Report to

THE INTERNATIONAL JOINT COMMISSION

on

THE DIVISION OF THE WATERS OF

THE ST. MARY AND MILK RIVERS

1991

Cover photo:

Verdigris Coulee near confluence with the Milk River. (Sweet Grass Hills in background)
Photo by Don Bischoff, USGS, Helena, Montana.

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1991

by

R.A. Halliday
representing Canada

and

Philip Cohen
representing the United States

March 1992

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, 1991.

Respectfully submitted,

Philip Cohen
Accredited Officer of the United States

R.A. Halliday
Accredited Officer of Her Majesty

SYNOPSIS

During the 1991 irrigation season, the natural flow of the St. Mary and Milk rivers was 126 percent and 107 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, 1991, was 905 000 cubic decametres (dam^3) (734 000 acre-feet). Under the terms of the Boundary Waters Treaty, the Canadian share was 524 000 dam^3 (425,000 acre-feet). The total flow recorded at the International Boundary during the irrigation season was 127 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, 1991, was 148 000 dam^3 (120,000 acre-feet). Under the terms of the Treaty, the United States' allotment was 105 000 dam^3 (85,100 acre-feet). The United States received 141 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.

During 1991 the ad hoc task force, formed in 1987 to investigate options to develop a pragmatic solution to water apportionment in the southern tributaries of the Milk River, reduced its activities from those carried out in previous years. Montana held a public hearing in the basin on June 18 to hear testimony on a proposal to close the basin to additional water use permits. In September, the Montana Department of Natural Resources and Conservation issued an order stating that the Department would refuse to accept permit applications for additional appropriation of water from the southern tributaries.

The March to October natural flows of the three apportioned eastern tributaries of the Milk River; Lodge Creek, Battle Creek and Frenchman River; were 41, 62, and 126 percent, respectively, of the long-term averages. Minor deficits remained on the Frenchman River at the end of the season.

The annual meeting of the Field Representatives was held in Banff, Alberta on January, 28, 1992. Past operational problems were reviewed and resolved and program and study plans for 1992 were formulated. Streamflow and water level records collected by Canada and the United States were later approved through correspondence.

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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 1991 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 Banff, Alberta on January 28, 1992. Mutual problems, future plans, and changes in computational procedures were discussed and a schedule of field operations for 1992 was adopted.

Streamflow records and natural flow computations collected jointly by the United States and Canada were reviewed and approved 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 tentative 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 O5AE036) was 27 100 dam^3 (22,000 acre-feet) on October 31, 1990 and increased to 56 700 dam^3 (46,000 acre-feet) on February 12, 1991 when releases began. It subsequently decreased to 49 800 dam^3 (40,400 acre-feet) on March 31, 1991, just prior to the commencement of the irrigation season. Maximum storage was 84 200 dam^3 (68,300 acre-feet) on July 3, 1991 and storage decreased to 25 900 dam^3 (21,000 acre-feet) by the end of the irrigation season on October 31, 1991.

Water was diverted from the St. Mary River into the Milk River via the St. Mary Canal from March 19 to October 2, 1991. The total flow recorded at the gauging station on the St. Mary Canal at St. Mary Crossing (station 05AE029) was 270 000 dam^3 (219,000 acre-feet). Any seepage from the canal between the point of diversion and the crossing of the St. Mary River is assumed to return to the river and eventually become available to Canada.

The computed natural flow of the St. Mary River at the International Boundary from November 1, 1990 to October 31, 1991 was 1 043 000 dam^3 (846,000 acre-feet) of which 905 000 dam^3 (734,000 acre-feet) occurred during the irrigation season, April 1 to October 31, 1991. For the irrigation season, Canada's and the United States' shares were 524 000 dam^3 (425,000 acre-feet) and 381 000 dam^3 (309,000 acre-feet) respectively. A total discharge of 664 000 dam^3 (538,000 acre-feet) was recorded at the International Boundary, which was 127 per cent of the Canadian share. The computed natural flow during the irrigation season was 126 per cent of the average of the previous 88 years of record.

Deficit deliveries were recorded in 4 of the 14 division periods during the 1991 irrigation season. All four deficit deliveries, which occurred in April, May and August, were scheduled to be refunded by the Field Representatives.

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 1991[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	21 472	15 650	15 008		642
APR 16 - APR 30	30 488	21 027	20 677		350
MAY 1 - MAY 15	44 678	28 448	25 882		2 566
MAY 16 - MAY 31	185 122	99 080	130 965	31 885	
JUN 1 - JUN 15	155 929	84 074	115 626	31 552	
JUN 16 - JUN 30	158 897	85 556	124 237	38 681	
JUL 1 - JUL 15	122 612	67 416	99 456	32 040	
JUL 16 - JUL 31	72 436	42 733	48 133	5 400	
AUG 1 - AUG 15	42 012	27 114	27 940	826	
AUG 16 - AUG 31	27 057	19 679	18 712		967
SEP 1 - SEP 15	14 865	11 149	12 624	1 475	
SEP 16 - SEP 30	11 671	8 754	10 247	1 493	
OCT 1 - OCT 15	10 096	7 573	8 434	861	
OCT 16 - OCT 31	7 621	5 715	5 960	245	
TOTAL	904 956	523 968	663 901		

