

Report to

THE INTERNATIONAL JOINT COMMISSION

On

THE DIVISION OF THE WATERS OF

THE ST. MARY AND MILK RIVERS

2011



Cover Photo:

Eastend Reservoir: Milk River Eastern Tributaries, Frenchman River Basin, Saskatchewan

Photograph by Norm Midtlyng, USGS, Montana Water Science Center, Helena, Montana

REPORT TO
THE INTERNATIONAL JOINT COMMISSION
ON
THE DIVISION OF THE WATERS OF
THE ST. MARY AND MILK RIVERS
FOR THE YEAR 2011

Submitted By

Dr. Randall G. Updike

Representing the United States

And

Russell G. Boals

Representing Canada

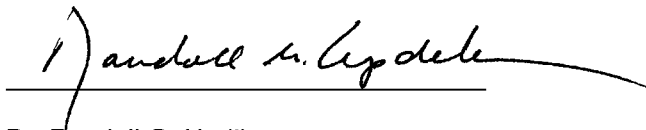
April 2012

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, 2011.

Respectfully submitted,

A handwritten signature in black ink, reading "Randall G. Updike", written over a horizontal line.

Dr. Randall G. Updike
Accredited Officer of the United States

A handwritten signature in black ink, reading "Russell Boals", written over a horizontal line.

Russell G. Boals
Field Representative for the Accredited Officer of Her Majesty

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SYNOPSIS

During the 2011 irrigation season, the natural flow of the St. Mary River was 132 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, 2011, was 936 600 cubic decametres (dam^3) (759,300 acre-feet). Under the terms of the Boundary Waters Treaty, the Canadian allotment was 541 800 dam^3 (439,200 acre-feet). The total flow recorded at the International Boundary during the irrigation season was 166 percent of the Canadian allotment.

The natural flow of the Milk River during the 2011 irrigation season was 265 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, 2011, was 358 700 dam^3 (290,800 acre-feet). Under terms of the Treaty, the United States' allotment was 227 400 dam^3 (184,400 acre-feet). The United States received 155 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 318 percent of the long-term average for Lodge Creek at the International Boundary, 347 percent for Battle Creek at the International Boundary, and 319 percent for Frenchman River at the International Boundary. The total flow recorded at the International Boundary during the irrigation season for Lodge Creek, Battle Creek, and Frenchman River was 178 percent, 166 percent, and 184 percent, respectively, of the United States allotment.

The annual meeting of the Field Representatives was held at Helena, Montana on February 16, 2012. Mutual problems, future plans, and changes in computational procedures were discussed and a schedule of field operations for 2012 was adopted.

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Map of St. Mary and Milk River Drainage Basins

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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 35 international gauging stations on a cooperative basis, under the direction of the Field Representatives of the United States and Canada. An additional 72 gauging stations were operated independently by the United States and Canada in the St. Mary and Milk River basins. Several of these stations were operated to obtain data on diversions, reservoir contents, return flows and index runoff which was used to improve the accuracy of natural-flow computations.

This report summarizes the year 2011 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 conversion factors. A summary of the conversion factors is contained in Annex D.

The Accredited Officer of Her Majesty position was vacant in 2011 following the retirement of Mr. Timothy Goos. Mr. Russell G. Boals, as Field Representative to the Accredited Officer of Her Majesty, represented Canada's interest on behalf of the Accredited Officer of Her Majesty. Dr. Randall Updike, as the Accredited Officer of the United States, was represented in the field by Mr. John M. Kilpatrick, United States Geological Survey, Helena, Montana. 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 Kilpatrick.

The annual meeting of the Field Representatives was held in Helena, Montana on February 16, 2012. Mutual concerns, future plans, and changes in computational procedures were discussed and a schedule of field operations for 2012 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 to determine flow apportionment during the irrigation season. These 15 to 16 day periods are termed 'division periods' and serve to provide an opportunity to respond to varying use and flow conditions. For example, if use by the United States is in excess of its share during a division period, then a surplus delivery (or an amount in excess of its share in the subsequent division period) 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 5015500) was 44 830 dam³ (36,340 acre-feet) on October 31, 2010. Storage increased to 65 690 dam³ (53,250 acre-feet) on February 28, 2011, when the 2011 irrigation-season began. Maximum storage was 80 470 dam³ (65,240 acre-feet) on July 22, 2011 and storage had decreased to 19 980 dam³ (16,200 acre-feet) by the end of irrigation releases on October 11, 2011.

Water was diverted from the St. Mary River into the Milk River via the St. Mary Canal beginning on July 26, 2011 and continued through October 18, 2011. The total flow recorded at the gauging station on the St. Mary Canal at St. Mary Crossing (station 5018500) was 72 780 dam³ (59,000 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 (station 05AE027) from November 1, 2010 to October 31, 2011 was 1 042 000 dam³ (844,800 acre-feet) of which 936 600 dam³ (759,300 acre-feet) occurred during the irrigation season, April 1 to October 31, 2011. For the irrigation season, Canada's share was 541 800 dam³ (439,200 acre-feet) and the United States' share was 394 800 dam³ (320,100 acre-feet). During the irrigation season, a total discharge of 900 500 dam³ (730,000 acre-feet) was recorded at the International Boundary, which was 166 percent of the Canadian share. The computed natural flow during the irrigation season was 132 percent of the average of the previous 108 years of record.

A deficit delivery was recorded in 1 of the 16 division periods during the 2011 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 dam³) (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 dam³) (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.

The United States accumulated a deficit on the St. Mary River of 1 150 dam³ (930 acre-feet) for the September 16-30, 2011 division period. The United States, using October 1-15 surplus deliveries, eliminated this deficit. There was no deficit at the end of the irrigation season on October 31, 2011.

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 2011*
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	6,063	3,031	4,846	1,815	
MAR 16 - MAR 31	7,597	3,799	13,778	9,979	
APR 1 - APR 15	15,364	11,524	25,429	13,905	
APR 16 - APR 30	16,062	12,047	29,705	17,658	
MAY 1 - MAY 15	45,877	28,860	51,061	22,201	
MAY 16 - MAY 31	140,330	76,681	131,675	54,994	
JUNE 1 - JUNE 15	161,523	86,870	149,117	62,247	
JUNE 16 - JUNE 30	163,773	87,995	149,876	61,881	
JULY 1 - JULY 15	142,973	77,595	131,015	53,420	
JULY 16 - JULY 31	103,938	58,485	102,291	43,806	
AUG 1 - AUG 15	54,745	33,481	52,149	18,668	
AUG 16 - AUG 31	28,860	20,886	25,044	4,158	
SEP 1 - SEP 15	17,795	13,315	13,702	387	
SEP 16 - SEP 30	12,304	9,228	8,080		1,148
OCT 1 - OCT 15	16,555	12,414	18,333	5,919	
OCT 16 - OCT 31	16,513	12,386	13,001	615	
TOTAL	950,272	548,597	919,102		

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

Note:

Canadian share of St. Mary River waters deficit outstanding:
as of May 31, 2011: 0 dam³ (0 acre-feet) (0 cfs-days)
as of June 15, 2011: 0 dam³ (0 acre-feet) (0 cfs-days)
as of September 15, 2011: 0 dam³ (0 acre-feet) (0 cfs-days).

U.S.A. share of Milk River waters outstanding as of September 15, 2010: 0 dam³ (0 acre-feet) (0 cfs-days).
There were no deficit deliveries in any of the 16 division periods during the 2011 irrigation season on Milk River.

Allowable deficit carryovers, as per 2001 Letter of Intent respecting St. Mary-Milk Rivers streamflow transfers, are:
as of May 31, 2011: 9 800 dam³ (7,940 acre-feet) (4,000 cfs-days)
as of July 15, 2011: 4 900 dam³ (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 2011*
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	4,915	2,457	3,929	1,471	
MAR 16 - MAR 31	6,159	3,080	11,170	8,090	
APR 1 - APR 15	12,456	9,343	20,615	11,273	
APR 16 - APR 30	13,021	9,767	24,082	14,315	
MAY 1 - MAY 15	37,193	23,397	41,395	17,998	
MAY 16 - MAY 31	113,766	62,165	106,749	44,584	
JUNE 1 - JUNE 15	130,947	70,426	120,889	50,464	
JUNE 16 - JUNE 30	132,771	71,338	121,505	50,167	
JULY 1 - JULY 15	115,908	62,906	106,214	43,308	
JULY 16 - JULY 31	84,263	47,414	82,927	35,514	
AUG 1 - AUG 15	44,382	27,143	42,277	15,134	
AUG 16 - AUG 31	23,397	16,932	20,303	3,371	
SEP 1 - SEP 15	14,426	10,794	11,108	314	
SEP 16 - SEP 30	9,975	7,481	6,550		931
OCT 1 - OCT 15	13,421	10,064	14,863	4,799	
OCT 16 - OCT 31	13,387	10,041	10,540	499	
TOTAL	770,387	444,748	745,117		

* 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 River waters deficit outstanding:

as of May 31, 2011: 0 acre-feet (0 dam³) (0 acre-feet) (0 cfs-days)

as of June 15, 2011: 0 acre-feet (0 dam³) (0 acre-feet) (0 cfs-days)

as of September 15, 2011: 0 acre-feet (0 dam³) (0 acre-feet) (0 cfs-days).

