Report to

THE INTERNATIONAL JOINT COMMISSION

on

THE DIVISION OF THE WATERS OF

THE ST. MARY AND MILK RIVERS

1992

Cover photo:

Reesor Lake, August 1992 (upper end of the Battle Creek Basin)
Photo by Whitlow Wyatt, Water Resources Branch, Environment Canada, Regina, Saskatchewan.

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1992

by

Philip Cohen

representing the United States

and

R.A. Halliday

representing Canada

March 1993

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

Gentlemen:

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, 1992.

Respectfully submitted,

Philip Cohen
Accredited Officer of the United States

R.A. Halliday
Accredited Officer of Her Majesty

SYNOPSIS

During the 1992 irrigation season, the natural flow of the St. Mary and Milk rivers was 67 percent and 28 percent, respectively, 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, 1992, was 478 000 cubic decametres (dam^3) (388,000 acre-feet). Under the terms of the Boundary Waters Treaty, the Canadian share was 314 000 dam^3 (255,000 acre-feet). The total flow recorded at the International Boundary during the irrigation season was 103 percent of the Canadian allotment.

The natural flow of the Milk River at the eastern crossing of the International Boundary from March 1 to October 31, 1992, was 38 900 dam^3 (31,500 acre-feet). Under the terms of the Treaty, the United States' allotment was 26 900 dam^3 (21,800 acre-feet). The United States received 136 percent of its allotment at Eastern Crossing, in addition to its share of St. Mary River water diverted into the Milk River by the St. Mary Canal.

The March to October natural flows of the three apportioned tributaries of the Milk River; Lodge Creek, Battle Creek, and Frenchman River; were 1 percent, 24 percent, and 14 percent respectively of the long term averages. The natural flow on Lodge Creek was the lowest in the period of record. No flow was recorded on Lodge Creek at the International Boundary and a minor deficit remained at the end of the season.

The annual meeting of the Field Representatives was held in Cypress Hills Provincial Park, Saskatchewan on February 2, 1993. Mutual problems, future plans, and changes in computational procedures were discussed and a schedule of field operations for 1993 was adopted. Streamflow records and natural flow computations collected jointly by the United States and Canada were reviewed and approved at the meeting and through correspondence after the meeting.

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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. Copies of Article VI and the 1921 Order are contained in Annex A of this report.

To comply with this Treaty, Field Representatives of the United States and Canada collected and compiled hydrometric data at 42 international gauging stations on a co-operative basis. An additional 29 gauging stations were operated independently by the United States or Canada to obtain data on diversions, reservoir contents, return flows and index runoff. Most of this additional information was used to improve the accuracy of natural flow computations.

This report summarizes the 1992 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 established by the International Joint Commission, this report uses SI units first, followed by inch-pound units in parentheses. Data in tables are shown in SI units first, followed by the respective inch-pound units (for example, Tables 1 and 1A). The format for Appendices A and B of the report is SI units only. All Canadian data are collected, computed and published in SI units. The United States' data, which are collected and computed in inch-pound units, were converted to SI units using the appropriate conversions. A summary of the conversion factors is contained in Annex B.

Mr. R.A. Halliday, as Accredited Officer of Her Majesty, was represented in the field by Mr. G.H. Morton, Chief, Water Resources Branch, Calgary, Alberta and Mr. R.G. Boals, Chief, Water Resources Branch, Regina, Saskatchewan. Mr. Philip Cohen, Chief

Hydrologist, United States Geological Survey, as Accredited Officer of the United States, was represented in the field by Mr. J.A. Moreland, District Chief, United States Geological Survey, Helena, Montana. This report was prepared jointly by personnel of Environment Canada, Water Resources Branch and the United States Geological Survey, under the supervision of Messrs. Morton, Boals and Moreland.

The annual meeting of the Field Representatives was held in Cypress Hills Provincial Park, Saskatchewan, on February 2, 1993. Mutual problems, future plans, and changes in computational procedures were discussed and a schedule of field operations for 1993 was adopted.

Streamflow records and natural flow computations collected jointly by the United States and Canada were reviewed and approved at the meeting and through correspondence after the meeting.

ST. MARY RIVER

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

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

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

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

Storage in Lake Sherburne (station 05AE036) was 25 900 dam^3 (21,000 acre-feet) on October 31, 1991 and increased to 36 400 dam^3 (29,500 acre-feet) on February 28, 1992 when releases began. It subsequently decreased to 15 800 dam^3 (12,800 acre-feet) on March 31, 1992, just prior to the commencement of the irrigation season. Maximum storage

was 44 000 dam^3 (35,700 acre-feet) on July 6, 1992 and storage decreased to 27 000 dam^3 (21,900 acre-feet) by the end of the irrigation season on October 31, 1992.

Water was diverted from the St. Mary River into the Milk River via the St. Mary Canal from March 2 to August 27, 1992. The total flow recorded at the gauging station on the St. Mary Canal at St. Mary Crossing (station 05AE029) was 170 000 dam^3 (138,000 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 Canal was shut down for repairs June 15 - 27, 1992, due to a breach in the canal bank.

The computed natural flow of the St. Mary River at the International Boundary from November 1, 1991 to October 31, 1992 was 537 000 dam^3 (435,000 acre-feet) of which 478 000 dam^3 (388,000 acre-feet) occurred during the irrigation season, April 1 to October 31, 1992. For the irrigation season, Canada's and the United States' shares were 314 000 dam^3 (255,000 acre-feet) and 164 000 dam^3 (133,000 acre-feet) respectively. A total discharge of 323 000 dam^3 (262,000 acre-feet) was recorded at the International Boundary, which was 103 per cent of the Canadian share. The computed natural flow during the irrigation season was 67 per cent of the average of the previous 89 years of record.

Deficit deliveries were recorded in 6 of the 14 division periods during the 1992 irrigation season. Deficits which occurred in April and May were refunded by the end of June. July and September deficits were refunded in subsequent division periods.

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
SUMMARIES OF ST. MARY RIVER DIVISION FOR 1992[1]
QUANTITIES IN CUBIC DECAMETRES

DIVISION PERIOD AT INTERNATIONAL BOUNDARY	COMPUTED NATURAL FLOW	CANADA'S SHARE	RECEIVED BY CANADA	RECEIVED BY CANADA	
				ABOVE SHARE	BELOW SHARE
APR 1 - APR 15	14 306	10 727	9 807		920
APR 16 - APR 30	27 648	19 669	18 384		1 285
MAY 1 - MAY 15	68 671	40 444	37 456		2 988
MAY 16 - MAY 31	57 902	35 468	36 616	1 148	
JUN 1 - JUN 15	57 432	34 826	36 768	1 942	
JUN 16 - JUN 30	62 959	37 586	47 399	9 813	
JUL 1 - JUL 15	44 098	28 157	27 942		215
JUL 16 - JUL 31	30 137	21 513	21 804	291	
AUG 1 - AUG 15	18 489	13 867	13 875	8	
AUG 16 - AUG 31	17 777	13 183	13 654	471	
SEP 1 - SEP 15	13 135	9 852	9 723		129
SEP 16 - SEP 30	20 626	15 138	12 798		2 340
OCT 1 - OCT 15	24 177	17 774	20 517	2 743	
OCT 16 - OCT 31	20 934	15 700	16 147	447	
TOTAL	478 291	313 904	322 890		

[1]This is a summary of data from Table 6, Appendix A.