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

TABLE 1A
SUMMARIES OF ST. MARY RIVER DIVISION FOR 1991[1]
QUANTITIES IN ACRE-FEET

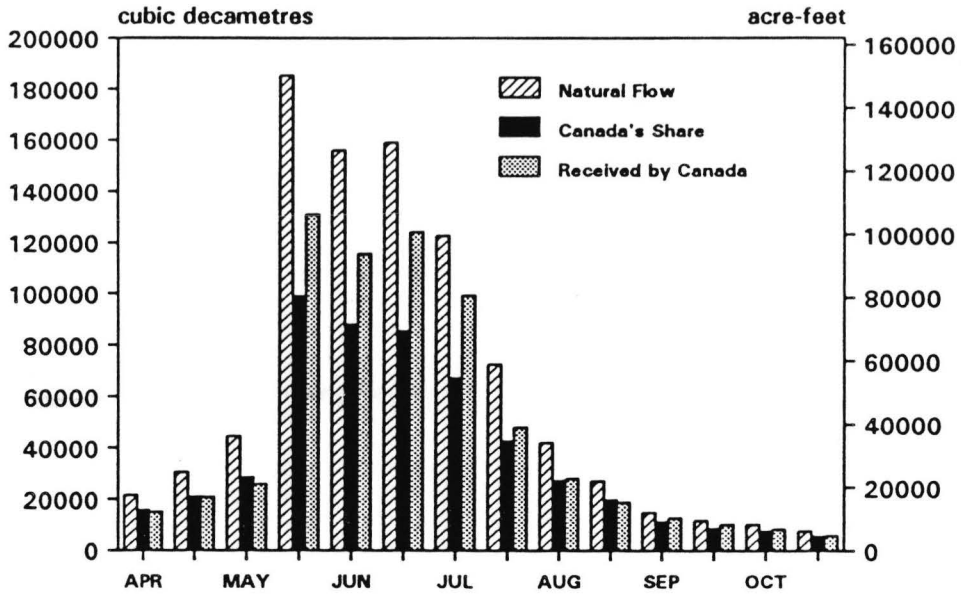
DIVISION PERIOD AT INTERNATIONAL BOUNDARY	COMPUTED NATURAL FLOW	CANADA'S SHARE	RECEIVED BY CANADA	RECEIVED BY CANADA	
				ABOVE SHARE	BELOW SHARE
APR 1 - APR 15	17,407	12,687	12,167		521
APR 16 - APR 30	24,717	17,047	16,763		284
MAY 1 - MAY 15	36,220	23,063	20,983		2,080
MAY 16 - MAY 31	150,078	80,324	106,173	25,849	
JUN 1 - JUN 15	126,412	68,159	93,738	25,579	
JUN 16 - JUN 30	128,818	69,360	100,719	31,359	
JUL 1 - JUL 15	99,402	54,654	80,629	25,975	
JUL 16 - JUL 31	58,724	34,644	39,021	4,378	
AUG 1 - AUG 15	34,059	21,981	22,651	670	
AUG 16 - AUG. 31	21,935	15,954	15,170		784
SEP 1 - SEP 15	12,051	9,038	10,234	1,196	
SEP 16 - SEP 30	9,462	7,097	8,307	1,210	
OCT 1 - OCT 15	8,185	6,139	6,837	698	
OCT 16 - OCT 31	6,178	4,633	4,832	199	
TOTAL	733,648	424,781	538,225		

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

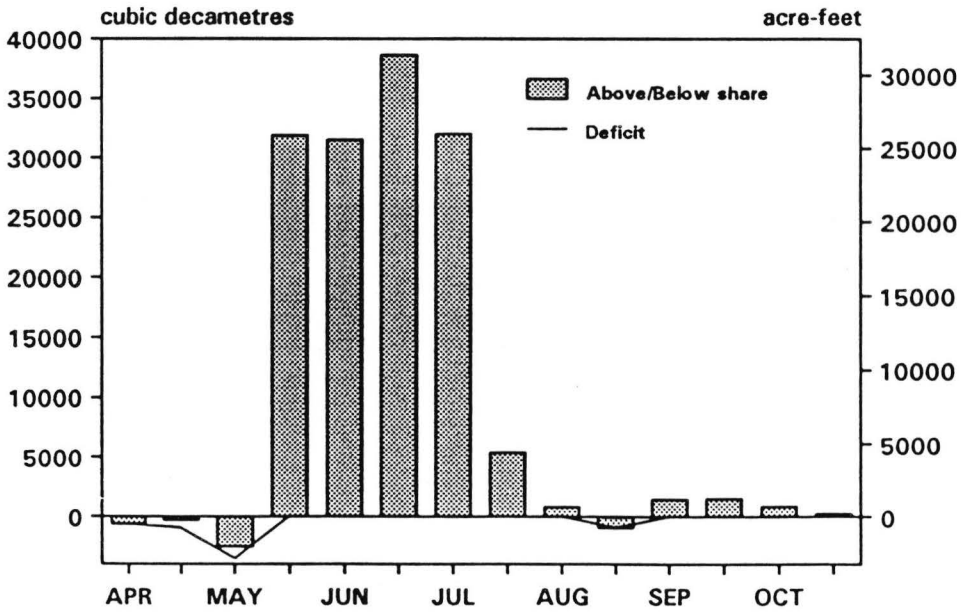
FIGURE 1

ST. MARY RIVER DIVISION, 1991

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 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-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 1991, 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 5 110 dam^3 (4,140 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, 1991 was 148 000 dam^3 (120,000 acre-feet). This flow was 107 per cent of the average computed natural flow of the previous 79 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 105,000 dam^3 (85,300 acre-feet) and 42 800 dam^3 (34,700 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 1991[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	3 240	1 620	3 244	1 623	
MAR 16 - MAR 31	4 560	2 280	4 573	2 293	
APR 1 - APR 15	11 504	8 610	11 561	2 951	
APR 16 - APR 30	10 930	8 198	10 981	2 783	
MAY 1 - MAY 15	12 854	9 624	12 891	3 267	
MAY 16 - MAY 31	29 726	20 973	28 988	8 016	
JUN 1 - JUN 15	18 457	13 786	17 918	4 132	
JUN 16 - JUN 30	25 127	16 729	25 336	8 607	
JUL 1 - JUL 15	15 451	11 241	15 483	4 242	
JUL 16 - JUL 31	4 399	3 299	4 283	984	
AUG 1 - AUG 15	3 498	2 623	3 327	704	
AUG 16 - AUG 31	1 635	1 226	1 594	369	
SEP 1 - SEP 15	503	377	590	213	
SEP 16 - SEP 30	1 673	1 255	2 224	969	
OCT 1 - OCT 15	2 444	1 833	2 948	1 115	
OCT 16 - OCT 31	2 059	1 544	2 070	526	
TOTAL	148 060	105 218	148 011		