U.S.A. share of Milk River waters outstanding as of September 15, 2010: 0 acre-feet (0 dam³) (0 cfs-days)

There were no deficit deliveries in any of the 16 division periods during the 2011 irrigation season on Milk River.

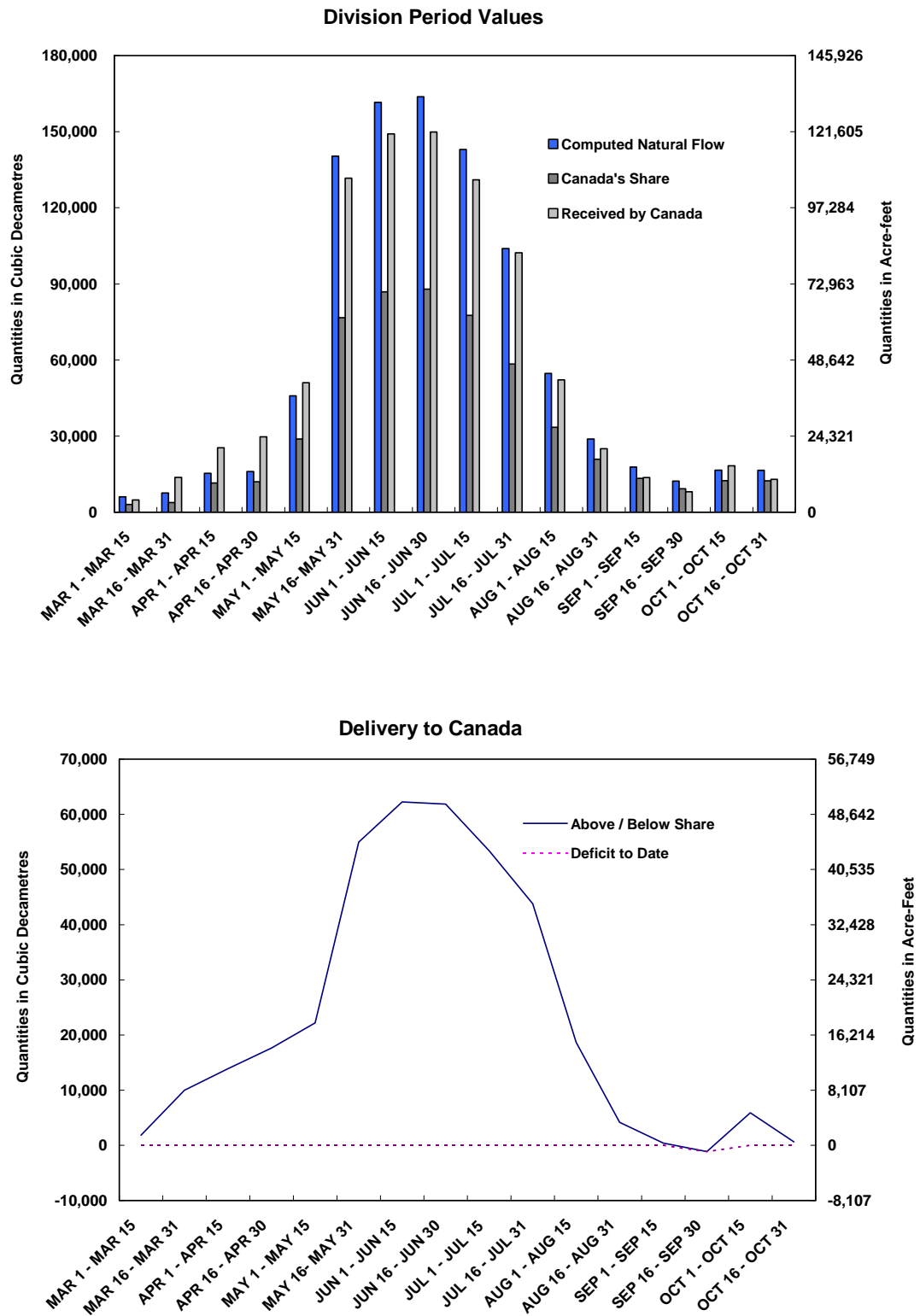
Allowable deficit carryovers, as per 2001 Letter of Intent respecting St. Mary-Milk Rivers streamflow transfers, are:

as of May 31, 2011: 7,940 acre-feet (9 800 dam³) (4,000 cfs-days)

as of July 15, 2011: 3,970 acre-feet (4 900 dam³) (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, 2011



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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 2011, evapo-transpiration was estimated using the Onefour pan evaporation data as an index of Morton's model results.

During 2011, the United States' estimated consumptive use was 5 050 dam³ (4,090 acre-feet) and Canada's estimated consumptive use was 5 160 dam³ (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 (station 6135000) from March 1 to October 31, 2011 was 358 700 dam³ (290,800 acre-feet). This flow was 265 percent of the average computed natural flow of the previous 99 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, 2011, the United States' share was 227 400 dam³ (184,400 acre-feet) and Canada's share was 131 200 dam³ (106,400 acre-feet). The United States received 155 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.

There were no deficit deliveries recorded in any of the 16 division periods during the irrigation season on the Milk River. 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 dam³) (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.

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 2011*
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	2,297	1,149	2,298	1,149	
MAR 16 - MAR 31	47,598	23,799	47,598	23,799	
APR 1 - APR 15	42,526	27,179	42,526	15,347	
APR 16 - APR 30	24,840	18,159	24,840	6,681	
MAY 1 - MAY 15	28,607	20,432	28,607	8,175	
MAY 16 - MAY 31	53,983	33,529	53,003	19,474	
JUNE 1 - JUNE 15	82,425	47,341	81,467	34,126	
JUNE 16 - JUNE 30	29,588	20,753	29,225	8,472	
JULY 1 - JULY 15	12,859	9,644	12,198	2,554	
JULY 16 - JULY 31	9,078	6,809	8,374	1,565	
AUG 1 - AUG 15	3,292	2,469	2,748	279	
AUG 16 - AUG 31	2,575	1,931	1,994	63	
SEP 1 - SEP 15	2,380	1,785	2,017	232	
SEP 16 - SEP 30	2,288	1,716	2,288	572	
OCT 1 - OCT 15	8,853	6,640	8,853	2,213	
OCT 16 - OCT 31	5,465	4,099	5,465	1,366	
TOTAL	358,654	227,434	353,501		

* 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, 2011: 0 dam³ (0 acre-feet) (0 cfs-days).

Canadian share of St. Mary River waters deficit outstanding:
as of May 31, 2011: 0 dam³ (0 acre-feet) (0 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 dam³ (2,000 cfs-days) (3,970 acre-feet), whichever is less.

