Report to

THE INTERNATIONAL JOINT COMMISSION

On

THE DIVISION OF THE WATERS OF

THE ST. MARY AND MILK RIVERS

2009

Cover Photo:

Vir Khanna (Environment Canada) and Wayne Tice (USGS) floating the Milk River during a field study conducted in August 2007.

Photograph by Don Bischoff, 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 2009

Submitted By

Dr. Randall G. Updike

Representing the United States

And

Russell G. Boals

Representing Canada

November 2011

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, 2009.

Respectfully submitted,

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

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

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SYNOPSIS

During the 2009 irrigation season, the natural flow of the St. Mary River was 77 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, 2009, was 548 000 cubic decametres (dam^3) (444,000 acre-feet). Under the terms of the Boundary Waters Treaty, the Canadian allotment was 340 000 dam^3 (276,000 acre-feet). The total flow recorded at the International Boundary during the irrigation season was 101 percent of the Canadian allotment.

The natural flow of the Milk River during the 2009 irrigation season was 59 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, 2009, was 79 800 dam^3 (64,700 acre-feet). Under terms of the Treaty, the United States' allotment was 56 000 dam^3 (45,400 acre-feet). The United States received 134 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 16 percent of the long-term average for Lodge Creek at the International Boundary, 40 percent for Battle Creek at the International Boundary, and 44 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 95 percent, 100 percent, and 101 percent, respectively, of the United States allotment.

The annual meeting of the Field Representatives was held at Medicine Hat, Alberta on February 18, 2010. Mutual problems, future plans, and changes in computational procedures were discussed and a schedule of field operations for 2010 was adopted.

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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 2009 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.

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. The Accredited Officer of Her Majesty position was vacant in 2009 following the retirement of Mr. Tim Goos. Mr. Russell G. Boals, as the Field Representative to the Accredited Officer of Her Majesty, represented Canada's interest on behalf of the Accredited Officer of Her Majesty. This report was prepared jointly by personnel of Environment Canada, Water Survey Division, and the United States Geological Survey, under the supervision of Messrs. Kilpatrick and Boals.

The annual meeting of the Field Representatives was held in Medicine Hat, Alberta on February 18, 2010. Mutual concerns, future plans, and changes in computational procedures were discussed and a schedule of field operations for 2010 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 48 400 dam^3 (39,200 acre-feet) on October 31, 2008. Storage increased to 60 500 dam^3 (49,000 acre-feet) on February 28, 2009, when the 2009 irrigation-season began. Maximum storage was 76 900 dam^3 (62,300 acre-feet) on July 7, 2009 and storage had decreased to 16 600 dam^3 (13,500 acre-feet) by the end of irrigation releases on September 29, 2009.

Water was diverted from the St. Mary River into the Milk River via the St. Mary Canal beginning on March 19, 2009 and continued through September 27, 2009. The total flow recorded at the gauging station on the St. Mary Canal at St. Mary Crossing (station 5018500) was 242 000 dam^3 (196,000 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, 2008 to October 31, 2009 was 605 000 dam^3 (490,000 acre-feet) of which 548 000 dam^3 (444,000 acre-feet) occurred during the irrigation season, April 1 to October 31, 2009. For the irrigation season, Canada's share was 340 000 dam^3 (276,000 acre-feet) and the United States' share was 208 000 dam^3 (169,000 acre-feet). During the irrigation season, a total discharge of 345 000 dam^3 (280,000 acre-feet) was recorded at the International Boundary, which was 101 percent of the Canadian share. The computed natural flow during the irrigation season was 77 percent of the average of the previous 106 years of record.

Deficit deliveries were recorded in 4 of the 16 division periods during the 2009 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 2009, the United States accumulated a deficit on the St. Mary River of 7 710 dam^3 (6,250 acre-feet) as of May 15. The United States was allowed to apply the May 16-31 and June 1-15 surplus deliveries to reduce the deficit to 2 560 dam^3 (2,080 acre-feet) which remained in effect until September 15. A deficit of 570 dam^3 (462 acre-feet) remained after offset by remaining Canadian deficit on the Milk River was applied. No deficits remained as of October 15. The 690 dam^3 (559 acre-feet) deficit incurred due to Lake Sherburne storage during the October 16-31 period was refunded with November 1-15 surplus flows.

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 2009*
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	4,220	2,110	3,255	1,145	
MAR 16 - MAR 31	1,923	961	2,787	1,826	
APR 1 - APR 15	5,799	4,347	4,631	284	
APR 16 - APR 30	28,717	19,515	13,413		6,102
MAY 1 - MAY 15	36,349	24,284	22,679		1,605
MAY 16 - MAY 31	97,796	55,416	61,817	6,401	
JUNE 1 - JUNE 15	97,028	54,624	56,876	2,252	
JUNE 16 – JUNE 30	86,003	49,111	49,005		106
JULY 1 - JULY 15	53,735	32,975	34,232	1,257	
JULY 16 – JULY 31	47,589	30,312	31,642	1,330	
AUG 1 - AUG 15	29,629	20,914	21,670	756	
AUG 16 - AUG 31	23,502	17,438	17,685	247	
SEP 1 - SEP 15	12,618	9,466	9,601	135	
SEP 16 - SEP 30	9,973	7,481	7,587	106	
OCT 1 - OCT 15	7,474	5,604	6,202	598	
OCT 16 - OCT 31	11,693	8,770	8,080		690
TOTAL	554,048	343,328	351,162		

* 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, 2009*: 2 560 dam^3 (2,080 acre-feet) (1,047 cfs-days)
as of July 15, 2009: 2 560 dam^3 (2,080 acre-feet) (1,047 cfs-days)
as of September 15, 2009: 2 560 dam^3 (2,080 acre-feet) (1,047 cfs-days)

U.S.A. share of Milk River waters outstanding as of September 15, 2009: 1 990 dam^3 (1,610 acre-feet) (813 cfs-days)

Allowable deficit carryovers, as per 2001 Letter of Intent respecting St. Mary-Milk Rivers streamflow transfers, are:
as of May 31, 2009: 9 800 dam^3 (7,940 acre-feet) (4,000 cfs-days)
as of July 15, 2009: 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.

*The U.S.A. was allowed by Canada to apply a portion of the May 16-31 surplus flows to the outstanding deficit as favorable water supply conditions existed in the St. Mary River basin for Canada.

Table 1A Summary of St. Mary River Division for 2009*
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	3,421	1,711	2,640	928	
MAR 16 - MAR 31	1,559	779	2,259	1,480	
APR 1 - APR 15	4,701	3,524	3,754	230	
APR 16 - APR 30	23,281	15,821	10,874		4,947
MAY 1 - MAY 15	29,468	19,687	18,386		1,301
MAY 16 - MAY 31	79,283	44,926	50,115	5,189	
JUNE 1 - JUNE 15	78,661	44,284	46,109	1,826	
JUNE 16 – JUNE 30	69,723	39,814	39,728		86
JULY 1 - JULY 15	43,563	26,733	27,752	1,019	
JULY 16 – JULY 31	38,580	24,574	25,652	1,078	
AUG 1 - AUG 15	24,020	16,955	17,568	613	
AUG 16 - AUG 31	19,053	14,137	14,337	200	
SEP 1 - SEP 15	10,229	7,674	7,784	109	
SEP 16 - SEP 30	8,085	6,065	6,151	86	
OCT 1 - OCT 15	6,059	4,543	5,028	485	
OCT 16 - OCT 31	9,480	7,110	6,550		559
TOTAL	449,167	278,336	284,687		

* 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, 2009*: 2,080 acre-feet (2 560 dam^3) (1,047 cfs-days)
as of July 15, 2009: 2,080 acre-feet (2 560 dam^3) (1,047 cfs-days)
as of September 15, 2009: 2,080 acre-feet (2 560 dam^3) (1,047 cfs-days)

U.S.A. share of Milk River waters outstanding as of September 15, 2009:

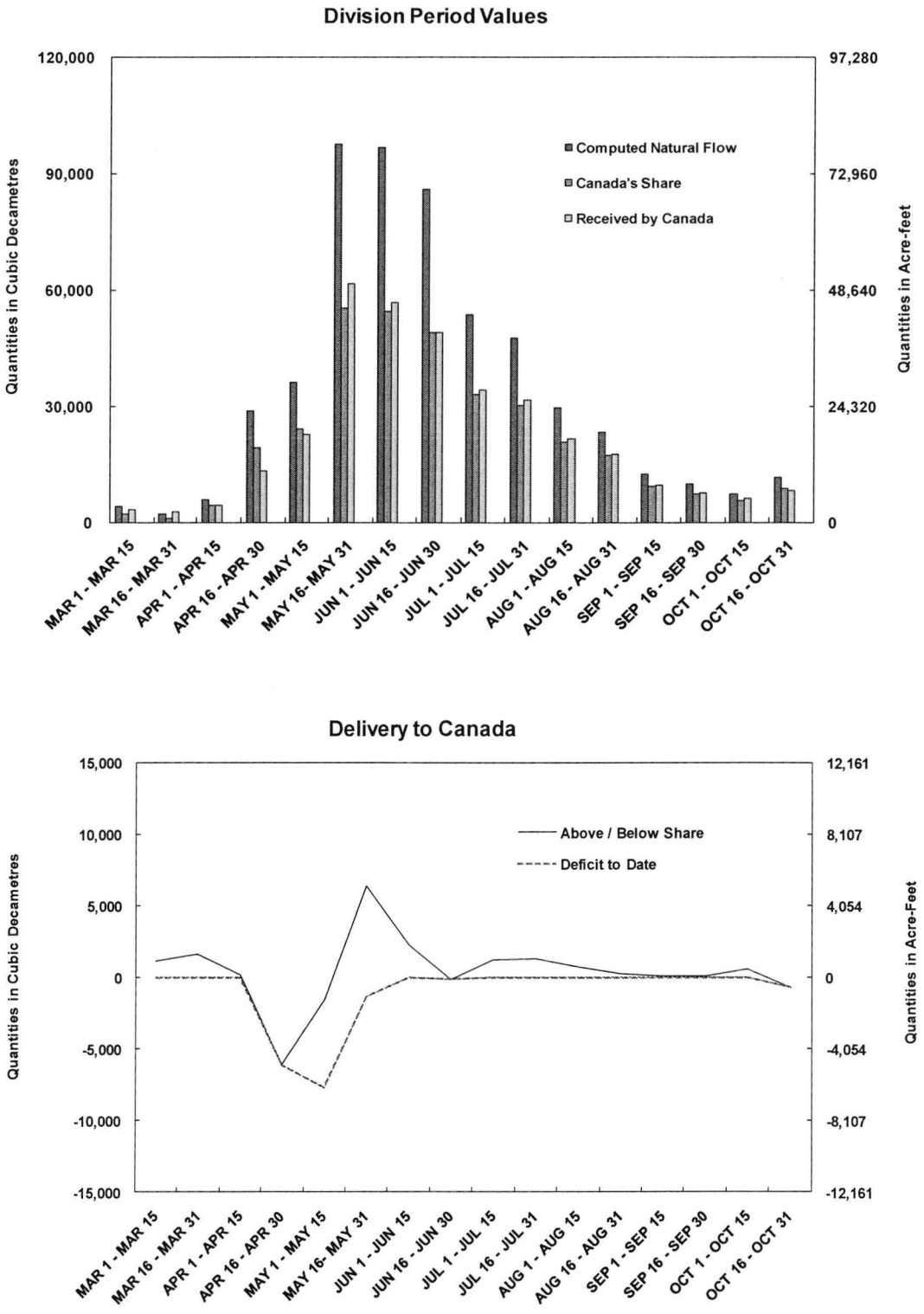
1,610 acre-feet (1 990 dam^3) (813 cfs-days)

Allowable deficit carryovers, as per 2001 Letter of Intent respecting St. Mary-Milk Rivers streamflow transfers, are:
as of May 31, 2009: 7,940 acre-feet (9,800 dam^3) (4,000 cfs-days)
as of July 15, 2009: 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.

*The U.S.A. was allowed by Canada to apply a portion of the May 16-31 surplus flows to the outstanding deficit as favorable water supply conditions existed in the St. Mary River basin for Canada.

Figure 1. St. Mary River Division, 2009



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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 2009, evapo-transpiration was estimated using the Onefour pan evaporation data as an index of Morton's model results.

During 2009, 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 (station 6135000) from March 1 to October 31, 2009 was 79 800 dam^3 (64,700 acre-feet). This flow was 59 percent of the average computed natural flow of the previous 97 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, 2009, the United States' share was 56 000 dam^3 (45,400 acre-feet) and Canada's share was 23 800 dam^3 (19,300 acre-feet). The United States received 134 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 5 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 2009, Canada accumulated a deficit on the Milk River of 1 990 dam^3 (1,610 acre-feet) as of September 15. This deficit partially offset the 2 560 dam^3 (2,080 acre-feet) deficit accumulated by the United States on the St. Mary River as of July 15.

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 2009* 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	798	399	798	399	
MAR 16 - MAR 31	14,596	7,298	14,596	7,298	
APR 1 - APR 15	9,639	7,229	9,639	2,410	
APR 16 - APR 30	12,254	9,190	12,254	3,064	
MAY 1 - MAY 15	10,043	7,515	10,043	2,528	
MAY 16 - MAY 31	10,917	8,188	9,937	1,749	
JUNE 1 - JUNE 15	8,811	6,608	7,852	1,244	
JUNE 16 – JUNE 30	2,949	2,212	2,586	374	
JULY 1 - JULY 15	485	363	0		540
JULY 16 – JULY 31	570	428	0		562
AUG 1 - AUG 15	503	377	0		419
AUG 16 - AUG 31	582	437	0		435
SEP 1 - SEP 15	1,315	986	952		34
SEP 16 - SEP 30	1,227	920	1,227	307	
OCT 1 - OCT 15	2,624	1,968	2,624	656	
OCT 16 - OCT 31	2,526	1,895	2,526	632	
TOTAL	79,838	56,013	75,033		

* 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, 2009: 1 990 dam³ (1,610 acre-feet) (813 cfs-days)

Canadian share of St. Mary R. waters deficit outstanding
as of May 31, 2009: 2 560 dam³ (2,080 acre-feet) (1,047 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 2009*
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	647	323	647	323	
MAR 16 - MAR 31	11,833	5,916	11,833	5,916	
APR 1 - APR 15	7,814	5,861	7,814	1,954	
APR 16 - APR 30	9,934	7,451	9,934	2,484	
MAY 1 - MAY 15	8,142	6,092	8,142	2,049	
MAY 16 - MAY 31	8,851	6,638	8,056	1,418	
JUNE 1 - JUNE 15	7,143	5,357	6,366	1,009	
JUNE 16 - JUNE 30	2,390	1,793	2,096	303	
JULY 1 - JULY 15	393	295	0		438
JULY 16 - JULY 31	462	347	0		456
AUG 1 - AUG 15	408	306	0		339
AUG 16 - AUG 31	472	354	0		353
SEP 1 - SEP 15	1,066	800	772		28
SEP 16 - SEP 30	995	746	995	249	
OCT 1 - OCT 15	2,127	1,595	2,127	532	
OCT 16 - OCT 31	2,048	1,536	2,048	512	
TOTAL	64,725	45,410	60,829		