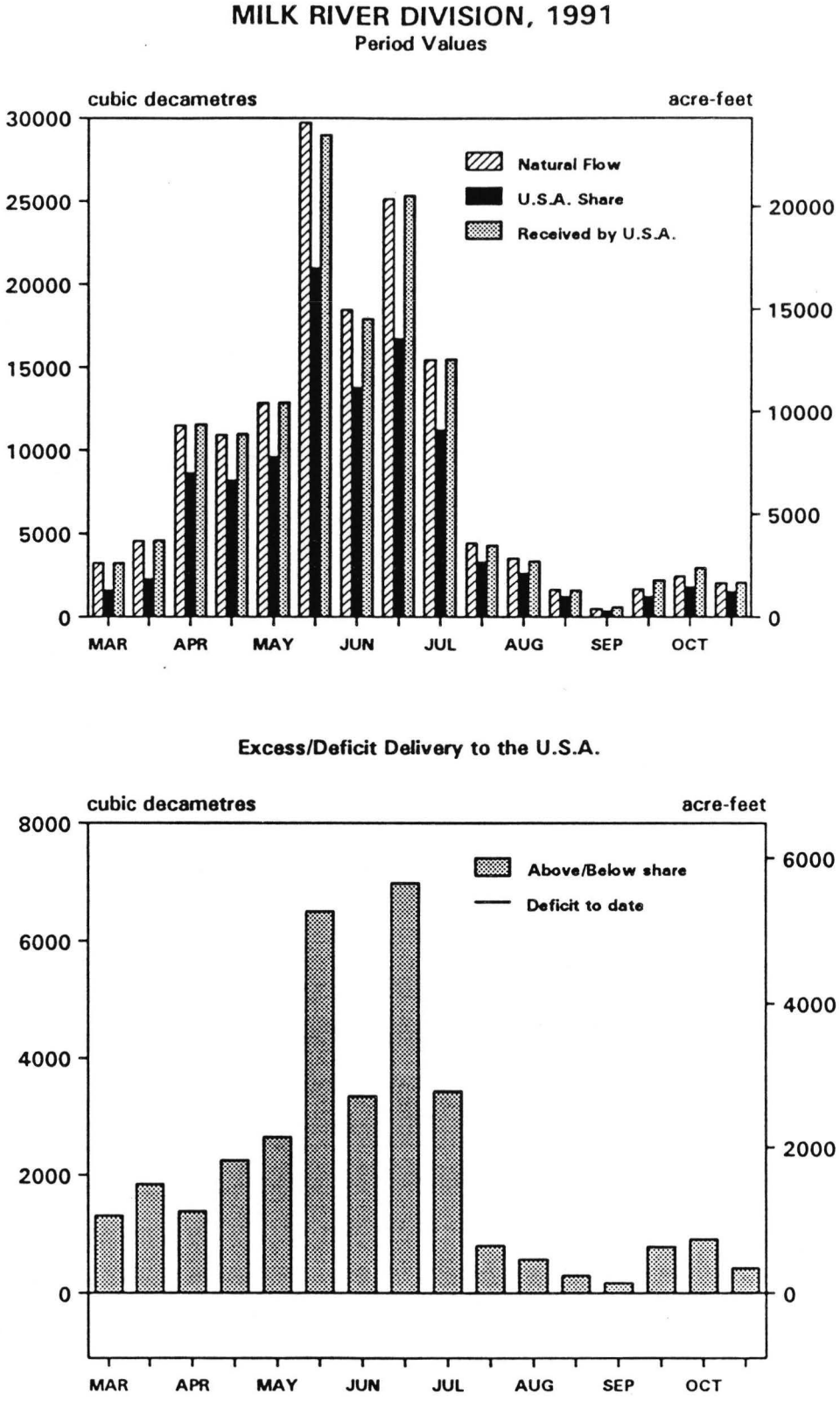
[1] This is a summary of data from Table 8, Appendix A.

TABLE 2A
SUMMARY OF MILK RIVER DIVISION FOR 1991 [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	2,627	1,313	2,630	1,316	
MAR 16 - MAR 31	3,697	1,848	3,707	1,859	
APR 1 - APR 15	9,326	6,980	9,373	2,392	
APR 16 - APR 30	8,861	6,646	8,902	2,256	
MAY 1 - MAY 15	10,421	7,802	10,451	2,649	
MAY 16 - MAY 31	24,099	17,003	23,501	6,499	
JUN 1 - JUN 15	14,963	11,176	14,526	3,350	
JUN 16 - JUN 30	20,370	13,562	20,540	6,978	
JUL 1 - JUL 15	12,526	9,113	12,552	3,439	
JUL 16 - JUL 31	3,566	2,674	3,472	798	
AUG 1 - AUG 15	2,836	2,126	2,697	571	
AUG 16 - AUG 31	1,325	994	1,292	299	
SEP 1 - SEP 15	408	306	478	173	
SEP 16 - SEP 30	1,356	1,017	1,803	786	
OCT 1 - OCT 15	1,981	1,486	2,390	904	
OCT 16 - OCT 31	1,669	1,252	1,678	426	
TOTAL	120,032	85,300	119,993		

[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, 1991
Period Values
cubic decametres
acre-feet
30000
25000
20000
15000
10000
5000
0
20000
15000
10000
5000
0
Natural Flow
U.S.A. Share
Received by U.S.A.
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
Excess/Deficit Delivery to the U.S.A.
cubic decametres
acre-feet
8000
6000
4000
2000
0
6000
4000
2000
0
Above/Below share
Deficit to date
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT

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 goals 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, 1989. 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 by direct diversion without storage for irrigation or any other consumptive use.

Based upon Findings of Fact and Conclusions of Law, the Department made the following:

ORDER

On and after September 1, 1991, the Department of Natural Resources and Conservation shall refuse to accept permit applications to appropriations of water from the southern tributaries of the Milk River in Toole and Liberty Counties, Montana, said tributaries being Miners Coulee, Halfbreed Coulee, and Bear Creek including all their respective tributaries.