Table 2A: Summary of Milk River Division for 2011*
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	1,862	931	1,863	931	
MAR 16 - MAR 31	38,588	19,294	38,588	19,294	
APR 1 - APR 15	34,476	22,034	34,476	12,442	
APR 16 - APR 30	20,138	14,722	20,138	5,416	
MAY 1 - MAY 15	23,192	16,564	23,192	6,627	
MAY 16 - MAY 31	43,764	27,182	42,970	15,788	
JUNE 1 - JUNE 15	66,822	38,379	66,045	27,666	
JUNE 16 - JUNE 30	23,987	16,824	23,693	6,868	
JULY 1 - JULY 15	10,425	7,818	9,889	2,071	
JULY 16 - JULY 31	7,360	5,520	6,789	1,269	
AUG 1 - AUG 15	2,669	2,002	2,228	226	
AUG 16 - AUG 31	2,088	1,565	1,617	51	
SEP 1 - SEP 15	1,929	1,447	1,635	188	
SEP 16 - SEP 30	1,855	1,391	1,855	464	
OCT 1 - OCT 15	7,177	5,383	7,177	1,794	
OCT 16 - OCT 31	4,430	3,323	4,430	1,107	
TOTAL	290,761	184,381	286,583		

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

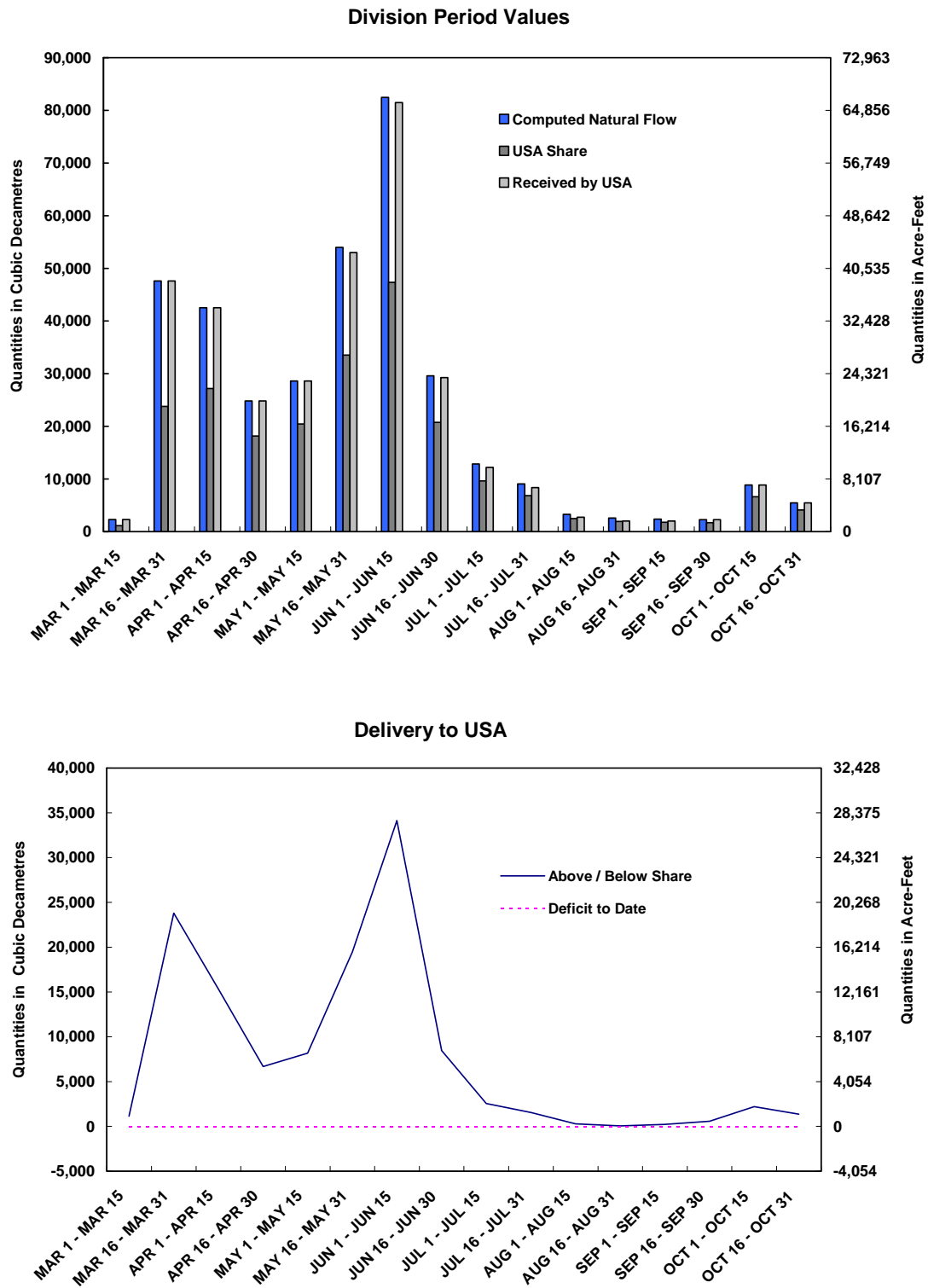
Note:

U.S.A. share of Milk River waters deficit outstanding:
as of September 15, 2011: 0 acre-feet (0 dam³) (0 cfs-days).

Canadian share of St. Mary River waters deficit outstanding:
as of May 31, 2011: 0 acre-feet (0 dam³) (0 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 dam³ (2,000 cfs-days) (3,970 acre-feet), whichever is less.

Figure 2. Milk River Division, 2011



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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 discussions 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 2011.

Flows for March through October 2011 for the southern tributaries were as follows:

- o Bear Creek near International Boundary – 6 770 dam³ (5,490 acre-feet)
- o Miners Coulee near International Boundary – 3 780 dam³ (3,060 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 daily basis; however, the physical limitation due to transit time in the flow system was recognized to be an impediment to the most beneficial use of the water if a daily apportionment were adopted. 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 flow from March to October of 5 030 dam³ (4,080 acre-feet) was recorded on Lyons Creek for the year 2011.

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 spring freshet event of 2011 was one of the most unconventional spring runoff events in recent history of the Eastern Tributaries.

The Cypress Hills area was the last region in the province to go through the spring snowmelt runoff because of the thick snow pack on the south side of the Cypress Hills, coupled with several late snowfall events, kept air and ground temperatures unseasonably cold. Streamflow, resulting from the heavy snowpack and coupled with above average rainfall in June, was well above normal at the international boundary in 2011.

In the Lodge Creek basin, Agri-Environment Services Branch (formerly Prairie Farm Rehabilitation Administration) has an operational strategy to not operate the riparian gate on Middle Creek Reservoir. The high spring runoff volumes filled the reservoir and consequently, approximately 7 000 dam³ (5,670 acre-feet) went over the earthen flood spillway, an event that has not occurred since 1996-97 and prior to that 1964. The majority of this water ended up in the Orleans Duck Project with some water likely going into Simms Lake. The Field Representatives may re-evaluate the Lodge Creek apportionment model to accommodate water leaving the Middle Creek Reservoir via the flood spillway as this water may have been ultimately stored.

In the Battle Creek basin the above normal runoff prompted the State of Montana to request Canada to divert flows from Battle Creek into Cypress Lake without incurring a deficit in the international apportionment computations. Canada complied and as a result Cypress Lake, which was nearly dry in 2009, was filled to its full supply level (FSL) of 975.970 m (3,202.00 feet). Cypress Lake now contains 128 600 dam³ (104,300 acre-feet), a volume that has not been achieved since 1971. No modification to the apportionment calculation was necessary to

accommodate this diversion to Cypress Lake as the volume of water subsequently crossing the international boundary during the remainder of the irrigation season was sufficient to cover the diversion to Cypress Lake without Canada incurring a deficit.

Approximately 14 100 dam³ (11,430 acre-feet) of water was also diverted down Belanger Creek diversion during the spring freshet with most of the diverted water going into Cypress Lake.

The late nature of the 2011 runoff coupled with high flow volumes skewed the irrigation season in both time and volume. In the Lodge Creek basin part of a normal irrigation on the Spangler Project was received in August instead of May and June. Irrigation in the Battle Creek basin began early with the Vidora, Richardson, and McKinnon projects utilizing the high spring flows by receiving small volumes of water in late May. Gaff Ditch was operated in late April through May. Nashlyn project received water in the late March to April period for the spring backflood irrigators and a small volume in early June. In the Frenchman River basin, periods of irrigation were shorter than normal. The Eastend project only received water during one division period beginning in late May and the Newton project irrigated once beginning in August. The Huff Lake project received two complete irrigations, one in May and the other in August.

The Lodge Creek basin incurred a 21 dam³ (17 acre-feet) year-end deficit due to an early September rain event which resulted in water being stored in Altawan Reservoir.