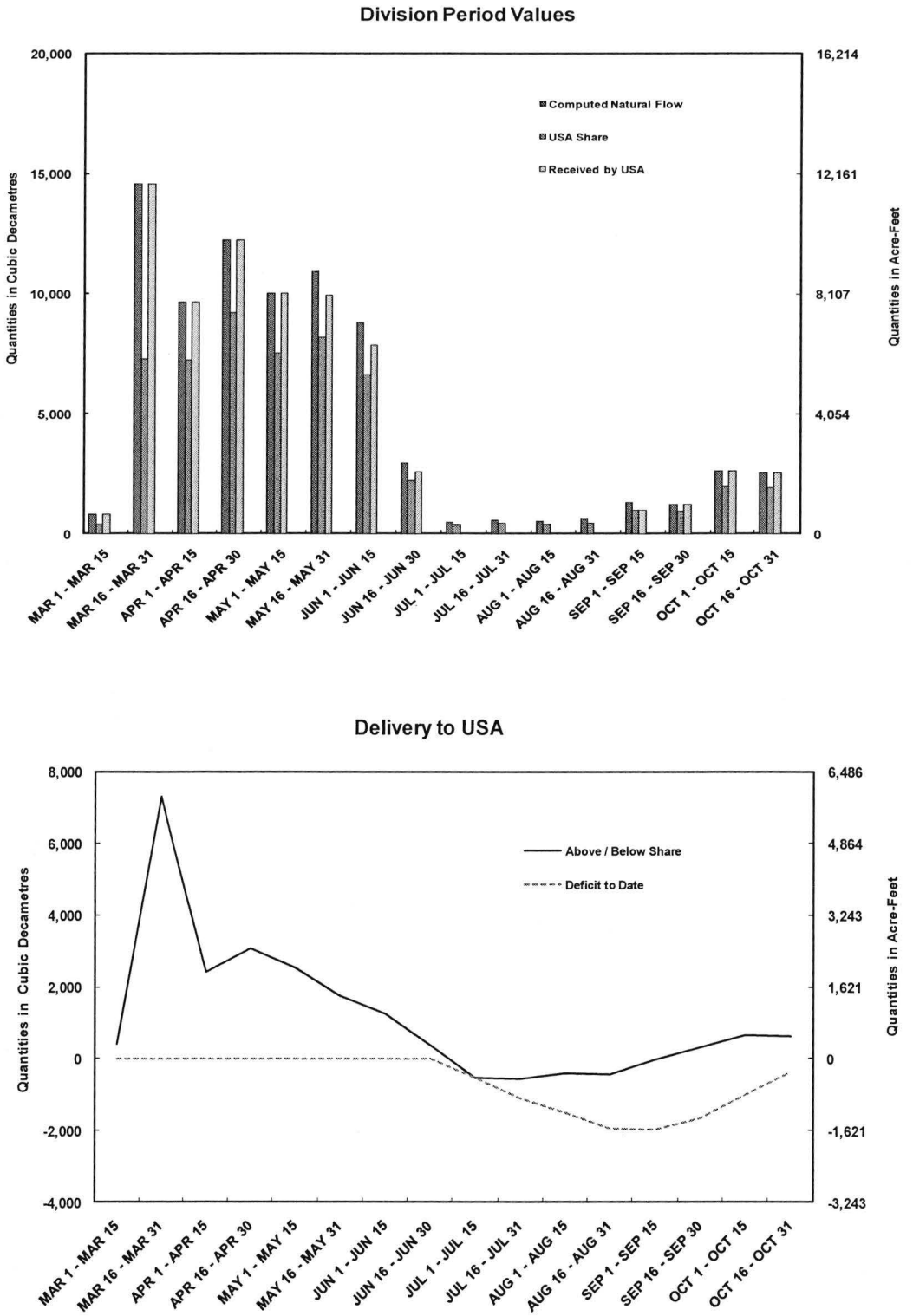
* All values are conversions of data from Table 2. Totals and shares may not add or subtract exactly as a result of rounding.

Note:
U.S.A. share of Milk River waters deficit outstanding
as of September 15, 2009: 1,610 acre-feet (1 990 dam^3) (813 cfs-days)

Canadian share of St. Mary R. waters deficit outstanding
as of May 31, 2009: 2,080 acre-feet (2 560 dam^3) (1,047 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, 2009



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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 2009.

Flows for March through October 2009 for the southern tributaries were as follows:

- Bear Creek near International Boundary – 710 dam^3 (576 acre-feet).
- Miners Coulee near International Boundary – 42 dam^3 (34 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 flows from March to October of 52 dam^3 (42 acre-feet) were recorded on Lyons Creek for the year 2009.

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 2008 – 2009 was below normal. Altawan Reservoir in the Lodge Creek basin did not fill with the spring freshet. The upper reservoirs in the Lodge Creek basin had capacity for storage this year but also saw little inflow.

At the end of the spring freshet the diversions stored in Cypress Lake were not able to support any irrigation this year and water levels remained below the dead storage elevation for the entire season. A total volume of 1 940 dam^3 (1,570 acre-feet) was diverted from Battle Creek into Cypress Lake during the season. Another 3 090 dam^3 (2,510 acre-feet) was diverted into Cypress Lake from the headwaters of the Frenchman River. The three other irrigation reservoirs located in the Frenchman River basin filled in the spring period and two half irrigations were completed, one in May and another in August. The Spangler irrigation project in the Lodge Creek basin also experienced a limited irrigation (May 18 to June 6) this season.

Summer rains did not materialize in a significant way during 2009 and the basins remained dry until late in the fall. Reservoir elevations were lower at the end of the season for all the reservoirs except for Huff Lake which ended significantly higher from where it began in February.

Outstanding deficits remained on Lodge Creek, Battle Creek, and the Frenchman River at the end of the 2009 season. An estimated 21 percent return flow factor was used for the Nashlyn area irrigation project based upon an interpretative analysis of flows between Battle Creek near Consul and Battle Creek below Nashlyn Project. Domestic use in the Battle Creek basin was determined to be 30 percent of the minor diversion use. The Nashlyn Reservoir, a small off stream reservoir, was not used for a deficit repayment release this season.

Figure 3. Reservoirs in Lodge Creek, Battle Creek, and Frenchman River Basins
Month-End Contents: 2008, 2009, and 1999-2008 Mean

Figure 3a. Altawan Reservoir

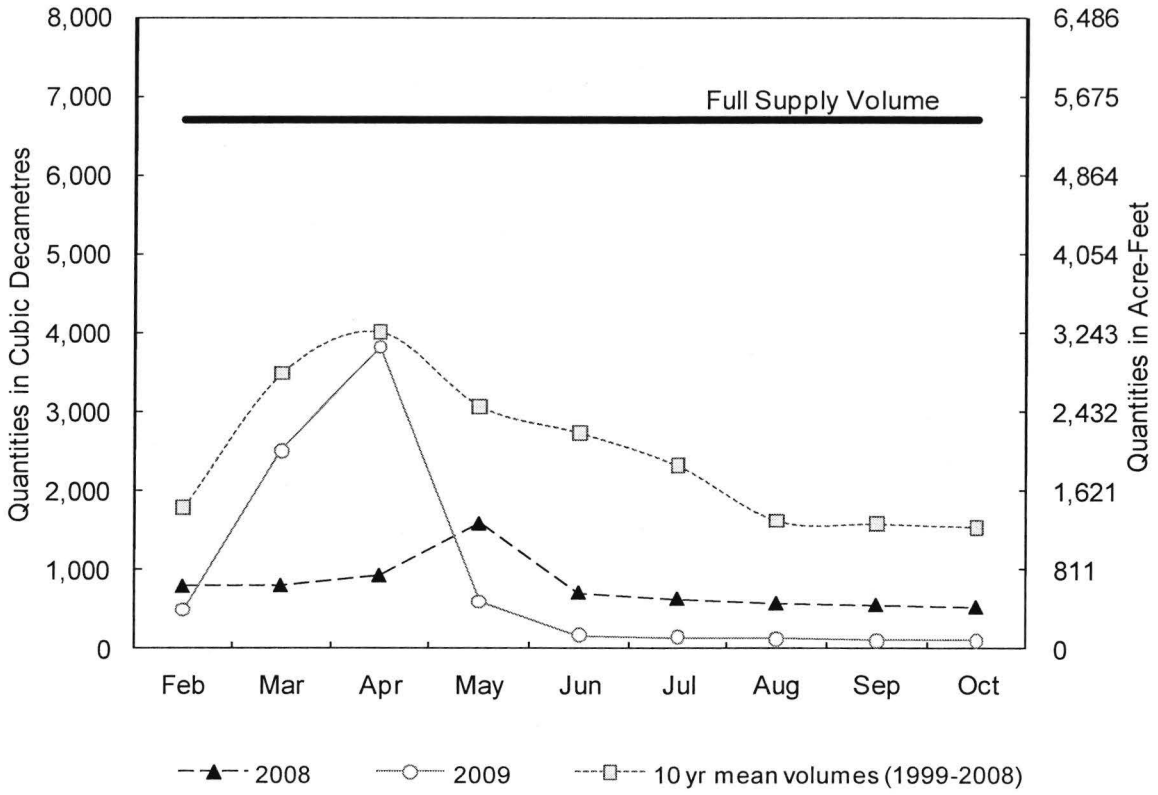


Figure 3. Reservoirs in Lodge Creek, Battle Creek, and Frenchman River Basins
Month-End Contents: 2008, 2009, and 1999-2008 Mean

