government of Canada constructed three dams on the Frenchman River creating Eastend Reservoir (station 11AC055), Huff Lake (station 11AC063), and Newton Lake (station 11AC056) which necessitated an operational division of flow on this tributary by 1937. In 1938, dams were constructed at both ends of Cypress Lake (station 11AC037) near the Battle Creek-Frenchman River divide to allow inter-basin storage and transfers of water. In the early 1950's, the redevelopment of several private irrigation projects and the construction of the Vidora Irrigation Project resulted in increased use of Battle Creek water in Canada and made an operational division of the flow on this tributary necessary by 1957. In 1960, construction of Altawan Reservoir (station 11AB089) and Spangler Irrigation Project (station 11AB060) on Lodge Creek made an operational division of flow on this tributary necessary by 1961.

During the period March 1 to October 31, twice-monthly computations of the natural flow of Lodge Creek, Battle Creek, and the Frenchman River are made to determine each country's share. If use by Canada is in excess of its share, then a delivery of an equivalent quantity of water is made to the United States at the earliest opportunity. When mutually agreed to, the United States or Canada may request that deficit deliveries be delayed to allow for more efficient use of the water.

Regular interim reports on the progress of the division of the natural flows of Lodge Creek, Battle Creek, and Frenchman River at the International Boundary are distributed to interested agencies during the irrigation season. Additional computations may be made to account for

significant usages before October 31. Generally, no division of flow is made during winter as flow and use are low and streamflow records are impractical to obtain.

Lyons Creek (station 11AB075) is monitored by Canada, but does not have sufficient use in Canada at this time to warrant an operational division of flow. Total flows from March to October of 416 dam^3 (337 acre-feet) were recorded on Lyons Creek for the year 2006.

A modification in the procedures for the computation of the natural flows on Battle Creek and Frenchman River were implemented in 2006. This modification applied minor diversions to the channel reach area in which those diversions occurred as opposed to previous method of applying minor diversions at the border. This procedural modification better reflects actual conditions and decreases the likelihood of computed negative natural flows.

Volumes for unmeasured diversions to private irrigation projects in the Lodge Creek, Battle Creek, and Frenchman River basins in Saskatchewan were based on year-end reports provided by the Saskatchewan Watershed Authority, and by Alberta Environment for the Lodge Creek and Battle Creek basins located in Alberta. Lists of reported diversions are contained in Appendix B.

The snow pack and subsequent snowmelt runoff of the winter of 2005 – 2006 was in the normal to below-normal range. Snowmelt runoff completely filled Altawan Reservoir in the Lodge Creek basin and resulted in some spillway overflow. A contributing factor to this runoff event was the limited storage capacity on two upper Lodge Creek reservoirs, Michel and Cressday, which were undergoing dam rehabilitation. Some flow was temporary stored in both reservoirs but was subsequently released to allow construction to continue. The dam-rehabilitation work at both reservoirs was not completed at the end of 2006. Both reservoirs remain largely depleted with Cressday Reservoir being completely dry at the end of the 2006 season.

At the end of the spring freshet the diversions stored in Cypress Lake allowed only enough water to support half an irrigation this year. Water was removed from Cypress Lake by utilizing two diesel pumps as the lake was too low for a gravity-fed irrigation. The three other irrigation reservoirs located in the Frenchman River basin filled in the spring period and two full irrigations were completed this season (May 12 to June 5 and July 28 to Aug 6). The Spangler irrigation project in the Lodge Creek basin also experienced two full irrigations (April 30 to May 24 and July 24 to August 8).

Summer rains did not materialize in 2006 and the basins remained dry until late in the fall, when rain events did provide some relief. Conditions were so dry that Battle Creek at International Boundary experienced 54 days of no flow in the summer of 2006. Reservoir levels throughout the region in the fall of 2006 were generally lower than levels recorded at the end of the 2005 season.

Figure 3. Reservoirs in Lodge Creek, Battle Creek, and Frenchman River Basins
Month-End Contents: 2005, 2006, and 1996-2005 Mean

Figure 3a. Altawan Reservoir

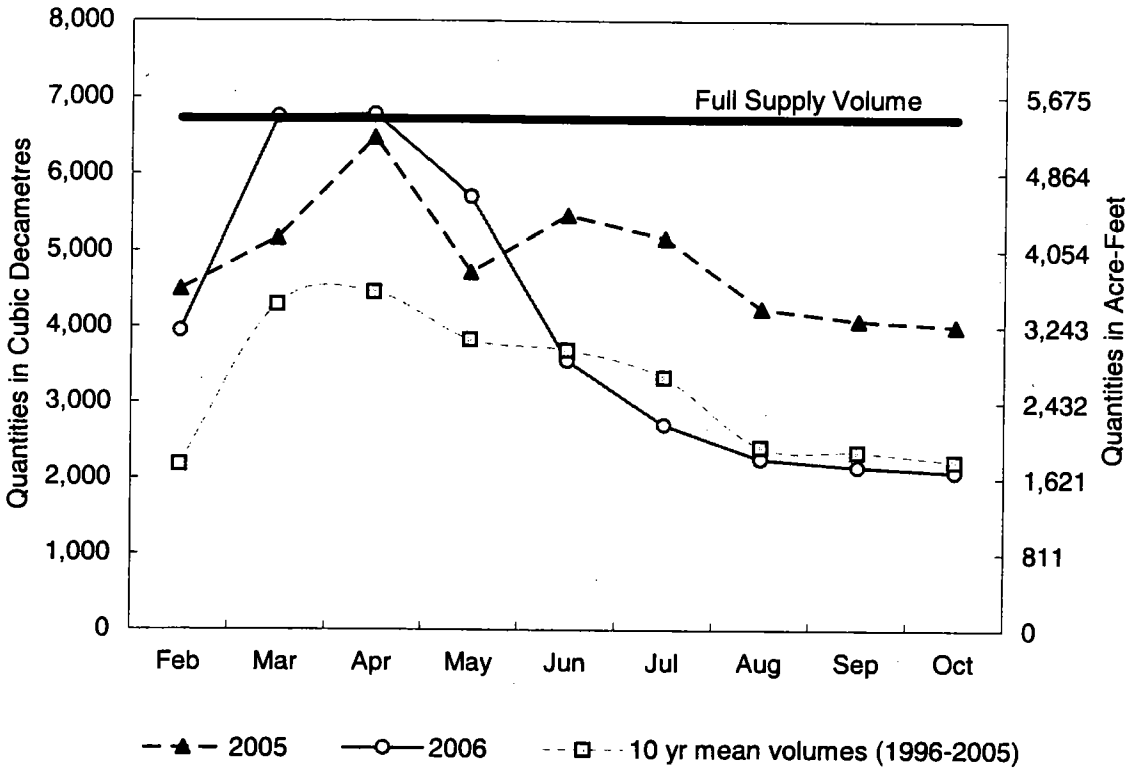


Figure 3. Reservoirs in Lodge Creek, Battle Creek, and Frenchman River Basins
Month-End Contents: 2005, 2006, and 1996-2005 Mean

Figure 3b. Cypress Lake

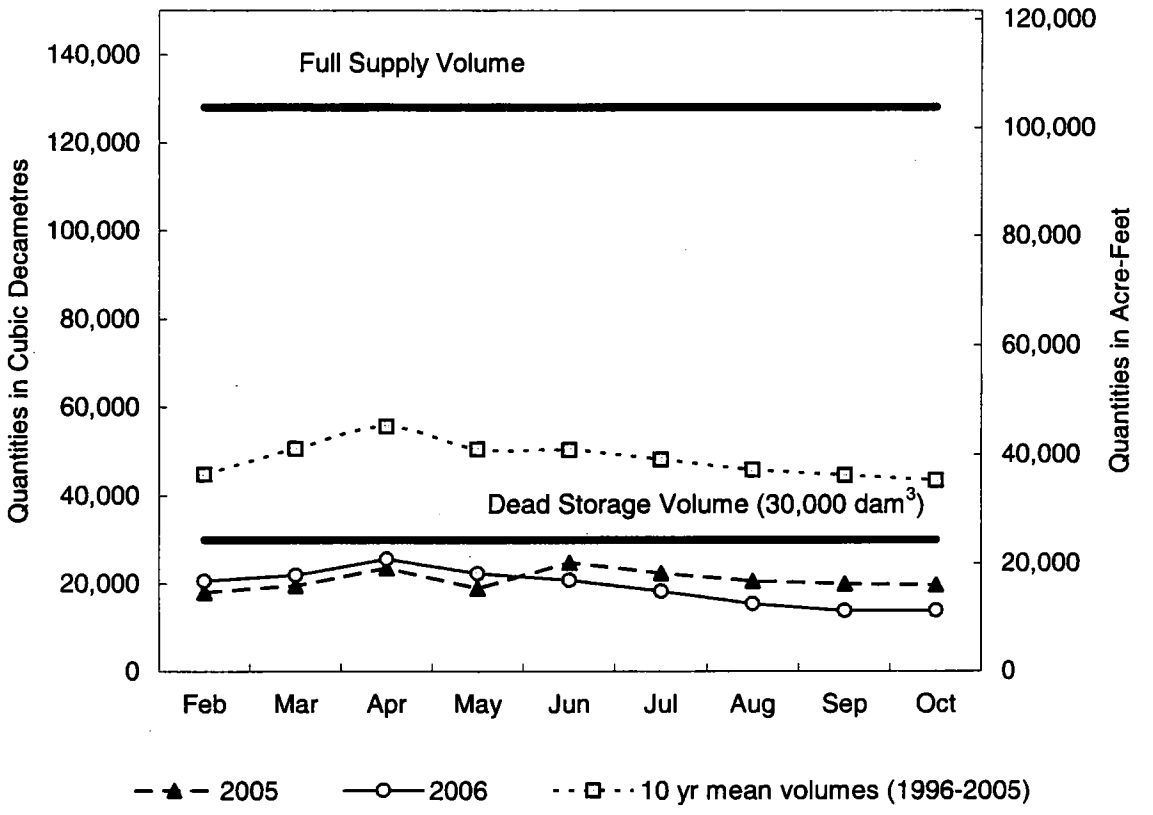


Figure 3. Reservoirs in Lodge Creek, Battle Creek, and Frenchman River Basins
Month-End Contents: 2005, 2006, and 1996-2005 Mean