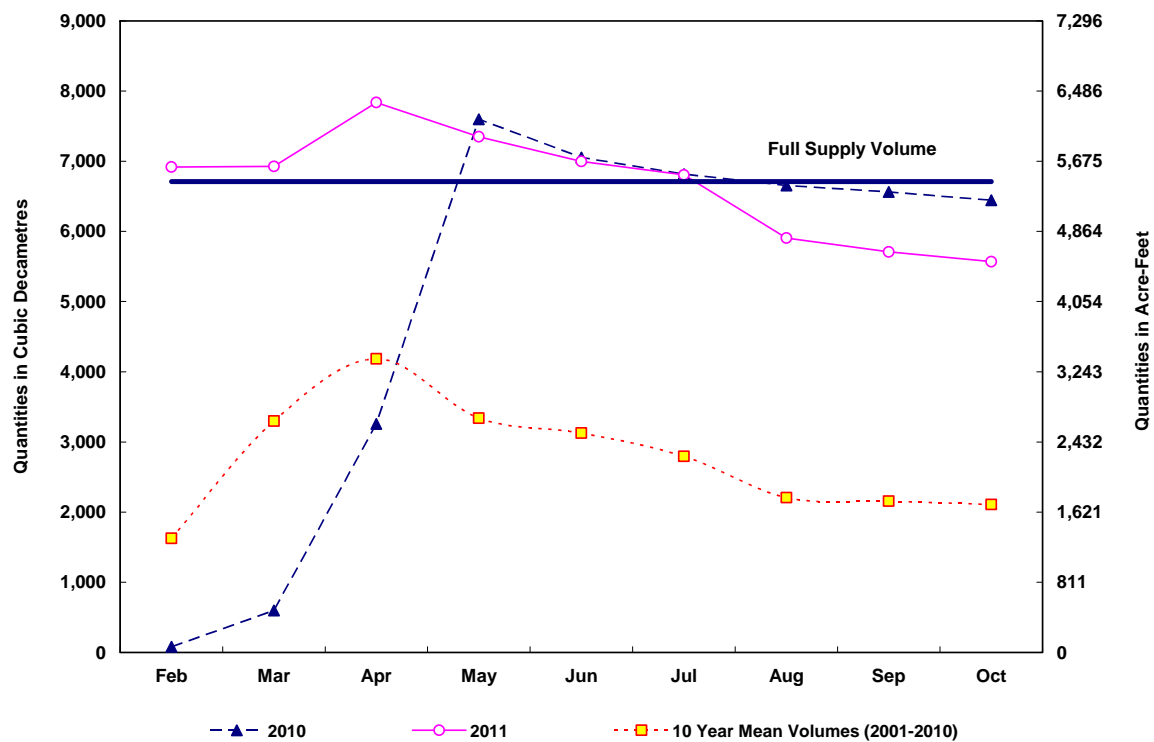
There were no deficit deliveries in the Battle Creek basin in any of the 16 division periods during the 2011 irrigation season.

The Frenchman River basin ended with no outstanding deficit even though there was a cooperative operations effort made between Saskatchewan Watershed Authority (SWA) and the State of Montana to hold back water in Canada to facilitate dam repairs on the Frenchman River dam in Montana.

Figures 3a to 3e show month-end and mean contents of major reservoirs in Lodge Creek, Battle Creek, and Frenchman River basins.

Figure 3. Reservoirs in Lodge Creek, Battle Creek, and Frenchman River Basins
Month-End Contents: 2010, 2011, and 2001-2010 Mean

Figure 3a. Altawan Reservoir



**Figure 3. Reservoirs in Lodge Creek, Battle Creek, and Frenchman River Basins
Month-End Contents: 2010, 2011, and 2001-2010 Mean**

Figure 3b. Cypress Lake

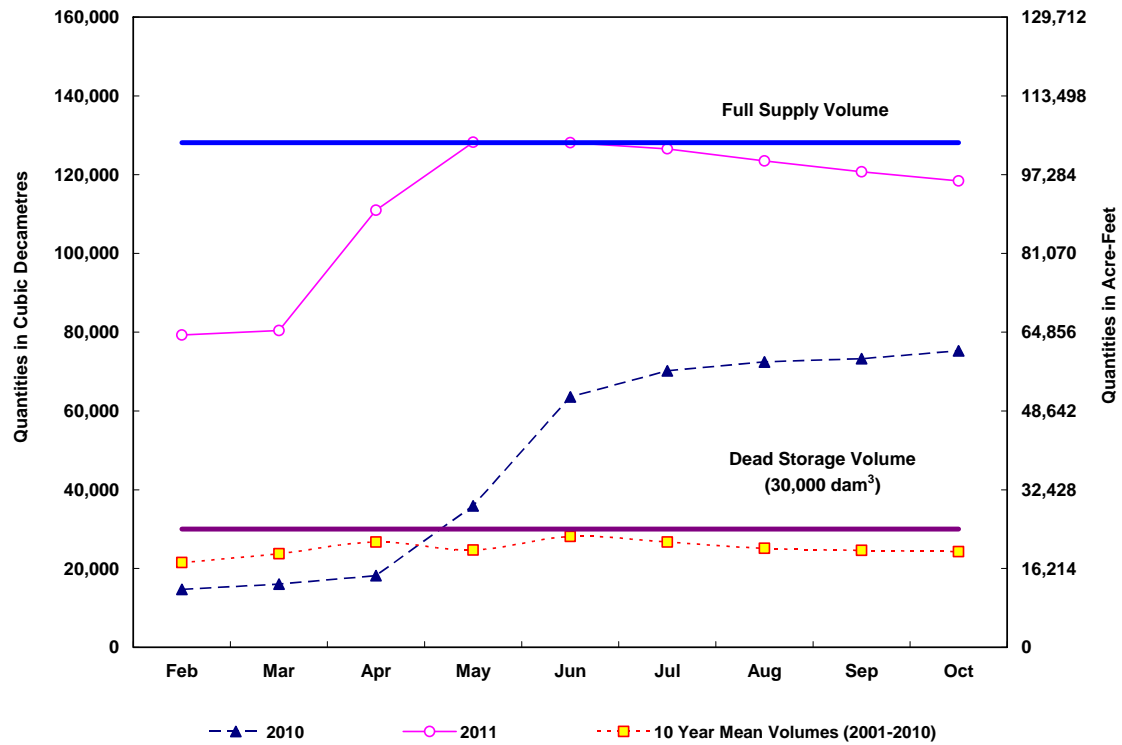
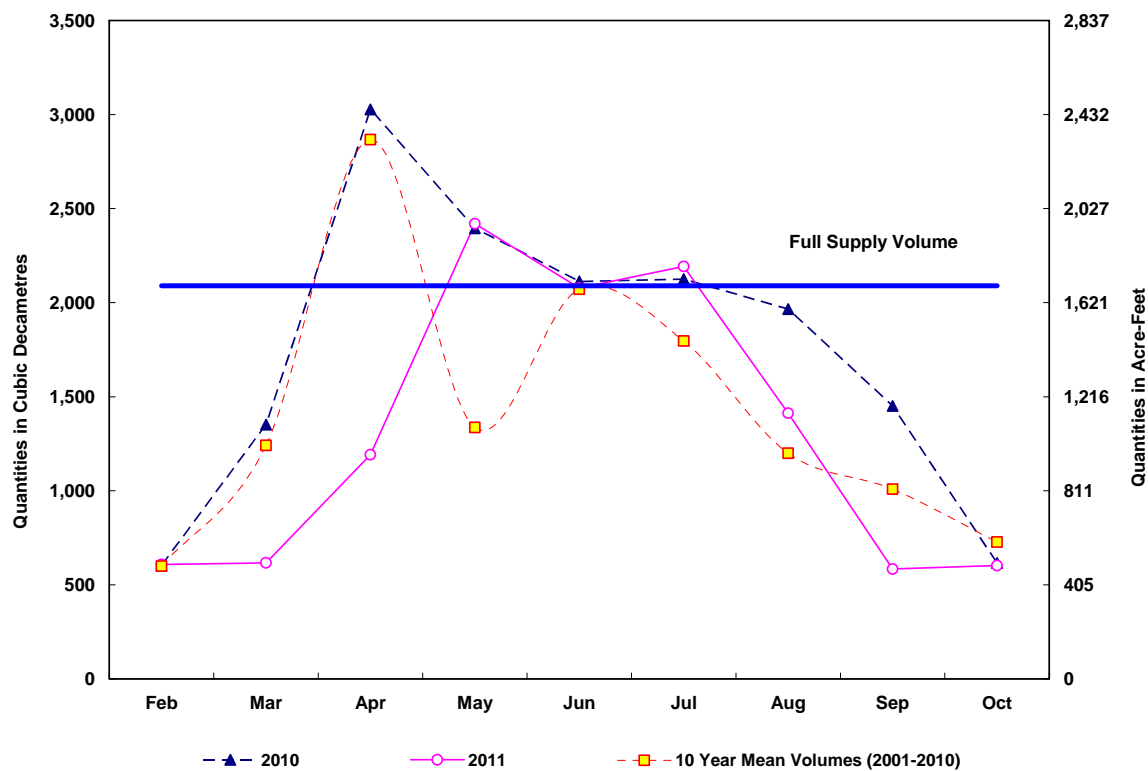