Figure 3b. Cypress Lake

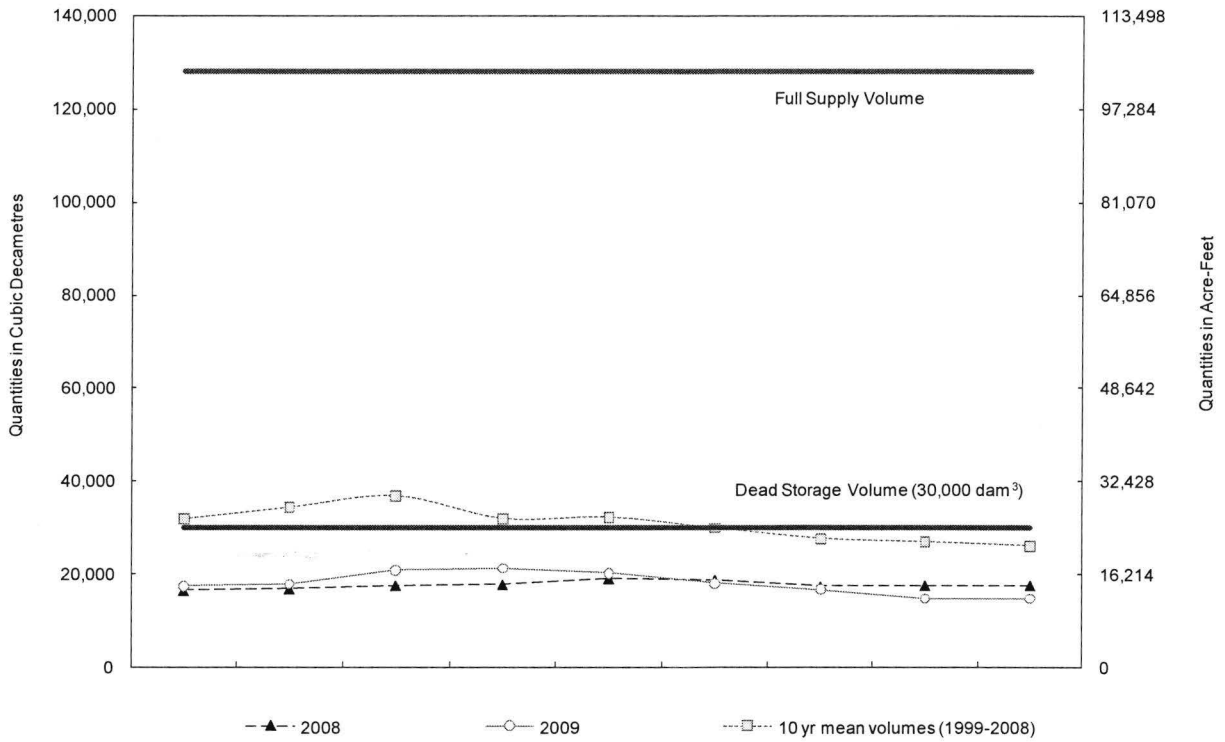


Figure 3. Reservoirs in Lodge Creek, Battle Creek, and Frenchman River Basins
Month-End Contents: 2008, 2009, and 1999-2008 Mean

Figure 3c. Eastend Reservoir

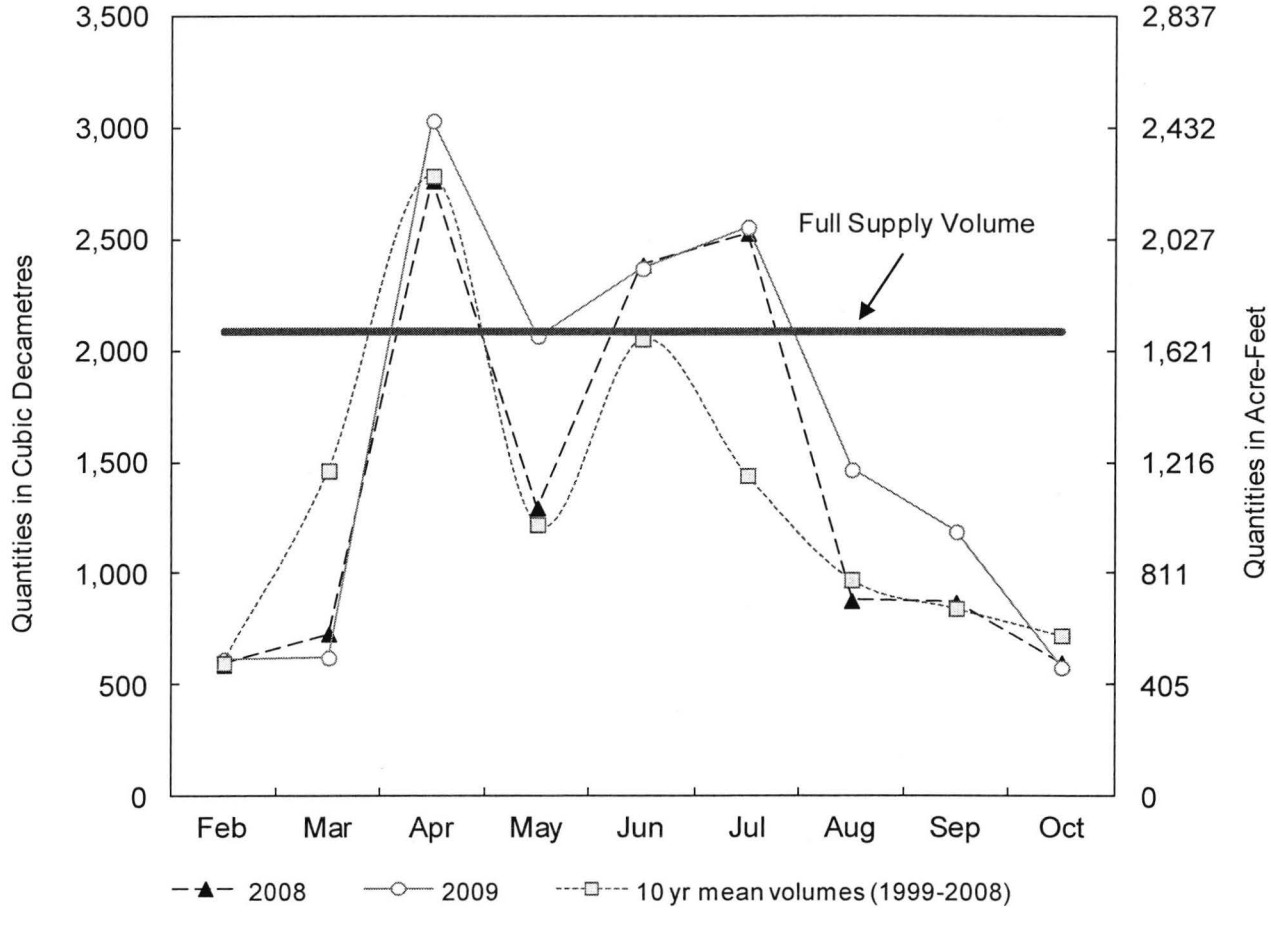
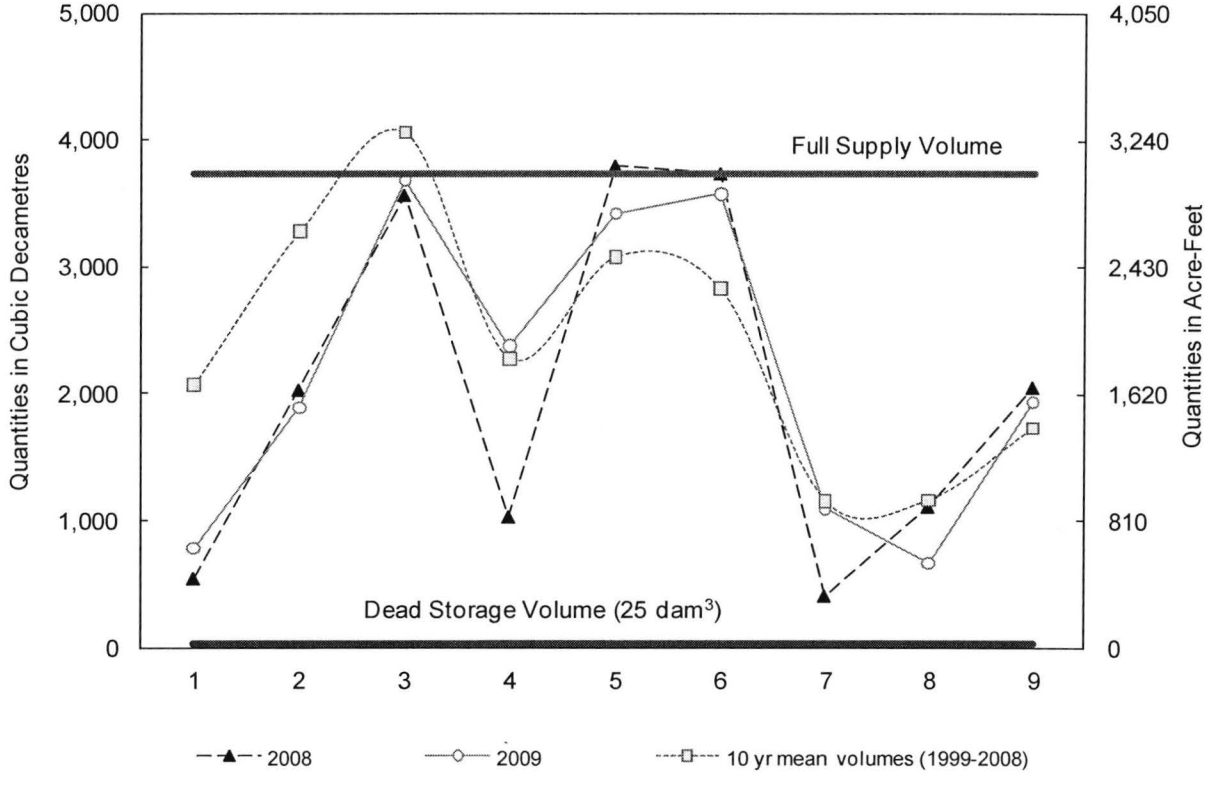