Figure 3c. Eastend Reservoir

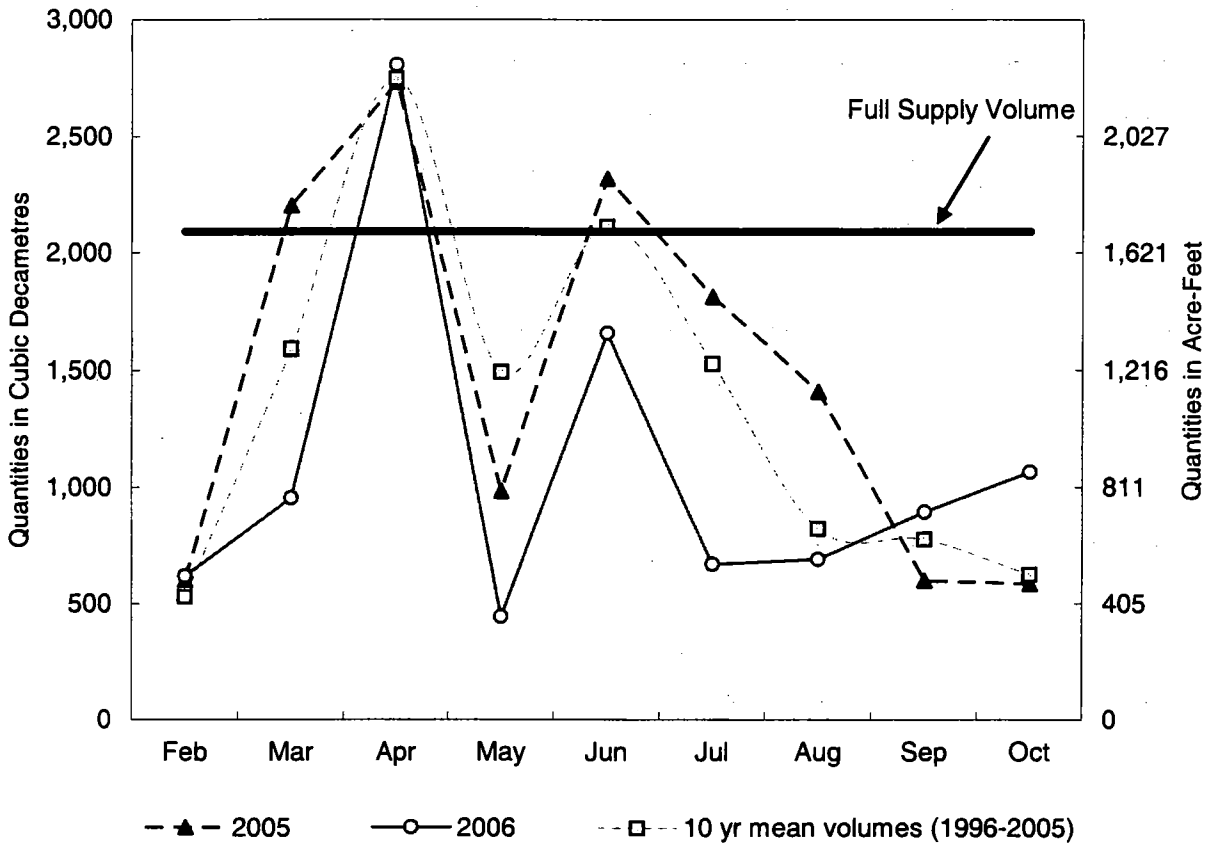
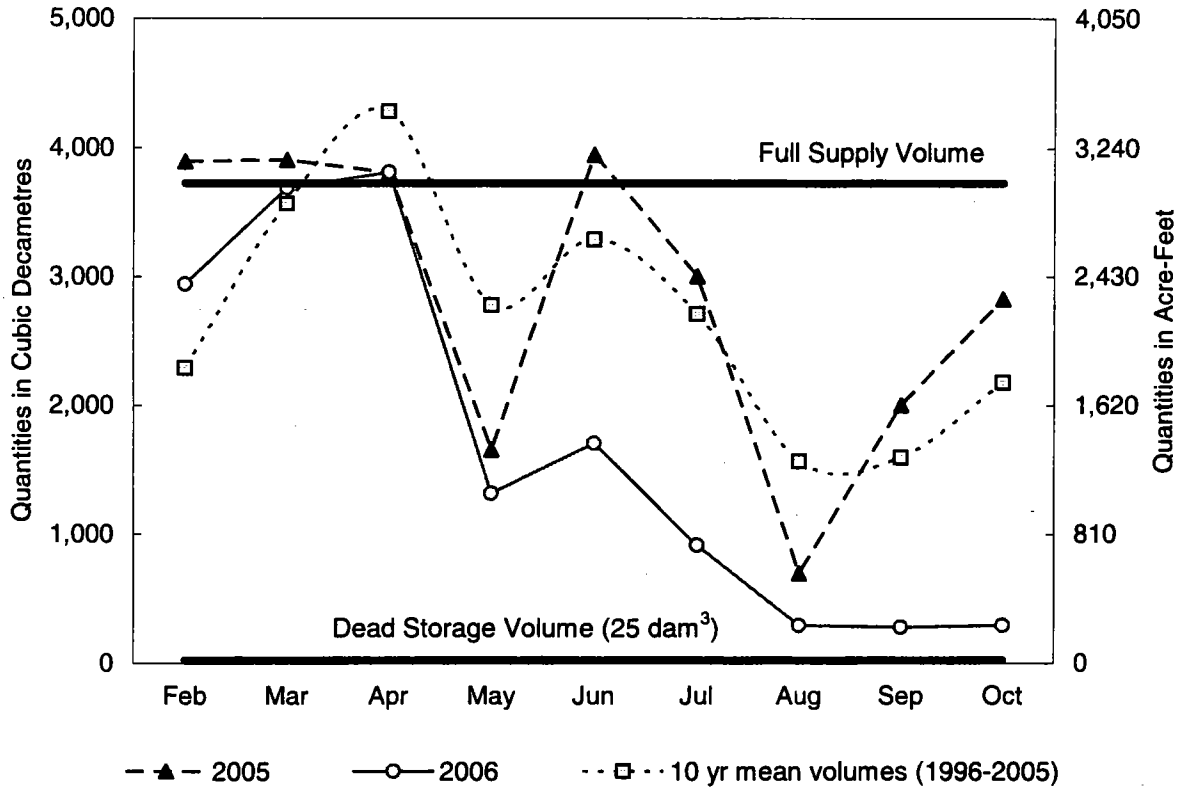


Figure 3. Reservoirs in Lodge Creek, Battle Creek, and Frenchman River Basins
Month-End Contents: 2005, 2006, and 1996-2005 Mean

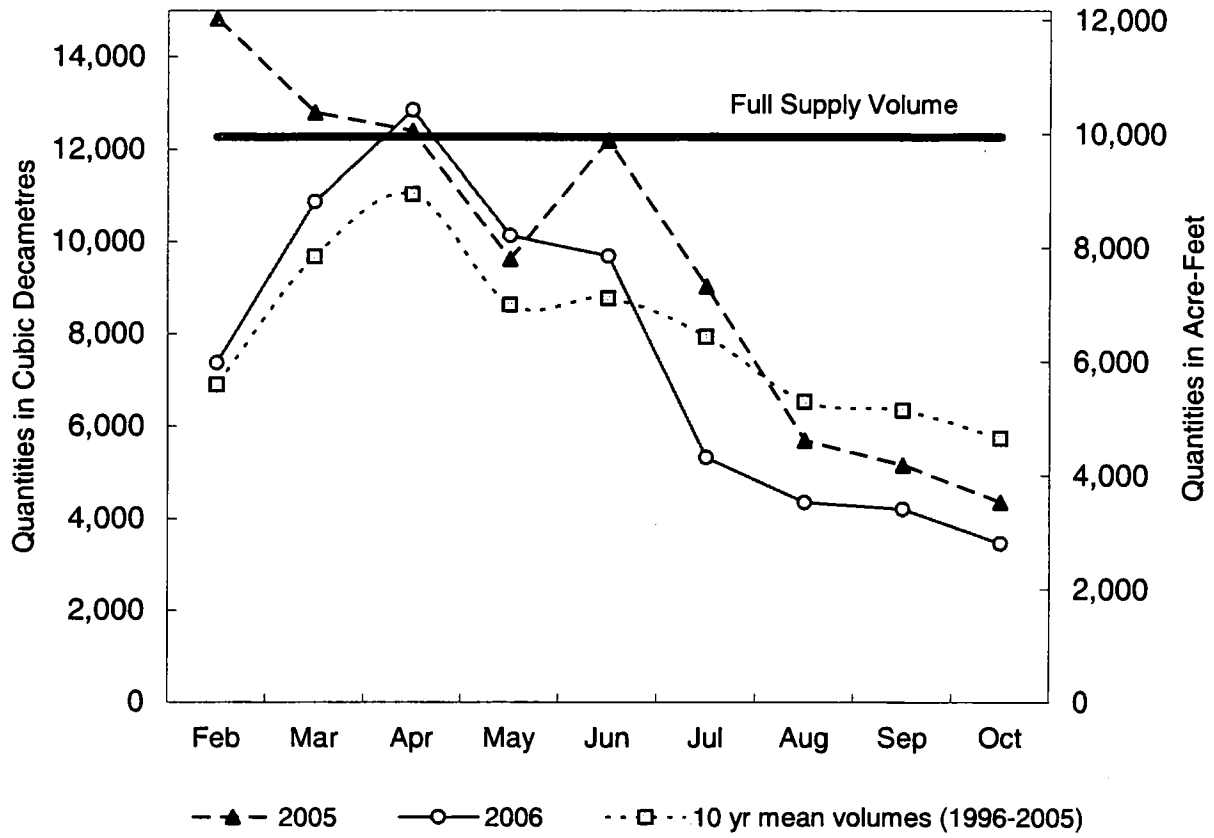
Figure 3d. Huff Lake



Huff Lake stage-storage table was revised in 2004, increasing the dead storage and decreasing the full supply storage volumes from previous years.