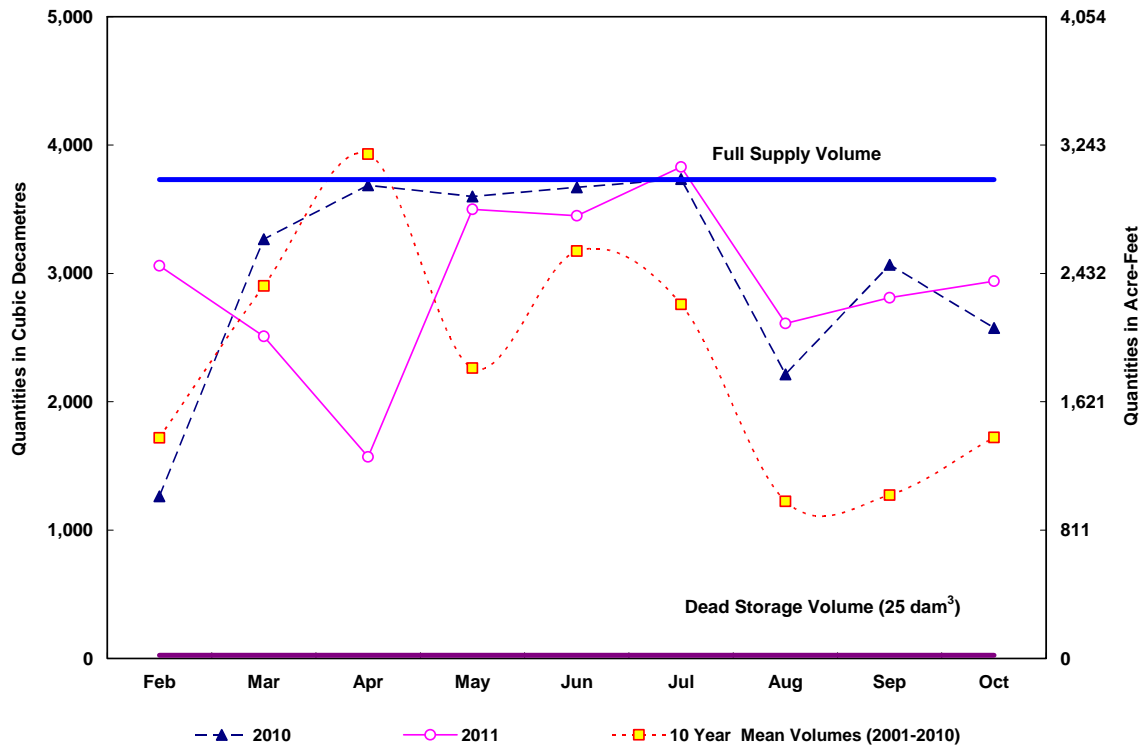
Figure 3. Reservoirs in Lodge Creek, Battle Creek, and Frenchman River Basins
Month-End Contents: 2010, 2011, and 2001-2010 Mean

Figure 3c. Eastend Reservoir



**Figure 3. Reservoirs in Lodge Creek, Battle Creek, and Frenchman River Basins
Month-End Contents: 2010, 2011, and 2001-2010 Mean**

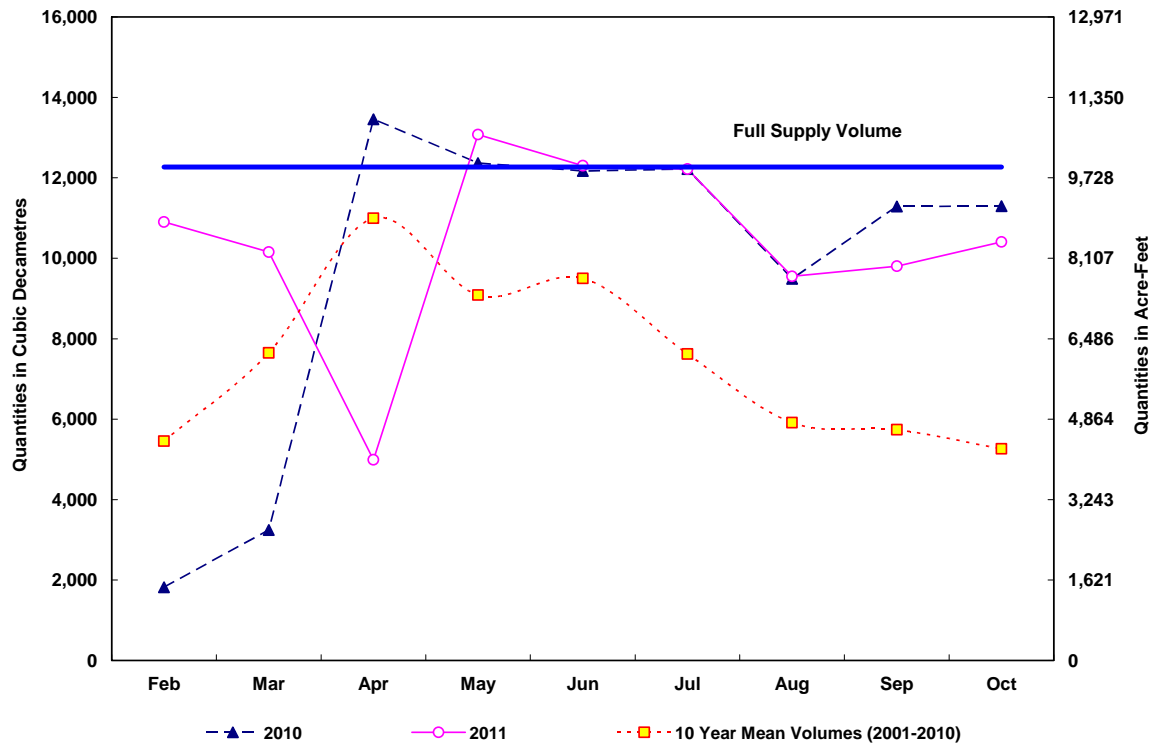
Figure 3d. Huff Lake



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: 2010, 2011, and 2001-2010 Mean**

Figure 3e. Newton Lake



LODGE CREEK

The computed natural flow of Lodge Creek at the International Boundary from March 1 to October 31, 2011 was 89 490 dam³ (72,550 acre-feet). This volume is 318 percent of the average natural flow of the previous 61 years of record. Each country is entitled to 50 percent of the natural flow, or 44 745 dam³ (36,275 acre-feet) for the irrigation season. A total flow of 79 850 dam³ (64,730 acre-feet) was recorded at Lodge Creek below McRae Creek at the International Boundary (station 11AB083) from March 1 to October 31. This volume was 178 percent of the United States allotment.

Deficit deliveries were recorded for 3 of the 16 division periods during the irrigation season. An outstanding deficit of 21 dam³ (17 acre-feet) remained at the end of October 2011.

The division of the Lodge Creek natural flow is summarized in Tables 3 and 3A and in 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.