TABLE 1A
SUMMARIES OF ST. MARY RIVER DIVISION FOR 1992[1]
QUANTITIES IN ACRE-FEET

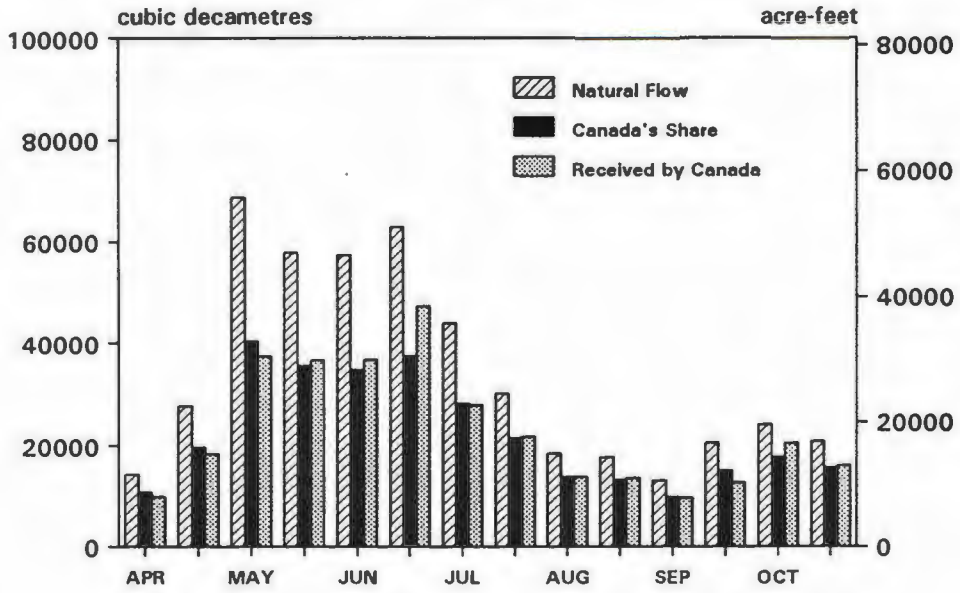
DIVISION PERIOD AT INTERNATIONAL BOUNDARY	COMPUTED NATURAL FLOW	CANADA'S SHARE	RECEIVED BY CANADA	RECEIVED BY CANADA	
				ABOVE SHARE	BELOW SHARE
APR 1 - APR 15	11,598	8,696	7,951		746
APR 16 - APR 30	22,414	15,946	14,904		1,042
MAY 1 - MAY 15	55,672	32,788	30,366		2,422
MAY 16 - MAY 31	46,941	28,754	29,685	931	
JUN 1 - JUN 15	46,560	28,233	29,808	1,574	
JUN 16 - JUN 30	51,041	30,471	38,426	7,955	
JUL 1 - JUL 15	35,750	22,827	22,653		174
JUL 16 - JUL 31	24,432	17,441	17,677	236	
AUG 1 - AUG 15	14,989	11,242	11,248	6	
AUG 16 - AUG. 31	14,412	10,687	11,069	382	
SEP 1 - SEP 15	10,649	7,987	7,882		105
SEP 16 - SEP 30	16,721	12,272	10,375		1,897
OCT 1 - OCT 15	19,600	14,409	16,663	2,224	
OCT 16 - OCT 31	16,971	12,728	13,090	362	
TOTAL	387,751	254,482	261,767		

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

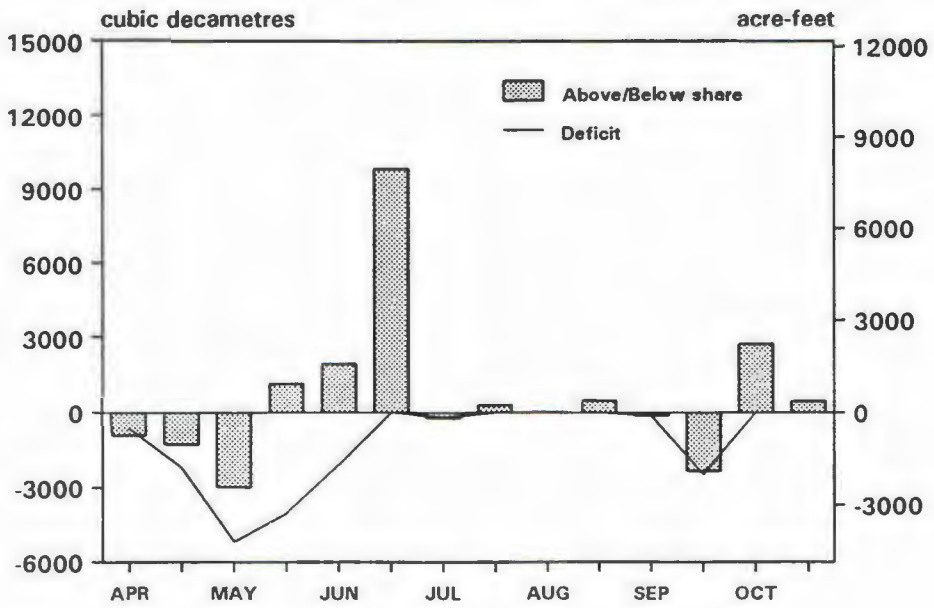
FIGURE 1

ST. MARY RIVER DIVISION, 1992

Period Values



Excess/Deficit Delivery to Canada



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 meters 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-seventies, uses of the natural flow of the Milk River by Canada and the United States 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 sprinkler 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 interbasin transfer of water in Canada. An additional refinement was made in 1988 when F. I. Morton's evapotranspiration model replaced the adjusted pan evaporation method in the natural flow computations. During 1992, the United States' and Canada's respective estimated consumptive uses were 5 050 dam^3 (4,090 acre-feet) and 5 160 dam^3 (4,180 acre-feet) respectively. An interbasin transfer of 2 980 dam^3 (2,420 acre-feet) from Verdigris Coulee near the Mouth (station 11AA038) was credited to the Canadian consumptive use.

The computed natural flow of the Milk River at the Eastern Crossing of the International Boundary from March 1 to October 31, 1992 was 38 900 dam^3 (31,500 acre-feet). This flow was 28 percent of the average computed natural flow of the previous 80 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 flows of previous years. The respective shares of the United States and Canada were 26 900 dam^3 (21,800 acre-feet) and 12 000 dam^3 (9,730 acre-feet).

The division of Milk River natural flow is summarized in Tables 2 and 2A and Figure 2 which follow. The detailed computation of 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 1992[1]
QUANTITIES IN CUBIC DECAMETRES

DIVISION PERIOD AT INTERNATIONAL BOUNDARY	COMPUTED NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 15	6 130	3 065	6 131	3 066	
MAR 16 - MAR 31	2 937	1 469	3 069	1 600	
APR 1 - APR 15	2 033	1 525	2 280	755	
APR 16 - APR 30	2 174	1 630	2 429	799	
MAY 1 - MAY 15	574	431	744	313	
MAY 16 - MAY 31	1 230	922	319		603
JUN 1 - JUN 15	1 524	1 143	590		553
JUN 16 - JUN 30	4 499	3 375	4 164	789	
JUL 1 - JUL 15	5 085	3 814	4 628	814	
JUL 16 - JUL 31	1 823	1 367	1 322		45
AUG 1 - AUG 15	1 842	1 382	1 620	238	
AUG 16 - AUG 31	1 525	1 144	1 260	116	
SEP 1 - SEP 15	2 694	2 021	2 764	743	
SEP 16 - SEP 30	1 484	1 113	1 857	744	
OCT 1 - OCT 15	1 156	867	1 347	480	
OCT 16 - OCT 31	2 185	1 639	2 190	551	
TOTAL	38 895	26 907	36 714		

[1] This is a summary of data from Table 8, Appendix A.