Figure 3. Reservoirs in Lodge Creek, Battle Creek, and Frenchman River Basins
Month-End Contents: 2005, 2006, and 1996-2005 Mean

Figure 3e. Newton Lake



LODGE CREEK

The computed natural flow of Lodge Creek at the International Boundary from March 1 to October 31, 2006 was 11 000 dam^3 (8,920 acre-feet). This volume is 37 percent of the average natural flow of the previous 56 years of record. Each country is entitled to 50 percent of the natural flow, or 5 500 dam^3 (4,460 acre-feet) for the irrigation season. A total flow of 5 140 dam^3 (4,170 acre-feet) was recorded at Lodge Creek below McRae Creek at the International Boundary (station 11AB083) from March 1 to October 31.

Deficit deliveries were recorded for 3 of the 16 division periods during the irrigation season. An outstanding deficit[1] of 369 dam^3 (299 acre-feet) remained at the end of October 2006.

The division of the Lodge Creek natural flow is summarized in Tables 3 and 3A and Figure 4 which follow. The detailed computation of the natural flow is given in Table 10 and the historical summary is given in Table 11, both in Appendix A.

[1]Please note the deficit figure was initially computed and reported to Saskatchewan Watershed Authority water managers as 133 dam^3 (108 acre-feet) based on the limited data available for Michel and Cressday Reservoirs, which are both undergoing dam rehabilitation. Michel Reservoir and Cressday Reservoir water-level records were later reconstructed based upon new information. The revised Michel Reservoir record resulted in revisions to the apportionment computation from a zero deficit at the end of period 7 to a deficit of 176 dam^3 (143 acre-feet). The revised Cressday Reservoir record indicated that water temporarily stored in the reservoir was released over two periods rather than one as initially assumed, resulting in a deficit that was not reported during the interim computations.

Table 3: Summary of Lodge Creek Division for 2006* Quantities in Cubic Decametres

DIVISION PERIOD AT INTERNATIONAL BOUNDARY	NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 15	0	0	0	0	
MAR 16 – MAR 31	2,182	1,091	0		1,091
APR 1 - APR 15	8,095	4,048	3,260		788
APR 16 - APR 30	286	143	311	168	
MAY 1 - MAY 15	32	16	65	49	
MAY 16 - MAY 31	130	65	234	169	
JUNE 1 - JUNE 15	0	0	1,251	1,251	
JUNE 16 - JUNE 30	285	143	16		127
JULY 1 - JULY 15	0	0	0	0	
JULY 16 – JULY 31	0	0	0	0	
AUG 1 - AUG 15	0	0	0	0	
AUG 16 - AUG 31	0	0	0	0	
SEP 1 - SEP 15	0	0	0	0	
SEP 16 - SEP 30	0	0	0	0	
OCT 1 - OCT 15	0	0	0	0	
OCT 16 - OCT 31	0	0	0	0	
TOTAL	11,010	5,506	5,137		

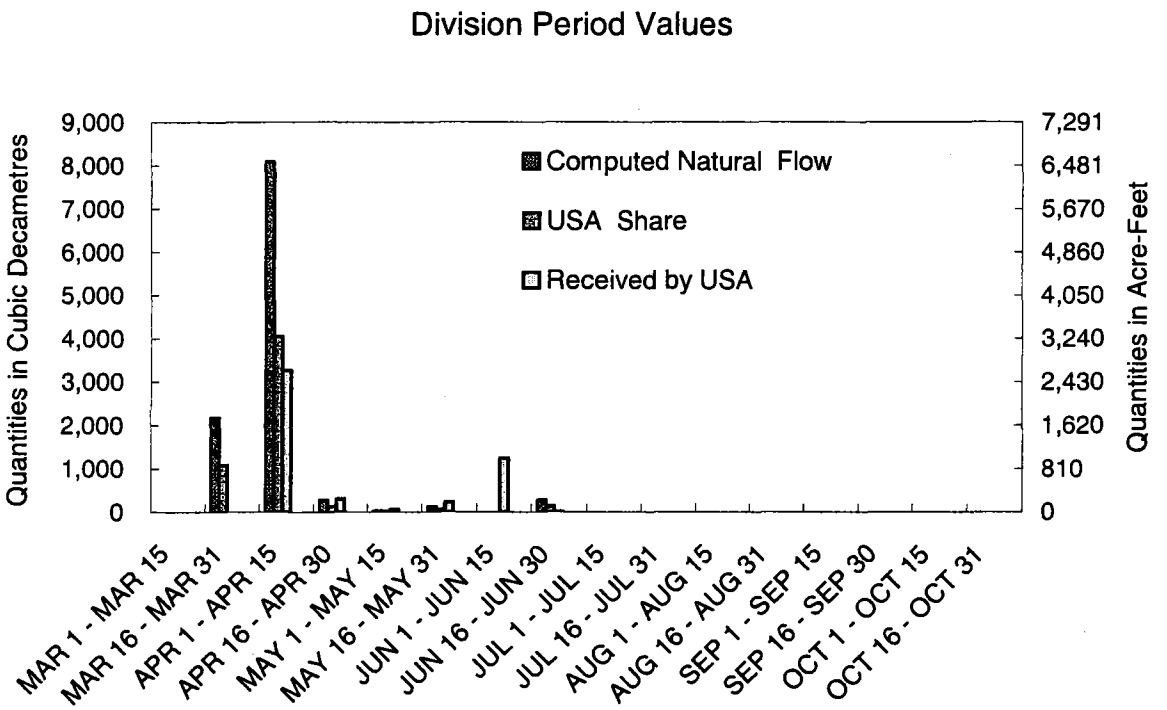
* This is a summary of data from Table 10, Appendix A. Totals and shares may not add or subtract exactly as a result of rounding.

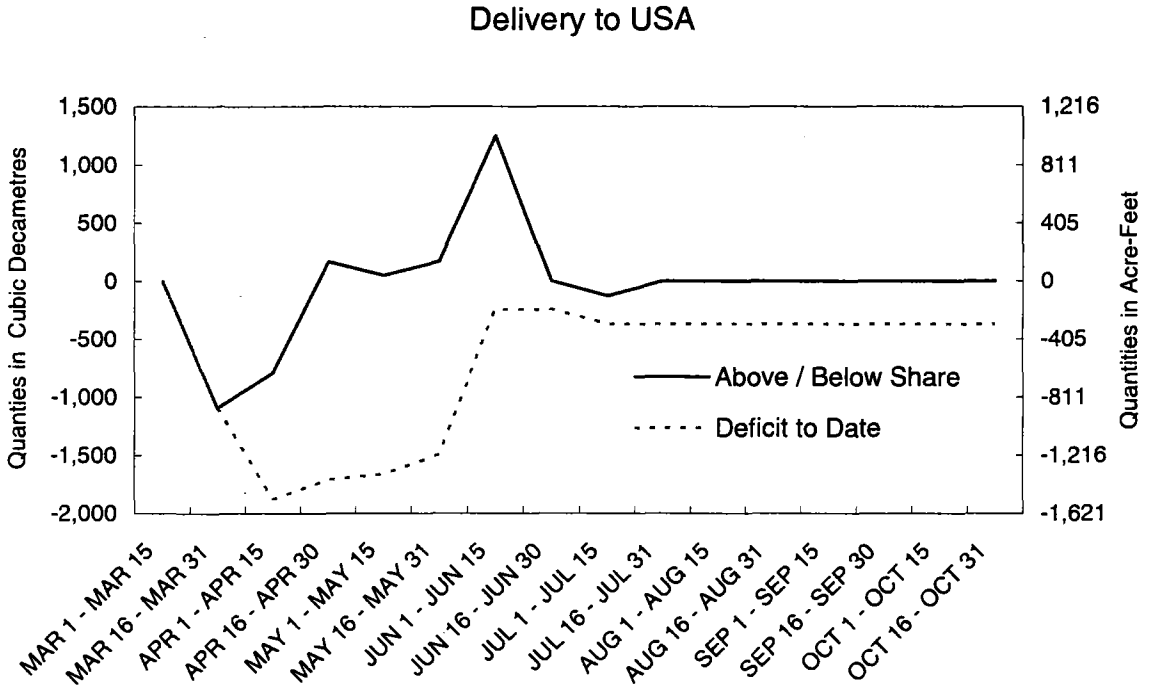
Table 3A: Summary of Lodge Creek Division for 2006* Quantities in Acre-Feet

DIVISION PERIOD AT INTERNATIONAL BOUNDARY	NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 15	0	0	0	0	
MAR 16 - MAR 31	1,769	884	0		884
APR 1 - APR 15	6,563	3,282	2,643		639
APR 16 - APR 30	232	116	252	136	
MAY 1 - MAY 15	26	13	53	40	
MAY 16 - MAY 31	105	53	190	137	
JUNE 1 - JUNE 15	0	0	1,014	1,014	
JUNE 16 - JUNE 30	231	116	13		103
JULY 1 - JULY 15	0	0	0	0	
JULY 16 - JULY 31	0	0	0	0	
AUG 1 - AUG 15	0	0	0	0	
AUG 16 - AUG 31	0	0	0	0	
SEP 1 - SEP 15	0	0	0	0	
SEP 16 - SEP 30	0	0	0	0	
OCT 1 - OCT 15	0	0	0	0	
OCT 16 - OCT 31	0	0	0	0	
TOTAL	8,926	4,464	4,165		

* All values are conversions of data from Table 3. Totals and shares may not add or subtract exactly as a result of rounding.

