Report to

THE INTERNATIONAL JOINT COMMISSION

on

THE DIVISION AND USE MADE OF THE WATERS OF

ST. MARY AND MILK RIVERS

by

J. D. McLEOD
representing Canada

and

L. B. LEOPOLD
representing United States

1960

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International Joint Commission,

Washington, D.C., and Ottawa, Ontario.

Gentlemen:

In compliance with the Provisions of Clause VIII (c) of your Order of the 4th October, 1921, directing the division of the waters of 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, 1960.

Respectfully submitted,

J. D. McLeod
Accredited Officer of Her Majesty.

Leona B. Leopold
L. B. Leopold
Accredited Officer of the United States.

March 17, , 1961.
(date)

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List of gauging stations with map showing their locations in the river basins.

Introduction

The field work incidental to the division and administration of the waters of the St. Mary and Milk Rivers in Alberta, Saskatchewan and Montana was conducted during the irrigation season of 1960 by representatives of the Water Resources Branch (Canada) and the United States Geological Survey.

Mr. J. D. McLeod, Chief Engineer, Water Resources Branch, Department of Northern Affairs and National Resources, acting in the capacity of accredited officer of Her Majesty, was represented in the field by Mr. E. P. Collier, District Engineer, Calgary, Alberta. Dr. L. B. Leopold, Chief Hydraulic Engineer, United States Geological Survey, as accredited officer of the United States, was represented in the field by Mr. F. Stermitz, District Engineer, Helena, Montana.

This report has been prepared jointly by Mr. E. P. Collier and Mr. F. Stermitz.

The waters of the two rivers were divided between the two countries in accordance with the Order of the International Joint Commission dated at Ottawa, Canada, on the 4th day of October, 1921.

The hydrometric data upon which this report is based were collected and compiled jointly for 36 international stations by engineers of the United States Geological Survey under the direction of Mr. Stermitz and of the Water Resources Branch (Canada) under the direction of Mr. Collier. Data for another 23 stations in Canada and 7 stations in the United States were collected independently by the same engineers in their respective countries. The United States Bureau of Reclamation furnished data for 8 canal and 2 reservoir stations and the United States Bureau of Indian Affairs furnished data for one other canal station in Montana.

Complete data for 53 of the stations mentioned above are contained in the appendix to this report; monthly quantities only for 12 canal stations in Montana are shown in Table 5, Page 3, and Table 9. Data for 4 stations maintained by the United States Geological Survey in the St. Mary River basin and 6 stations maintained by Canada in the St. Mary and Milk River basins are not used for purposes of division and are not included in either this report or its appendix.

The construction of the Altawan Reservoir on Lodge Creek in Saskatchewan during 1959 and 1960 has made it necessary to institute a more formal division of Lodge Creek water in future. To provide data required for this division Canada constructed four new gauging stations in the basin in 1960. Three of these are stream gauging stations and the fourth is a staff gauge installation on Altawan Reservoir.

Water Supply

St. Mary River

The total natural flow of the St. Mary River at the international boundary for the year 1 November 1959 to 31 October 1960 was 578,292 acre-feet. Of this total 482,907 occurred during the irrigation season, 1 April to 31 October. The natural flow during the irrigation season was 82 percent of 590,157 acre-feet, the average of the previous 57 years of record. Of the total natural flow there was delivered to Canada 397,825 acre-feet, 319,988 acre-feet during the irrigation season and 77,837 acre-feet during the balance of the year.

The thirty-ninth annual international survey of snow conditions in the St. Mary River drainage basin was conducted on 3 and 4 May 1960. The survey provided advance information on the probable run-off during the irrigation season. The tabulated results of the forecasts and measured discharge at three locations are shown below.

Location	Period of Correlation	Forecast of 1960 Run-off		Measured Run-off	
		Acre-Feet	% of Average	Acre-feet	% of Average
Swiftcurrent Creek at Many Glacier	1923-57	67,000 (May to July)	(1923-59) 98	64,020 (May to July)	(1923-59) 93
Natural Flow Swiftcurrent Creek at Sherburne	1922-57	112,000 (May to Sept.)	(1922-59) 97	105,100 (May to Sept.)	(1922-59) 91
Natural Flow St. Mary River at International Boundary	1922-57	492,000 (May to Sept.)	(1922-59) 97	427,400 (May to Sept.)	(1922-59) 85

Milk River

The estimated natural flow of Milk River at its eastern crossing of the international boundary, during the period 1 March to 31 October 1960, was 96,000 acre-feet or 83 percent of 116,000 acre-feet, the estimated average of the previous 48 years of record.

Eastern Tributaries of Milk River

The total quantity of water delivered to the United States by the eastern tributaries of Milk River during the period, 1 March to 31 October 1960, was 145,600 acre-feet or 101 percent of 144,300 acre-feet, the average of the previous 33 years. The quantities delivered to the United States by the various tributaries are listed in Table 10.

During the season a total of 41,540 acre-feet was diverted from the eastern tributaries in Canada to irrigation canals or storage. These diversions are listed in Table 8. The consumptive use was less than the total diversions shown because of return flow from irrigation projects. Measured diversions in Montana amounted to 14,550 acre-feet. These are listed in Table 9.

The eighth annual snow survey in the basins of the eastern tributaries of Milk River was conducted by the Water Resources Branch, Canada

Location	Period of Correlation	Forecast of 1960 Run-off		Measured Run-off	
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During the season a total of 41,391 acre-feet was diverted from the eastern tributaries in Canada to irrigation canals or storage. These diversions are listed in Table 8. The consumptive use was less than the total diversions shown because of return flow from irrigation projects. Measured diversions in Montana amounted to 14,550 acre-feet. These are listed in Table 9.

The eighth annual snow survey in the basins of the eastern tributaries of Milk River was conducted by the Water Resources Branch, Canada

on 1, 2 and 3 March 1960. The correlation of snow survey data and subsequent run-off will be attempted after several more years record have been obtained. For comparison purposes the average snow cover and the average water content for the history of the survey are listed below:

Year	Average Snow Cover	Average Water Content
1953	10.3 inches	2.1 inches
1954	4.4 "	1.2 "
1955	10.4 "	2.8 "
1956	13.0 "	3.4 "
1957	7.7 "	2.1 "
1958	7.9 "	1.2 "
1959	9.8 "	3.4 "
1960	9.1 "	2.4 "

Division of Water

St. Mary River

The division of the waters of the St. Mary River was carried out in accordance with the Order of the International Joint Commission dated October 4, 1921, which stipulates:

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

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

The daily natural flow of the St. Mary River was determined in the following manner:

(1) Daily records were obtained at the following gauging and climatologic stations:

1. Lake Sherburne (formerly called Sherburne Lake Reservoir), Daily Storage or Release.

2. United States St. Mary Canal at St. Mary Crossing near Babb (United States Diversion from St. Mary River Basin).

3. St. Mary River at International Boundary (Quantity delivered to Canada).

4. Evaporation and Precipitation station near Babb, Montana.

(2a) When water was being stored in Lake Sherburne, the natural flow of the St. Mary River at the international boundary was considered to be the sum of the quantities measured at gauging stations 1, 2 and 3 above. This sum is the total of the United States storage and diversion and the quantity delivered to Canada.

(2b) When water was being released from Lake Sherburne, the natural flow of the St. Mary River at the international boundary was computed by adding the quantities measured at gauging stations 2 and 3 above, and subtracting the quantity measured at station 1; that is, the natural flow was considered to be the sum of the quantity diverted in the United States St. Mary Canal and that delivered to Canada reduced by the quantity released from Lake Sherburne.

(3) In order to synchronize Lake Sherburne operations with flow quantities at the international boundary, a two-day time lag was applied to data from station 1.

(4) The natural flow of the St. Mary River having been determined, the division of its waters was carried out in accordance with the above Order.

(5) Computed evaporation losses from Lake Sherburne were treated as storage by the United States.

During the irrigation season, 1 April to 31 October, field engineers of both countries made frequent computations of the daily natural flow of the river and each country's share thereof, in order that any appropriation by the United States in excess of their share could be adjusted by a subsequent delivery to Canada of an equivalent amount at the earliest opportunity.

Regular interim reports on the progress of the division of the natural flow at the international boundary were made to interested agencies throughout the irrigation season.

During the non-irrigation season, 1 November 1959 to 31 March 1960, no interim reports were made as the only United States use during this period was storage in Lake Sherburne where the contributing drainage area is about 14 percent of the total area of the St. Mary River drainage basin in the United States.

Storage in Lake Sherburne was 2,980 acre-feet on 31 October 1959 and had increased to 21,430 by 31 March 1960 and to 63,740 acre-feet by 9 July 1960. Thereafter, water was released at varying rates of flow until the storage was reduced to 2,300 acre-feet by 23 September 1960. On 31 October 1960 the storage had been increased to 7,560 acre-feet.

The United States St. Mary Canal was operated between 11 April and 22 September and water was delivered to the North Branch of the Milk River from 13 April to 24 October. Sept

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 discharge of 174,300 acre-feet which passed the gauging station on the United States St. Mary Canal at St. Mary Crossing between 11 April and 22 September was considered to be the quantity diverted from the St. Mary River by the

United States. A total of 171,640 acre-feet was delivered to the North Branch of Milk River at Hudson Bay Divide during the season, from where it was conveyed to irrigation projects in Montana via the Milk River.

Canada diverted 354,436 acre-feet of water from the St. Mary River Reservoir in 1960 as measured at the Canadian St. Mary Canal and Magrath Irrigation District Canal gauging stations near Spring Coulee.

Milk River

No division of the flow of Milk River at Eastern Crossing was made in 1960. Except for a few small unmeasured diversions above the eastern crossing of the international boundary, the entire natural flow of the Milk River at that point was delivered to the United States.

A complaint by an Alberta rancher was lodged with the Province of Alberta in the fall of 1960 after flow in the South Branch of the Milk River at the international boundary ceased on 8 September and did not begin again until 13 October. A joint inspection of the basins of the North and South Branches of the Milk River in the United States was then carried out on 26 October 1960 by representatives of the U.S. Geological Survey, U.S. Bureau of Reclamation, Department of Water Resources of Alberta and the Water Resources Branch of Canada.

The inspection revealed that some private irrigation is practised in these basins in the United States, most of the lands being relatively poorly served by small ditches or sub-surface irrigation. No obstructions other than beaver dams were observed in the stream channels at the time of the inspection and most of the diversion is apparently effected by beaver dams or bank overflow during higher stages. A likelihood of expansion in irrigation activities was noted. It was concluded that curtailment of late season irrigation will probably become necessary if more frequent occurrence of a dry

stream channel at the boundary is to be avoided in the future. It was also concluded that resumption of flow in the South Branch at the boundary in mid-October 1960 was the result of natural causes.