Table 3: Summary of Lodge Creek Division for 2011*
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	8	4	0		4
MAR 16 - MAR 31	0	0	0	0	
APR 1 - APR 15	10,556	5,278	10,005	4,727	
APR 16 - APR 30	34,710	17,355	29,879	12,524	
MAY 1 - MAY 15	18,815	9,407	13,475	4,068	
MAY 16 - MAY 31	8,509	4,254	8,474	4,220	
JUNE 1 - JUNE 15	14,528	7,264	15,113	7,849	
JUNE 16 - JUNE 30	1,694	847	2,166	1,319	
JULY 1 - JULY 15	414	207	524	317	
JULY 16 - JULY 31	203	102	203	101	
AUG 1 - AUG 15	8	4	8	4	
AUG 16 - AUG 31	0	0	2	2	
SEP 1 - SEP 15	9	4	1		3
SEP 16 - SEP 30	39	19	1		18
OCT 1 - OCT 15	1	1	1	0	
OCT 16 - OCT 31	1	1	1	0	
TOTAL	89,493	44,747	79,853		

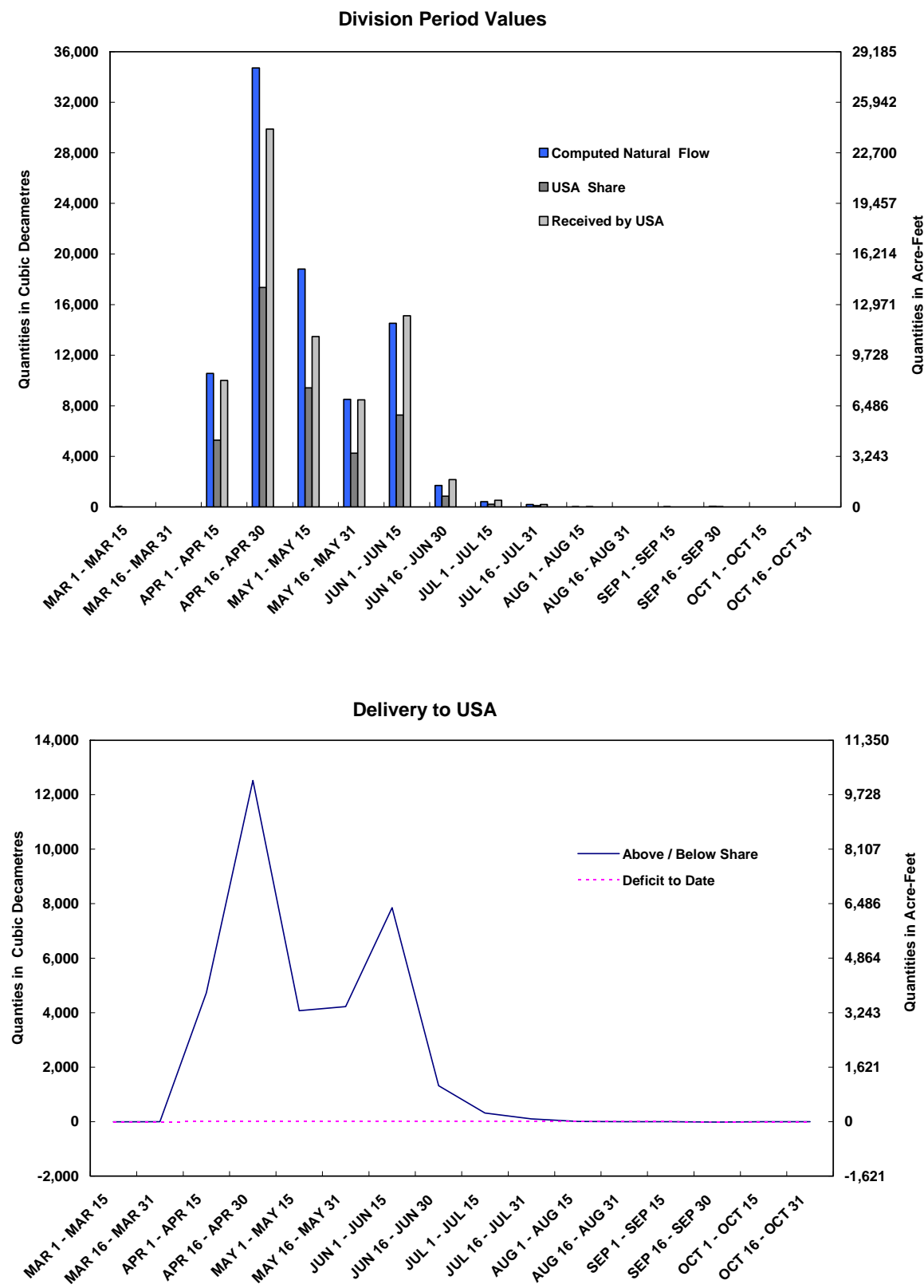
* This is a summary of data from Table 10, Appendix A. Totals and shares may not add or subtract exactly as a result of rounding.

Table 3A: Summary of Lodge Creek Division for 2011*
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	6	3	0		3
MAR 16 - MAR 31	0	0	0	0	
APR 1 - APR 15	8,558	4,279	8,111	3,832	
APR 16 - APR 30	28,139	14,070	24,223	10,153	
MAY 1 - MAY 15	15,253	7,626	10,924	3,298	
MAY 16 - MAY 31	6,898	3,449	6,870	3,421	
JUNE 1 - JUNE 15	11,778	5,889	12,252	6,363	
JUNE 16 - JUNE 30	1,373	687	1,756	1,069	
JULY 1 - JULY 15	336	168	425	257	
JULY 16 - JULY 31	165	82	165	82	
AUG 1 - AUG 15	6	3	6	3	
AUG 16 - AUG 31	0	0	2	2	
SEP 1 - SEP 15	7	3	1		2
SEP 16 - SEP 30	32	15	1		15
OCT 1 - OCT 15	1	0	1	0	
OCT 16 - OCT 31	1	0	1	0	
TOTAL	72,552	36,276	64,737		

* 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, 2011



BATTLE CREEK

The computed natural flow of Battle Creek at the International Boundary from March 1 to October 31, 2011 was 103 000 dam³ (83,500 acre-feet). This volume is 347 percent of the average natural flow of the previous 71 years of record. Each country is entitled to 50 percent of the natural flow or 51 500 dam³ (41,750 acre-feet) for the irrigation season. A total flow volume of 85 700 dam³ (69,480 acre-feet) was recorded at Battle Creek at International Boundary (station 11AB027) from March 1 to October 31, 2011. This volume was 166 percent of the United States allotment.

There were no deficit deliveries recorded in any of the 16 division periods during the irrigation season.

The division of the Battle Creek natural flow is summarized in Tables 4 and 4A and in 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.

Table 4: Summary of Battle Creek Division for 2011*
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	1,364	682	1,437	755	
MAR 26 - APR 9	2,124	1,062	1,142	80	
APR 10 - APR 24	19,031	9,515	14,451	4,936	
APR 25 - MAY 9	23,178	11,589	15,278	3,689	
MAY 10 - MAY 25	13,811	6,905	10,299	3,394	
MAY 26 - JUNE 9	16,809	8,404	16,437	8,033	
JUNE 10 - JUNE 24	7,111	3,556	7,080	3,524	
JUNE 25 - JULY 9	4,235	2,118	4,235	2,117	
JULY 10 - JULY 25	5,174	2,587	5,174	2,587	
JULY 26 - AUG 9	2,153	1,076	2,153	1,077	
AUG 10 - AUG 25	1,588	794	1,588	794	
AUG 26 - SEP 9	1,417	708	1,417	709	
SEP 10 - SEP 24	1,411	706	1,411	705	
SEP 25 - OCT 9	1,336	668	1,336	668	
OCT 10 - OCT 25	1,661	831	1,661	830	
OCT 26 - OCT 31	604	302	604	302	
TOTAL	103,005	51,503	85,701		