Figure 4. Lodge Creek Division, 2006





BATTLE CREEK

The computed natural flow of Battle Creek at the International Boundary from March 1 to October 31, 2006, was 11 700 dam^3 (9,490 acre-feet). This volume is 39 percent of the average natural flow of the previous 66 years of record. Each country is entitled to 50 percent of the natural flow, or 5 850 dam^3 (4,740 acre-feet) for the irrigation season. A total flow of 4 990 dam^3 (4,050 acre-feet) was recorded at Battle Creek at International Boundary (station 11AB027) from March 1 to October 31.

Deficit deliveries were recorded in 3 of the 16 division periods during the March 1 to October 31 irrigation season. An outstanding deficit[1] of 970 dam^3 (786 acre-feet) remained at end of October 2006.

The division of the Battle Creek natural flow is summarized in Tables 4 and 4A and Figure 5, which follow. The detailed computation of the natural flow is given in Table 12 and the historical summary is given in Table 13, both in Appendix A.

[1]Please note that a zero deficit was initially computed and reported to Saskatchewan Watershed Authority water managers using a standard 25-percent return-flow rate. The return-flow rate was revised later after reviewing the 2006 irrigation season flow records, resulting in a deficit that was not reported during the interim computations.

Table 4: Summary of Battle Creek Division for 2006* Quantities in Cubic Decametres

DIVISION PERIOD AT INTERNATIONAL BOUNDARY	NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 25	773	387	483	96	
MAR 26 - APR 9	3,777	1,889	629		1,260
APR 10 - APR 24	2,130	1,065	478		587
APR 25 – MAY 9	894	447	489	42	
MAY 10 - MAY 25	1,384	692	116		576
MAY 26 - JUNE 9	706	353	771	418	
JUNE 10 - JUNE 24	679	340	632	292	
JUNE 25 - JULY 9	477	239	477	238	
JULY 10 - JULY 25	125	63	144	81	
JULY 26 – AUG 9	6	3	6	3	
AUG 10 - AUG 25	0	0	0	0	
AUG 26 - SEP 9	0	0	0	0	
SEP 10 - SEP 24	0	0	0	0	
SEP 25 - OCT 9	248	124	248	124	
OCT 10 - OCT 25	347	174	347	173	
OCT 26 - OCT 31	165	83	165	82	
TOTAL	11,711	5,859	4,985		

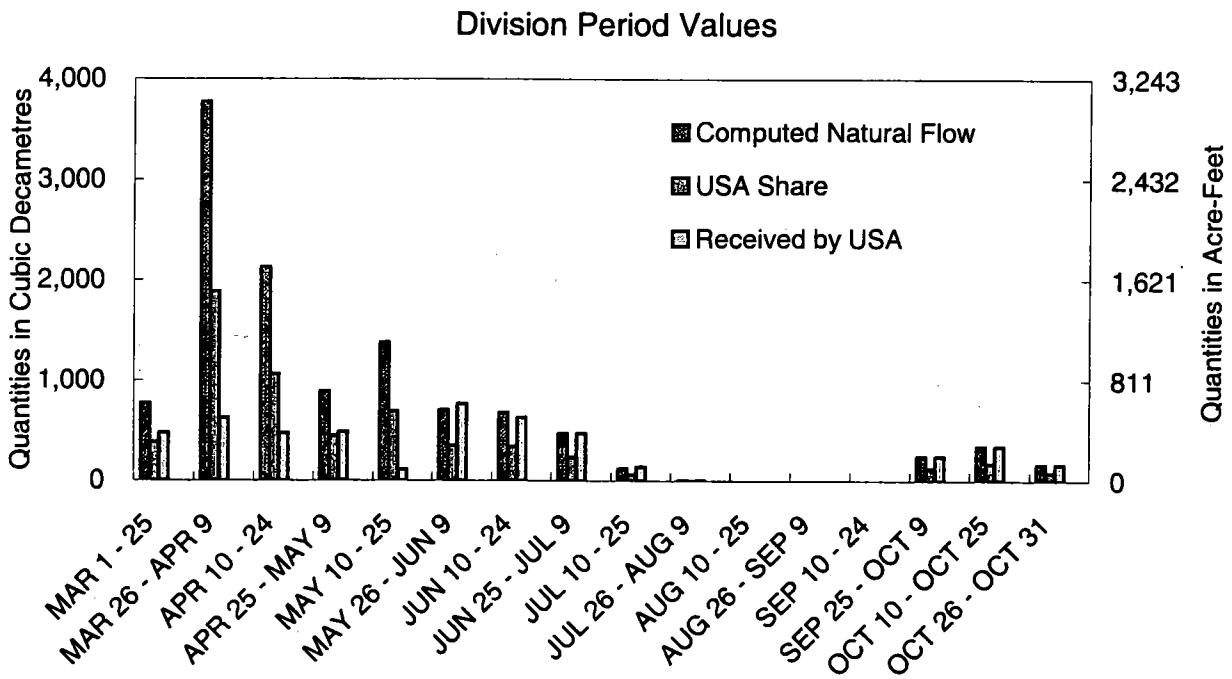
* This is a summary of data from Table 12, Appendix A. Totals and shares may not add or subtract exactly as a result of rounding.

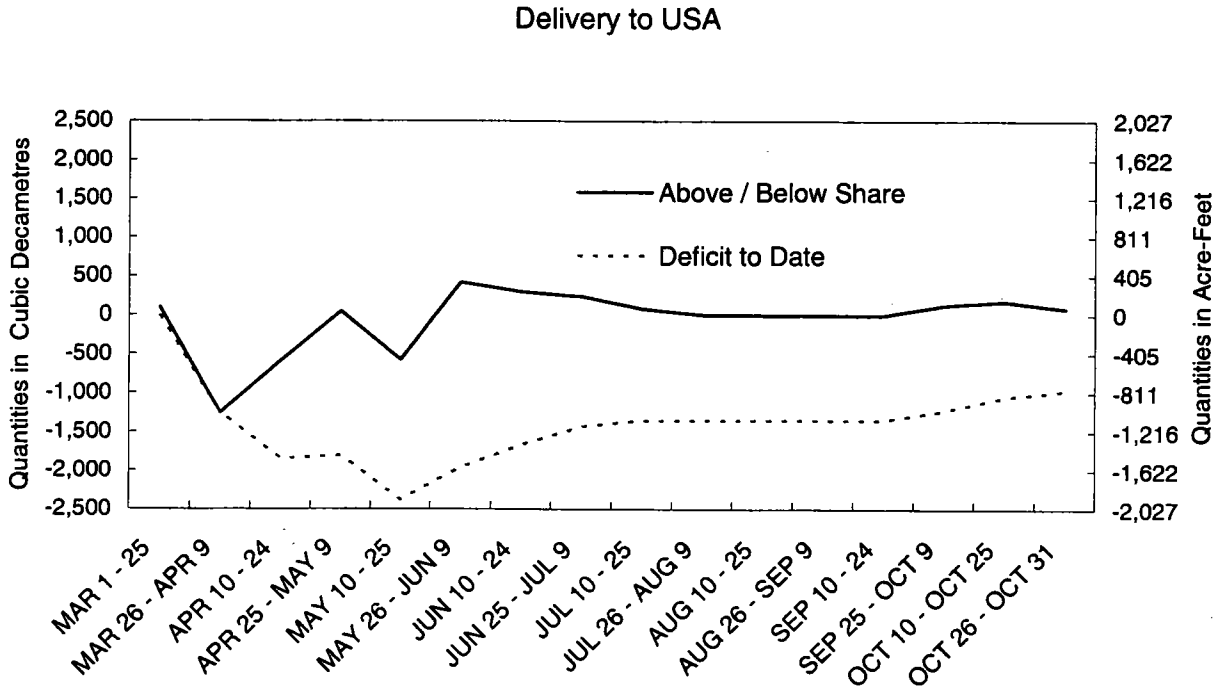
Table 4A: Summary of Battle Creek Division for 2006* Quantities in Acre-Feet

DIVISION PERIOD AT INTERNATIONAL BOUNDARY	NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 25	627	314	392	78	
MAR 26 - APR 9	3,062	1,531	510		1,021
APR 10 - APR 24	1,727	863	388		476
APR 25 - MAY 9	725	362	396	34	
MAY 10 - MAY 25	1,122	561	94		467
MAY 26 - JUNE 9	572	286	625	339	
JUNE 10 - JUNE 24	550	276	512	237	
JUNE 25 - JULY 9	387	194	387	193	
JULY 10 - JULY 25	101	51	117	66	
JULY 26 - AUG 9	5	2	5	2	
AUG 10 - AUG 25	0	0	0	0	
AUG 26 - SEP 9	0	0	0	0	
SEP 10 - SEP 24	0	0	0	0	
SEP 25 - OCT 9	201	101	201	101	
OCT 10 - OCT 25	281	141	281	140	
OCT 26 - OCT 31	134	67	134	66	
TOTAL	9,494	4,750	4,041		

* All values are conversions of data from Table 4. Totals and shares may not add or subtract exactly as a result of rounding.