Eastern Tributaries of Milk River

Minor Diversions

There are a number of small diversions from the eastern tributaries of Milk River in Saskatchewan for which only estimates of the quantities diverted are available. These estimates were provided by the Water Rights Division of the Province of Saskatchewan and are based on reports from the individual irrigators. It is considered that the quantities diverted do not justify the expense of gauging these small diversions. These estimates, being incomplete and of doubtful value, are not used in the Frenchman River and Battle Creek division computations in Tables 6 and 7, except as an adjustment to the totals for the season. The estimated quantities reported to date for 1960 are, however, shown in Table 8 and also detailed in the appendix to this report.

Battle Creek

The computed natural flow of Battle Creek at the international boundary for the period 1 March to 31 October 1960 was 27,988 acre-feet, of which each country was entitled to fifty percent. The details of this division are shown in Table 6 of this report. Canada used 11,528 acre-feet, including an estimated 2,014 acre-feet in minor diversions as detailed in the appendix, and delivered 15,689 acre-feet to the United States.

Frenchman River

The computed natural flow of the Frenchman River at the international boundary for the period 1 March to 31 October 1960 was 77,185

acre-feet, of which each country was entitled to fifty percent. The details of this division are shown in Table 7 of this report. Canada used 13,211 acre-feet, including an estimated 1,601 acre-feet in minor diversions as detailed in the appendix, and delivered 61,160 acre-feet to the United States.

Lodge Creek

Canada diverted or stored a total of 8,179 acre-feet in the Lodge Creek basin during the period 1 March to 31 October 1960 and delivered 23,920 acre-feet to the United States. The Canadian use mentioned above includes 1,520 acre-feet diverted into the Spangler ditch near Govenlock, 6,830 acre-feet stored in Middle Creek Reservoir and an additional 285 acre-feet in minor diversions as detailed in the appendix.

Completion of the 6,000 acre-feet capacity Altawan Reservoir on Lodge Creek near Govenlock, Saskatchewan, in 1960 has made necessary a more formal division of Lodge Creek water than has heretofore been carried out. Division procedures were adopted during 1960 and will be instituted in 1961. Canada constructed the following three stream gauging stations in the basin to provide data required for the computations:

Lodge Creek below Spangler Project
Middle Creek near Battle Creek
Walburger Coulee below diversions.

These stations are equipped with automatic stage recorders. They will be operated by Canada with some assistance from the United States Geological Survey during peak load periods.

Canada also installed a staff gauge on Altawan Reservoir in 1960.

acre-feet, of which each country was entitled to fifty percent. The details of this division are shown in Table 7 of this report. Canada used 13,169 acre-feet, including an estimated 1,531 acre-feet in minor diversions as detailed in the appendix, and delivered 61,160 acre-feet to the United States.

Lodge Creek

Canada diverted or stored a total of 8,127 acre-feet in the Lodge Creek basin during the period 1 March to 31 October 1960 and delivered 23,920 acre-feet to the United States. The Canadian use mentioned above includes 1,520 acre-feet diverted into the Spangler ditch near Govenlock, 6,830 acre-feet stored in Middle Creek Reservoir and an additional 233 acre-feet in minor diversions as detailed in the appendix.

Completion of the 6,000 acre-feet capacity Altawan Reservoir on Lodge Creek near Govenlock, Saskatchewan, in 1960 has made necessary a more formal division of Lodge Creek water than has heretofore been carried out. Division procedures were adopted during 1960 and will be instituted in 1961. Canada constructed the following three stream gauging stations in the basin to provide data required for the computations:

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Canada also installed a staff gauge on Altawan Reservoir in 1960.

Description of Tables

The ten tables accompanying this report show the total water available in the St. Mary and Milk River basins, the manner in which it was divided and the use made by each country of its share during the irrigation season.

Table 1 deals with the natural flow of the St. Mary River at the international boundary and its division. It comprises seven pages, one for each month of the irrigation season. The table shows the computed daily natural flow and each country's share thereof. It also shows the recorded flow at international boundary and the quantity diverted by the United States.

Table 2 is a summary of the mean monthly natural flow of the St. Mary River at International Boundary.

Table 3 is a summary of the mean monthly United States share of the natural flow of the St. Mary River at International Boundary.

Table 4 is a summary of the mean monthly Canadian share of the natural flow of the St. Mary River at International Boundary.

Table 5, Page 1, (upper table), shows the monthly discharge of the St. Mary River at the International Boundary, the contributions by Lee and Rolph Creeks in Canada and the total available to Canada from St. Mary River at the St. Mary Reservoir near Spring Coulee.

Table 5, Page 1, (lower table), shows the monthly disposition made by Canada of its share of the natural flow of the St. Mary River at the international boundary.

Table 5, Page 2, is a summary by months of the disposition of the United States share of the natural flow of the St. Mary River at the international boundary. It shows the quantities stored in or released from Lake Sherburne, the quantity diverted to the United States St. Mary Canal for delivery to the Milk River basin and the

unused portion of the United States share. The table also shows, by months, the measured discharge of the Milk River at Eastern Crossing. This discharge is the sum of the natural flow of the Milk River above its eastern crossing of the international boundary and the water diverted from the St. Mary River basin in the United States. Thus it represents the total quantity available to the United States from the two basins during the irrigation season of 1960.

Table 5, Page 3, shows the measured diversions, in acre-feet, from the Milk River to several canals in the United States. These records as well as the data for Fresno and Nelson Reservoirs were furnished by the Milk River Project of the United States Bureau of Reclamation and the United States Bureau of Indian Affairs.

Table 6 is a compilation, in ten-day periods, of the natural flow of the Battle Creek at the international boundary. This table consists of three pages. Page 1 shows the Canadian diversion to Cypress Lake; Page 2 shows the Canadian diversion to irrigated lands; Page 3 shows the total quantity used by Canada, the natural flow of Battle Creek at the international boundary, the quantity delivered, the United States share and the excess quantity delivered to the United States.

Table 7 is a compilation, in ten-day periods, of the natural flow of the Frenchman River at the international boundary. This table consists of four pages. Page 1 shows the Canadian storage in the main stem reservoirs; Page 2 shows the Canadian diversions; Page 3 shows the summary of storage and diversion and Page 4 shows the net Canadian diversion and storage, the natural flow of the Frenchman River at international boundary, the United States share thereof and the quantity delivered to the United States.

Table 8 summarizes the available information on the diversions from the Eastern Tributaries of Milk River in Canada in 1960.

Table 9 shows the available information on quantities diverted from the Eastern Tributaries of Milk River in the United States in 1960.

Table 10 shows the measured monthly run-off, in acre-feet, of the Eastern Tributaries of Milk River at the international boundary for the period 1 March to 31 October 1960.

Following the tables is a list of the gauging stations operated jointly by Canada and the United States in the St. Mary and Milk River drainage basins in 1960 and a list of other gauging stations in these basins operated independently by either the United States or Canada. A map showing the location of all these stations is included in this report.

Appendix

An appendix, submitted with this report, under separate cover, contains the result of discharge measurements, summary of monthly discharge and the daily gauge height and discharge data for 53 gauging stations operated during 1960 in the St. Mary and Milk River drainage basins. Details of the Canadian minor diversions, as grouped in Table 8 of the report, are included.

APRIL 1960

NATURAL FLOW OF ST. MARY RIVER AT INTERNATIONAL BOUNDARY AND ITS DIVISION BETWEEN CANADA AND UNITED STATES (Cu. ft. per sec.) Table 1.

1960 Day APRIL	Computed Nat. Flow St. Mary River at Int. Bdry.	Canada's share of St. Mary River Nat. Flow	Recorded Flow of St. Mary River nr. Int.Bdry.	Canada rec'd more (+) or less (-) than share +	-	U.S. share of St. Mary River.	Storage Factors Lake Sherburne (2-day lag applied) Stored	Rlsd.	Diverted by U.S. St. Mary Canal	Net Used by United States	U.S. used more (+) or less (-) than share. +	-
1	497	373	300		73	124	197		0	197	73	
2	451	338	300		38	113	151		0	151	38	
3	446	334	315		19	112	131		0	131	19	
4	491	368	355		13	123	136		0	136	13	
5	511	383	390	7		128	121		0	121		7
6	638	478	436		42	160	202		0	202	42	
7	716	525	449		76	191	267		0	267	76	
8	766	550	477		73	216	289		0	289	73	
9	840	587	528		59	253	312		0	312	59	
10	883	608	588		20	275	295		0	295	20	
11	897	615	618	3		282	278		1	279		3
12	995	664	610		54	331	338		47	385	54	
13	996	665	618		47	331	328		50	378	47	
14	921	627	602		25	294	267		52	319	25	
15	789	561	484		77	228	256		49	305	77	
16	711	522	423		99	189	239		49	288	99	
17	671	502	492		10	169	129		50	179	10	
18	750	542	550	8		208	151		49	200		8
19	789	561	550		11	228	188		51	239	11	
20	751	542	542	0		209	158		51	209		0
21	731	532	535	3		199	146		50	196		3
22	676	505	499		6	171	128		49	177	6	
23	785	559	640	81		226	92		53	145		81
24	488	366	610	244		122		174	52	-122		244
25	553	415	550	135		138		47	50	3		135
26	640	480	492	12		160	98		50	148		12
27	596	447	442		5	149	104		50	154	5	
28	554	416	410		6	138	95		49	144	6	
29	617	463	449		14	154	95		73	168	14	
30	482	362	390	28		120		169	261	92		28
31												
Total Sec.-ft.	20,631	14,890	14,644	(521)	(767) 246	5,741	5,191	390	1,186	5,987	(767) 246	(521)
Mean	688	496	488		8.20	191	173	13.0	39.5	200	8.20	
Ac.-ft.	40,921	29,534	29,046		488	11,387	10,296	774	2,352	11,875	488	

MAY 1960

NATURAL FLOW OF ST. MARY RIVER AT INTERNATIONAL BOUNDARY AND ITS DIVISION BETWEEN CANADA AND UNITED STATES (Cu. ft. per sec.) Table 1.