TABLE 2A
SUMMARY OF MILK RIVER DIVISION FOR 1992[1]
QUANTITIES IN ACRE-FEET

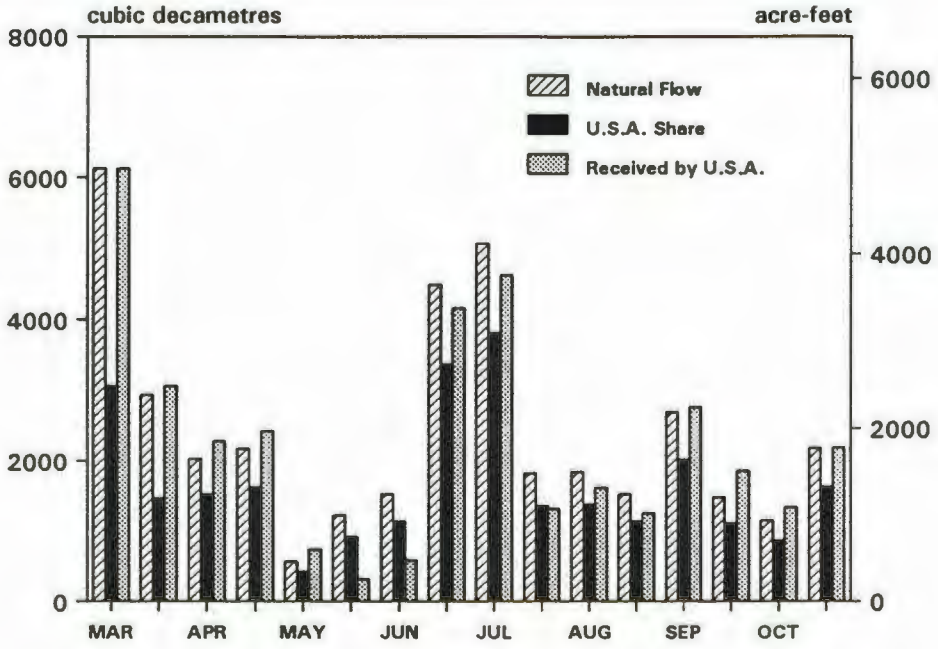
DIVISION PERIOD AT INTERNATIONAL BOUNDARY	COMPUTED NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 15	4,970	2,485	4,970	2,486	
MAR 16 - MAR 31	2,381	1,191	2,488	1,297	
APR 1 - APR 15	1,649	1,236	1,848	612	
APR 16 - APR 30	1,762	1,322	1,969	648	
MAY 1 - MAY 15	466	349	603	254	
MAY 16 - MAY 31	997	748	259		489
JUN 1 - JUN 15	1,235	926	478		448
JUN 16 - JUN 30	3,648	2,736	3,376	640	
JUL 1 - JUL 15	4,122	3,092	3,752	660	
JUL 16 - JUL 31	1,478	1,108	1,072		37
AUG 1 - AUG 15	1,493	1,120	1,313	193	
AUG 16 - AUG 31	1,236	927	1,021	94	
SEP 1 - SEP 15	2,184	1,638	2,241	602	
SEP 16 - SEP 30	1,203	902	1,505	603	
OCT 1 - OCT 15	937	703	1,092	389	
OCT 16 - OCT 31	1,771	1,329	1,775	446	
TOTAL	31,532	21,814	29,764		

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

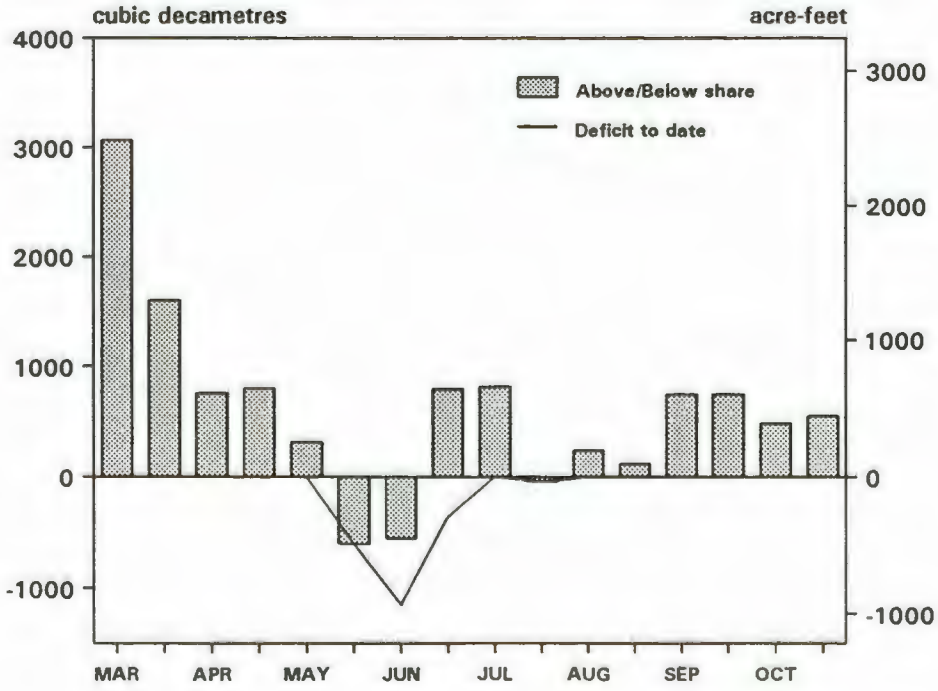
FIGURE 2

MILK RIVER DIVISION, 1992

Period Values



Excess/Deficit Delivery to the U.S.A.



SOUTHERN TRIBUTARIES OF THE MILK RIVER

Division of the waters of the southern tributaries of the Milk River is not clearly defined in the 1921 Order of the International Joint Commission. At its executive session on December 8, 1986, the Commission agreed, in principle, that the issue of the utilization of the southern tributaries should be addressed in an informal, pragmatic manner. Accordingly, the Commission instructed the Accredited Officers to proceed with discussions with the goal of determining an early solution. To assist them in implementing the Commission's instructions, the Accredited Officers established a four-member ad hoc task force comprised of officials from the State of Montana and the Province of Alberta water management agencies, and United States and Canadian Field Representatives for the St. Mary-Milk River Treaty.

The task force commenced activities in the fall of 1987 with a tour of the basin and a meeting with a local member of the Montana State Legislature. In the spring of 1988, a meeting was held to inform ranchers of both countries of the formation and activities of the task force. During April, 1988 a meeting was held in Washington, D.C. among some members of the task force and Commissioners Fulton and Totten and IJC engineering and legal advisors. During March, 1989 another public information meeting was held in Canada to further update ranchers on the progress and future activities of the task force. Commissioners Fulton and Totten, Canadian IJC engineering staff, and the task force members visited various ranchers at the end of August, 1988. The task force members decided to discontinue meetings with ranchers during 1990 as they felt that these meetings would be of limited value. During June, 1991 the Department of Natural Resources and Conservation of the State of Montana held hearings concerning the closure of the southern tributaries to additional water use, and in September, 1991 issued an Order to implement this basin closure. During 1992 task force activities were minimal, and consisted of addressing the preparation of a final report to the Commission and Accredited Officers that documents the history of this water use issue, activities completed during the life of the task force, and other pertinent information.

After sufficient water deliveries during 1990 and 1991 to satisfy the irrigation and domestic requirements of Canadian ranchers, the 1992 runoff was almost non-existent. Deliveries to Canada were 2.94 dam^3 (2.38 acre-feet) on Bear Creek, 33.0 dam^3 (26.8 acre-feet) on Breed Creek, and 10.9 dam^3 (8.84 acre-feet) on Miners Coulee. At this low level of deliveries, it can be assumed that there was also insufficient streamflow to satisfy the needs of United States ranchers.

EASTERN TRIBUTARIES OF THE MILK RIVER

The waters of the eastern tributaries of the Milk River are divided in accordance with the 1921 Order of the International Joint Commission, which stipulates under Rule III that "The natural flow of the eastern (otherwise known as the Saskatchewan or northern) tributaries of the Milk River at the points where they cross the International Boundary shall be divided equally between the two countries." This order might well be interpreted as requiring that the division of water be made on a continuing basis, however, the physical limitation due to transit time in the flow system was recognized. Further analysis showed that the minimum practical time frame for compilation of the natural flows at the International Boundary was every 10 days.

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 1930s, 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) and subsequently an operational division of flow on this tributary became necessary by 1937. In 1938, dams were constructed at both ends of Cypress Lake (station 11AC037) near the Battle Creek-Frenchman River divide to allow interbasin storage and transfers of water. In the early 1950s 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 flow on this tributary necessary by 1957. In 1960, construction of Altawan Reservoir (station 11AB089) and the Spangler Irrigation Project on Lodge Creek made an operational division of flow on this tributary necessary by 1961.

During the period March 1 to October 31, ten-day 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. During some years, the United States may request that delivery of deficit water be delayed to allow more efficient use by United States' irrigators. Canada may honour this request if no flow regulation problems are anticipated by delaying the refund of the deficit.

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. Generally, no division of flow is made during the winter as flow and use are low and streamflow records are impractical to obtain.

Lyons Creek is monitored but does not have sufficient use in Canada at this time to warrant an operational division of flow. No flow was recorded on this tributary in 1992.