Figure 5. Battle Creek Division, 2006





FRENCHMAN RIVER

The computed natural flow of the Frenchman River at the International Boundary from March 1 to October 31, 2006, was 40 000 dam^3 (32,400 acre-feet). This volume of natural flow is 51 percent of the average natural flow of the previous 66 years of record. Each country is entitled to 50 percent of the natural flow, or 20 000 dam^3 (16,200 acre-feet) for the irrigation season. A total flow of 25 100 dam^3 (20,300 acre-feet) was recorded at Frenchman River at International Boundary (station 11AC041) from March 1 to October 31.

Deficit deliveries were recorded in 3 of 16 division periods during the irrigation season. No outstanding deficit remained at the end of October 2006.

The division of the Frenchman River natural flow is summarized in Tables 5 and 5A and in Figure 6, which follow. The detailed computation of the natural flow is given in Table 14 and the historical summary is given in Table 15, both in Appendix A.

Table 5: Summary of Frenchman River Division for 2006* Quantities in Cubic Decametres

DIVISION PERIOD AT INTERNATIONAL BOUNDARY	NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 15	453	227	213		14
MAR 16 - MAR 31	6,288	3,144	4,325	1,181	
APR 1 - APR 15	21,439	10,719	12,755	2,036	
APR 16 - APR 30	3,943	1,971	3,343	1,372	
MAY 1 - MAY 15	2,210	1,105	326		779
MAY 16 - MAY 31	2,152	1,076	1,387	311	
JUNE 1 - JUNE 15	1,499	749	907	158	
JUNE 16 - JUNE 30	1,809	904	1,048	144	
JULY 1 - JULY 15	136	68	3		65
JULY 16 - JULY 31	0	0	118	118	
AUG 1 - AUG 15	55	28	415	387	
AUG 16 - AUG 31	2	1	2	1	
SEP 1 - SEP 15	0	0	0	0	
SEP 16 - SEP 30	0	0	0	0	
OCT 1 - OCT 15	53	27	53	26	
OCT 16 – OCT 31	0	0	180	180	
TOTAL	40,039	20,019	25,075		

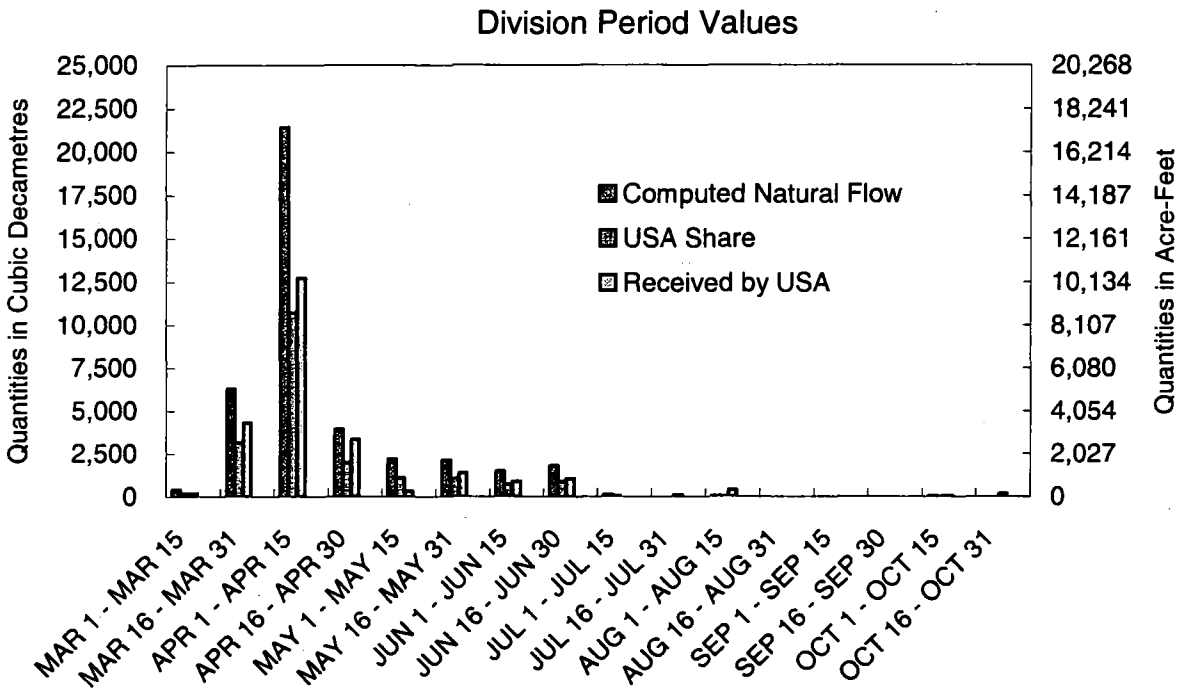
* This is a summary of data from Table 14, Appendix A. Totals and shares may not add or subtract exactly as a result of rounding.

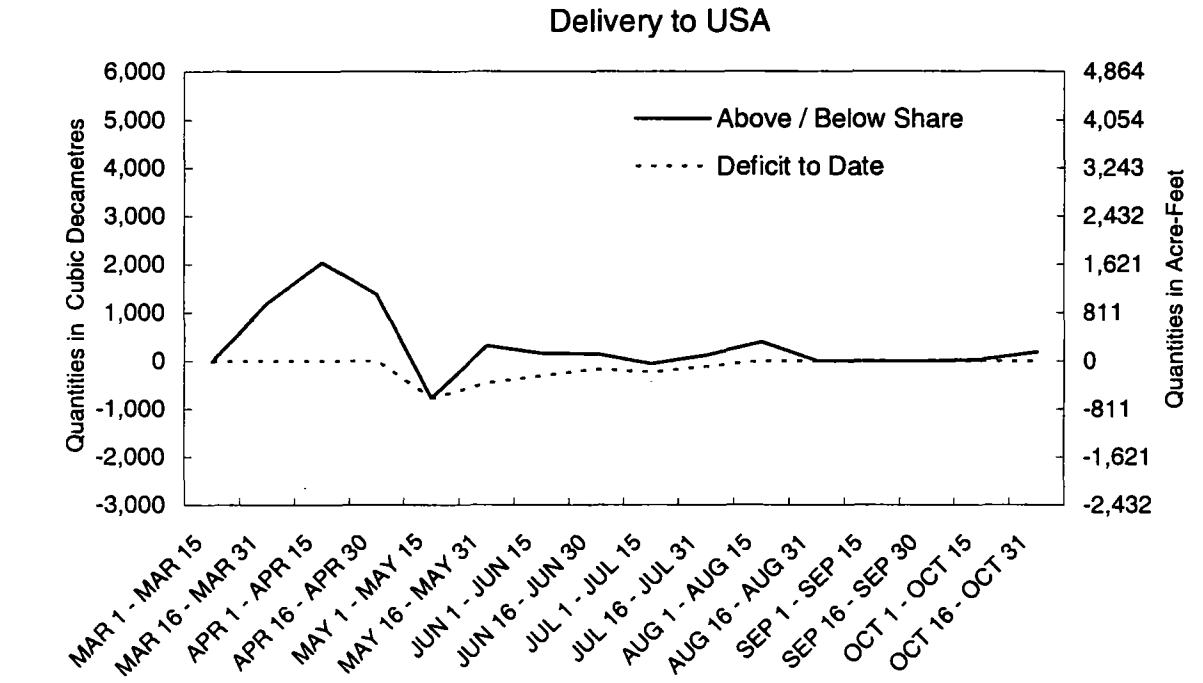
Table 5A: Summary of Frenchman River Division for 2006* Quantities in Acre-Feet

DIVISION PERIOD AT INTERNATIONAL BOUNDARY	NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 15	367	184	173		11
MAR 16 - MAR 31	5,098	2,549	3,506	957	
APR 1 - APR 15	17,381	8,690	10,340	1,651	
APR 16 - APR 30	3,197	1,598	2,710	1,112	
MAY 1 - MAY 15	1,792	896	264		632
MAY 16 - MAY 31	1,745	872	1,124	252	
JUNE 1 - JUNE 15	1,215	607	735	128	
JUNE 16 - JUNE 30	146	733	850	117	
JULY 1 - JULY 15	110	55	2		53
JULY 16 - JULY 31	0	0	96	96	
AUG 1 - AUG 15	45	23	336	314	
AUG 16 - AUG 31	2	1	2	1	
SEP 1 - SEP 15	0	0	0	0	
SEP 16 - SEP 30	0	0	0	0	
OCT 1 - OCT 15	43	22	43	21	
OCT 16 – OCT 31	0	0	146	146	
TOTAL	32,460	16,229	20,328		

* All values are conversions of data from Table 5. Totals and shares may not add or subtract exactly as a result of rounding.

Figure 6. Frenchman River Division, 2006





ANNEX A

1921 Order of the International Joint Commission
Respecting the St. Mary-Milk Rivers

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INTERNATIONAL JOINT COMMISSION
ORDER
IN THE MATTER OF THE MEASUREMENT AND APPORTIONMENT OF THE WATERS OF THE ST. MARY AND MILK RIVERS AND THEIR TRIBUTARIES IN THE STATE OF MONTANA AND THE PROVINCES OF ALBERTA AND SASKATCHEWAN.