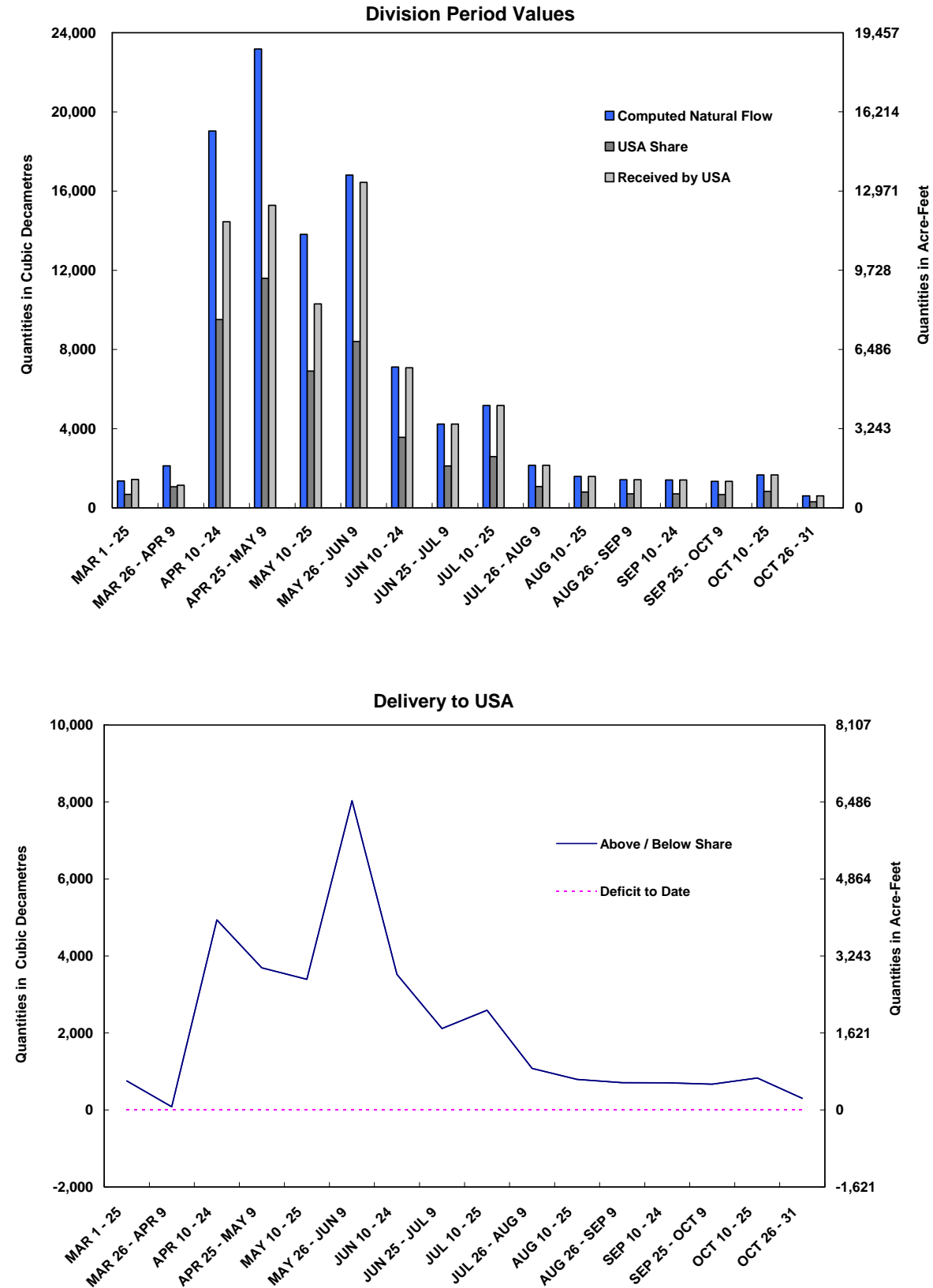
* This is a summary of data from Table 12, Appendix A. Totals and shares may not add or subtract exactly as a result of rounding.

Table 4A: Summary of Battle Creek Division for 2011*
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	1,106	553	1,165	612	
MAR 26 – APR 9	1,722	861	926	65	
APR 10 - APR 24	15,428	7,714	11,715	4,002	
APR 25 – MAY 9	18,790	9,395	12,386	2,991	
MAY 10 - MAY 25	11,197	5,598	8,349	2,752	
MAY 26 - JUNE 9	13,627	6,813	13,325	6,512	
JUNE 10 - JUNE 24	5,765	2,883	5,740	2,857	
JUNE 25 - JULY 9	3,433	1,717	3,433	1,716	
JULY 10 - JULY 25	4,195	2,097	4,195	2,097	
JULY 26 - AUG 9	1,745	872	1,745	873	
AUG 10 – AUG 25	1,287	644	1,287	644	
AUG 26 - SEP 9	1,149	574	1,149	575	
SEP 10 - SEP 24	1,144	572	1,144	572	
SEP 25 - OCT 9	1,083	542	1,083	542	
OCT 10 - OCT 25	1,347	674	1,347	673	
OCT 26 - OCT 31	490	245	490	245	
TOTAL	83,506	41,753	69,478		

* 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, 2011



FRENCHMAN RIVER

The computed natural flow of the Frenchman River at the International Boundary from March 1 to October 31, 2011 was 241 800 dam³ (196,000 acre-feet). This volume of natural flow is 319 percent of the average natural flow of the previous 71 years of record. Each country is entitled to 50 percent of the natural flow, or 120 900 dam³ (98,010 acre-feet) for the irrigation season. A total flow of 223 000 dam³ (180,800 acre-feet) was recorded at Frenchman River at International Boundary (station 11AC041) from March 1 to October 31. This volume was 184 percent of the United States allotment.

Deficit deliveries were recorded in 2 of 16 division periods during the irrigation season. There was no outstanding deficit at the end of October 2011.

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 2011*
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	449	225	792	567	
MAR 16 - MAR 31	2,780	1,390	3,105	1,715	
APR 1 - APR 15	40,241	20,120	36,767	16,647	
APR 16 - APR 30	62,228	31,114	69,517	38,403	
MAY 1 - MAY 15	55,157	27,579	38,137	10,558	
MAY 16 - MAY 31	19,917	9,958	18,439	8,481	
JUNE 1 - JUNE 15	23,532	11,766	23,691	11,925	
JUNE 16 - JUNE 30	16,672	8,336	16,748	8,412	
JULY 1 - JULY 15	6,354	3,177	5,905	2,728	
JULY 16 - JULY 31	4,819	2,410	4,336	1,926	
AUG 1 - AUG 15	2,410	1,205	1,907	702	
AUG 16 - AUG 31	2,543	1,271	1,332	61	
SEP 1 - SEP 15	1,669	835	510		325
SEP 16 - SEP 30	1,038	519	767	248	
OCT 1 - OCT 15	1,056	528	517		11
OCT 16 - OCT 31	898	449	544	95	
TOTAL	241,762	120,882	223,014		

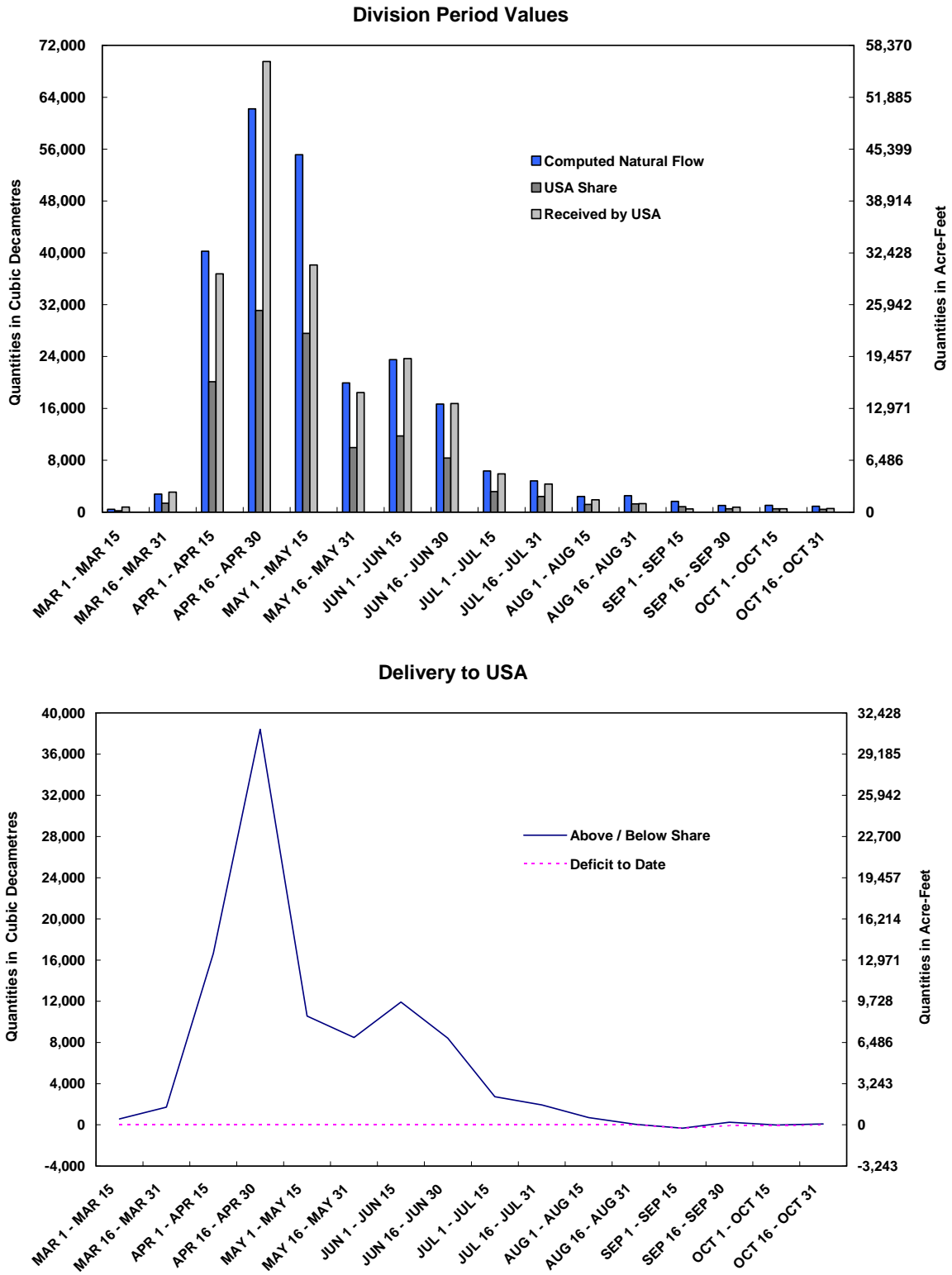
* This is a summary of data from Table 14, Appendix A. Totals and shares may not add or subtract exactly as a result of rounding.