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 Water Corporation, and for the Lodge Creek and Battle Creek basins in Alberta, by Alberta Environment. These reports are compiled from reports received from operators of irrigation projects and from on-site inspections. An additional adjustment is made for domestic projects in the Battle Creek and Frenchman River basins based on the results of studies conducted by Canada on domestic use.

For the interim reports prepared at the end of division periods, estimates of minor diversions were made based on a correlation between annual natural flows and reported use for previous years. The total natural flow for the current year was derived from computed natural flow to date, plus an estimate of runoff volume for the rest of the year, dependent on runoff conditions. At mid-year and at year-end, estimates of minor diversions were updated based on usage reports received from Alberta Environment and the Saskatchewan Water Corporation. Consequently, some discrepancy exists between interim and final division computations. Lists of reported diversions are contained in Appendix B.

The recorded flow and natural flow of Lodge Creek at the International Boundary in 1992 were the lowest in the period of record. For the first time since 1950, when natural flow was first calculated on this tributary, there was zero recorded flow. Natural flow was only 398 dam^3 (323 acre-feet).

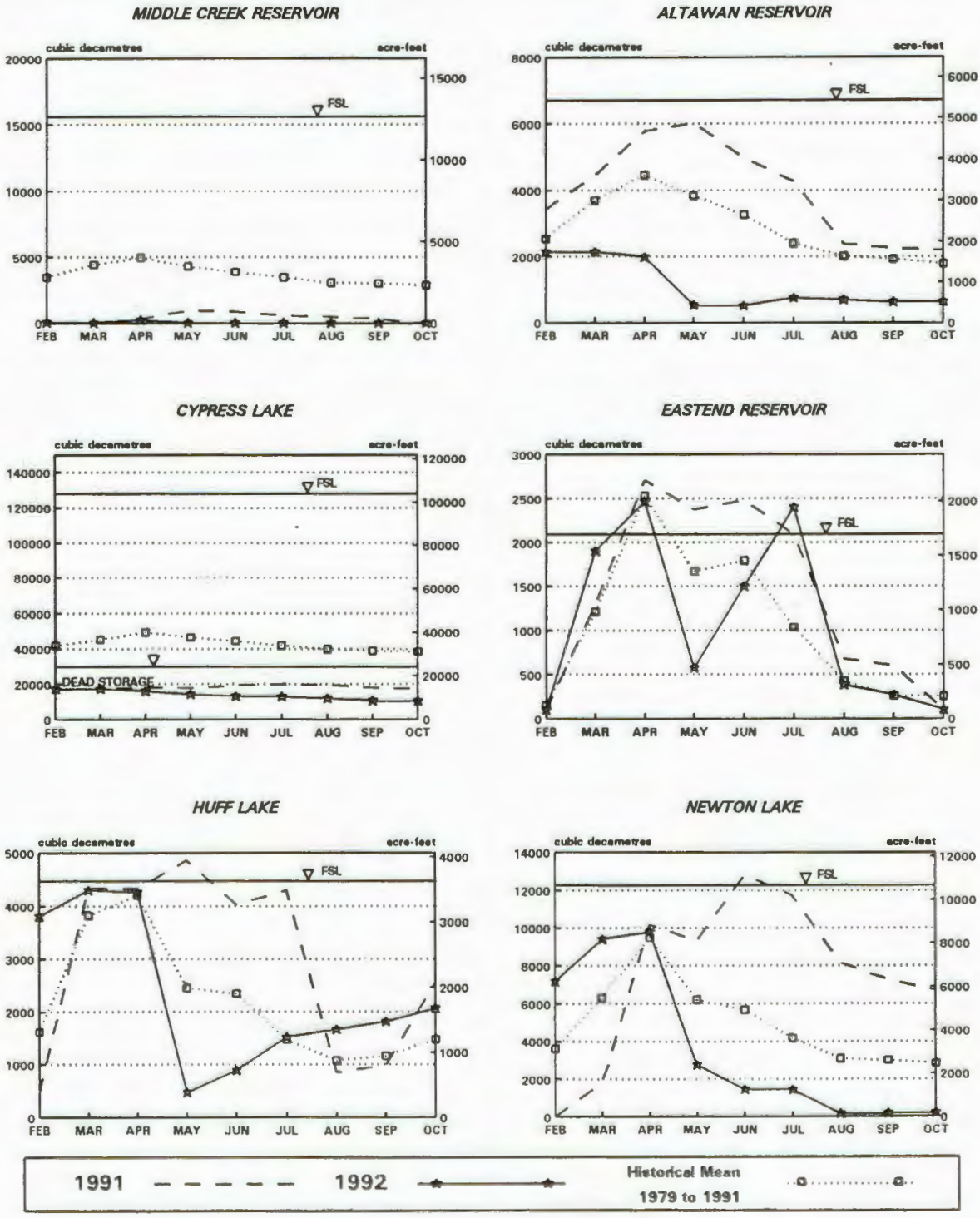
The below normal flows since 1988 have made diversion to Cypress Lake impractical. With very little inflow in 1992, the lake levels continued to decline. All irrigation from the lake and diversion to the lake have ceased as the water levels have receded too far

to be retrieved by practical means. At the end of October the lake contained 10 200 dam^3 (8,270 acre-feet) which is 19 800 dam^3 (16,100 acre-feet) below the dead storage level of 30 000 dam^3 (24,300 acre-feet). If below normal flows continue in 1993, the lake will soon be dry.

At the end of February, the combined usable storage of Middle Creek Reservoir, Altawan Reservoir, Eastend Reservoir, Huff Lake and Newton Lake was 13 500 dam^3 (10,900 acre-feet), or 33 percent of the total live storage of 41 100 dam^3 (33,300 acre-feet). By the end of April, runoff had increased the combined usable storage to the yearly maximum of 18 600 dam^3 (15,100 acre-feet) or 45 percent of the total live storage. By the end of October, irrigation usage, evaporation, and releases from the reservoirs depleted the combined usable storage to 3 000 dam^3 (2,400 acre-feet) or 7 percent of the total live storage. Further details on storage in the major Canadian reservoirs are provided in Figure 3, and in Table 16 of Appendix B.

FIGURE 3

RESERVOIRS IN LODGE, BATTLE AND FRENCHMAN BASINS
MONTH-END CONTENTS FOR 1991 AND 1992



FSL: Full Supply Level

LODGE CREEK

The computed natural flow of Lodge Creek at the International Boundary from March 1 to October 31, 1992, was 398 dam^3 (322 acre-feet). This represents 1 percent of the average natural flow and is the lowest flow ever recorded in the past 42 years of record. Each country is entitled to 50 percent of the natural flow or 199 dam^3 (161 acre-feet). With zero flow recorded at Lodge Creek below McRae Creek at the International Boundary (station 11AB083), a deficit of 199 dam^3 (161 acre-feet) remained as of October 31, 1992.

Since there was no flow at the International Boundary and the channel between the Boundary and the nearest storage facility (Altawan Reservoir - station 11AB089) was reportedly dry all year, refunding a small deficit would have resulted in substantial water loss. Therefore in the interest of good water management the deficit was allowed to remain. Small deficits were recorded in 10 of the 24 division periods during the season.

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 of Appendix A.

TABLE 3
SUMMARY OF LODGE CREEK DIVISION FOR 1992 [1]
QUANTITIES IN CUBIC DECAMETRES

DIVISION PERIOD AT INTERNATIONAL BOUNDARY	COMPUTED NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 10	70	35	0		35
MAR 11 - MAR 20	25	12	0		12
MAR 21 - MAR 31	15	8	0		8
APR 1 - APR 10	1	1	0		1
APR 11 - APR 20	47	24	0		24
APR 21 - APR 30	13	7	0		7
MAY 1 - MAY 10	0	0	0	0	
MAY 11 - MAY 20	0	0	0	0	
MAY 21 - MAY 31	0	0	0	0	
JUNE 1 - JUNE 10	0	0	0	0	
JUNE 11 - JUNE 20	14	7	0		7
JUNE 21 - JUNE 30	0	0	0	0	
JULY 1 - JULY 10	31	16	0		16
JULY 11 - JULY 20	175	88	0		88
JULY 21 - JULY 31	0	0	0	0	
AUG 1 - AUG 10	7	3	0		3
AUG 11 - AUG 20	0	0	0	0	
AUG 21 - AUG 31	0	0	0	0	
SEP 1 - SEP 10	0	0	0	0	
SEP 11 - SEP 20	0	0	0	0	
SEP 21 - SEP 30	0	0	0	0	
OCT 1 - OCT 10	0	0	0	0	
OCT 11 - OCT 20	0	0	0	0	
OCT 21 - OCT 31	0	0	0	0	
TOTAL	398	199	0		

[1] This is a summary of data from Table 10, Appendix A.