Figure 3. Reservoirs in Lodge Creek, Battle Creek, and Frenchman River Basins
Month-End Contents: 2008, 2009, and 1999-2008 Mean

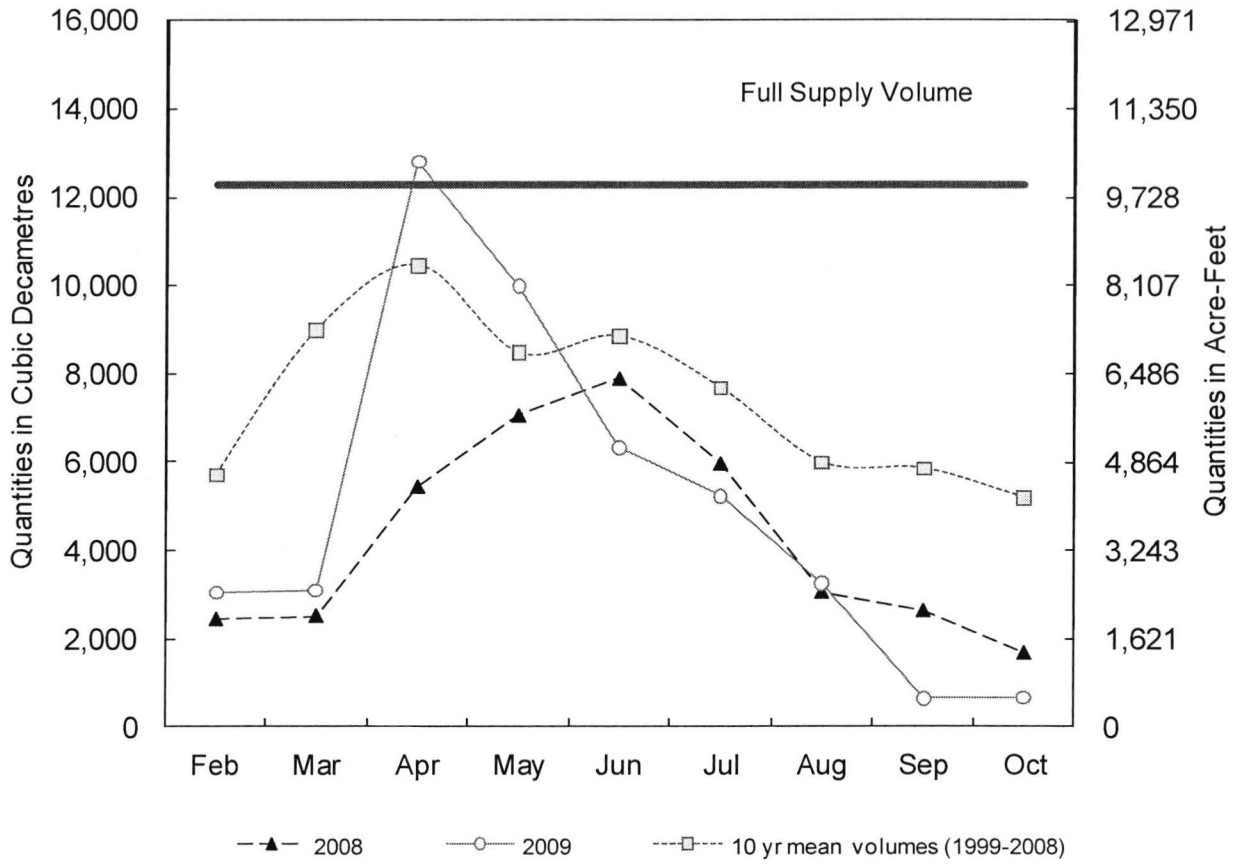
Figure 3d. Huff Lake



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: 2008, 2009, and 1999-2008 Mean

Figure 3e. Newton Lake



LODGE CREEK

The computed natural flow of Lodge Creek at the International Boundary from March 1 to October 31, 2009 was 4 640 dam^3 (3,760 acre-feet). This volume is 16 percent of the average natural flow of the previous 59 years of record. Each country is entitled to 50 percent of the natural flow, or 2 320 dam^3 (1,880 acre-feet) for the irrigation season. A total flow of 2 210 dam^3 (1,790 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 95 percent of the United States allotment.

Deficit deliveries were recorded for 4 of the 16 division periods during the irrigation season. An outstanding deficit of 109 dam^3 (88 acre-feet) remained at the end of October 2009.

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.