Wherein the waters proposed for appropriation are surface waters; the proposed means of diversion is by direct diversion without an integrated on-source storage facility; the period of diversion applied for is within the period from January 1 through December 31, inclusive of each year; and the intended purpose of use is irrigation or any other consumptive use, with the exception of domestic or stock watering uses of up to three acre-feet.

Lack of delivery of sufficient water to meet the needs of Canadian ranchers was a problem which existed throughout the 1980's. Fortunately, during 1990, nature solved the problem. Runoff commenced in late February and continued to mid-July with the flows on Miners Coulee and Bear Creek being the largest since 1979. Although 1991 flows were not of the same magnitude, deliveries to Canada of 726 dam^3 (594 acre-feet) on Bear Creek, 1940 dam^3 (1570 acre-feet) on Breed Creek, and 270 dam^3 (214 acre-feet) on Miners Coulee were timely and satisfied the irrigation and domestic requirements of Canadian 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. A total flow of 165 dam^3 (134 acre-feet) was recorded on this tributary from March 1 to October 31, 1991.

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.

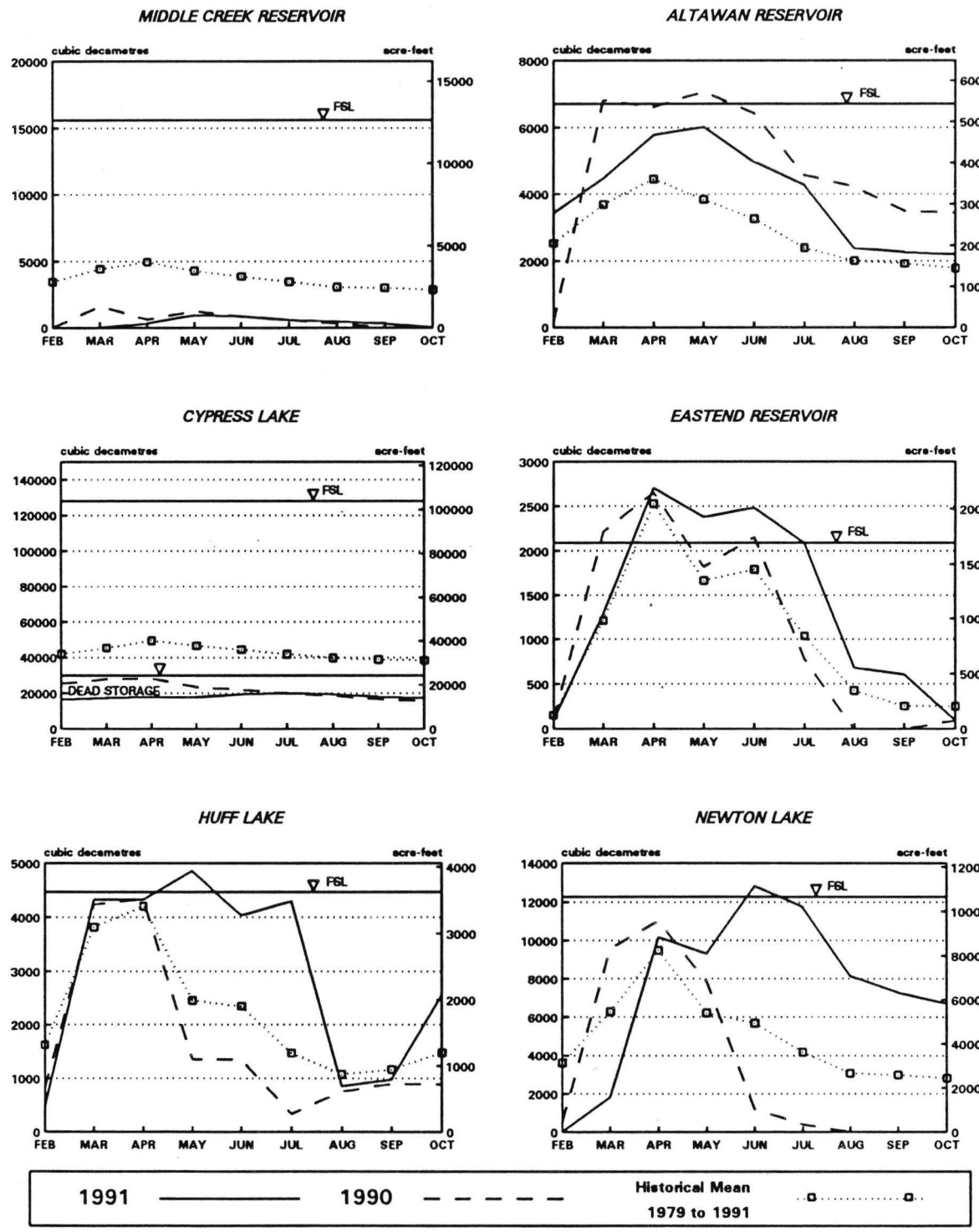
For the interim reports prepared at the end of division periods, estimates of minor diversions were made based on a correlation between annual natural flows and reported use for previous years. The total natural flow for the current year was derived from computed natural flow to date, plus an estimate 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 extremely below normal flows of 1988 and 1989 and below normal flows of 1990 and 1991 have particularly affected storage levels in Cypress Lake. In 1991 the lake never exceeded the dead storage level and all irrigation from the lake required pumping. At the end of October the lake contained 17 200 dam^3 (13,900 acre-feet) which is 12 800 dam^3 (10,400 acre-feet) below the dead storage level of 30 000 dam^3 (24,300 acre-feet). The possibility exists that Cypress Lake will become dry in 1992.

At the end of February, the combined usable storage of Middle Creek Reservoir, Altawan Reservoir, Eastend Reservoir, Huff Lake and Newton Lake was 4 000 dam^3 (3,240 acre-feet), or 10 percent of the total live storage of 41 100 dam^3 (33,300 acre-feet). By the end of June, late spring flows had increased the combined usable storage to the yearly maximum of 26 200 dam^3 (21,200 acre-feet) or 64 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 11 500 dam^3 (9,320 acre-feet) or 28 percent of the total live storage. A majority of this storage was in Huff Lake and Newton Lake which benefitted from late rain events. Further details on storage in the major Canadian reservoirs are provided in Figure 3, and in Table 16, Appendix B.