Operational Meeting
Calgary - Helena

Agenda

General

Review of field schedules

St Mary River

Letter of Intent...Do we need to mention this in narrative of IJC report?
Paragraph concerning Lake Sherburne in IJC report...What are we trying to describe?

Milk River

Discuss format of Milk River natural flow summary table for next year.
Coordinate the collection of library reference materials noted on p. 5.16 in 1991 procedures manual.

LETTER OF INTENT STATES "SEPT 31ST"
& new calendar

FOR REPORT THE ANNEX SHOULD INCLUDE A COPY OF THE "LETTER OF INTENT" THIS WOULD BECOME ANNEX "D"

TABLE 3A
SUMMARY OF LODGE CREEK DIVISION FOR 1992 [1]
QUANTITIES IN ACRE-FEET

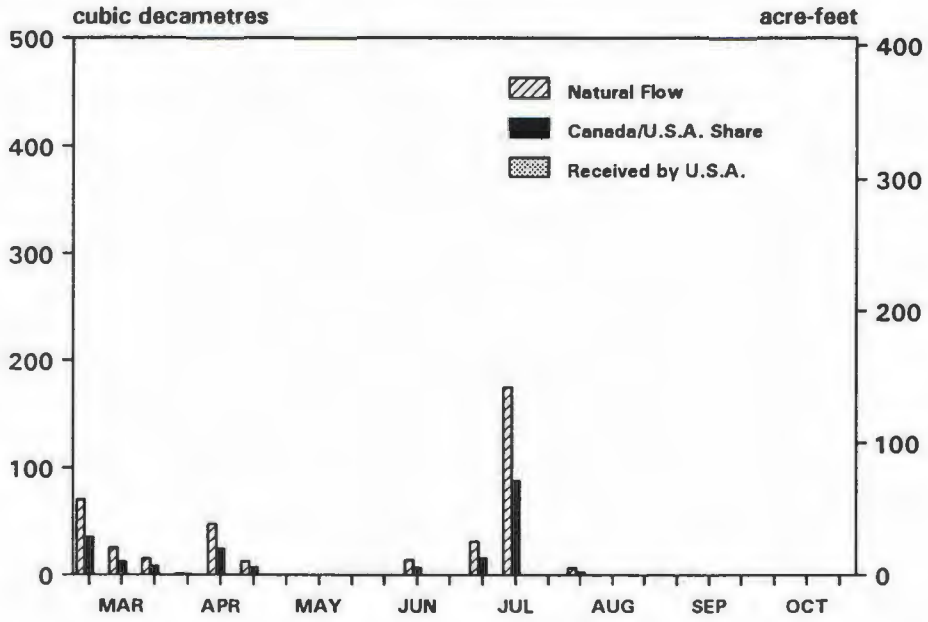
DIVISION PERIOD AT INTERNATIONAL BOUNDARY	COMPUTED NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 10	57	28	0		28
MAR 11 - MAR 20	20	10	0		10
MAR 21 - MAR 31	12	6	0		6
APR 1 - APR 10	1	1	0		1
APR 11 - APR 20	38	19	0		19
APR 21 - APR 30	11	6	0		6
MAY 1 - MAY 10	0	0	0	0	
MAY 11 - MAY 20	0	0	0	0	
MAY 21 - MAY 31	0	0	0	0	
JUNE 1 - JUNE 10	0	0	0	0	
JUNE 11 - JUNE 20	11	6	0		6
JUNE 21 - JUNE 30	0	0	0	0	
JULY 1 - JULY 10	25	13	0		13
JULY 11 - JULY 20	142	71	0		71
JULY 21 - JULY 31	0	0	0	0	
AUG 1 - AUG 10	5	2	0		2
AUG 11 - AUG 20	0	0	0	0	
AUG 21 - AUG 31	0	0	0	0	
SEP 1 - SEP 10	0	0	0	0	
SEP 11 - SEP 20	0	0	0	0	
SEP 21 - SEP 30	0	0	0	0	
OCT 1 - OCT 10	0	0	0	0	
OCT 11 - OCT 20	0	0	0	0	
OCT 21 - OCT 31	0	0	0	0	
TOTAL	323	161	0		

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

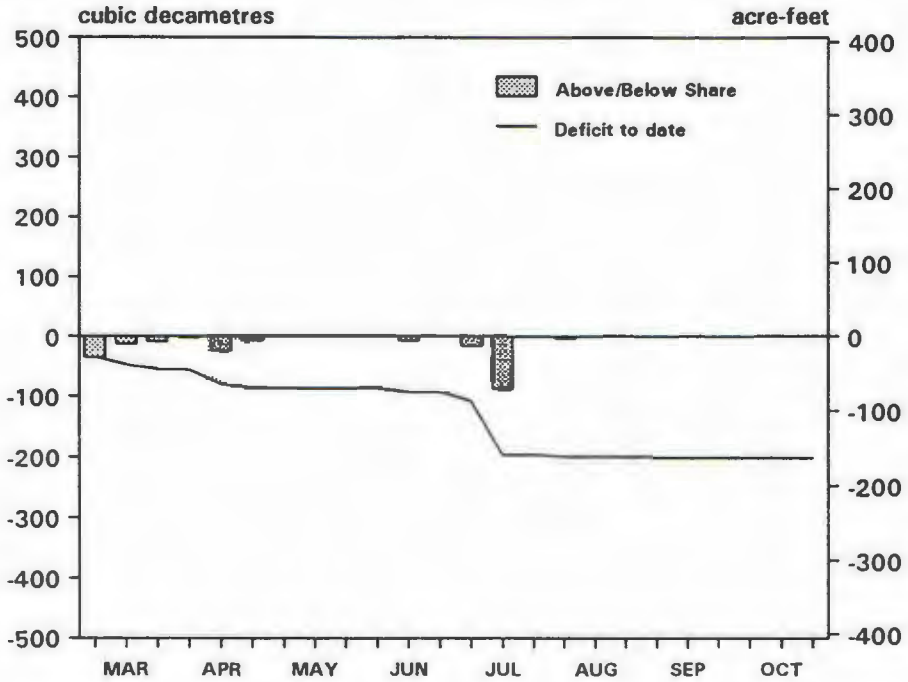
FIGURE 4

LODGE CREEK DIVISION, 1992

Period Values



Excess/Deficit Delivery to the U.S.A.



BATTLE CREEK

The computed natural flow of Battle Creek at the International Boundary from March 1 to October 31, 1992, was 7 490 dam^3 (6,070 acre-feet) or 24 percent of the average natural flow of the previous 52 years of record. Each country is entitled to 50 percent of the natural flow or 3 745 dam^3 (3,035 acre-feet). A total flow of 4 820 dam^3 (3,910 acre-feet) was recorded at Battle Creek at International Boundary (station 11AB027) during this period.

Apportionment on Battle Creek was extended beyond October 31, 1992 to account for water stored in the Nashlyn Irrigation Project. In addition to the 24 regular apportionment divisions, a period from November 1 to December 9 was added to the calculations. To maintain consistency, flows during this period were not included in the totals reported. No deficit arose during this period.

Deficit deliveries were recorded in 7 of the 24 division periods during the season. No deficit remained at the end of October.

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 of Appendix A.