1960 Day MAY	Computed Nat. Flow St. Mary River at Int. Bdry.	Canada's share of St. Mary River Nat. Flow	Recorded Flow of St. Mary River nr. Int.Bdry.	Canada rec'd more (+) less (-) or than share +	-	U.S. share of St. Mary River.	Storage Factors Lake Sherburne (2-day lag applied) Stored	Rlsd.	Diverted by U.S. St. Mary Canal	Net Used by United States	U.S. used more (+) less (-) or than share. +	-
1	425	319	449	130		106		361	337	-24		130
2	596	447	477	30		149		364	483	119		30
3	671	502	492		10	169		314	493	179	10	
4	718	526	484		42	192		265	499	234	42	
5	698	516	463		53	182		260	495	235	53	
6	681	507	484		23	174		298	495	197	23	
7	769	551	520		31	218		248	497	249	31	
8	788	561	513		48	227		222	497	275	48	
9	850	592	492		100	258		141	499	358	100	
10	1,017	675	542		133	342		26	501	475	133	
11	1,159	746	686		60	413		34	507	473	60	
12	1,544	939	1,050	111		605		28	522	494		111
13	2,302	1,318	1,530	212		984	235		537	772		212
14	2,816	1,575	1,560		15	1,241	709		547	1,256	15	
15	2,877	1,605	1,520		85	1,272	806		551	1,357	85	
16	2,502	1,418	1,460	42		1,084	491		551	1,042		42
17	2,174	1,254	1,420	166		920	203		551	754		166
18	1,994	1,164	1,290	126		830	157		547	704		126
19	1,752	1,043	1,190	147		709	17		545	562		147
20	1,604	969	1,030	61		635	37		537	574		61
21	1,515	924	903		21	591	79		533	612	21	
22	1,404	869	804		65	535	71		529	600	65	
23	1,350	842	734		108	508	89		527	616	108	
24	1,342	838	768		70	504	45		529	574	70	
25	1,339	836	777		59	503	35		527	562	59	
26	1,248	791	777		14	457		49	520	471	14	
27	1,135	734	777	43		401		162	520	358		43
28	1,228	781	795	14		447		87	520	433		14
29	1,328	831	822		9	497		14	520	506	9	
30	1,411	872	903	31		539		12	520	508		31
31	1,763	1,048	1,200	152		715	24		539	563		152
Total Sec.-ft.	43,000	26,593	26,912	(1,265) 319	(946)	16,407	2,998	2,885	15,975	16,088	(946)	(1,265) 319
Mean	1,387	858	868	10.3		529	96.7	93.1	515	519		10.3
Ac.-ft.	85,289	52,746	53,379	633		32,543	5,946	5,722	31,686	31,910		633

JUNE 1960

NATURAL FLOW OF ST. MARY RIVER AT INTERNATIONAL BOUNDARY AND ITS DIVISION BETWEEN CANADA AND UNITED STATES (Cu. ft. per sec.) Table 1.

1960 Day JUNE	Computed Nat. Flow St. Mary River at Int. Bdry.	Canada's share of St. Mary River Nat. Flow	Recorded Flow of St. Mary River nr. Int.Bdry.	Canada rec'd more (+) or less (-) than share +	-	U.S. share of St. Mary River.	Storage Factors Lake Sherburne (2-day lag applied) Stored	Rlsd.	Diverted by U.S. St. Mary Canal	Net Used by United States	U.S. used more (+) or less (-) than share. +	-
1	2,228	1,281	1,470	189		947	173		585	758		189
2	2,826	1,580	1,740	160		1,246	492		594	1,086		160
3	3,300	1,817	2,190	373		1,483	508		602	1,110		373
4	3,676	2,005	2,610	605		1,671	454		612	1,066		605
5	4,276	2,305	2,890	585		1,971	781		605	1,386		585
6	4,348	2,341	2,880	539		2,007	861		607	1,468		539
7	3,768	2,051	2,730	679		1,717	409		629	1,038		679
8	3,534	1,934	2,540	606		1,600	367		627	994		606
9	3,433	1,883	2,330	447		1,550	478		625	1,103		447
10	3,057	1,695	2,030	335		1,362	398		629	1,027		335
11	2,986	1,660	1,830	170		1,326	518		638	1,156		170
12	2,939	1,636	1,720	84		1,303	583		636	1,219		84
13	2,960	1,647	1,700	53		1,313	624		636	1,260		53
14	3,000	1,667	1,710	43		1,333	635		655	1,290		43
15	3,140	1,737	1,740	3		1,403	740		660	1,400		3
16	3,107	1,720	1,770	50		1,387	675		662	1,337		50
17	3,429	1,881	2,010	129		1,548	752		667	1,419		129
18	3,997	2,165	2,310	145		1,832	1,008		679	1,687		145
19	3,887	2,110	2,290	180		1,777	918		679	1,597		180
20	3,111	1,722	2,160	438		1,389	277		674	951		438
21	2,845	1,589	2,010	421		1,256	163		672	835		421
22	2,718	1,526	1,860	334		1,192	191		667	858		334
23	2,471	1,402	1,740	338		1,069	69		662	731		338
24	2,235	1,284	1,590	306		951		8	653	645		306
25	2,255	1,294	1,550	256		961	52		653	705		256
26	2,371	1,352	1,560	208		1,019	154		657	811		208
27	2,559	1,446	1,560	114		1,113	342		657	999		114
28	2,447	1,390	1,530	140		1,057	260		657	917		140
29	2,324	1,329	1,500	171		995	171		653	824		171
30	2,254	1,294	1,430	136		960	177		647	824		136
31												
Total Sec.-ft.	91,481	50,743	58,980	8,237		40,738	13,230	8	19,279	32,501		8,237
Mean	3,049	1,691	1,966	275		1,358	441	0.27	643	1,083		275
Ac.-ft.	181,450	100,647	116,985	16,338		80,803	26,241	15.9	38,239	64,465		16,338

JULY 1960

NATURAL FLOW OF ST. MARY RIVER AT INTERNATIONAL BOUNDARY AND ITS DIVISION BETWEEN CANADA AND UNITED STATES (Cu. ft. per sec.) Table 1.

1960 Day JULY	Computed Nat. Flow St. Mary River at Int. Bdry.	Canada's share of St. Mary River Nat. Flow	Recorded Flow of St. Mary River nr. Int.Bdry.	Canada rec'd more (+) or less (-) than share +	-	U.S. share of St. Mary River.	Storage Factors Lake Sherburne (2-day leg applied) Stored	Rlsd.	Diverted by U.S. St. Mary Canal	Net Used by United States	U.S. used more (+) or less (-) than share. +	-
1	2,332	1,333	1,380	47		999	308		644	952		47
2	2,316	1,325	1,310		15	991	362		644	1,006	15	
3	2,389	1,361	1,270		91	1,028	475		644	1,119	91	
4	2,290	1,312	1,200		112	978	448		642	1,090	112	
5	2,216	1,275	1,140		135	941	442		634	1,076	135	
6	2,078	1,206	1,060		146	872	387		631	1,018	146	
7	1,981	1,157	993		164	824	357		631	988	164	
8	1,906	1,120	934		186	786	336		636	972	186	
9	1,913	1,123	924		199	790	351		638	989	199	
10	2,056	1,195	1,020		175	861	392		644	1,036	175	
11	1,873	1,103	1,040		63	770	189		644	833	63	
12	1,677	1,005	1,030	25		672		2	649	647		25
13	1,655	994	1,020	26		661		14	649	635		26
14	1,583	958	981	23		625		45	647	602		23
15	1,583	958	957		1	625		18	644	626	1	
16	1,584	959	945		14	625		5	644	639	14	
17	1,571	952	924		28	619	5		642	647	28	
18	1,528	931	903		28	597		15	640	625	28	
19	1,542	938	934		4	604		32	640	608	4	
20	1,460	897	945	48		563		125	640	515		48
21	1,360	847	945	98		513		227	642	415		98
22	1,383	858	945	87		525		202	640	438		87
23	1,299	816	892	76		483		231	638	407		76
24	1,237	785	840	55		452		237	634	397		55
25	1,148	741	813	72		407		299	634	335		72
26	1,060	697	750	53		363		330	640	310		53
27	1,042	688	710	22		354		306	638	332		22
28	1,056	695	759	64		361		341	638	297		64
29	975	654	795	141		321		458	638	180		141
30	705	519	742	223		186		673	636	-37		223
31	935	634	702	68		301		401	634	233		68
Total Sec.-ft.	49,733	30,036	29,803	(1,128)	(1,361) 233	19,697	4,052	3,961	19,839	19,930	(1,361) 233	(1,128)
Mean	1,604	969	961		7.52	635	131	128	640	643	7.52	
Ac.-ft.	98,644	59,576	59,113		462	39,068	8,037	7,857	39,350	39,531	462	

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AUGUST 1960

NATURAL FLOW OF ST. MARY RIVER AT INTERNATIONAL BOUNDARY AND ITS DIVISION BETWEEN CANADA AND UNITED STATES (Cu. ft. per sec.) Table 1.

1960 Day AUGUST	Computed Nat. Flow St. Mary River at Int. Bdry.	Canada's share of St. Mary River Nat. Flow	Recorded Flow of St. Mary River nr. Int.Bdry.	Canada rec'd more (+) or less (-) than share +	-	U.S. share of St. Mary River.	Storage Factors Lake Sherburne (2-day lag applied) Stored	Rlsd.	Diverted by U.S. St. Mary Canal	Net Used by United States	U.S. used more (+) or less (-) than share. +	-
1	904	619	702	83		285		434	636	202		83
2	1,012	673	768	95		339		396	640	244		95
3	1,012	673	710	37		339		342	644	302		37
4	1,043	688	726	38		355		332	649	317		38
5	981	657	726	69		324		394	649	255		69
6	992	663	726	63		329		383	649	266		63
7	917	625	718	93		292		450	649	199		93
8	868	601	694	93		267		470	644	174		93
9	822	578	662	84		244		482	642	160		84
10	709	521	610	89		188		541	640	99		89
11	740	537	565	28		203		461	636	175		28
12	683	508	506		2	175		457	634	177	2	
13	676	505	484		21	171		442	634	192	21	
14	659	494	484		10	165		463	638	175	10	
15	653	490	477		13	163		460	636	176	13	
16	660	495	499	4		165		479	640	161		4
17	588	441	513	72		147		567	642	75		72
18	519	389	499	110		130		622	642	20		110
19	434	326	470	144		108		676	640	-36		144
20	488	366	456	90		122		606	638	32		90
21	457	343	449	106		114		626	634	8		106
22	504	378	430	52		126		560	634	74		52
23	501	376	410	34		125		540	631	91		34
24	457	343	384	41		114		556	629	73		41
25	472	354	384	30		118		541	629	88		30
26	402	302	372	70		100		599	629	30		70
27	399	299	367	68		100		595	627	32		68
28	386	290	355	65		96		596	627	31		65
29	354	266	326	60		88		597	625	28		60
30	391	293	310	17		98		544	625	81		17
31	349	262	300	38		87		574	623	49		38
Total Sec.-ft.	20,032	14,355	16,082	(1,773) 1,727	(46)	5,677		15,785	19,735	3,950	(46)	(1,773) 1,727
Mean	646	463	519	55.7		183		509	637	127		55.7
Ac.-ft.	39,733	28,473	31,898	3,425		11,260		31,309	39,144	7,835		3,425

SEPTEMBER 1960

NATURAL FLOW OF ST. MARY RIVER AT INTERNATIONAL BOUNDARY AND ITS DIVISION BETWEEN CANADA AND UNITED STATES (Cu. ft. per sec.) Table 1.