Table 3: Summary of Lodge Creek Division for 2009* 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		
MAR 16 – MAR 31	2,265	1,133	234		899
APR 1 - APR 15	1,750	875	165		710
APR 16 - APR 30	530	265	14		251
MAY 1 - MAY 15	0	0	1447	1447	
MAY 16 - MAY 31	28	14	350	336	
JUNE 1 - JUNE 15	2	1	2	1	
JUNE 16 - JUNE 30	67	33	0		33
JULY 1 - JULY 15	0	0	0		
JULY 16 – JULY 31	0	0	0		
AUG 1 - AUG 15	0	0	0		
AUG 16 - AUG 31	0	0	0		
SEP 1 - SEP 15	0	0	0		
SEP 16 - SEP 30	0	0	0		
OCT 1 - OCT 15	0	0	0		
OCT 16 - OCT 31	0	0	0		
TOTAL	4,642	2,321	2,212		

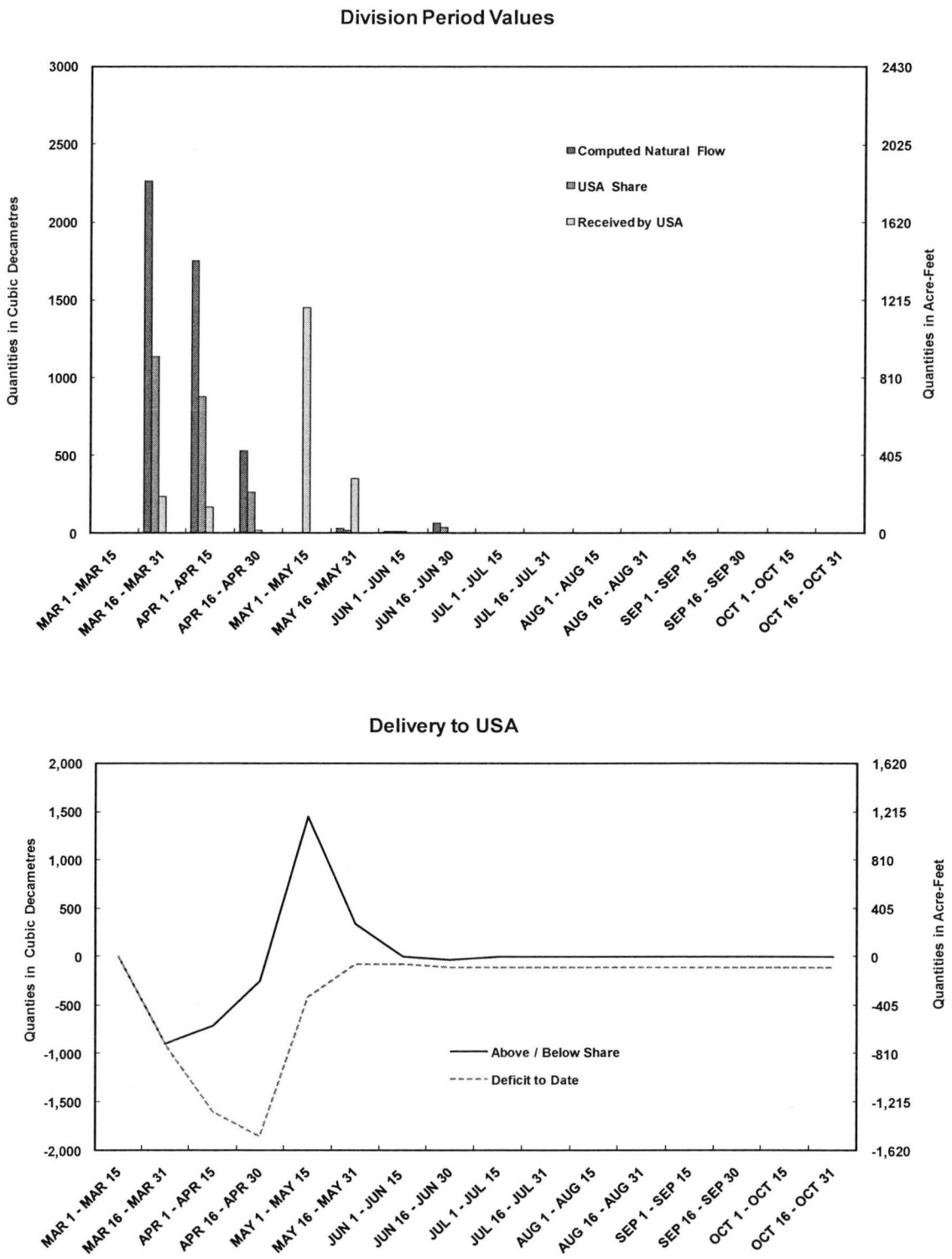
* This is a summary of data from Table 10, Appendix A. Totals and shares may not add or subtract exactly as a result of rounding.

Table 3A: Summary of Lodge Creek Division for 2009* 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		
MAR 16 - MAR 31	1,836	919	190		729
APR 1 - APR 15	1,419	709	134		576
APR 16 - APR 30	430	215	11		203
MAY 1 - MAY 15	0	0	1,173	1,173	
MAY 16 - MAY 31	23	11	284	272	
JUNE 1 - JUNE 15	2	1	2	1	
JUNE 16 - JUNE 30	54	27	0		27
JULY 1 - JULY 15	0	0	0		
JULY 16 - JULY 31	0	0	0		
AUG 1 - AUG 15	0	0	0		
AUG 16 - AUG 31	0	0	0		
SEP 1 - SEP 15	0	0	0		
SEP 16 - SEP 30	0	0	0		
OCT 1 - OCT 15	0	0	0		
OCT 16 - OCT 31	0	0	0		
TOTAL	3,763	1,882	1,793		

* 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, 2009



BATTLE CREEK

The computed natural flow of Battle Creek at the International Boundary from March 1 to October 31, 2009, was 11 730 dam^3 (9,510 acre-feet). This volume is 40 percent of the average natural flow of the previous 69 years of record. Each country is entitled to 50 percent of the natural flow, or 5 865 dam^3 (4,750 acre-feet) for the irrigation season. A total flow of 5 840 dam^3 (4,730 acre-feet) was recorded at Battle Creek at International Boundary (station 11AB027) from March 1 to October 31. This volume was 100 percent of the United States allotment.

Deficit deliveries were recorded in 4 of the 16 division periods during the March 1 to October 31 irrigation season. An outstanding deficit of 25 dam^3 (20 acre-feet) remained at end of October 2009.

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.

Table 4: Summary of Battle Creek Division for 2009* 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	171	86	23		63
MAR 26 - APR 9	1,367	684	286		398
APR 10 - APR 24	3,966	1,983	784		1,199
APR 25 – MAY 9	1,463	732	882	150	
MAY 10 - MAY 25	983	492	403		89
MAY 26 - JUNE 9	847	424	602	178	
JUNE 10 - JUNE 24	830	415	862	447	
JUNE 25 - JULY 9	374	187	374	187	
JULY 10 - JULY 25	432	216	432	216	
JULY 26 – AUG 9	101	51	101	50	
AUG 10 - AUG 25	161	81	161	80	
AUG 26 - SEP 9	254	127	156	29	
SEP 10 - SEP 24	157	79	157	78	
SEP 25 - OCT 9	93	47	93	46	
OCT 10 - OCT 25	326	163	326	163	
OCT 26 - OCT 31	200	100	200	100	
TOTAL	11,725	5,867	5,842		