TABLE 4
SUMMARY OF BATTLE CREEK DIVISION FOR 1992 [1]
QUANTITIES IN CUBIC DECAMETRES

DIVISION PERIOD AT INTERNATIONAL BOUNDARY	COMPUTED NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 14	1 025	513	645	132	
MAR 15 - MAR 25	1 045	522	519		3
MAR 26 - APR 4	721	361	484	123	
APR 5 - APR 14	442	221	179		42
APR 15 - APR 24	351	175	128		47
APR 25 - MAY 4	371	186	80		106
MAY 5 - MAY 14	356	178	30		148
MAY 15 - MAY 25	331	165	9		156
MAY 26 - JUNE 4	155	78	12		66
JUNE 5 - JUNE 14	52	26	47	21	
JUNE 15 - JUNE 24	286	143	285	142	
JUNE 25 - JULY 4	214	107	213	106	
JULY 5 - JULY 14	341	171	340	169	
JULY 15 - JULY 25	448	224	537	313	
JULY 26 - AUG 4	277	139	276	137	
AUG 5 - AUG 14	227	114	196	82	
AUG 15 - AUG 25	46	23	45	22	
AUG 26 - SEP 4	13	7	12	5	
SEP 5 - SEP 14	46	23	45	22	
SEP 15 - SEP 24	35	17	34	17	
SEP 25 - OCT 4	98	49	97	48	
OCT 5 - OCT 14	171	85	170	85	
OCT 15 - OCT 25	241	120	240	120	
OCT 26 - OCT 31	197	99	196	97	
** NOV 1 - DEC 9*	*1 134*	*567*	*732*	*165*	
TOTAL (excluding Nov1-Nov9)	7 489	3 745	4 819		

[1] This is a summary of data from Table 12, Appendix A.

* Additional period to account for storage in Nashlyn Irrigation Project (not included in totals)

TABLE 4A
SUMMARY OF BATTLE CREEK DIVISION FOR 1992 [1]
QUANTITIES IN ACRE-FEET

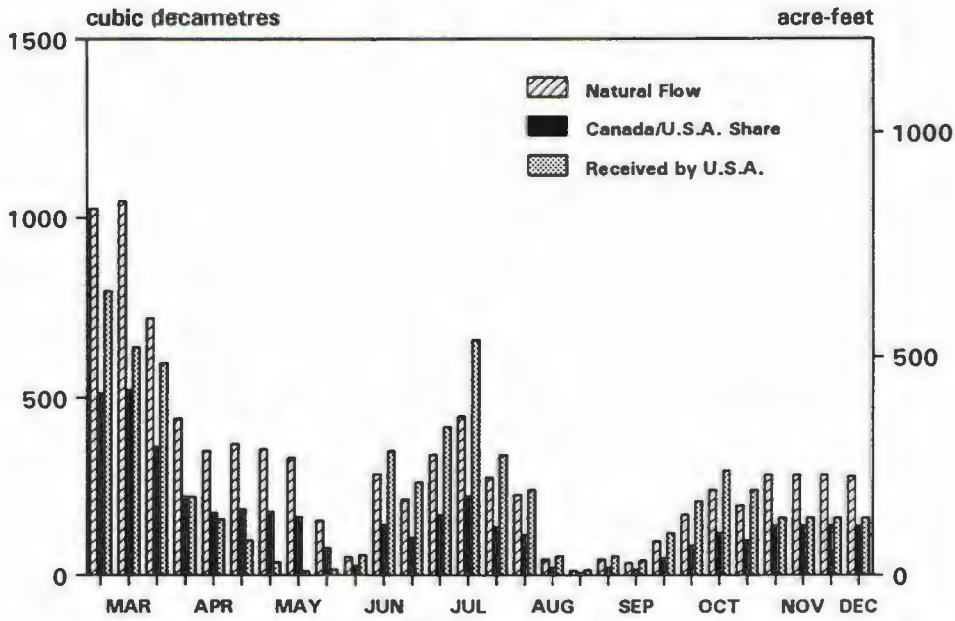
DIVISION PERIOD AT INTERNATIONAL BOUNDARY	COMPUTED NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 14	831	416	523	107	
MAR 15 - MAR 25	847	423	420		3
MAR 26 - APR 4	585	293	393	100	
APR 5 - APR 14	358	179	145		34
APR 15 - APR 24	284	142	104		38
APR 25 - MAY 4	301	151	65		86
MAY 5 - MAY 14	289	144	25		120
MAY 15 - MAY 25	268	134	7		127
MAY 26 - JUNE 4	126	63	10		53
JUNE 5 - JUNE 14	42	21	38	17	
JUNE 15 - JUNE 24	232	116	231	115	
JUNE 25 - JULY 4	173	87	172	86	
JULY 5 - JULY 14	277	139	276	137	
JULY 15 - JULY 25	363	182	435	254	
JULY 26 - AUG 4	225	113	224	111	
AUG 5 - AUG 14	184	92	159	67	
AUG 15 - AUG 25	37	19	36	18	
AUG 26 - SEP 4	11	6	10	4	
SEP 5 - SEP 14	37	19	36	17	
SEP 15 - SEP 24	28	14	27	13	
SEP 25 - OCT 4	79	40	79	39	
OCT 5 - OCT 14	139	69	138	69	
OCT 15 - OCT 25	195	97	194	97	
OCT 26 - OCT 31	160	80	159	79	
** NOV 1 - DEC 9*	*919*	*460*	*593*	*134*	
TOTAL	6,071	3,036	3,907		

[1] All values are conversions from Table 4. Totals and shares may not add or subtract as a result of rounding.
* Additional period to account for storage in Nashlyn Irrigation Project (not included in totals)

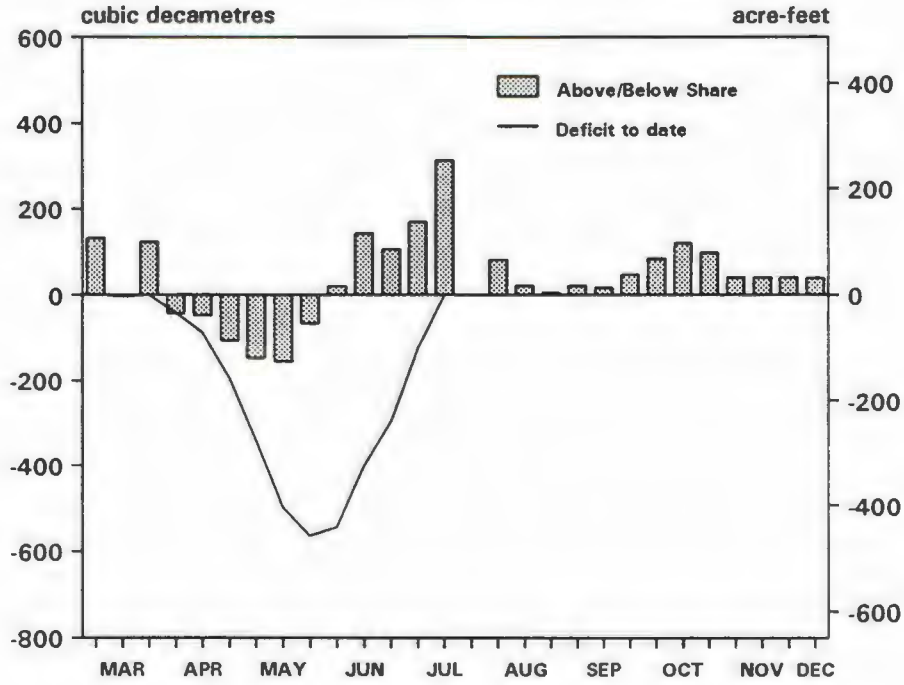
FIGURE 5

BATTLE CREEK DIVISION, 1992

Period Values



Excess/Deficit Delivery to the U.S.A.



FRENCHMAN RIVER

The computed natural flow of the Frenchman River at the International Boundary from March 1 to October 31, 1992, was 11 100 dam^3 (9,000 acre-feet) or 14 percent of the average natural flow of the previous 52 years of record. Each country is entitled to 50 percent of the natural flow or 5 500 dam^3 (4,500 acre-feet). A total flow of 5 980 dam^3 (4,850 acre-feet) was recorded at Frenchman River at International Boundary (station 11AC041) from March 1 to October 31.

Deficit deliveries were recorded in 16 of the 24 division periods during the season. No deficit remained at the end of October.