1960 Day SEPTEMBER	Computed Nat. Flow St. Mary River at Int. Bdry.	Canada's share of St. Mary River Nat. Flow	Recorded Flow of St. Mary River nr. Int.Bdry.	Canada rec'd more (+) or less (-) than share +	Canada rec'd more (+) or less (-) than share -	U.S. share of St. Mary River.	Storage Factors Lake Sherburne (2-day lag applied) Stored	Storage Factors Lake Sherburne (2-day lag applied) Rlsd.	Diverted by U.S. St. Mary Canal	Net Used by United States	U.S. used more (+) or less (-) than share. +	U.S. used more (+) or less (-) than share. -
1	290	218	278	60		72		611	623	12		60
2	390	292	294	2		98		527	623	96		2
3	382	286	310	24		96		551	623	72		24
4	393	295	326	31		98		562	629	67		31
5	410	308	349	41		102		570	631	61		41
6	427	320	338	18		107		534	623	89		18
7	433	325	332	7		108		522	623	101		7
8	475	356	338		18	119		486	623	137	18	
9	505	379	321		58	126		439	623	184	58	
10	497	373	321		52	124		447	623	176	52	
11	386	290	321	31		96		555	620	65		31
12	391	293	300	7		98		529	620	91		7
13	416	312	305		7	104		509	620	111	7	
14	382	286	305	19		96		539	616	77		19
15	345	259	300	41		86		555	600	45		41
16	372	279	310	31		93		525	587	62		31
17	351	263	305	42		88		510	556	46		42
18	351	263	321	58		88		488	518	30		58
19	248	186	315	129		62		479	412	-67		129
20	169	127	305	178		42		428	292	-136		178
21	318	238	355	117		80		197	160	-37		117
22	322	242	430	188		80		124	16	-108		188
23	360	270	404	134		90		44	0	-44		134
24	335	251	349	98		84		14	0	-14		98
25	586	440	305		135	146	281		0	281	135	
26	445	334	284		50	111	161		0	161	50	
27	333	250	263	13		83	70		0	70		13
28	309	232	249	17		77	60		0	60		17
29	311	233	244	11		78	67		0	67		11
30	302	226	235	9		76	67		0	67		9
31												
Total Sec.-ft.	11,234	8,426	9,412	(1,306) 986	(320)	2,808	706	10,745	11,861	1,822	(320)	(1,306) 986
Mean	374	281	314	32.9		93.6	23.5	358	395	60.7		32.9
Ac.-ft.	22,282	16,713	18,668	1,956		5,570	1,400	21,312	23,526	3,614		1,956

NATURAL FLOW OF ST. MARY RIVER AT INTERNATIONAL BOUNDARY AND ITS DIVISION BETWEEN CANADA AND UNITED STATES (Cu. ft. per sec.) Table 1.

1960 Day OCTOBER	Computed Nat. Flow St. Mary River at Int. Bdry.	Canada's share of St. Mary River Nat. Flow	Recorded Flow of St. Mary River nr. Int.Bdry.	Canada rec'd more (+) or less (-) than share +	-	U.S. share of St. Mary River.	Storage Factors Lake Sherburne (2-day lag applied) Stored	Rlsd.	Diverted by U.S. St. Mary Canal	Net Used by United States	U.S. used more (+) or less (-) than share. +	-
1	306	230	235	5		76	71		0	71		5
2	290	218	230	12		72	60		0	60		12
3	268	201	221	20		67	47		0	47		20
4	263	197	212	15		66	51		0	51		15
5	255	191	204	13		64	51		0	51		13
6	256	192	196	4		64	60		0	60		4
7	243	182	191	9		61	52		0	52		9
8	225	169	183	14		56	42		0	42		14
9	218	164	179	15		54	39		0	39		15
10	224	168	176	8		56	48		0	48		8
11	231	173	176	3		58	55		0	55		3
12	238	178	179	1		60	59		0	59		1
13	238	178	172		6	60	66		0	66	6	
14	223	167	164		3	56	59		0	59	3	
15	223	167	164	-	3	56	59		0	59	3	
16	213	160	164	4		53	49		0	49		4
17	196	147	161	14		49	35		0	35		14
18	204	153	161	8		51	43		0	43		8
19	190	142	157	15		48	33		0	33		15
20	204	153	157	4		51	47		0	47		4
21	215	161	161	0		54	54		0	54		0
22	200	150	157	7		50	43		0	43		7
23	196	147	153	6		49	43		0	43		6
24	210	158	153		5	52	57		0	57	5	
25	262	196	157		39	66	105		0	105	39	
26	260	195	161		34	65	99		0	99	34	
27	249	187	172		15	62	77		0	77	15	
28	282	212	176		36	70	106		0	106	36	
29	254	190	168		22	64	86		0	86	22	
30	221	166	176	10		55	45		0	45		10
31	298	224	179		45	74	119		0	119	45	
Total Sec.-ft.	7,355	5,516	5,495	(187)	(208) 21	1,839	1,860		0	1,860	(208) 21	(187)
Mean	237	178	177		0.68	59.3	60.0		0	60.0	0.68	
Ac.-ft.	14,588	10,941	10,899		41.7	3,648	3,689		0	3,689	41.7	

Historical Summary
of
Natural Flow of St. Mary River at International Boundary

TABLE 2

Year	Mean Monthly Discharge In Second-feet During Irrigation Season April - October							Run-off in Acre-feet		
	April	May	June	July	August	September	October	Non Irrigation Season Nov.-Mar.	Irrigation Season Apr.-Oct.	For Year Nov.-Oct.
1901-02	-	-	-	-	-	618 d	477 d	-	66,111 z	66,111 z
1902-03	568	1726	5200	2924	1404	1109	917	57,965	837,816	895,781
1903-04	724	2022	2936	1903	933	420	221	96,361	555,162	651,523
1904-05	304	1215	2461	1642	847	371	772	39,128	461,855	500,983
1905-06	481	1504	2285	1826	946	628	756	51,592	511,307	562,899
1906-07	489	1931	4259	3117	1335	1214	632	124,082	785,988	910,070
1907-08	844	2485	7500	2488	834	462	481	62,436	910,631	973,067
1908-09	350	1904	5169	3000	1460	640	450	65,276	785,464	850,740
1909-10	1188	2315	2243	1175	580	553	1036	87,729	551,042	638,771
1910-11	520	2035	3470	1679	1053	1380	621	97,349	650,860	748,209
1911-12	542	2031	2347	1582	887	524	423	59,092	505,795	564,887
1912-13	749	1913	4519	2024	1162	574	448	69,604	688,735	758,339
1913-14	637	2230	2298	1430	719	584	841	58,564	530,307	588,871
1914-15	575	1644	2251	1722	969	842	739	83,970	530,287	614,257
1915-16	664	1707	4634	3463	1228	947	391	109,773	789,058	898,831
1916-17	453	2215	4104	2427	759	470	378	58,828	654,520	713,348
1917-18	661	1875	3093	1185	763	489	394	91,256	511,779	603,035
1918-19	340	1978	2116	919	498	336	186	49,684	386,325	436,009
1919-20	429	1720	3133	2355	800	572	557	61,025	579,977	641,002
1920-21	646	2664	3713	1809	755	416	499	72,117	636,167	708,284
1921-22	282	2293	3835	1578	642	420	301	64,657	565,880	630,537
1922-23	422	2286	3359	1726	788	482	560	47,191	583,204	630,395
1923-24	393	2080	3152	1534	728	397	302	51,406	520,145	571,551
1924-25	1272	3461	3512	1893	807	542	406	78,619	720,710	799,329
1925-26	670	1264	1078	818	405	751	1141	49,198	371,837	421,035
1926-27	600	2685	5434	2812	1274	1509	1143	74,838	935,423	1,010,261
1927-28	546	3695	2940	2594	921	513	863	112,116	734,376	846,492
1928-29	314	1837	2558	1272	493	291	289	66,040	427,448	493,488
1929-30	1477	2425	2489	1264	511	370	314	52,374	535,575	587,949
1930-31	224	1957	1838	796	592	464	294	38,856	374,083	412,939
1931-32	567	2497	2896	1409	595	307	240	83,750	515,819	599,569
1932-33	416	1764	4339	2169	766	492	685	67,488	643,242	710,730
1933-34	1734	3441	2929	1155	540	323	269	168,272	629,044	797,316
1934-35	392	1841	2716	1516	630	387	235	136,576	467,568	604,144
1935-36	617	2417	2152	823	420	252	162	30,004	414,845	444,849
1936-37	267	1797	3752	1409	475	298	285	34,013	500,701	534,714
1937-38	696	2611	3323	1622	510	360	322	65,262	571,983	637,245
1938-39	640	2271	1721	1069	459	292	188	59,359	402,996	462,355
1939-40	381	1860	1802	737	382	427	415	37,815	364,056	401,871
1940-41	364	1333	1429	879	359	520	635	32,842	334,846	367,688
1941-42	676	1890	2773	1824	754	526	397	94,304	535,668	629,972
1942-43	1240	1996	3722	2691	810	376	328	63,366	675,767	739,133
1943-44	197	1273	1634	809	536	424	374	36,343	318,121	354,464
1944-45	153	2000	3382	1455	457	486	421	46,471	505,676	552,147
1945-46	658	2361	2731	1500	571	495	521	76,816	535,571	612,387
1946-47	913	2729	2585	1634	657	526	1250	86,866	624,962	711,828
1947-48	621	2963	5486	1576	758	329	266	71,379	725,024	796,403
1948-49	526	2337	2272	991	471	532	404	35,419	456,637	492,056
1949-50	462	1969	4537	3159	1100	492	929	96,111	766,778	862,889
1950-51	819	3366	3431	3230	1128	1209	1390	141,366	885,233	1,026,599
1951-52	969	2408	2204	1433	839	409	264	82,832	517,093	599,925
1952-53	635	2716	5534	2519	887	438	283	62,545	786,960	849,505
1953-54	435	3237	3637	3184	1100	771	736	62,618	795,874	858,492
1954-55	267	1491	3755	2248	799	363	810	79,260	589,738	668,998
1955-56	525	2793	3631	2027	828	441	513	89,020	652,395	741,415
1956-57	275	3569	2947	1077	478	303	332	59,363	545,264	604,627
1957-58	401	2754	2847	1182	556	482	529	58,512	530,645	589,157
1958-59	702	2110	4056	2128	799	1035	979	93,513	714,693	808,206
1959-60	688	1387	3049	1604	646	374	237	95,385	482,907	578,292
Average	**597**	**2212**	**3262**	**1793**	**766**	**551**	**530**	**72,034**	**588,308**	**660,342**

This table contains revisions to formerly reported data.