Table 5A: Summary of Frenchman River Division for 2011*
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	364	182	642	460	
MAR 16 - MAR 31	2,254	1,127	2,517	1,390	
APR 1 - APR 15	32,623	16,311	29,807	13,496	
APR 16 - APR 30	50,448	25,224	56,357	31,133	
MAY 1 - MAY 15	44,716	22,358	30,918	8,559	
MAY 16 - MAY 31	16,147	8,073	14,948	6,876	
JUNE 1 - JUNE 15	19,077	9,539	19,206	9,668	
JUNE 16 - JUNE 30	13,516	6,758	13,578	6,820	
JULY 1 - JULY 15	5,151	2,576	4,787	2,212	
JULY 16 - JULY 31	3,907	1,954	3,515	1,561	
AUG 1 - AUG 15	1,954	977	1,546	569	
AUG 16 - AUG 31	2,062	1,030	1,080	49	
SEP 1 - SEP 15	1,353	677	413		263
SEP 16 - SEP 30	842	421	622	201	
OCT 1 - OCT 15	856	428	419		9
OCT 16 - OCT 31	728	364	441	77	
TOTAL	195,996	97,999	180,797		

* 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, 2011



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;

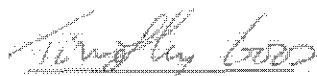
And whereas, Canada finds it beneficial to use more than its share of the Milk River in the June-September period each year to supply water to Canadian Milk River irrigators;

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 dam³) 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 dam³) 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 dam³) 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 dam³). Deficit deliveries greater than the allowed cumulative total of 4,000 cfs-days (9 800 dam³) 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 dam³), 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 dam³) 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 dam³) 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 dam³). Deficit deliveries greater than the allowed total of 2,000 cfs-days (4 900 dam³) 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 dam³) 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

Letter of Intent Respecting the Eastern Tributaries of the Milk River Streamflow Transfers

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LETTER OF INTENT
TO
BETTER UTILIZE THE WATERS OF THE EASTERN TRIBUTARIES OF THE
MILK RIVER

Whereas, the Boundary Waters Treaty of 1909 and the International Joint Commission Order of 1921 authorize 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 the Eastern Tributaries of the Milk River;

And, whereas the Order of 1921 identifies an equal-sharing arrangement as the basis for apportionment on the Eastern Tributaries;

And, whereas apportionment procedures have been developed and accepted identifying the manner in which the equal-sharing arrangement is to be met;

And whereas, Canada and the United States have identified that beneficial use of the respective shares of the waters of both countries may be improved by providing for increased flexibility in the application of the accepted procedures;

It is therefore ordered and directed by the Accredited Officers that:

1. Acceptable means by which to provide increased flexibility and benefit may include:

For all formally apportioned Eastern Tributaries

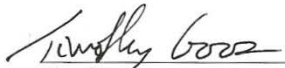
- a. Management of deficit deliveries to allow for prolonged periods of deficit storage in Canadian reservoirs in the Province of Saskatchewan, interim partial deficit discharge, and release rates coordinated with downstream Montana needs and uses where such operations would provide mutually determined and incidental benefits.

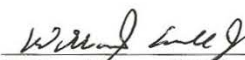
For the Frenchman River Tributary

- b. Notwithstanding that reasonable water-management operations will be made by Canada to balance outstanding deficits, residual season-end deficits of less than 300 dam³ (240 acre-feet) shall be allowed and forgiven if live-channel flow at the international boundary is anticipated to continue beyond the apportionment season.

For the Lodge/Middle Creek Tributary

- c. Notwithstanding that reasonable water-management operations will be made by Canada to balance outstanding deficits, small deficits on the order of 200 dam³ (160 acre-feet) which arise in the latter apportionment season shall be concluded by mutual agreement, giving due consideration to factors including, but not limited to, available Canadian storage in Saskatchewan reservoirs, existing channel conditions, and beneficial use of the deficit volume. Where it is concluded that a specified deficit volume cannot reasonably and beneficially be offset by a release from Canadian storage, the deficit volume shall be allowed and forgiven.
2. Mutual agreement for the extent and application of Clause 1 above shall be determined by designates of Montana Department of Natural Resources and Conservation (DNRC) and the Saskatchewan Watershed Authority. The intended actions determined by mutual agreement shall be communicated to the Field Representatives for the United States and Canada for approval.
3. Normally accepted calculations of deficit and surplus flows shall continue to determine the apportionment balance.
4. All apportionment balances within the general limits stated in Clause 1 shall be considered resolved at the end of the apportionment season and resulting deficits shall not be carried forward to the next apportionment season.
5. In the event operations arising from Clause 1 cannot be agreed upon between the Montana DNRC and the Saskatchewan Watershed Authority, the original terms of the procedures shall be the default position. Such default may be initiated by request of the Montana DNRC or the Saskatchewan Watershed Authority to the Field Representatives for the United States and Canada.
6. Environment Canada and the U.S. Geological Survey will provide apportionment information to all parties in a timely manner. A list of the parties is included as Annex A and will be updated annually, or more often as required.
7. Termination of this Letter of Intent will be allowed upon request by either the United States or Canada notifying the other party in writing by February 1 of the year of intended termination.


Tim Goos
Accredited Officer of Her Majesty
Dated this 23 day of August, 2007


William J. Carswell Jr. for the
Accredited Officer of the United States
Dated this 11 day of September, 2007

CONTACT LIST REGARDING

LETTER OF INTENT – TO BETTER UTILIZE THE WATERS OF THE EASTERN TRIBUTARIES OF THE MILK RIVER

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John Kilpatrick (F.R.)	USGS	jmkilpat@usgs.gov	(406) 457-5902
Norm Midtlyng	USGS	nmidtlyn@usgs.gov	(406) 457-5948

Legend

ESRD	Alberta Environment and Sustainable Resource Development (formerly Alberta Environment)
ECan	Environment Canada
Montana DNRC	Montana Department of Natural Resources and Conservation
AESB	Agri-Environment Services Branch
WSA	Water Security Agency (formerly Saskatchewan Watershed Authority)
USGS	United States Geological Survey
F.R.	Field Representative

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ANNEX D

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 E

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
2011

Stations listed in downstream order

Map Index	Station Name
<u>ST. MARY RIVER BASIN</u>	
5015500	Lake Sherburne at Sherburne, Montana
5018000	St. Mary Canal at St. Mary Crossing near Babb, Montana
05AE027	St. Mary River at International Boundary
<u>MILK RIVER BASIN</u>	
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
11AA031	Milk River at Eastern Crossing of International Boundary
<u>LODGE CREEK TRIBUTARY BASIN</u>	
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
<u>BATTLE CREEK TRIBUTARY BASIN</u>	
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
<u>FRENCHMAN RIVER TRIBUTARY BASIN</u>	
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
2011

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

**Station not operated in 2011

Map Index	Station Name	Operated by
<u>ST. MARY RIVER BASIN</u>		
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
<u>MILK RIVER BASIN</u>		
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
11AA038*	Verdigris Coulee near the Mouth	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.
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SAGE CREEK TRIBUTARY BASIN

11AA026*	Sage Creek at Q Ranch near Wildhorse	Canada
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