During the non-apportioned months, November, 1991 and February, 1992, Huff Lake experienced a significant rise in level. At the end of October, 1991, Huff Lake contained 2 560 dam^3 (2,080 acre-feet). At the end of February, 1992 the level had increased to 3 800 dam^3 (3,080 acre-feet). The increase of 1 240 dam^3 (1 000 acre-feet) measured between these dates was primarily a result of unusually high late fall flows.

The division of the Frenchman River natural flow is summarized in Tables 5 and 5A and 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 of Appendix A.

TABLE 5
SUMMARY OF FRENCHMAN RIVER DIVISION FOR 1992 [1]
QUANTITIES IN CUBIC DECAMETRES

DIVISION PERIOD AT INTERNATIONAL BOUNDARY	COMPUTED NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 10	1 528	764	126		638
MAR 11 - MAR 20	1 261	631	57		574
MAR 21 - MAR 31	1 234	617	29		588
APR 1 - APR 10	767	383	14		369
APR 11 - APR 20	551	276	6		270
APR 21 - APR 30	784	392	9		383
MAY 1 - MAY 10	786	393	20		373
MAY 11 - MAY 20	298	149	123		26
MAY 21 - MAY 31	318	159	2 104	1 945	
JUNE 1 - JUNE 10	515	257	1 688	1 431	
JUNE 11- JUNE 20	475	238	380	142	
JUNE 21 - JUNE 30	600	300	146		154
JULY 1 - JULY 10	334	167	38		129
JULY 11 - JULY 20	459	229	79		150
JULY 21 - JULY 31	97	49	2		47
AUG 1 - AUG 10	148	74	0		74
AUG 11 - AUG 20	0	0	550	550	
AUG 21 - AUG 31	245	123	205	82	
SEP 1 - SEP 10	131	66	6		60
SEP 11 - SEP 20	70	35	1		34
SEP 21 - SEP 30	0	0	0	0	
OCT 1 - OCT 10	19	9	0		9
OCT 11 - OCT 20	162	81	162	81	
OCT 21 - OCT 31	313	157	230	73	
TOTAL	11 096	5 548	5 975		

[1] This is a summary of data from Table 10, Appendix A.

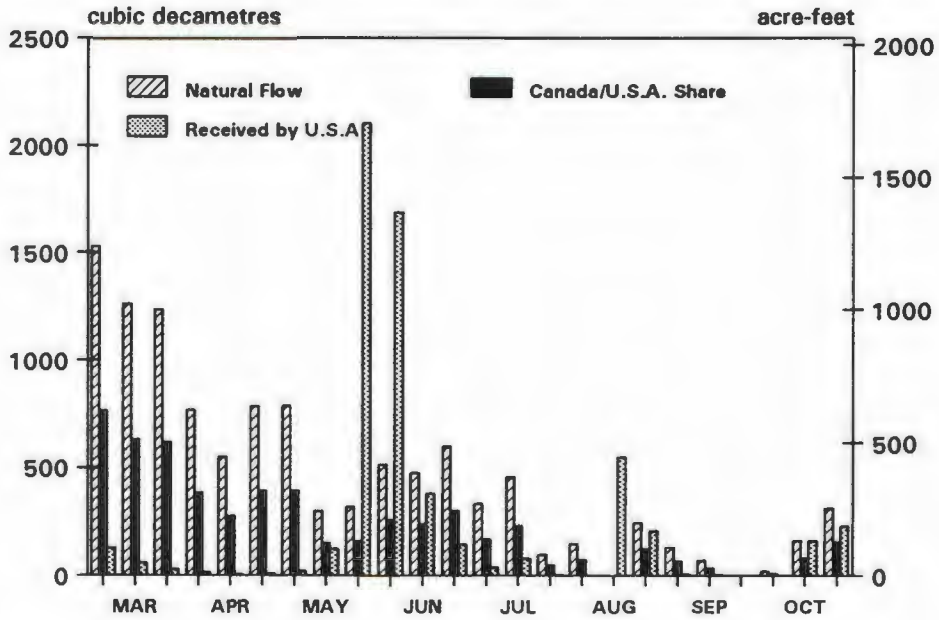
TABLE 5A
SUMMARY OF FRENCHMAN RIVER DIVISION FOR 1992 [1]
QUANTITIES IN ACRE-FEET

DIVISION PERIOD AT INTERNATIONAL BOUNDARY	COMPUTED NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 10	1,239	619	102		517
MAR 11 - MAR 20	1,023	512	46		466
MAR 21 - MAR 31	1,001	500	24		476
APR 1 - APR 10	622	310	11		299
APR 11 - APR 20	447	224	5		219
APR 21 - APR 30	635	318	7		311
MAY 1 - MAY 10	637	319	17		302
MAY 11 - MAY 20	242	121	100		21
MAY 21 - MAY 31	258	129	1,706	1,577	
JUNE 1 - JUNE 10	417	208	1,368	1,160	
JUNE 11- JUNE 20	385	193	308	115	
JUNE 21 - JUNE 30	486	243	118		125
JULY 1 - JULY 10	271	135	31		105
JULY 11 - JULY 20	372	186	64		122
JULY 21 - JULY 31	79	40	1		38
AUG 1 - AUG 10	120	60	0		60
AUG 11 - AUG 20	0	0	446	446	
AUG 21 - AUG 31	199	100	166	66	
SEP 1 - SEP 10	106	54	5		49
SEP 11 - SEP 20	57	28	1		28
SEP 21 - SEP 30	0	0	0	0	
OCT 1 - OCT 10	15	7	0		7
OCT 11 - OCT 20	132	66	132	66	
OCT 21 - OCT 31	254	127	186	59	
TOTAL	8,996	4,498	4,844		

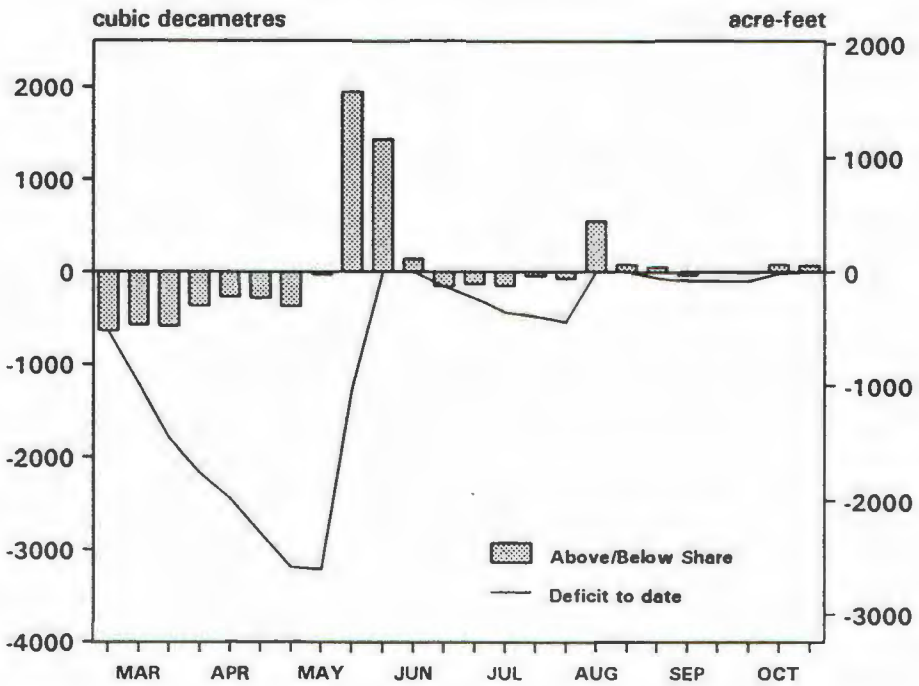
[1] All values are conversions of data from Table 5. Totals and shares may not add or subtract exactly as a result of rounding.

FIGURE 6
FRENCHMAN RIVER DIVISION, 1992

Period Values



Excess/Deficit Delivery to the U.S.A.



ANNEX A

TREATY BETWEEN THE UNITED STATES AND GREAT BRITAIN RELATING TO BOUNDARY WATERS, AND QUESTIONS ARISING BETWEEN THE UNITED STATES AND CANADA - ARTICLE VI

INTERNATIONAL JOINT COMMISSION
1921 ORDER

TREATY
BETWEEN THE UNITED STATES AND GREAT BRITAIN RELATING TO BOUNDARY WATERS, AND QUESTIONS ARISING BETWEEN THE UNITED STATES AND CANADA

ARTICLE VI

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.