Natural flow records computed on basis of Lake Sherburne storage and release records as published in the original reports to the International Joint Commission.

d - 1902 data not used.
z - Partial record not included in average.

TABLE 2

Historical Summary of United States Share of Natural Flow of St. Mary River at International Boundary

TABLE 3

Year	Mean Monthly Discharge In Second-feet During Irrigation Season April - October							Run-off in Acre-feet		
	April	May	June	July	August	September	October	Non Irrigation Season Nov.-Mar.	Irrigation Season Apr.-Oct.	For Year Nov.-Oct.
1901-02	-	-	-	-	-	156 d	119 d	-	16,637 z	16,637 z
1902-03	170	696	2433	1306	535	388	295	28,983	352,098	381,081
1903-04	221	844	1301	784	302	105	55.2	48,180	218,938	267,118
1904-05	79.4	442	1064	654	268	92.4	241	19,564	172,185	191,749
1905-06	144	586	976	746	306	174	221	25,796	191,286	217,082
1906-07	122	801	1962	1392	500	440	174	62,041	326,525	388,566
1907-08	302	1076	3583	1077	256	115	120	31,218	393,572	424,790
1908-09	88	785	2418	1333	563	174	112	32,638	331,192	363,830
1909-10	430	991	954	421	150	150	351	43,865	208,947	252,812
1910-11	130	851	1568	672	360	523	170	48,674	258,357	307,031
1911-12	139	849	1006	624	280	131	106	29,546	190,175	219,721
1912-13	244	789	2092	845	414	150	112	34,802	280,792	315,594
1913-14	192	949	982	548	197	154	253	29,282	198,764	228,046
1914-15	167	655	958	694	318	256	205	41,985	197,290	239,275
1915-16	172	686	2150	1565	447	314	97.8	54,886	328,788	383,674
1916-17	116	949	1885	1047	215	117	94.6	29,414	267,802	297,216
1917-18	191	782	1380	426	218	122	98.4	45,628	194,448	240,076
1918-19	90.7	822	891	295	125	84.0	46.5	24,842	142,621	167,463
1919-20	116	699	1400	1011	241	146	142	30,512	227,566	258,078
1920-21	180	1165	1690	738	219	104	126	36,059	255,689	291,748
1921-22	75.8	980	1750	622	170	105	75.0	32,328	228,434	260,762
1922-23	109	976	1513	696	232	122	146	23,596	229,833	253,429
1923-24	98.7	878	1409	600	200	99.0	75.5	25,703	203,399	229,102
1924-25	470	1564	1589	779	238	136	102	39,310	295,509	334,819
1925-26	226	465	372	251	101	214	410	24,599	123,780	148,379
1926-27	208	1176	2550	1239	470	588	405	37,419	401,387	438,806
1927-28	152	1681	1303	1130	296	130	282	56,058	302,731	358,789
[illegible]	[illegible]	[illegible]	1112	469	124	72.8	72.2	33,020	162,343	195,363
1929-30	572	1046	1078	465	128	92.5	78.8	26,187	209,274	235,461
1930-31	56.1	813	752	233	168	116	73.5	19,428	134,186	153,614
1931-32	153	1082	1281	537	151	76.8	59.9	41,875	202,453	244,328
1932-33	116	715	2003	918	220	123	223	33,744	261,031	294,775
1933-34	710	1554	1298	411	139	80.5	67.3	84,136	257,770	341,906
1934-35	103	754	1191	591	171	96.7	58.9	68,288	179,546	247,834
1935-36	191	1042	910	250	105	62.9	40.5	15,002	157,613	172,615
1936-37	66.8	734	1709	538	121	74.5	71.3	17,006	200,099	217,105
1937-38	225	1139	1495	644	129	90.1	80.5	32,631	230,229	262,860
1938-39	202	969	694	368	115	72.9	47.0	29,680	150 149,764 170	179,444
1939-40	95.9	764	734	208	95.5	109	104	18,907	128 127,835 134	146,742
1940-41	93.4	500	548	281	89.7	133	167	16,421	110 109,876 128	126,297
1941-42	215	778	1219	746	221	134	99.6	47,152	207 206,753 167	253,905
1942-43	465	831	1694	1179	251	94.0	82.1	31,683	278 278,134 118	309,817
1943-44	49.2	475	650	254	136	106	93.4	18,172	107 106,824 111	124,996
1944-45	38.3	841	1524	561	115	123	105	23,235	200 200,071 178	223,306
1945-46	211	1014	1199	583	149	124	135	38,408	207 206,912 194	245,320
1946-47	305	1198	1126	650	176	136	458	43,433	246 245,873 140	289,306
1947-48	201	1315	2576	621	223	82.1	66.6	35,690	307 306,970 115	342,660
1948-49	148	1002	969	329	118	143	101	17,709	170 170,269 153	187,978
1949-50	116	827	2102	1413	383	127	325	48,056	321 320,765 154	368,821
1950-51	251	1516	1549	1448	397	438	528	70,683	372 372,351 54	443,034
1951-52	348	1037	935	550	260	102	66.1	41,416	200 200,079 107	241,495
1952-53	218	1191	2600	1093	281	109	70.7	31,272	336 336,248 116	367,520
1953-54	111	1462	1652	1425	383	227	214	31,309	333 332,634 107	363,943
1954-55	66.9	590	1711	957	245	90.6	265	39,630	237 237,646 110	277,276
1955-56	153	1230	1649	847	250	111	130	44,510	265 264,855 195	309,365
1956-57	70.2	1618	1306	372	120	75.8	82.9	29,682	221 221,248 172	250,930
1957-58	100	1215	1257	424	143	128	132	29,256	206 206,065 173	235,321
1958-59	201	888	1861	897	237	351	325	46,756	288 287,954 221	334,710
1959-60	191	529	1358	635	183	93.6	59.3	47,693	184 184,278 174	231,971
60-61									224 205	
Average	185	941	1464	731	235	157	155	36,017	4,910,000 2,494,000 234,311	270,329

This table contains revisions to formerly reported data.

Natural flow records computed on basis of Lake Sherburne storage and release records as published in the original reports to the International Joint Commission.

d - 1902 data not used.
z - Partial record not included in average.

TABLE 3

Historical Summary
of Canadian Share of
Natural Flow of St. Mary River at International Boundary

TABLE 4

Year	Mean Monthly Discharge In Second-feet During Irrigation Season April - October							Run-off in Acre-feet		
	April	May	June	July	August	September	October	Non Irrigation Season Nov.-Mar.	Irrigation Season Apr.-Oct.	For Year Nov.-Oct.
1901-02	-	-	-	-	-	462 d	358 d	-	49,474 z	49,474 z
1902-03	398	1030	2767	1618	869	721	622	28,982	485,718	514,700
1903-04	504	1178	1635	1118	631	315	166	48,181	336,224	384,405
1904-05	225	773	1397	988	580	278	531	19,564	289,670	309,234
1905-06	336	919	1309	1079	640	454	535	25,796	320,021	345,817
1906-07	366	1130	2296	1726	834	774	457	62,041	459,463	521,504
1907-08	542	1410	3917	1411	578	346	361	31,218	517,059	548,277
1908-09	262	1119	2752	1667	897	466	338	32,638	454,272	486,910
1909-10	757	1325	1288	754	430	403	685	43,864	342,095	385,959
1910-11	390	1185	1902	1006	694	857	452	48,675	392,503	441,178
1911-12	403	1182	1340	958	608	393	317	29,546	315,620	345,166
1912-13	504	1123	2426	1179	748	424	336	34,802	407,942	442,744
1913-14	444	1282	1316	882	522	430	587	29,282	331,543	360,825
1914-15	408	989	1292	1028	652	586	534	41,985	332,997	374,982
1915-16	492	1020	2484	1899	781	633	394	54,887	460,270	515,157
1916-17	337	1266	2219	1380	545	352	284	29,414	386,717	416,131
1917-18	470	1094	1713	759	545	367	295	45,628	317,332	362,960
1918-19	249	1156	1225	625	374	252	140	24,642	243,703	268,345
1919-20	313	1021	1733	1344	559	426	415	30,513	358,411	388,924
1920-21	466	1499	2023	1071	535	310	373	39,058	377,477	416,535
1921-22	206	1313	2085	956	472	315	226	32,329	332,446	364,775
1922-23	313	1310	1846	1030	556	360	414	23,535	352,981	376,516
1923-24	295	1202	1743	934	522	298	326	25,703	316,746	342,449
1924-25	302	1898	1923	1113	569	406	305	39,309	425,201	464,510
1925-26	444	799	706	568	304	537	731	24,599	248,057	272,656
1926-27	392	1509	2884	1573	804	971	738	37,419	534,036	571,455
1927-28	394	2014	1637	1464	695	383	581	56,058	431,645	487,703
1928-29	236	1085	1445	803	366	216	217	33,070	265,105	298,175
1929-30	206	1380	1411	799	383	278	235	26,187	326,301	352,488
1930-31	168	1144	1086	563	424	348	221	19,428	239,897	259,325
1931-32	415	1415	1615	872	444	230	180	41,875	313,367	355,242
1932-33	300	1040	2336	1251	546	269	460	33,744	382,211	415,955
1933-34	1024	1887	1631	744	401	240	701	84,136	371,274	455,410
1934-35	290	1087	1525	995	459	290	177	68,238	288,072	356,310
1935-36	426	1376	1243	574	315	189	199	15,002	257,232	272,234
1936-37	200	1063	2043	891	354	224	214	17,007	300,603	317,610
1937-38	471	1473	1808	972	380	270	241	32,631	341,754	374,385
1938-39	438	1302	1027	701	344	219	141	29,677	253,032	282,711
1939-40	285	1096	1068	530	287	319	311	18,908	236,221	255,129
1940-41	271	833	881	598	269	387	468	16,471	224,969	241,390
1941-42	461	1112	1553	1079	533	392	297	47,152	328,915	376,067
1942-43	775	1165	2028	1512	559	282	246	31,683	397,632	429,315
1943-44	148	728	984	555	400	318	288	18,171	211,297	229,468
1944-45	115	1158	1858	894	340	363	316	23,236	305,605	328,841
1945-46	446	1347	1537	917	422	371	386	38,408	328,659	367,067
1946-47	607	1531	1459	984	481	340	791	43,433	379,089	422,522
1947-48	420	1643	2010	955	535	247	295	35,689	418,054	453,743
1948-49	372	1335	1303	662	353	390	303	17,710	286,368	304,078
1949-50	346	1143	2435	1746	717	364	604	48,055	446,013	494,068
1950-51	568	1250	1882	1782	731	771	862	70,683	512,882	583,565
1951-52	621	1371	1269	883	578	307	195	41,416	317,014	358,430
1952-53	417	1525	2934	1426	566	328	312	31,073	450,712	481,785
1953-54	325	1775	1985	1759	717	544	522	31,309	463,240	494,549
1954-55	200	901	2044	1291	554	272	545	28,630	362,094	391,724
1955-56	372	1563	1982	1180	578	330	383	44,510	387,538	432,048
1956-57	205	1951	1640	705	358	227	249	29,681	324,016	353,697
1957-58	300	1539	1590	758	413	354	397	29,256	324,581	353,837
1958-59	501	1222	2195	1231	562	684	654	46,757	426,738	473,495
1959-60	496	858	1691	969	463	281	178	47,692	298,629	346,321
1960-61										
Average	**411**	**1271**	**1798**	**1063**	**530**	**393**	**375**	**36,017**	**353,997**	**390,014**