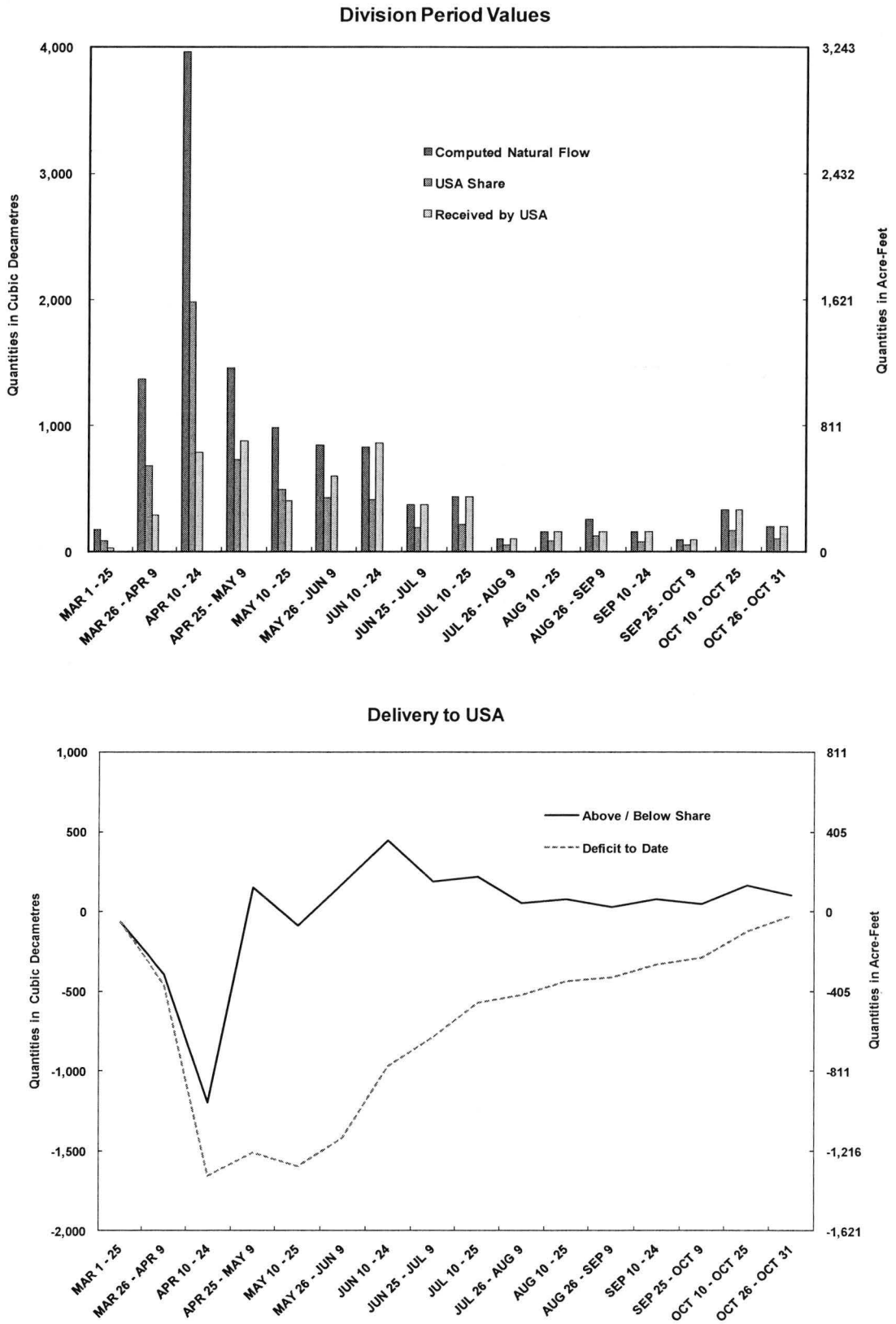
* This is a summary of data from Table 12, Appendix A. Totals and shares may not add or subtract exactly as a result of rounding.

Table 4A: Summary of Battle Creek Division for 2009* 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	139	70	19		51
MAR 26 - APR 9	1,108	555	232		323
APR 10 - APR 24	3,215	1,608	636		972
APR 25 - MAY 9	1,186	593	715	122	
MAY 10 - MAY 25	797	399	327		72
MAY 26 - JUNE 9	687	344	488	144	
JUNE 10 - JUNE 24	673	336	699	362	
JUNE 25 - JULY 9	303	152	303	152	
JULY 10 - JULY 25	350	175	350	175	
JULY 26 - AUG 9	82	41	82	41	
AUG 10 - AUG 25	131	66	131	65	
AUG 26 - SEP 9	206	103	126	24	
SEP 10 - SEP 24	127	64	127	63	
SEP 25 - OCT 9	75	38	75	37	
OCT 10 - OCT 25	264	132	264	132	
OCT 26 - OCT 31	162	81	162	81	
TOTAL	9,505	4,756	4,736		

* 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, 2009



FRENCHMAN RIVER

The computed natural flow of the Frenchman River at the International Boundary from March 1 to October 31, 2009, was 33 850 dam^3 (27 440 acre-feet). This volume of natural flow is 44 percent of the average natural flow of the previous 69 years of record. Each country is entitled to 50 percent of the natural flow, or 16 925 dam^3 (13,720 acre-feet) for the irrigation season. A total flow of 17 140 dam^3 (13,900 acre-feet) was recorded at Frenchman River at International Boundary (station 11AC041) from March 1 to October 31. This volume was 101 percent of the United States allotment.

Deficit deliveries were recorded in 7 of 16 division periods during the irrigation season. An outstanding deficit of 430 dam^3 (349 acre-feet) remained at the end of October 2009.

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 2009* 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	17	17	
MAR 16 - MAR 31	3,232	1,616	2,242	626	
APR 1 - APR 15	8,073	4,036	3,646		390
APR 16 - APR 30	12,255	6,127	1,816		4,311
MAY 1 - MAY 15	2,416	1,208	1,389	181	
MAY 16 - MAY 31	2,695	1,347	934		413
JUNE 1 - JUNE 15	1,720	860	2,509	1,649	
JUNE 16 - JUNE 30	1,424	712	1,758	1,046	
JULY 1 - JULY 15	587	293	129		164
JULY 16 - JULY 31	293	147	13		134
AUG 1 - AUG 15	0	0	209	209	
AUG 16 - AUG 31	501	251	192		59
SEP 1 - SEP 15	9	5	1,599	1,594	
SEP 16 - SEP 30	0	0	674	674	
OCT 1 - OCT 15	9	5	9	4	
OCT 16 – OCT 31	638	319	3		316
TOTAL	33,852	16,926	17,139		

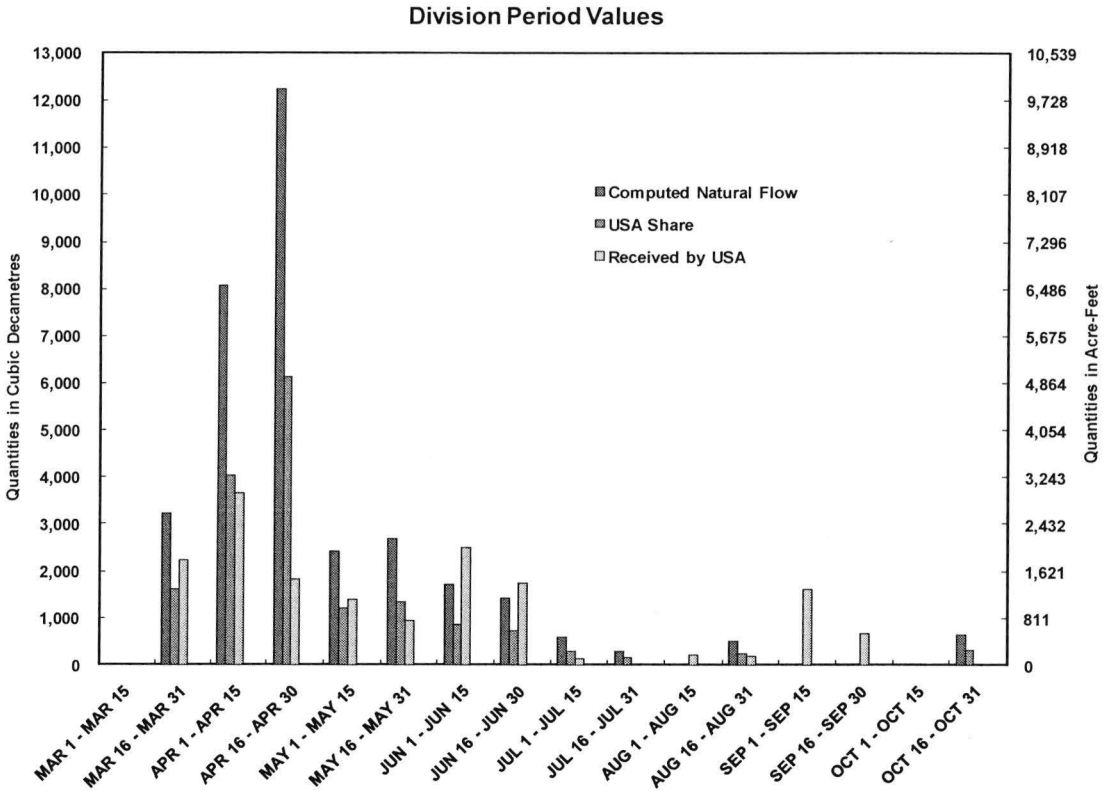
* This is a summary of data from Table 14, Appendix A. Totals and shares may not add or subtract exactly as a result of rounding.