FIGURE 3

RESERVOIRS IN LODGE, BATTLE AND FRENCHMAN BASINS
MONTH-END CONTENTS FOR 1990 AND 1991



FSL: Full Supply Level

LODGE CREEK

The computed natural flow of Lodge Creek at the International Boundary from March 1 to October 31, 1991, was 13 900 dam^3 (11,300 acre-feet) or 41 percent of the average natural flow of the previous 41 years of record. Each country is entitled to 50 percent of the natural flow or 6 940 dam^3 (5,630 acre-feet). A total flow of 7 670 dam^3 (6,220 acre-feet) was recorded at Lodge Creek below McRae Creek at International Boundary (station 11AB083) from March 1 to October 31.

Deficit deliveries were recorded in 8 of the 24 division periods during the season. No deficit remained at the end of October.

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 1991 [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	0	0	0	0	
MAR 11 - MAR 20	339	170	0		170
MAR 21 - MAR 31	1 218	609	0		609
APR 1 - APR 10	1 819	910	1		909
APR 11 - APR 20	573	286	1		285
APR 21 - APR 30	24	12	18	6	
MAY 1 - MAY 10	497	249	20		229
MAY 11 - MAY 20	5 116	2 558	2 003		555
MAY 21 - MAY 31	1 962	981	2 055	1 074	
JUNE 1 - JUNE 10	361	181	1 363	1 183	
JUNE 11 - JUNE 20	62	31	586	555	
JUNE 21 - JUNE 30	448	224	46		178
JULY 1 - JULY 10	1 326	663	7		656
JULY 11 - JULY 20	0	0	687	687	
JULY 21 - JULY 31	0	0	63	63	
AUG 1 - AUG 10	0	0	28	28	
AUG 11 - AUG 20	124	62	718	656	
AUG 21 - AUG 31	0	0	74	74	
SEP 1 - SEP 10	1	1	1	1	
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	13 870	6 937	7,672		

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

TABLE 3A
SUMMARY OF LODGE CREEK DIVISION FOR 1991 [1]
QUANTITIES IN ACRE-FEET

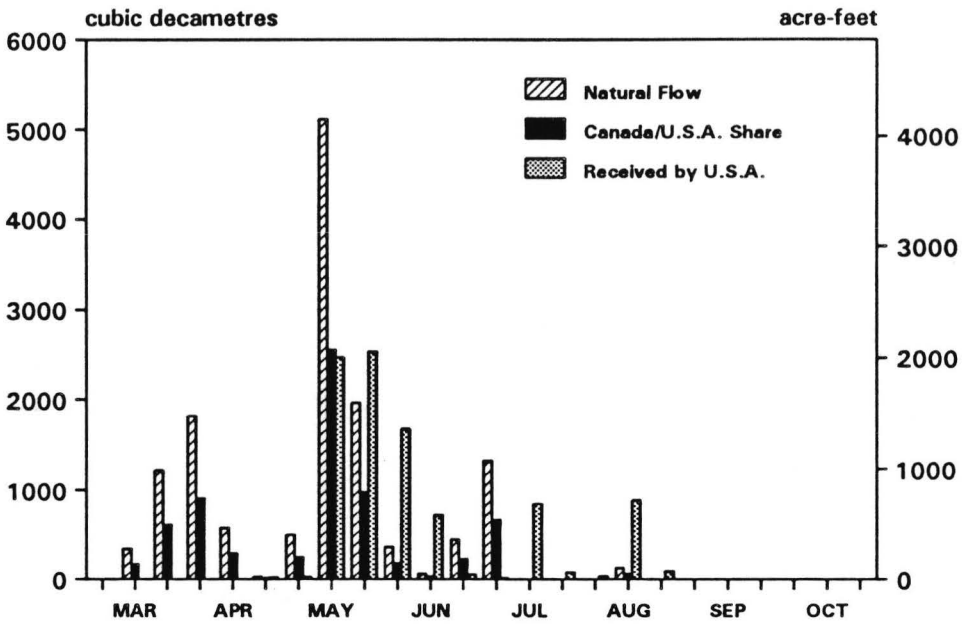
DIVISION PERIOD AT INTERNATIONAL BOUNDARY	COMPUTED NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 10	0	0	0	0	
MAR 11 - MAR 20	275	137	0		137
MAR 21 - MAR 31	987	494	0		494
APR 1 - APR 10	1,475	737	1		737
APR 11 - APR 20	465	232	1		231
APR 21 - APR 30	19	10	15	5	
MAY 1 - MAY 10	403	201	16		185
MAY 11 - MAY 20	4,148	2,074	1,624		450
MAY 21 - MAY 31	1,591	795	1,666	871	
JUNE 1 - JUNE 10	293	146	1,105	959	
JUNE 11 - JUNE 20	50	25	475	450	
JUNE 21 - JUNE 30	363	182	37		144
JULY 1 - JULY 10	1,075	537	6		532
JULY 11 - JULY 20	0	0	557	557	
JULY 21 - JULY 31	0	0	51	51	
AUG 1 - AUG 10	0	0	23	23	
AUG 11 - AUG 20	101	50	582	532	
AUG 21 - AUG 31	0	0	60	60	
SEP 1 - SEP 10	1	1	1	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	11,244	5,622	6,219		