This table contains revisions to formerly reported data.

Natural flow records computed on basis of Lake Sherburne storage and release records as published in the original reports to the International Joint Commission.

d - 1902 data not used.
z - Partial record not included in average.

TABLE 4

DIVISION OF FLOW OF ST. MARY RIVER
1960

Water Available to Canada at Spring Coulee from St. Mary River
(Acre-feet)

Month	St. Mary River Int. Boundary	Rolph Creek Kimball	Lee Creek Cardston	Total Available at Spring Coulee
April	29,046	743	5,380	35,169
May	53,379	1,030	13,170	67,579
June	116,985	256	6,180	123,421
July	59,113	84	1,710	60,907
August	31,898	304	978	33,180
September	18,668	198	695	19,561
October	10,899	51	749	11,699
Total	319,988	2,666	28,862	351,516

DISPOSITION OF CANADIAN SHARE

Water Used in St. Mary and Milk Rivers Development
(Acre-feet)

Month	Canada's Share Natural Flow: Int. Boundary	Canadian St. Mary Canal: Spring Coulee	Magrath I.D. Canal: Spring Coulee	Total Diverted to S.M.R.D.	Available Storage from Canada's Share
April	29,534	22	4	26	29,508
May	52,746	144	126	270	52,476
June	100,647	38,770	2,150	40,920	59,727
July	59,576	96,770	3,360	100,130	-40,554
August	28,473	107,700	1,510	109,210	-80,737
September	16,713	65,490	1,700	67,190	-50,477
October	10,941	35,300	1,390	36,690	-25,749
Total	298,630	344,196	10,240	354,436	-55,806

Storage in St. Mary Reservoir March 31, Elev. 3610.10 = 240,300 acre-feet
October 31, Elev. 3585.68 = 119,300 acre-feet

DIVISION OF FLOWS OF ST. MARY AND MILK RIVERS
1960

Water Available to the United States in Milk River at Eastern Crossing including Diversion from St. Mary River
(Acre-feet)

Month	St. Mary River Basin						Milk River Basin
	United States Share Nat.Flow	Lake Sherburne Stored	Lake Sherburne Rlsd.	Total Available for Diversion	Diverted to Milk River Basin	Unused	Measured Flow at Eastern Crossing*
April	11,387	10,296	774	1,865	2,352	-487	19,470
May	32,543	5,946	5,722	32,319	31,686	633	51,320
June	80,803	26,241	16	54,578	38,239	16,339	41,330
July	39,068	8,037	7,857	38,888	39,350	-462	37,100
Aug.	11,260	0	31,309	42,569	39,144	3,425	37,990
Sept.	5,570	1,400	21,312	25,482	23,526	1,956	29,360
Oct.	3,648	3,689	0	-41	0	-41	2,490
Total	184,279	55,609	66,990	195,660	174,297	21,363	219,060

* Represents natural flow of Milk River and diversion from St. Mary River Basin.

Lake Sherburne quantities are corrected for evaporation.

Storage in Lake Sherburne on March 31 = 21,430 acre-feet
October 31 = 7,560 acre-feet

Storage in Fresno Reservoir on March 31 = 133,400 acre-feet
October 31 = 32,690 acre-feet

MAJOR DIVERSIONS FROM MILK RIVER
IN THE UNITED STATES
1960

(Acre-feet)

DIVERSION	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Total
Fort Belknap Canal	0	0	10,080	17,210	18,340	13,900	7,650	1,670	0	68,850
Paradise Canal	0	0	4,760	8,460	7,440	7,410	4,170	436	0	32,676
Harlem Canal	0	0	1,820	4,320	5,710	3,930	1,820	476	0	18,076
Harlem No. 2	0	0	188	1,130	1,700	1,170	377	0	0	4,565
Agency Canal	0	0	1,330	7,000	7,130	6,990	4,200	0	0	26,650
Dodson North	0	0	3,570	8,670	10,790	8,470	5,160	714	0	37,374
Dodson South	1,190	10,310	8,030	18,550	19,070	21,270	14,430	9,220	1,010	103,080
Vandalia Canal	0	0	5,120	9,880	11,070	10,870	9,520	7,760	1,750	55,970
Wiota Pumping Plant	0	0	813	1,690	1,580	409	725	1,330	0	6,547
Totals	1,190	10,310	35,711	76,910	82,830	74,419	48,052	21,606	2,760	353,788

Storage in Nelson Reservoir on March 31, 50,237 acre-feet
on October 31, 45,930 acre-feet

DETERMINATION OF NATURAL FLOW OF BATTLE CREEK AT INTERNATIONAL BOUNDARY 1960

Diversion to Cypress Lake
Quantities in Second-foot Days

Period at International Boundary	West Inflow Canal	West Inflow Canal Drain	Diversion to Cypress Lake	West Outflow Canal	Net Diversion to Cypress Lake
Feb.23 - Mar. 4	0.0	0.0	0.0	0.0	0.0
Mar. 5 - Mar.14	0.0	0.0	0.0	0.0	0.0
Mar.15 - Mar.25	359.0	28.0	+ 331.0	0.0	+ 331.0
Mar.26 - Apr. 4	2,801.0	19.0	+ 2,782.0	40.2	+ 2,741.8
Apr. 5 - Apr.14	1,140.7	4.6	+ 1,136.1	649.0	+ 487.1
Apr.15 - Apr.24	279.6	1.8	+ 277.8	142.0	+ 135.8
Apr.25 - May 4	314.1	3.3	+ 310.8	64.9	+ 245.9
May 5 - May 14	682.0	0.8	+ 681.2	70.9	+ 610.3
May 15 - May 25	546.1	53.9	+ 492.2	16.4	+ 475.8
May 26 - June 4	327.8	277.3	+ 50.5	41.1	+ 9.4
June 5 -June 14	302.2	315.7	- 13.5	606.0	- 619.5
June 15-June 24	160.3	130.3	+ 30.0	486.1	- 456.1
June 25-July 4	146.9	135.6	+ 11.3	470.4	- 459.1
July 5-July 14	114.0	112.3	+ 1.7	287.5	- 285.8
July 15-July 25	50.7	37.8	+ 12.9	709.0	- 696.1
July 26-Aug. 4	0.0	0.0	0.0	775.0	- 775.0
Aug. 5 - Aug.14	0.0	0.0	0.0	381.4	- 381.4
Aug.15 - Aug.25	0.0	0.0	0.0	94.6	- 94.6
Aug.26 - Sept.4	0.0	0.0	0.0	5.7	- 5.7
Sept. 5-Sept.14	0.0	0.0	0.0	6.3	- 6.3
Sept.15-Sept.24	0.0	0.0	0.0	3.9	- 3.9
Sept.25- Oct. 4	0.0	0.0	0.0	4.4	- 4.4
Oct. 5 - Oct.14	0.0	0.0	0.0	8.7	- 8.7
Oct.15 - Oct.25	0.0	0.0	0.0	5.1	- 5.1
Oct.26 - Oct.31	0.0	0.0	0.0	0.4	- 0.4
Total	7,224.4	1,120.4	6,104.0	4,869.0	+ 1,235.0
Acre-feet	14,329	2,222	12,107	9,658	+ 2,450

DETERMINATION OF NATURAL FLOW OF BATTLE CREEK
AT INTERNATIONAL BOUNDARY
1960

Diversion to Irrigated Lands
Quantities in Second-foot Days

Period at International Boundary	Stirling & Nash Ditch	McKinnon Ditch	Richardson Ditch	Vidora Ditch	Total Diverted	Return Flow	Net Diversion to Irrigated Land
Feb.23 - Mar. 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mar. 5 - Mar.14	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mar.15 - Mar.25	136.0	0.0	0.0	0.0	136.0	40.8	95.2
Mar.26 - Apr. 4	212.4	0.0	0.0	2.0	214.4	64.3	150.1
Apr. 5 - Apr.14	331.0	0.0	0.0	25.4	356.4	106.9	249.5
Apr.15 - Apr.24	220.4	0.0	0.0	0.0	220.4	66.1	154.3
Apr.25 - May 4	106.8	0.0	3.4	0.0	110.2	33.1	77.1
May 5 - May 14	6.4	0.0	0.3	0.0	6.7	2.0	4.7
May 15 - May 25	0.0	0.0	64.4	0.0	64.4	19.3	45.1
May 26 - June 4	34.0	58.4	209.4	2.4	304.2	91.3	212.9
June 5 -June 14	118.3	308.4	106.0	185.3	718.0	215.4	502.6
June 15-June 24	99.4	220.8	54.3	194.3	568.8	170.6	398.2
June 25-July 4	105.6	65.0	77.1	228.5	476.2	142.9	333.3
July 5-July 14	4.3	20.7	124.0	100.0	249.0	74.7	174.3
July 15-July 25	0.0	92.5	261.5	176.1	530.1	159.0	371.1
July 26-Aug. 4	0.8	242.1	232.6	222.2	697.7	209.3	488.4
Aug. 5 - Aug.14	49.2	138.4	49.9	77.4	314.9	94.5	220.4
Aug.15 - Aug.25	31.7	19.9	0.6	0.0	52.2	15.7	36.5
Aug.26 - Sept.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sept. 5-Sept.14	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sept.15-Sept.24	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sept.25- Oct. 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oct. 5 - Oct.14	0.0	19.1	5.5	0.0	24.6	7.4	17.2
Oct.15 - Oct.25	0.0	44.0	0.0	0.0	44.0	13.2	30.8
Oct.26 - Oct.31	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1,456.3	1,229.3	1,189.0	1,213.6	5,088.2	1,526.5	3,561.7
Acre-feet	2,889	2,438	2,358	2,407	10,092	3,028	7,065