Whereas by Article VI of the Treaty entered into between the United States of America and His Majesty, the King of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas, Emperor of India, signed at Washington on the 11th of January 1909, it is provided as follows:

> The High Contracting Parties agree that the St. Mary and Milk Rivers and their tributaries (in the State of Montana and the Provinces of Alberta and Saskatchewan) are to be treated as one stream for the purposes of irrigation and power, and the waters thereof shall be apportioned equally between the two countries, but in making such equal apportionment more than half may be taken from one river and less than half from the other by either country so as to afford a more beneficial use to each. It is further agreed that in the division of such waters during the irrigation season, between the 1st of April and 31st of October, inclusive, annually, the United States is entitled to a prior appropriation of 500 cubic feet per second of the waters of the Milk River, or so much of such amount as constitutes three-fourths of its natural flow, and that Canada is entitled to a prior appropriation of 500 cubic feet per second of the flow of St. Mary River, or so much of such amount as constitutes three-fourths of its natural flow.
>
> The channel of the Milk River in Canada may be used at the convenience of the United States for the conveyance, while passing through Canadian territory, of waters diverted from the St. Mary River. The provisions of Article II of this treaty shall apply to any injury resulting to property in Canada from the conveyance of such waters through the Milk River.
>
> The measurement and apportionment of the water to be used by each country shall from time to time be made jointly by the properly constituted reclamation officers of the United States and the properly constituted irrigation officers of His Majesty under the direction of the International Joint Commission.

And whereas, the said Reclamation and Irrigation Officers have been unable to agree as to the manner in which the waters mentioned in the said Article VI should be measured and apportioned;

And whereas, before giving directions as to the measurement and apportionment of the said waters, the International Joint Commission deemed it proper to hear such representations and suggestions thereon as the Governments of the United States and Canada, the Provinces of Alberta and Saskatchewan, and the State of Montana, and as corporations and persons interested might see fit to make, and for such purposes sittings of the Commission were held at the following times and places: At the city of St. Paul, in the State of Minnesota, on the 24th, 25th, 26th, 27th, and 28th days of May, 1915; at the city of Detroit, in the State of Michigan, on the 15th, 16th, and 17th days of May, 1917; at the city of Ottawa, in the Province of Ontario, on the 3rd, 4th, and 5th days of May, 1920; at the village of Chinook, in the State of Montana, on the 15th day of September 1921; and at the city of Lethbridge, in the Province of Alberta, on the 17th day of September, 1921, when counsel and representatives of the said Governments, corporations, and persons appeared and presented their views;

And whereas, pending final decision as to the proper method of measuring and apportioning said waters, interim orders with reference thereto have been made by the International Joint Commission from time to time, the last of such orders bearing the date of 5th day of April, 1921;

And whereas the members of the International Joint Commission have unanimously determined that the said Reclamation and Irrigation Officers should be guided in the measurement and apportionment of said waters by the directions and instructions hereinafter set forth;

IT IS THEREFORE ORDERED AND DIRECTED by the Commission in pursuance of the powers conferred by the said Article VI of the said Treaty that the Reclamation and Irrigation Officers of the United States and Canada shall, until this order is varied, modified, or withdrawn by the Commission, make jointly the measurement and apportionment of the water to be used by the United States and Canada in accordance with the following rules:

St. Mary River

I. (a) During the irrigation season when the natural flow of the St. Mary River at the point where it crosses the international boundary is six hundred and sixty-six (666) cubic feet per second or less Canada shall be entitled to three-fourths and the United States to one-fourth of such flow.

(b) During the irrigation season when the natural flow of the St. Mary River at the point where it crosses the international boundary is more than six hundred and sixty-six (666) cubic feet per second Canada shall be entitled to a prior appropriation of five hundred (500) cubic feet per second, and the excess over six hundred and sixty-six (666) cubic feet per second shall be divided equally between the two countries.

(c) During the non-irrigation season the natural flow of the St. Mary River at the point where it crosses the international boundary shall be divided equally between the two countries.

Milk River

II. (a) During the irrigation season when the natural flow of the Milk River at the point where it crosses the international boundary for the last time (commonly and hereafter called the Eastern Crossing) is six hundred and sixty-six (666) cubic feet per second or less, the United States shall be entitled to three-fourths and Canada to one-fourth of such natural flow.

(b) During the irrigation season when the natural flow of the Milk River at the Eastern Crossing is more than six hundred and sixty-six (666) cubic feet per second the United States shall be entitled to a prior appropriation of five hundred (500) cubic feet per second and the excess over six hundred and sixty-six (666) cubic feet per second shall be divided equally between the two countries.

(c) During the non-irrigation season the natural flow of the Milk River at the Eastern Crossing shall be divided equally between the two countries.

Eastern Tributaries of Milk River

III. The natural flow of the eastern (otherwise known as the Saskatchewan or northern) tributaries of the Milk River at the points where they cross the international boundary shall be divided equally between the two countries.

Waters not naturally crossing the boundary

IV. Each country shall be apportioned such waters of the said rivers and of any tributaries thereof as rise in that country but do not naturally flow across the international boundary.

V. For the purpose of carrying out the apportionment directed in Paragraphs I, II, and III hereof the said Reclamation and Irrigation Officers shall jointly take steps:

(a) To ascertain and keep a daily record of the natural flow of the St. Mary River at the international boundary, of the Milk River at the Eastern Crossing, and of the eastern tributaries of the Milk River at the international boundary by measurement in each case:

(1) At the gauging station at the international boundary;

(2) At all places where any of the waters which would naturally flow across the international boundary at that particular point are diverted in either country prior to such crossing;

(3) At all places where any of the waters which would naturally flow across the international boundary at that particular point are stored, or the natural flow thereof increased or decreased prior to such crossing;

(b) To fix the amount of water to which each country is entitled in each case by applying the directions contained in paragraphs 1, 2, and 3 hereof to the total amount of the natural flow so ascertained in each case.

(c) To communicate the amount so fixed to all parties interested, so that the apportionment of the said waters may be fully carried out by both countries in accordance with the said directions.

VI. Each country may receive its share of the said waters as so fixed at such point or points as it may desire. A gauging station shall be established and maintained by the Reclamation or Irrigation Officers of the country in which any diversion, storage, increase or decrease of the natural flow shall be made at every point where such diversion, storage, increase, or decrease takes place.

VII. International gauging stations shall be maintained at the following points:

St. Mary River near international boundary; the north branch of Milk River near international boundary; the south branch of Milk River near international boundary; Milk River at Eastern Crossing; Lodge Creek, Battle Creek, and Frenchman River, near international boundary; and gauging stations shall be established and maintained at such other points as the Commission may from time to time approve.

VIII. The said Reclamation and Irrigation Officers are hereby further authorized and directed:

(a) To make such additional measurements and to take such further and other steps as may be necessary or advisable in order to insure the apportionment of the said waters in accordance with the directions herein set forth.

(b) To operate the irrigation works of either country in such a manner as to facilitate the use by the other country of its share of the said waters and subject hereto to secure to the two countries the greatest beneficial use thereof.

(c) To report to the Commission the measurements made at all international and other gauging stations established pursuant to this order.

IX. In the event of any disagreement in respect to any matter or thing to be done under this order the said Reclamation and Irrigation Officers shall report to the Commission, setting forth fully the points of difference and the facts relating thereto.

X. The said order of the Commission dated the 6th day of April 1921, is hereby withdrawn, except with respect to the report to be furnished to the Commission thereunder.

Dated at Ottawa, Canada, this 4th day of October, 1921.
O. GARDNER,
C.A. MAGRATH,
C.D. CLARK,
HENRY A. POWELL,
W.H. HEARST,
MARK A. SMITH.

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ANNEX B

Letter of Intent Respecting
the St. Mary - Milk Rivers
Streamflow Transfers

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LETTER OF INTENT
TO BETTER UTILIZE THE WATERS OF THE ST. MARY AND MILK RIVERS

Whereas Article VI of the Boundary Waters Treaty of 1909 states that the St. Mary and Milk Rivers and their tributaries are to be treated as one for the purposes of irrigation and power;

And whereas, the Boundary Waters Treaty of 1909 and the International Joint Commission Order of 1921 authorizes the Reclamation and Irrigation Officers of the United States and Canada (currently designated as the Accredited Officers of the United States and Canada) to make the greatest beneficial use of the waters of the St. Mary and Milk Rivers;

And whereas, Canada finds it beneficial to use more than its share of the Milk River in the June-September period each year to supply water to Canadian Milk River irrigators;

And whereas, the United States finds it beneficial to use more than its share of the St. Mary River in the March-May period each year to supply water to United States Milk River irrigators;

It is therefore ordered and directed by said Accredited Officers or their designates that the United States be allowed to accumulate a deficit on the St. Mary River of up to 4,000 cfs-days (9 800 dam^3) between March 1 and May 31 of each year which, at the discretion of the United States, may be reduced to no less than 2,000 cfs-days (4 900 dam^3) between June 1 and July 15 of each year with surplus deliveries of St. Mary River water, and that Canada be allowed to accumulate a deficit on the Milk River of up to 2,000 cfs-days (4 900 dam^3) between June 1 and September 15 of each year. The incurred deficits on the St. Mary and Milk Rivers can be offsetting and the outstanding deficits as of September 15 will be equalized by October 31 of each year under administration by Field Representatives of the Accredited Officers. Detailed accounting procedures for the computation of deficit and surplus deliveries under this Letter Of Intent are outlined in Appendix A, " Procedures for the Computation of Deficit and Surplus Deliveries to Better Utilize Waters of the St. Mary and Milk Rivers".