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 Great Britain and Ireland and of the British Dominions beyond the Seas, Emperor of India, signed at Washington on the 11th of January, 1909;

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 then 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 then 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 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. MACGRATH,
C.D. CLARK,
HENRY A. POWELL,
W.H. HEARST,
MARK A. SMITH.

ANNEX B

International System of Units

(SI) Conversions

WRB - USGS

INCH-POUND TO INTERNATIONAL SYSTEM OF UNITS (SI) CONVERSION

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 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

ANNEX C

List of Gauging Stations

INTERNATIONAL GAUGING STATIONS OPERATED JOINTLY BY THE UNITED STATES AND CANADA ST. MARY AND MILK RIVER DRAINAGE BASINS 1992

Map Index	Station Name
	ST. MARY RIVER BASIN
05AE027	St. Mary River at International Boundary
05AE029	St. Mary Canal at St. Mary Crossing near Babb, Montana
05AE033	Swiftcurrent Creek at Sherburne, Montana
05AE036	Lake Sherburne at Sherburne, Montana
	MILK RIVER BASIN
11AA001	North Milk River near International Boundary
11AA005	Milk River at Milk River Alberta
11AA025	Milk River at Western Crossing of International Boundary
11AA031	Milk River at Eastern Crossing of International Boundary
11AA032	N. Fork Milk River above St. Mary Canal near Browning, Montana.
11AA033	South Fork Milk River near Babb, Montana
11AA038	Verdigris Coulee near the Mouth
	LODGE CREEK TRIBUTARY BASIN
11AB008	Middle Creek above Lodge Creek
11AB001	Middle Creek below Middle Creek Reservoir
11AB108	Middle Creek near Govenlock
11AB009	Middle Creek near Saskatchewan Boundary
11AB060	Spangler Ditch near Govenlock
11AB080	Middle Creek Reservoir
11AB083	Lodge Creek below McRae Creek at International Boundary
11AB089	Altawan Reservoir near Govenlock

BATTLE CREEK TRIBUTARY BASIN

11AB018	Nashlyn Canal near Consul
11AB027	Battle Creek at International Boundary
11AB044	McKinnon Ditch near Consul
11AB058	Richardson Ditch near Consul
11AB075	Lyons Creek at International Boundary
11AB077	Cypress Lake West Outflow Canal
11AB078	Cypress Lake West Inflow Canal
11AB084	Vidora Ditch near Consul
11AB085	Cypress Lake West Inflow Canal Drain
11AB102	Gaff Ditch near Merryflat

FRENCHMAN RIVER TRIBUTARY BASIN

11AC001	Frenchman River below Eastend Reservoir
11AC037	Cypress Lake
11AC041	Frenchman River at International Boundary
11AC052	Eastend Canal near Eastend
11AC054	Newton Lake Main Canal
11AC055	Eastend Reservoir
11AC056	Newton Lake
11AC060	Cypress Lake East Outflow Canal
11AC062	Frenchman River below Newton Lake
11AC063	Huff Lake
11AC064	Belanger Creek Diversion to Cypress Lake
11AC065	Huff Lake Gravity Canal
11AC066	Huff Lake Pumping Canal

GAUGING STATIONS OPERATED INDEPENDENTLY BY EITHER THE UNITED STATES OR CANADA IN THE ST. MARY AND MILK RIVER DRAINAGE BASINS 1992

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

Map Index	Station Name	Operated by
	ST. MARY RIVER BASIN	
5-0145*	Swiftcurrent Creek at Many Glacier, Montana	U.S.A.
5-0175*	St. Mary River near Babb, Montana	U.S.A.
	MILK RIVER BASIN	
11AA028*	Bear Creek near International Boundary	Canada
11AA029*	Miners Coulee near International Boundary	Canada
11AA040*	Breed Creek near International Boundary	Canada
	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

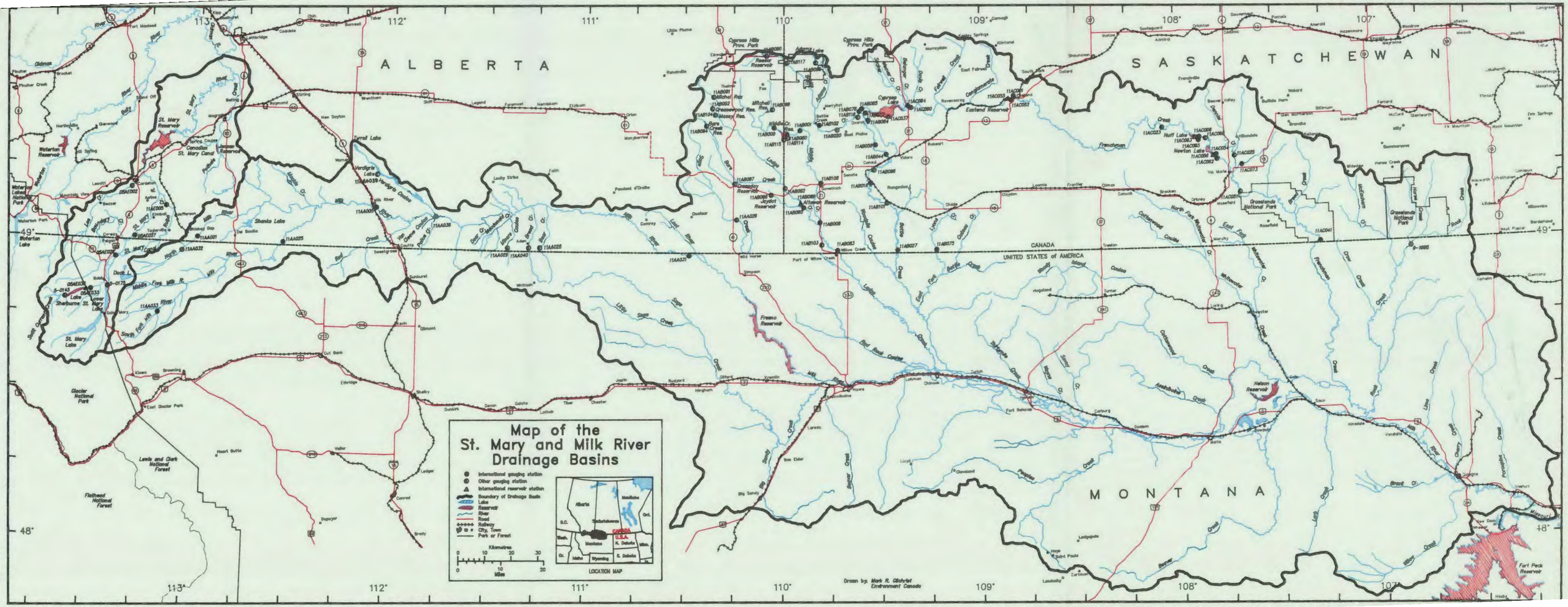
11AB020*	Shepherd Ditch near Consul	Canada
11AB090	Reesor Reservoir near Elkwater	Canada
11AB095*	Adams Lake	Canada
11AB096*	Battle Creek near Consul	Canada
11AB101*	Battle Creek below Nashlyn Project	Canada
11AB117*	Battle Creek at Alberta Boundary	Canada
11AB118*	Battle Creek below Wilson's Weir	Canada

FRENCHMAN RIVER TRIBUTARY BASIN

11AC023*	Frenchman River at 50-Mile	Canada
11AC025*	Denniel Creek near Val Marie	Canada
11AC051*	Frenchman River below Val Marie	Canada
11AC068*	Val Marie Pump No. 1	Canada
11AC073*	Denniel Creek East Tributary	Canada

ROCK CREEK TRIBUTARY BASIN

6-1695*	Rock Creek below Horse Creek near International Boundary	U.S.A.



Map of the St. Mary and Milk River Drainage Basins

Drawn by: Mark R. Gilchrist
Environment Canada

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

DATE DUE	BORROWER'S NAME

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