DETERMINATION OF NATURAL FLOW OF BATTLE CREEK AT INTERNATIONAL BOUNDARY

1960

Quantities in Second-foot Days

Period at International Boundary	Net Diversion to Cypress Lake (12)	Net Diversion to Irrigated Land (7)	Total Used by Canada (13)	Battle Creek Flow at Int'l Boundary (14)	Battle Creek Natural Flow (15)	United States Share (16)	United States Received in Excess of Share (17)
Feb.23 - Mar. 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mar. 5 - Mar.14	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mar.15 - Mar.25	+331.0	95.2	+426.2	3,033.0	3,459.2	1,729.6	+1,303.4
Mar.26 - Apr. 4	+2,741.8	150.1	+2,891.9	1,410.0	4,301.9	2,151.0	-741.0
Apr. 5 - Apr.14	+487.1	249.5	+736.6	602.0	1,338.6	669.3	-67.3
Apr.15 - Apr.24	+135.8	154.3	+290.1	319.4	609.5	304.8	+14.6
Apr.25 - May 4	+245.9	77.1	+323.0	342.4	665.4	332.7	+9.7
May 5 - May 14	+610.3	4.7	+615.0	541.7	1,156.7	578.4	-36.7
May 15 - May 25	+475.8	45.1	+520.9	256.0	776.9	388.4	-132.4
May 26 - June 4	+9.4	212.9	+222.3	184.1	406.4	203.2	-19.1
June 5 -June 14	-619.5	502.6	-116.9	208.6	91.7	45.8	+162.8
June 15-June 24	-456.1	398.2	-57.9	144.4	86.5	43.2	+101.2
June 25-July 4	-459.1	333.3	-125.8	203.5	77.7	38.8	+164.7
July 5-July 14	-285.8	174.3	-111.5	181.0	69.5	34.8	+146.2
July 15-July 25	-696.1	371.1	-325.0	195.5	0.0	0.0	+195.5
July 26-Aug. 4	-775.0	488.4	-286.6	61.1	0.0	0.0	+61.1
Aug. 5 - Aug.14	-381.4	220.4	-161.0	137.0	0.0	0.0	+137.0
Aug.15 - Aug.25	-94.6	36.5	-58.1	56.9	0.0	0.0	+56.9
Aug.26 - Sept.4	-5.7	0.0	-5.7	21.5	15.8	7.9	+13.6
Sept. 5-Sept.14	-6.3	0.0	-6.3	5.9	0.0	0.0	+5.9
Sept.15-Sept.24	-3.9	0.0	-3.9	0.1	0.0	0.0	+0.1
Sept.25- Oct. 4	-4.4	0.0	-4.4	0.0	0.0	0.0	0.0
Oct. 5 - Oct.14	-8.7	17.2	+8.5	0.0	8.5	4.2	-4.2
Oct.15 - Oct.25	-5.1	30.8	+25.7	0.0	25.7	12.8	-12.8
Oct.26 - Oct.31	-0.4	0.0	-0.4	5.8	5.4	2.7	+3.1
Total	+1,235.0	3,561.7	+4,796.7	7,909.9	13,095.4	6,547.6	1,362.3
Acre-feet	+2,450	7,065	+9,514	15,689	25,974	12,987	2,702
Estimated acre-feet total of minor diversions detailed in appendix to this report.			2,014		2,014		
			11,528		27,988		

DETERMINATION OF NATURAL FLOW OF BATTLE CREEK AT INTERNATIONAL BOUNDARY 1960

Quantities in Second-foot Days

Period at International Boundary	Net Diversion to Cypress Lake	Net Diversion to Irrigated Land	Total Used by Canada	Battle Creek		United States	
				Flow at Int'l Boundary	Natural Flow	Share	Received in Excess of Share
Feb.23 - Mar. 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mar. 5 - Mar.14	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mar.15 - Mar.25	+331.0	95.2	+426.2	3,033.0	3,459.2	1,729.6	+1,303.4
Mar.26 - Apr. 4	+2,741.8	150.1	+2,891.9	1,410.0	4,301.9	2,151.0	-741.0
Apr. 5 - Apr.14	+487.1	249.5	+736.6	602.0	1,338.6	669.3	-67.3
Apr.15 - Apr.24	+135.8	154.3	+290.1	319.4	609.5	304.8	+14.6
Apr.25 - May 4	+245.9	77.1	+323.0	342.4	665.4	332.7	+9.7
May 5 - May 14	+610.3	4.7	+615.0	541.7	1,156.7	578.4	-36.7
May 15 - May 25	+475.8	45.1	+520.9	256.0	776.9	388.4	-132.4
May 26 - June 4	+9.4	212.9	+222.3	184.1	406.4	203.2	-19.1
June 5 -June 14	-619.5	502.6	-116.9	208.6	91.7	45.8	+162.8
June 15-June 24	-456.1	398.2	-57.9	144.4	86.5	43.2	+101.2
June 25-July 4	-459.1	333.3	-125.8	203.5	77.7	38.8	+164.7
July 5-July 14	-285.8	174.3	-111.5	181.0	69.5	34.8	+146.2
July 15-July 25	-696.1	371.1	-325.0	195.5	0.0	0.0	+195.5
July 26-Aug. 4	-775.0	488.4	-286.6	61.1	0.0	0.0	+61.1
Aug. 5 - Aug.14	-381.4	220.4	-161.0	137.0	0.0	0.0	+137.0
Aug.15 - Aug.25	-94.6	36.5	-58.1	56.9	0.0	0.0	+56.9
Aug.26 - Sept.4	-5.7	0.0	-5.7	21.5	15.8	7.9	+13.6
Sept. 5-Sept.14	-6.3	0.0	-6.3	5.9	0.0	0.0	+5.9
Sept.15-Sept.24	-3.9	0.0	-3.9	0.1	0.0	0.0	+0.1
Sept.25- Oct. 4	-4.4	0.0	-4.4	0.0	0.0	0.0	0.0
Oct. 5 - Oct.14	-8.7	17.2	+8.5	0.0	8.5	4.2	-4.2
Oct.15 - Oct.25	-5.1	30.8	+25.7	0.0	25.7	12.8	-12.8
Oct.26 - Oct.31	-0.4	0.0	-0.4	5.8	5.4	2.7	+3.1
Total	+1,235.0	3,561.7	+4,796.7	7,909.9	13,095.4	6,547.6	1,362.3
Acre-feet	+2,450	7,065	+9,514	15,689	25,974	12,987	2,702
Estimated acre-feet total of minor diversions detailed in appendix to this report.			1,959		1,959		
			11,473		27,933		

DETERMINATION OF NATURAL FLOW OF FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY 1960

Storage in Frenchman River Main Stem Reservoirs
Quantities in Second-foot Days

Period at International Boundary	Eastend Reservoir		Val Marie West Reservoir		Val Marie Reservoir		Total Storage on Frenchman River
	Stored	Released	Stored	Released	Stored	Released	
March							
1 - 10		5		9		35	- 49
11 - 20		2	14		8		+ 20
21 - 31	128		538		3,112		+ 3,778
April							
1 - 10	152		283		99		+ 534
11 - 20	583			97	397		+ 883
21 - 30	78		71		79		+ 228
May							
1 - 10	31		34		288		+ 353
11 - 20		55		7		237	- 299
21 - 31	22			30		208	- 216
June							
1 - 10		95		354		724	- 1,173
11 - 20		233		461		750	- 1,444
21 - 30		15	535			490	+ 30
July							
1 - 10		203	204			169	- 168
11 - 20		76	80			344	- 340
21 - 31		25		40		474	- 539
Aug.							
1 - 10	112			401		438	- 727
11 - 20		45		357		219	- 621
21 - 31		131		102		16	- 249
Sept.							
1 - 10	1			15	8		- 6
11 - 20		28		11		31	- 70
21 - 30		31		12		80	- 123
Oct.							
1 - 10		23	8			117	- 132
11 - 20		4	17			124	- 111
21 - 31	52		20			127	- 55
Total	1,159	971	1,804	1,896	3,991	4,583	- 496
Acre-feet	2,299	1,926	3,578	3,761	7,916	9,090	- 984

DETERMINATION OF NATURAL FLOW OF FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY 1960

Storage in Frenchman River Main Stem Reservoirs
Quantities in Second-foot Days

Period at International Boundary	Eastend Reservoir		Val Marie West Reservoir		Val Marie Reservoir		Total Storage on Frenchman River
	Stored	Released	Stored	Released	Stored	Released	
March							
1 - 10		5		9		35	- 49
11 - 20		2	14		8		+ 20
21 - 31	128		538		3,112		+ 3,778
April							
1 - 10	152		283		99		+ 534
11 - 20	583			97	397		+ 883
21 - 30	78		71		79		+ 228
May							
1 - 10	31		34		288		+ 353
11 - 20		55		7		237	- 299
21 - 31	22			30		208	- 216
June							
1 - 10		95		354		725	- 1,174
11 - 20		233		461		750	- 1,444
21 - 30		15	535			489	+ 31
July							
1 - 10		203	204			169	- 168
11 - 20		76	80		113		+ 117
21 - 31		25		40		921	- 986
Aug.							
1 - 10	112			401		438	- 727
11 - 20		45		357		220	- 622
21 - 31		131		102		16	- 249
Sept.							
1 - 10	1			15	10		- 4
11 - 20		28		11		28	- 67
21 - 30		31		12		80	- 123
Oct.							
1 - 10		23	8			117	- 132
11 - 20		4	17			124	- 111
21 - 31	52		20			127	- 55
Total	1,159	971	1,804	1,896	4,106	4,684	- 482
Acre-feet	2,299	1,926	3,578	3,761	8,144	9,291	- 956

DETERMINATION OF NATURAL FLOW OF FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY
1960