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

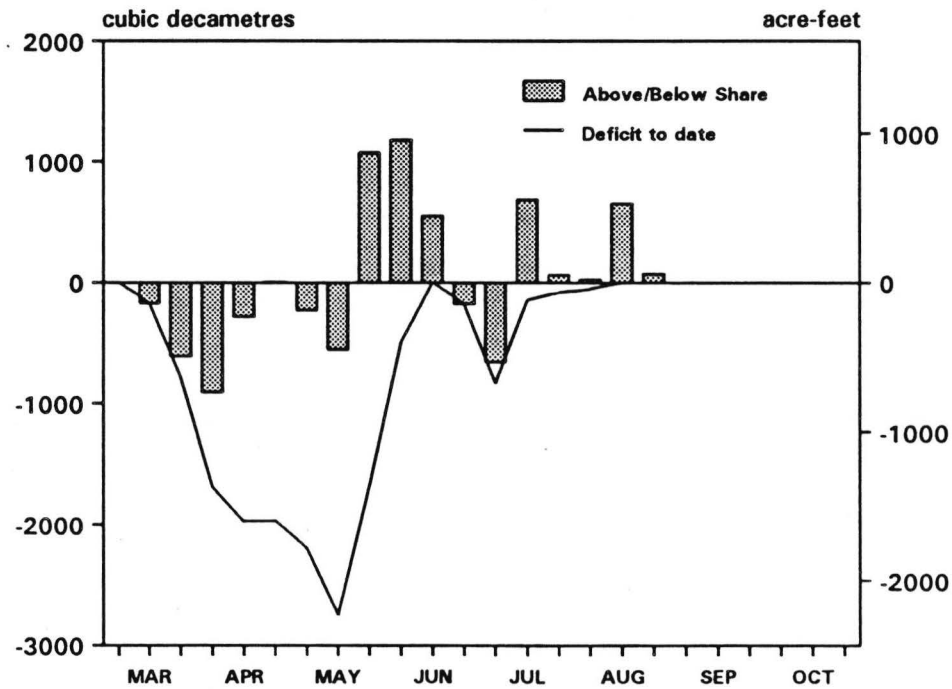
FIGURE 4

LODGE CREEK DIVISION, 1991

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, 1991, was 19 400 dam^3 (15,700 acre-feet) or 62 percent of the average natural flow of the previous 51 years of record. Each country is entitled to 50 percent of the natural flow or 9 690 dam^3 (7,850 acre-feet). A total flow of 9 930 dam^3 (8,050 acre-feet) was recorded at Battle Creek at International Boundary (station 11AB027) from March 1 to October 31.

Deficit deliveries were recorded in 10 of the 24 division periods during the season. No deficit remained at the end of October.

The accumulated effect of several years of below normal spring runoff resulted in continuing extremely low levels in Cypress Lake. In May of 1991, a temporary canal was constructed between Cypress Lake west inflow canal and Cypress Lake west outflow canal to bring water directly from Battle Creek to Vidora Ditch irrigation project. Otherwise, water for irrigation on Battle Creek from Cypress Lake required pumping.

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 1991 [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	114	57	68	11	
MAR 15 - MAR 25	920	460	645	185	
MAR 26 - APR 4	945	472	450		22
APR 5 - APR 14	1 888	944	712		232
APR 15 - APR 24	961	480	274		206
APR 25 - MAY 4	662	331	243		88
MAY 5 - MAY 14	1 711	856	647		209
MAY 15 - MAY 25	3 805	1 903	1 599		304
MAY 26 - JUNE 4	2 595	1 297	2 338	1 041	
JUNE 5 - JUNE 14	1 155	578	533		45
JUNE 15 - JUNE 24	443	221	225	4	
JUNE 25 - JULY 4	1 195	598	657	59	
JULY 5 - JULY 14	1 277	639	218		421
JULY 15 - JULY 25	352	176	36		140
JULY 26 - AUG 4	10	5	4		1
AUG 5 - AUG 14	11	6	9	3	
AUG 15 - AUG 25	517	258	515	257	
AUG 26 - SEP 4	104	52	102	50	
SEP 5 - SEP 14	37	18	35	17	
SEP 15 - SEP 24	51	25	37	12	
SEP 25 - OCT 4	102	51	86	35	
OCT 5 - OCT 14	163	81	149	68	
OCT 15 - OCT 25	264	132	255	123	
OCT 26 - OCT 31	94	47	94	47	
TOTAL	19 376	9 687	9 931		

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

TABLE 4A
SUMMARY OF BATTLE CREEK DIVISION FOR 1991 [1]
QUANTITIES IN ACRE-FEET

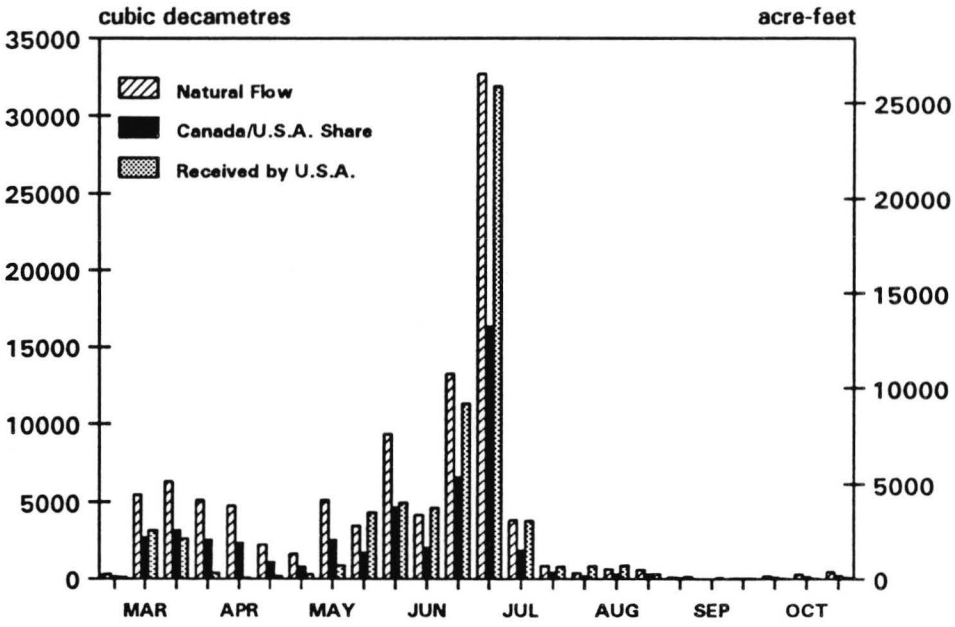
DIVISION PERIOD AT INTERNATIONAL BOUNDARY	COMPUTED NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 14	92	46	55	9	
MAR 15 - MAR 25	746	373	523	150	
MAR 26 - APR 4	766	383	365		18
APR 5 - APR 14	1,531	765	577		188
APR 15 - APR 24	779	389	222		167
APR 25 - MAY 4	537	268	197		71
MAY 5 - MAY 14	1,387	694	525		169
MAY 15 - MAY 25	3,085	1,543	1,296		246
MAY 26 - JUNE 4	2,104	1,051	1,895	844	
JUNE 5 - JUNE 14	936	469	432		36
JUNE 15 - JUNE 24	359	179	182	3	
JUNE 25 - JULY 4	969	485	533	48	
JULY 5 - JULY 14	1,035	518	177		341
JULY 15 - JULY 25	285	143	29		113
JULY 26 - AUG 4	8	4	3		1
AUG 5 - AUG 14	9	5	7	2	
AUG 15 - AUG 25	419	209	418	208	
AUG 26 - SEP 4	84	42	83	41	
SEP 5 - SEP 14	30	15	28	14	
SEP 15 - SEP 24	41	20	30	10	
SEP 25 - OCT 4	83	41	70	28	
OCT 5 - OCT 14	132	66	121	55	
OCT 15 - OCT 25	214	107	207	100	
OCT 26 - OCT 31	76	38	76	38	
TOTAL	15,708	7,853	8,051		