In signing this letter, the parties recognize this agreement is within the 1921 Order of the International Joint Commission. Additionally, the parties recognize that this Letter of Intent and Appendix A will form part of the St. Mary - Milk River Procedural Manual.

Termination of this Letter Of Intent will be allowed upon request by either the United States or Canada notifying the other party in writing two months prior to the commencement of the irrigation season (April 1st as specified by the 1921 Order).

Tim Goos
Accredited Officer of Her Majesty
Dated this 8th day of February, 2001

William J. Carswell, Jr. for the
Accredited Officer of the United States
Dated this 8th day of February, 2001

PROCEDURES FOR THE COMPUTATION OF DEFICIT AND SURPLUS DELIVERIES TO BETTER UTILIZE WATERS OF THE ST. MARY AND MILK RIVERS

ST. MARY RIVER

As of January 2001, the accounting procedures for the computation of deficit and surplus deliveries during March 1 through September 15 of each year on the St. Mary River are:

1. During March 1 through May 31 of each year, deficit deliveries from the United States to Canada at the end of each division period will carry over from one division period to another for the year, are cumulative for the year, and are allowed up to a cumulative total of 4,000 cfs-days (9 800 dam^3). Deficit deliveries greater than the allowed cumulative total of 4,000 cfs-days (9 800 dam^3) are to be refunded in the subsequent division period. Surplus deliveries at the end of a division period are not cumulative, cannot be used to reduce the accumulated deficit from previous division periods to below the allowed total deficit of 4,000 cfs-days (9 800 dam^3), and cannot be used as a credit to make up future deficits. Exceptions to these procedures for this period are allowed only if agreed upon in writing by the Field Representative for Canada.

2. During June 1 through July 15 of each year, the United States, at its discretion, may reduce the deficit accumulated in the March 1 through May 31 period to 2,000 cfs-days (4 900 dam^3) by making surplus deliveries of St. Mary River water. The remaining deficit is not refundable until after September 15 of that year unless agreed upon in writing by the Field Representative for Canada.

3. During June 1 through September 15 of each year, deficit deliveries from the United States to Canada at the end of each division are not to be incurred. However, if deficits are incurred, they are to be refunded by surplus deliveries in the subsequent division period or at a time agreed upon by both parties. Surplus deliveries do not carry over from one division period to another, are not cumulative, and cannot be used as a credit to make up future deficits.

4. On September 15 of each year, outstanding deficits are to be determined using the best available data, even though those data may be provisional. Any outstanding deficits as of September 15 are to be equalized by October 31 of each year. Deficit deliveries accumulated by Canada on the Milk River can be used to offset deficit deliveries accumulated by the United States on the St. Mary River.

5. The United States Bureau of Reclamation shall contact Canada (Environment Canada), the United States (U.S. Geological Survey), Montana (Montana Department of Natural Resources and Conservation), and Alberta (Alberta Environment) when they plan to begin deficit deliveries during the March 1 through May 31 period and when they plan to make surplus deliveries to reduce the accumulated deficits to 2,000 cfs-days (4 900 dam^3) during June 1 through July 15. On or about July 1, and again by September 15 of each year, the parties shall participate in a conference call or meeting to discuss refund of remaining deficit deliveries.

MILK RIVER

As of January 2001, the accounting procedures for the computation of deficit and surplus deliveries during March 1 through September 15 of each year on the Milk River are:

1. During March 1 through May 31 of each year, deficit deliveries from Canada to the United States at the end of each division period are not to be incurred. However, if deficits are incurred, they are to be refunded by surplus deliveries in the subsequent division period or at a time agreed upon by both parties. Surplus deliveries do not carry over from one division period to another, are not cumulative, and cannot be used as a credit to make up future deficits.

2. During June 1 through September 15 of each year, deficit deliveries from Canada to the United States at the end of each division period will carry over from one division period to another for the year, are cumulative for the year, and are allowed up to a cumulative total of 2,000 cfs-days (4 900 dam^3). Deficit deliveries greater than the allowed total of 2,000 cfs-days (4 900 dam^3) are to be refunded in the subsequent division period. Surplus deliveries at the end of a division period cannot be used to reduce the deficit accumulated during the June 1 through September 15 period to below the lesser of the allowed total deficit of 2,000 cfs-days (4 900 dam^3) or the outstanding United States' deficit accumulated on the St. Mary River in the March 1 through May 31 period, and cannot be used as credits to make up future deficits. The remaining deficit is not refundable until after September 15 of that year unless agreed upon in writing by the Field Representative for the United States.

3. On September 15 of each year, outstanding deficits are to be determined using the best available data, even though those data may be provisional. Any outstanding deficits as of September 15 are to be equalized by October 31 of each year. Deficit deliveries accumulated by Canada on the Milk River can be used to offset deficit deliveries accumulated by the United States on the St. Mary River.

4. Canada (Environment Canada), the United States (U.S. Bureau of Reclamation and U.S. Geological Survey), Alberta (Alberta Environment) and Montana (Montana Department of Natural Resources and Conservation) shall participate in a conference call or meeting on or about July 1, and again by September 15 of each year to decide on the approach to be used to reconcile outstanding deficit deliveries.

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ANNEX C

Conversion Factors

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FACTORS FOR CONVERSION BETWEEN INCH-POUND UNITS AND INTERNATIONAL SYSTEM (SI) UNITS

Since 1975, the Report to the International Joint Commission on the Division of the Waters of the St. Mary and Milk Rivers has used dual units (SI and inch-pound).

The two inch-pound units that were used in previous reports were cfs-days and acre-feet.

1 cfs-day = 86,400 cubic feet
1 acre-foot = 43,560 cubic feet
1 cfs-day = 1.9835 acre-feet

The SI unit replacing the inch-pound units for volume is the cubic decametre (dam^3).

1 dam^3 = 1 000 cubic metres
1 cubic metre = 35.315 cubic feet
1 dam^3 = 35,315 cubic feet
1 acre-foot = 1.2335 dam^3
1 cfs-day = 2.4466 dam^3
1 dam^3 = 0.8107 acre-feet

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ANNEX D

List of Gauging Stations

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INTERNATIONAL GAUGING STATIONS OPERATED JOINTLY
BY
THE UNITED STATES AND CANADA
ST. MARY AND MILK RIVER BASINS
2006

Stations listed in downstream order

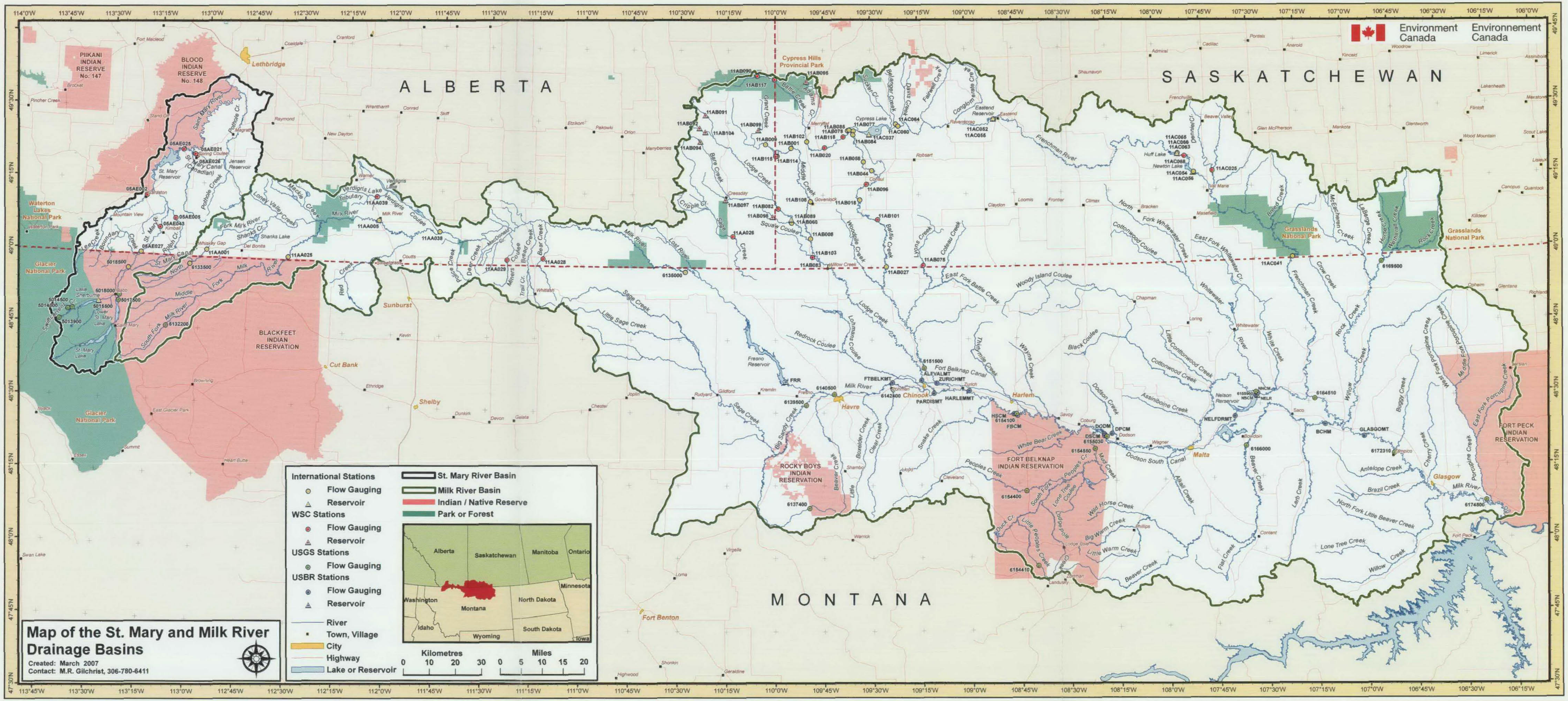
Map Index	Station Name
	ST. MARY RIVER BASIN
5015500	Lake Sherburne at Sherburne, Montana
5018000	St. Mary Canal at St. Mary Crossing near Babb, Montana
05AE027	St. Mary River at International Boundary
	MILK RIVER BASIN
6133500	N. Fork Milk River above St. Mary Canal near Browning, Montana
11AA001	North Milk River near International Boundary
11AA025	Milk River at Western Crossing of International Boundary
11AA005	Milk River at Milk River, Alberta
11AA038	Verdigris Coulee near the Mouth
11AA031	Milk River at Eastern Crossing of International Boundary
	LODGE CREEK TRIBUTARY BASIN
11AB089	Altawan Reservoir near Govenlock
11AB060	Spangler Ditch near Govenlock
11AB009	Middle Creek near Saskatchewan Boundary
11AB001	Middle Creek below Middle Creek Reservoir
11AB108	Middle Creek near Govenlock
11AB008	Middle Creek above Lodge Creek
11AB083	Lodge Creek below McRae Creek at International Boundary
	BATTLE CREEK TRIBUTARY BASIN
11AB102	Gaff Ditch near Merryflat
11AB078	Cypress Lake West Inflow Canal
11AB085	Cypress Lake West Inflow Canal Drain
11AB077	Cypress Lake West Outflow Canal
11AB084	Vidora Ditch near Consul
11AB058	Richardson Ditch near Consul
11AB044	McKinnon Ditch near Consul
11AB018	Nashlyn Canal near Consul
11AB027	Battle Creek at International Boundary
	FRENCHMAN RIVER TRIBUTARY BASIN
11AC064	Belanger Creek Diversion to Cypress Lake
11AC037	Cypress Lake
11AC060	Cypress Lake East Outflow Canal
11AC052	Eastend Canal near Eastend
11AC055	Eastend Reservoir
11AC063	Huff Lake
11AC066	Huff Lake Pumping Canal
11AC065	Huff Lake Gravity Canal
11AC056	Newton Lake
11AC054	Newton Lake Main Canal
11AC041	Frenchman River at International Boundary