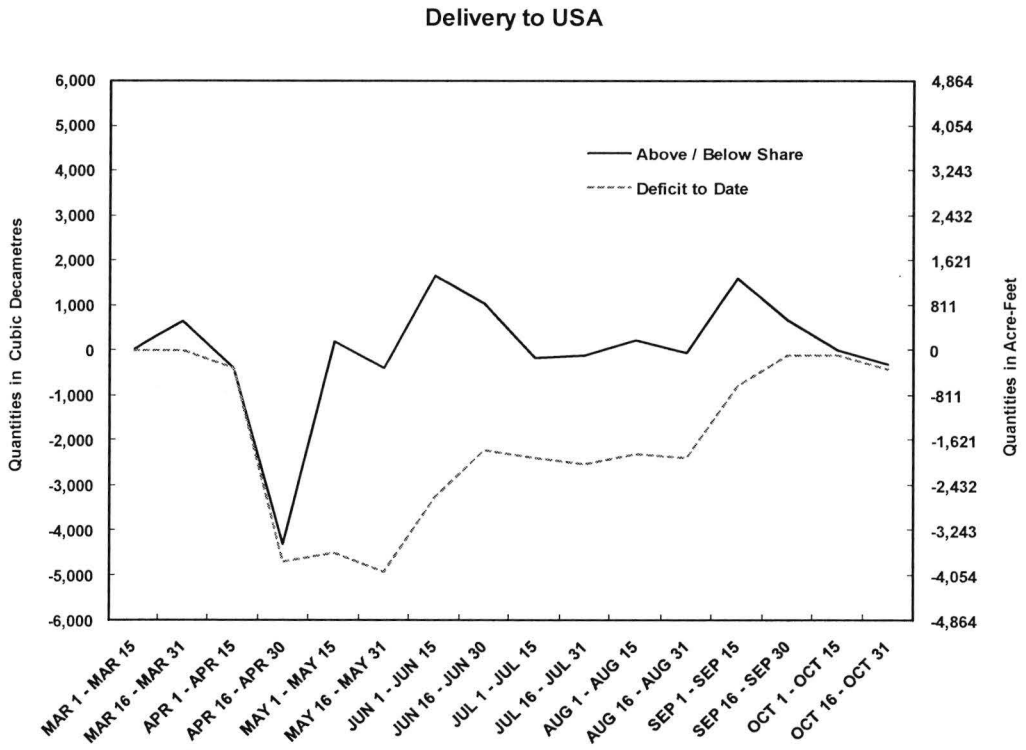
Table 5A: Summary of Frenchman River Division for 2009* Quantities in Acre-Feet

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	14	14	
MAR 16 - MAR 31	2,620	1,310	1,818	507	
APR 1 - APR 15	6,545	3,272	2,956		316
APR 16 - APR 30	9,935	4,967	1,472		3,495
MAY 1 - MAY 15	1,959	979	1,126	147	
MAY 16 - MAY 31	2,185	1,092	757		335
JUNE 1 - JUNE 15	1,394	697	2,034	1,337	
JUNE 16 - JUNE 30	1,154	577	1,425	848	
JULY 1 - JULY 15	476	238	105		133
JULY 16 - JULY 31	238	119	11		109
AUG 1 - AUG 15	0	0	169	169	
AUG 16 - AUG 31	406	203	156		48
SEP 1 - SEP 15	7	4	1,296	1,292	
SEP 16 - SEP 30	0	0	546	546	
OCT 1 - OCT 15	7	4	7	3	
OCT 16 – OCT 31	517	259	2		256
TOTAL	27,444	13,722	13,895		

* 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, 2009





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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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Letter of Intent to Better Utilize the Waters of the St. Mary and Milk Rivers

Decision as the Result of the August 18, 2009 Conference Call

Under the Terms of the "Letter of Intent to Better Utilize the Waters of the St. Mary and Milk Rivers" signed by or for the Accredited Officers for both the United States and Canada on February 8, 2001:

> *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.*

A conference call between the Field Representatives and Interested Parties was held on August 18, 2009 to review the state of the deliveries for the St. Mary River and for the Milk River. As of the August 15, 2009 the estimated deficits under the Letter of Intent are 2,958 cfs-days for the United States on the St. Mary River and 657 cfs-days for Canada on the Milk River.

The "Letter of Intent" explains:

> *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.*

However due to the favourable water supply conditions for the Alberta portion of the St. Mary River basin and the limited water supply conditions in United States portion of the Milk River basin, the Field Representatives agree that a portion of the 2226 cfs-days over-delivery during the period May 16 to 31 will be applied against United States deficit delivery under the Letter of Intent for the St. Mary River reducing the deficit to 1047 cfs-days.

Agreed to this 18th day of August 2009 by;

John Kilpatrick

Field Representative for the United States

Russell Boals P.Eng.

Field Representative for Canada

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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 dam^3 (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 dam^3 (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

ANNEX "A"

CONTACT LIST REGARDING

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

Name	Organization	Email/Fax	Phone
Sal Figliuzzi	AE	sal.figliuzzi@gov.ab.ca	(780) 427-2621
Werner Herrera	AE	werner.herrera@gov.ab.ca	(403) 381-5992
Russell Boals (F.R.)	ECan	russ.boals@ec.gc.ca	(306) 780-5338
Greg MacCulloch	ECan	greg.macculloch@ec.gc.ca	(403) 292-5409
Whit Wyatt	ECan	whit.wyatt@ec.gc.ca	(306) 780-5023
Marv Cross	Montana DNRC	mcross@mt.gov	(406) 265-5516
Bob L. Larson	Montana DNRC	blarson@mt.gov	(406) 265-5516
Larry Dolan	Montana DNRC	ldolan@mt.gov	(406) 444-6627
Ira Blakley	AESB	ira.blakley@agr.gc.caFax	(306) 299-2041 (306) 299-2040
Ron Magee	AESB	ron.magee@agr.gc.caFax	(306) 298-2050 (306) 298-2131
Larry Verpy	AESB	larry.verpy@agr.gc.caFax	(306) 295-3268 (306) 295-3252
Kevin Wingert	SWA	kevin.wingert@swa.ca	(306) 778-8335
Gord Hagen	SWA	gord.hagen@swa.ca	(306) 778-8266
Rob Wiebe	AESB	robert.wiebe@agr.gc.ca	(306) 778-5025
John Kilpatrick (F.R.)	USGS	jmkilpat@usgs.gov	(406) 457-5902
Norm Midtlyng	USGS	nmidtlyn@usgs.gov	(406) 457-5948

Legend

AE	Alberta Environment
ECan	Environment Canada
Montana DNRC	Montana Department of Natural Resources and Conservation
AESB	Agri-Environment Services Branch
SWA	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
2009

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
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
2009

*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
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.
	SAGE CREEK TRIBUTARY BASIN	
11AA026*	Sage Creek at Q Ranch near Wildhorse	Canada