[1] All values are conversions from Table 4. Totals and shares may not add or subtract as a result of rounding.

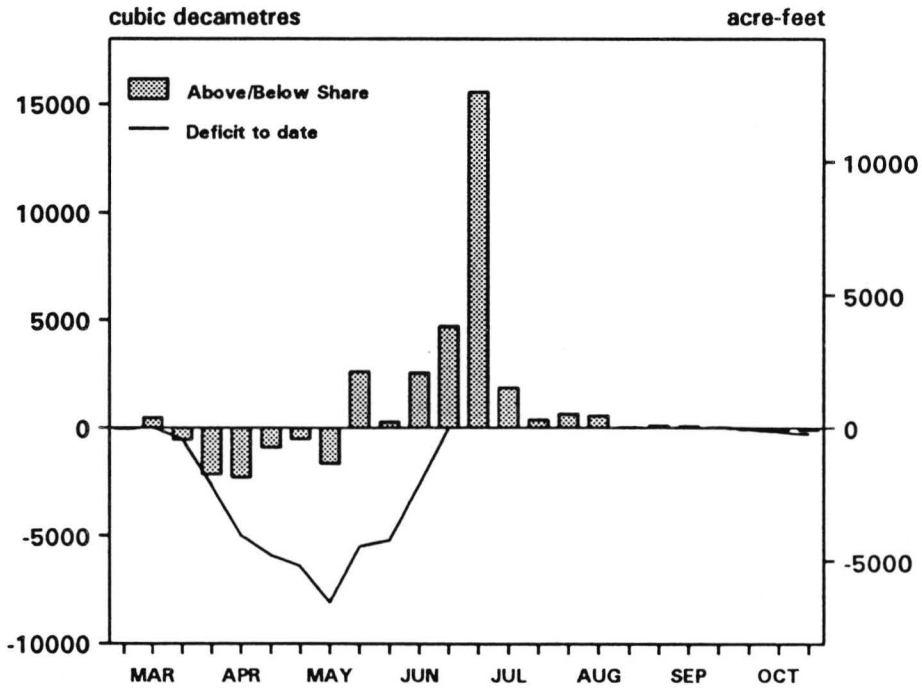
FIGURE 5

FRENCHMAN RIVER DIVISION, 1991

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, 1991, was 101 000 dam^3 (81,900 acre-feet) or 126 percent of the average natural flow of the previous 51 years of record. Each country is entitled to 50 percent of the natural flow or 50 700 dam^3 (41,100 acre-feet). A total flow of 72 100 dam^3 (58,500 acre-feet) was recorded at Frenchman River at International Boundary (station 11AC041) from March 1 to October 31.

The above average flows were a result of runoff from uncommonly large storms in late June and early July. For the period of record, the July 1991 mean flow recorded at Frenchman River at International Boundary (station 11AC041), was second only to the July 1955 mean flow.

Deficit deliveries were recorded in 10 of the 24 division periods during the season. A deficit of 310 dam^3 (250 acre-feet) remained at the end of October.

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 1991 [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	330	165	106		59
MAR 11 - MAR 20	5 458	2 729	3 183	454	
MAR 21 - MAR 31	6 324	3 162	2 622		540
APR 1 - APR 10	5 115	2 558	390		2 168
APR 11 - APR 20	4 738	2 369	64		2 305
APR 21 - APR 30	2 246	1 123	213		910
MAY 1 - MAY 10	1 635	818	303		515
MAY 11 - MAY 20	5 128	2 564	900		1 664
MAY 21 - MAY 31	3 485	1 743	4 349	2 606	
JUNE 1 - JUNE 10	9 358	4 679	4 970	291	
JUNE 11- JUNE 20	4 155	2 077	4 641	2 564	
JUNE 21 - JUNE 30	13 232	6 616	11 318	4 702	
JULY 1 - JULY 10	32 681	16 341	31 898	15 557	
JULY 11 - JULY 20	3 841	1 921	3 786	1 865	
JULY 21 - JULY 31	870	435	814	379	
AUG 1 - AUG 10	425	213	867	654	
AUG 11 - AUG 20	670	335	897	562	
AUG 21 - AUG 31	621	311	323	12	
SEP 1 - SEP 10	110	55	155	100	
SEP 11 - SEP 20	0	0	73	73	
SEP 21 - SEP 30	41	21	37	16	
OCT 1 - OCT 10	206	103	25		78
OCT 11 - OCT 20	322	161	35		126
OCT 21 - OCT 31	464	232	126		106
TOTAL	101 455	50 731	72 095		