GAUGING STATIONS OPERATED INDEPENDENTLY
BY EITHER
THE UNITED STATES OR CANADA
ST. MARY AND MILK RIVER BASINS
2006

*Data for these stations are not included in this report or appendices

Map Index	Station Name	Operated by
	ST. MARY RIVER BASIN	
5013900*	Grinnell Cr at Grinnell Glacier near Many Glacier, Montana	U.S.A.
5014300*	Swiftcurrent Creek above Swiftcurrent Lake, at Many Glacier, Montana	U.S.A.
5014500*	Swiftcurrent Creek at Many Glacier, Montana	U.S.A.
5017500*	St. Mary River near Babb, Montana	U.S.A.
5018000*	St. Mary Canal at intake, near Babb, Montana	U.S.A.
05AE043*	St. Mary River at Highway 501, near Kimball, Alberta	Canada
05AE005*	Rolph Creek near Kimball, Alberta	Canada
05AE002*	Lee Creek at Cardston, Alberta	Canada
05AE025*	St. Mary Reservoir near Spring Coulee, Alberta	Canada
05AE026*	Canadian St. Mary Canal near Spring Coulee, Alberta	Canada
05AE021*	MacGrath Irrigation District Canal near Spring Coulee, Alberta	Canada
	MILK RIVER BASIN	
6132200*	South Fork Milk River near Babb, Montana	U.S.A.
11AA028*	Bear Creek near International Boundary	Canada
11AA029*	Miners Coulee near International Boundary	Canada
6137400*	Big Sandy Creek at reservation boundary, near Rocky Boy, Montana	U.S.A.
FRR*	Fresno Reservoir	U.S.A.
6139500*	Big Sandy Creek near Havre, Montana	U.S.A.
6140500*	Milk River at Havre, Montana	U.S.A.
6142400*	Clear Creek near Chinook, Montana	U.S.A.
FTBELKMT*	Fort Belknap Main Diversion Canal	U.S.A.
ALFVALMT*	Alfalfa Valley Diversion Canal	U.S.A.
ZURICHMT*	Zurich Main Diversion Canal	U.S.A.
PARDISMT*	Paradise Main Diversion Canal	U.S.A.
6151500*	Battle Creek near Chinook, Montana	U.S.A.
HARLEMMT*	Harlem Main Pump Diversion	U.S.A.
HSCM*	Harlem Secondary Pump Diversion	U.S.A.
6154100*	Milk River at Harlem, Montana	U.S.A.
FBCM*	BIA – Fort Belknap Main Diversion Canal	U.S.A.
6154400*	Peoples Creek near Hays, Montana	U.S.A.
6154410*	Little Peoples Creek near Hays, Montana	U.S.A.
6154550*	Peoples Creek below Kuhn Coulee, near Dodson, Montana	U.S.A.
DODM*	Dodson North Canal	U.S.A.
DSCM*	Dodson South Canal	U.S.A.
6155030*	Milk River near Dodson, Montana	U.S.A.
DPCM*	Dodson Pump Diversion	U.S.A.
6155900*	Milk River at Cree Crossing, near Saco, Montana	U.S.A.
NELFDRMT*	Nelson Reservoir Feeder Canal	U.S.A.
NELR*	Nelson Reservoir	U.S.A.
NSCM*	Nelson South Canal	U.S.A.
NNCM*	Nelson North Canal	U.S.A.
6164510*	Milk River at Juneburg Bridge, near Saco, Montana	U.S.A.
6166000*	Beaver Creek below Guston Coulee, near Saco, Montana	U.S.A.
BCHM*	Beaver Creek near Hinsdale, Montana	U.S.A.
GLASGOMT*	Glasgow Main Diversion Canal	U.S.A.
6172310*	Milk River at Tampico, Montana	U.S.A.
6174500*	Milk River at Nashua, Montana	U.S.A.

	LODGE CREEK TRIBUTARY BASIN	
11AB082*	Lodge Creek at Alberta Boundary	Canada
11AB091	Michel Reservoir near Elkwater	Canada
11AB092	Greasewood Reservoir near Elkwater	Canada
11AB094	Bare Creek Reservoir near Elkwater	Canada
11AB097	Cressday Reservoir near Cressday	Canada
11AB098	Jaydot Reservoir near Jaydot	Canada
11AB099	Mitchell Reservoir near Elkwater	Canada
11AB103	Squaw Coulee near Willow Creek	Canada
11AB104	Massy Reservoir near Elkwater	Canada
11AB114	Middle Creek Reservoir Bedford Outlet	Canada
11AB115	Middle Creek Reservoir Flood Spillway	Canada
	BATTLE CREEK TRIBUTARY BASIN	
11AB020*	Shepherd Ditch near Consul	Canada
11AB075	Lyons Creek at International Boundary	Canada
11AB090	Reesor Reservoir near Elkwater	Canada
11AB095*	Adams Lake	Canada
11AB096*	Battle Creek near Consul	Canada
11AB101*	Battle Creek below Nashlyn Project	Canada
11AB117*	Battle Creek at Alberta Boundary	Canada
11AB118*	Battle Creek below Wilson's Weir	Canada
6151500	Battle Creek near Chinook, Montana	U.S.A.
	FRENCHMAN RIVER TRIBUTARY BASIN	
11AC025*	Denniel Creek near Val Marie	Canada
11AC062*	Frenchman River below Newton Lake	Canada
11AC068*	Val Marie Pump No. 1	Canada
	ROCK CREEK TRIBUTARY BASIN	
6169500	Rock Creek below Horse Creek near International Boundary	U.S.A.
	SAGE CREEK TRIBUTARY BASIN	
11AA026*	Sage Creek at Q Ranch near Wildhorse	Canada


Map of the St. Mary and Milk River Drainage Basins
Created: March 2007
Contact: M.R. Gilchrist, 306-780-6411
Environment Canada
Environnement Canada
ALBERTA
SASKATCHEWAN
MONTANA
International Stations
Flow Gauging
Reservoir
WSC Stations
Flow Gauging
Reservoir
USGS Stations
Flow Gauging
USBR Stations
Flow Gauging
Reservoir
River
Town, Village
City
Highway
Lake or Reservoir
St. Mary River Basin
Milk River Basin
Indian / Native Reserve
Park or Forest
Alberta
Saskatchewan
Manitoba
Ontario
Washington
Montana
North Dakota
Minnesota
Idaho
Wyoming
South Dakota
Iowa
Kilometres
0 10 20 30
Miles
0 5 10 15 20
PIIKANI INDIAN RESERVE No. 147
BLOOD INDIAN RESERVE No. 148
Lethbridge
Cypress Hills Provincial Park
Waterton Lakes National Park
Glacier National Park
BLACKFEET INDIAN RESERVATION
ROCKY BOYS INDIAN RESERVATION
FORT BELKNAP INDIAN RESERVATION
FORT PECK INDIAN RESERVATION
Grasslands National Park
Sunburst
Cut Bank
Shelby
Havre
Chinook
Harlem
Malta
Glasgow
Fort Benton
Milk River
Frenchman River
St. Mary River
Battle Creek
Lodge Creek
Whitewater Creek
Beaver Creek
Peoples Creek
Rock Creek
Willow Creek
North Fork Milk River
South Fork Milk River

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R424
2006

Report to the International Joint Commission on the division and use of the waters of the St. Mary and Milk Rivers...