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

TABLE 5A
SUMMARY OF FRENCHMAN RIVER DIVISION FOR 1991 [1]
QUANTITIES IN ACRE-FEET

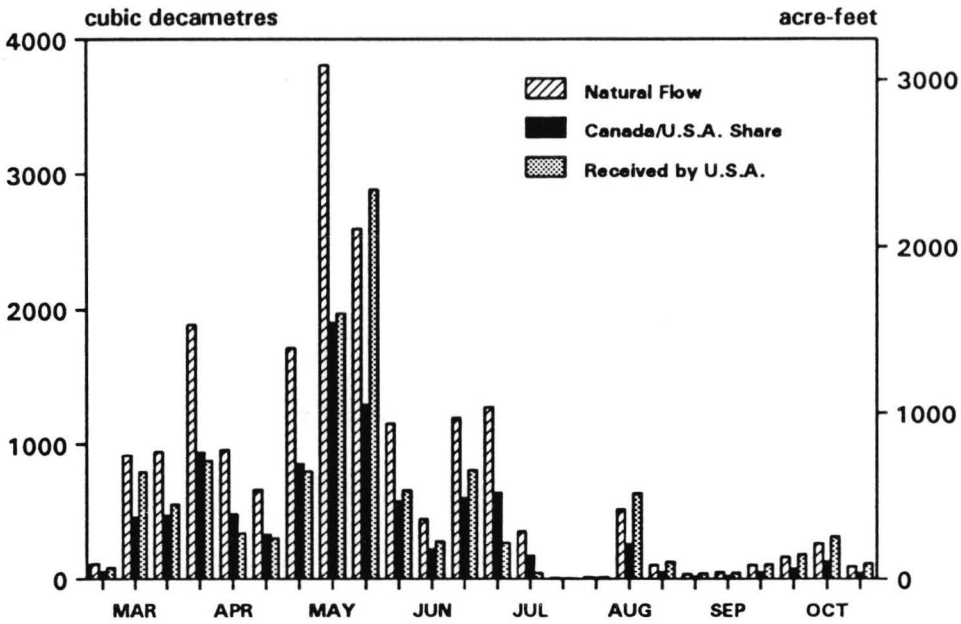
DIVISION PERIOD AT INTERNATIONAL BOUNDARY	COMPUTED NATURAL FLOW	U.S.A. SHARE	RECEIVED BY U.S.A.	RECEIVED BY U.S.A.	
				ABOVE SHARE	BELOW SHARE
MAR 1 - MAR 10	268	134	86		48
MAR 11 - MAR 20	4,425	2,212	2,580	368	
MAR 21 - MAR 31	5,127	2,563	2,126		438
APR 1 - APR 10	4,147	2,074	316		1,758
APR 11 - APR 20	3,841	1,921	52		1,869
APR 21 - APR 30	1,821	910	173		738
MAY 1 - MAY 10	1,325	663	246		418
MAY 11 - MAY 20	4,157	2,079	730		1,349
MAY 21 - MAY 31	2,825	1,413	3,526	2,113	
JUNE 1 - JUNE 10	7,587	3,793	4,029	236	
JUNE 11- JUNE 20	3,368	1,684	3,762	2,079	
JUNE 21 - JUNE 30	10,727	5,364	9,176	3,812	
JULY 1 - JULY 10	26,495	13,248	25,860	12,612	
JULY 11 - JULY 20	3,114	1,557	3,069	1,512	
JULY 21 - JULY 31	705	353	660	307	
AUG 1 - AUG 10	345	173	703	530	
AUG 11 - AUG 20	544	272	727	456	
AUG 21 - AUG 31	504	252	262	10	
SEP 1 - SEP 10	89	45	126	81	
SEP 11 - SEP 20	0	0	59	59	
SEP 21 - SEP 30	33	17	30	13	
OCT 1 - OCT 10	167	84	20		63
OCT 11 - OCT 20	261	131	28		102
OCT 21 - OCT 31	376	188	102		86
TOTAL	82,250	41,128	58,448		

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

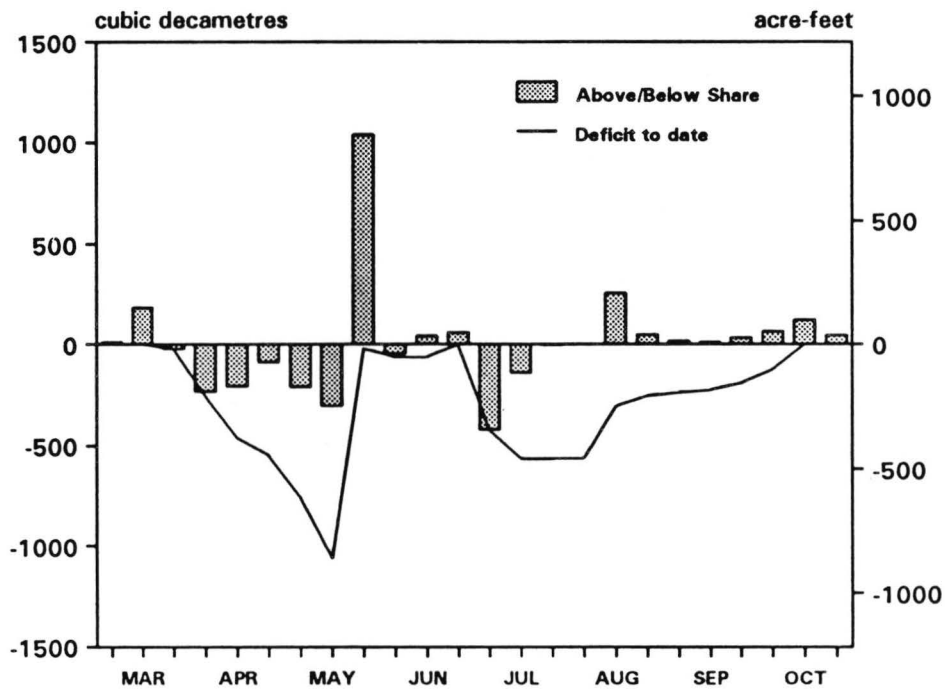
FIGURE 6

BATTLE CREEK DIVISION, 1991

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 1991

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
11AA025	Milk River at Western Crossing of International Boundary
11AA031	Milk River at Eastern Crossing of International Boundary
11AA032	North 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 1991

* 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.