Diversion to Irrigated Lands
Quantities in Second-foot Days

Period at International Boundary	Eastend Canal	Val Marie West Pumping Canal	Val Marie West Gravity Canal	Val Marie Main Canal	Total Diverted to Val Marie Districts	Total Diverted to Irrigated Lands
March						
1 - 10	0.0	0.0	0.0	0.0	0.0	0.0
11 - 20	0.0	0.0	0.0	0.0	0.0	0.0
21 - 31	0.0	0.0	0.0	0.0	0.0	0.0
April						
1 - 10	0.0	0.0	0.0	0.0	0.0	0.0
11 - 20	14.6	0.0	0.0	0.0	0.0	14.6
21 - 30	47.0	0.0	0.0	0.0	0.0	47.0
May						
1 - 10	0.9	0.0	0.0	0.0	0.0	0.9
11 - 20	0.0	0.9	0.0	0.0	0.9	0.9
21 - 31	101.5	61.1	0.0	48.9	110.0	211.5
June						
1 - 10	397.7	217.9	136.7	584.3	938.9	1,336.6
11 - 20	517.7	206.7	165.9	706.0	1,078.6	1,596.3
21 - 30	112.6	145.3	124.0	498.4	767.7	880.3
July						
1 - 10	420.9	0.0	139.6	182.6	322.2	743.1
11 - 20	305.3	0.0	12.0	297.3	309.3	614.6
21 - 31	317.3	30.5	25.1	404.6	460.2	777.5
Aug.						
1 - 10	389.4	220.8	199.8	423.9	844.5	1,233.9
11 - 20	259.2	214.2	32.9	185.2	432.3	691.5
21 - 31	142.4	90.8	0.0	118.6	209.4	351.8
Sept.						
1 - 10	25.2	9.1	0.0	42.2	51.3	76.5
11 - 20	0.0	0.0	0.0	0.0	0.0	0.0
21 - 30	0.0	0.0	0.0	0.0	0.0	0.0
Oct.						
1 - 10	0.0	0.0	0.0	0.0	0.0	0.0
11 - 20	0.0	5.3	0.0	0.0	5.3	5.3
21 - 31	0.0	54.7	0.0	0.0	54.7	54.7
Total	3,051.7	1,257.3	836.0	3,492.0	5,585.3	8,637.0
Acre-feet	6,053	2,494	1,658	6,926	11,078	17,131

DETERMINATION OF NATURAL FLOW OF
FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY
1960

Total Canadian Storage and Diversion
Quantities in Second-foot Days

Period at International Boundary	Total Storage on Frenchman River	Belanger Creek Diversion to Cypress Lake	Cypress Lake East Outflow Canal	Net Belanger Creek Diversion to Cypress Lake	Cypress Lake Natural Over-flow	Total Diverted to Irrigated Lands	Total Stored or Diverted by Canada
March							
1 - 10	- 49	0.0	10.0	- 10.0	Nil	0.0	- 59.0
11 - 20	+ 20	0.0	20.0	- 20.0	Nil	0.0	0.0
21 - 31	+ 3,778	344.0	66.0	+ 278.0	Nil	0.0	+ 4,056.0
April							
1 - 10	+ 534	1,842.0	96.0	+ 1,746.0	Nil	0.0	+ 2,280.0
11 - 20	+ 883	441.4	14.4	+ 427.0	Nil	14.6	+ 1,324.6
21 - 30	+ 228	76.8	1.2	+ 75.6	Nil	47.0	+ 350.6
May							
1 - 10	+ 353	109.6	1.9	+ 107.7	Nil	0.9	+ 461.6
11 - 20	- 299	128.2	11.4	+ 116.8	Nil	0.9	- 181.3
21 - 31	- 216	0.0	39.5	- 39.5	Nil	211.5	- 44.0
June							
1 - 10	- 1,173	0.2	52.9	- 52.7	Nil	1,336.6	+ 110.9
11 - 20	- 1,444	16.2	182.6	- 166.4	Nil	1,596.3	- 14.1
21 - 30	+ 30	4.1	688.0	- 683.9	Nil	880.3	+ 226.4
July							
1 - 10	- 168	0.0	241.8	- 241.8	Nil	743.1	+ 333.3
11 - 20	- 340	0.0	139.4	- 139.4	Nil	614.6	+ 135.2
21 - 31	- 539	0.0	393.2	- 393.2	Nil	777.5	- 154.7
Aug.							
1 - 10	- 727	0.0	473.0	- 473.0	Nil	1,233.9	+ 33.9
11 - 20	- 621	0.0	214.2	- 214.2	Nil	691.5	- 143.7
21 - 31	- 249	0.0	3.3	- 3.3	Nil	351.8	+ 99.5
Sept.							
1 - 10	- 6	0.0	1.6	- 1.6	Nil	76.5	+ 68.9
11 - 20	- 70	0.0	0.0	0.0	Nil	0.0	- 70.0
21 - 30	- 123	0.0	0.0	0.0	Nil	0.0	- 123.0
Oct.							
1 - 10	- 132	0.0	1.1	- 1.1	Nil	0.0	- 133.1
11 - 20	- 111	0.0	3.1	- 3.1	Nil	5.3	- 108.8
21 - 31	- 55	0.0	4.3	- 4.3	Nil	54.7	- 4.6
Total	- 496	2,962.5	2,658.9	+ 303.6	Nil	8,637.0	+ 8,444.6
Acre-feet	- 984	5,876	5,274	602	Nil	17,131	+16,750

DETERMINATION OF NATURAL FLOW OF
FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY
1960

Total Canadian Storage and Diversion
Quantities in Second-foot Days

Period at International Boundary	Total Storage on Frenchman River	Belanger Creek Diversion to Cypress Lake	Cypress Lake East Outflow Canal	Net Belanger Creek Diversion to Cypress Lake	Cypress Lake Natural Over-flow	Total Diverted to Irrigated Lands	Total Stored or Diverted by Canada
March							
1 - 10	- 49	0.0	10.0	- 10.0	Nil	0.0	- 59.0
11 - 20	+ 20	0.0	20.0	- 20.0	Nil	0.0	0.0
21 - 31	+ 3,778	344.0	66.0	+ 278.0	Nil	0.0	+ 4,056.0
April							
1 - 10	+ 534	1,842.0	96.0	+ 1,746.0	Nil	0.0	+ 2,280.0
11 - 20	+ 883	441.4	14.4	+ 427.0	Nil	14.6	+ 1,324.6
21 - 30	+ 228	76.8	1.2	+ 75.6	Nil	47.0	+ 350.6
May							
1 - 10	+ 353	109.6	1.9	+ 107.7	Nil	0.9	+ 461.6
11 - 20	- 299	128.2	11.4	+ 116.8	Nil	0.9	- 181.3
21 - 31	- 216	0.0	39.5	- 39.5	Nil	211.5	- 44.0
June							
1 - 10	- 1,174	0.2	52.9	- 52.7	Nil	1,336.6	+ 109.9
11 - 20	- 1,444	16.2	182.6	- 166.4	Nil	1,596.3	- 14.1
21 - 30	+ 31	4.1	688.0	- 683.9	Nil	880.3	+ 227.4
July							
1 - 10	- 168	0.0	241.8	- 241.8	Nil	743.1	+ 333.3
11 - 20	+ 117	0.0	139.4	- 139.4	Nil	614.6	+ 592.2
21 - 31	- 986	0.0	393.2	- 393.2	Nil	777.5	- 601.7
Aug.							
1 - 10	- 727	0.0	473.0	- 473.0	Nil	1,233.9	+ 33.9
11 - 20	- 622	0.0	214.2	- 214.2	Nil	691.5	- 144.7
21 - 31	- 249	0.0	3.3	- 3.3	Nil	351.8	+ 99.5
Sept.							
1 - 10	- 4	0.0	1.6	- 1.6	Nil	76.5	+ 70.9
11 - 20	- 67	0.0	0.0	0.0	Nil	0.0	- 67.0
21 - 30	- 123	0.0	0.0	0.0	Nil	0.0	- 123.0
Oct.							
1 - 10	- 132	0.0	1.1	- 1.1	Nil	0.0	- 133.1
11 - 20	- 111	0.0	3.1	- 3.1	Nil	5.3	- 108.8
21 - 31	- 55	0.0	4.3	- 4.3	Nil	54.7	- 4.6
Total	- 482	2,962.5	2,658.9	+ 303.6	Nil	8,637.0	+ 8,458.6
Acre-feet	- 956	5,876	5,274	602	Nil	17,131	+16,777

DETERMINATION OF NATURAL FLOW OF
FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY
1960

Quantities in Second-foot Days

Period at International Boundary	Total Stored or Diverted by Canada	Return Flow	Net Stored or Diverted by Canada	Frenchman River at International Boundary			
				Measured Flow	Natural Flow	United States Share	Received in Excess of Share by U.S.A.
March							
1 - 10	- 59.0	0.0	- 59.0	52.0	0	0	+ 52.0
11 - 20	0.0	0.0	0.0	1,160.0	1,160.0	580.0	+ 580.0
21 - 31	+ 4,056.0	0.0	+ 4,056.0	16,047.0	20,103.0	10,051.5	+5,995.5
April							
1 - 10	+ 2,280.0	0.0	+ 2,280.0	8,008.0	10,288.0	5,144.0	+2,864.0
11 - 20	+ 1,324.6	4.4	+ 1,320.2	850.0	2,170.2	1,085.1	- 235.1
21 - 30	+ 350.6	14.1	+ 336.5	613.3	949.8	474.9	+ 138.4
May							
1 - 10	+ 461.6	0.3	+ 461.3	781.0	1,242.3	621.2	+ 159.8
11 - 20	- 181.3	0.3	- 181.6	1,043.6	862.0	431.0	+ 612.6
21 - 31	- 44.0	63.4	- 107.4	689.0	581.6	290.8	+ 398.2
June							
1 - 10	+ 110.9	401.0	- 290.1	335.4	45.3	22.6	+ 312.8
11 - 20	- 14.1	478.9	- 493.0	288.6	0	0	+ 288.6
21 - 30	+ 226.4	264.1	- 37.7	318.4	280.7	140.4	+ 178.0
July							
1 - 10	+ 333.3	222.9	+ 110.4	144.0	254.4	127.2	+ 16.8
11 - 20	+ 135.2	184.4	- 49.2	84.3	35.1	17.6	+ 66.7
21 - 31	- 154.7	233.2	- 387.9	55.4	0	0	+ 55.4
Aug.							
1 - 10	+ 33.9	370.2	- 336.3	90.7	0	0	+ 90.7
11 - 20	- 143.7	207.4	- 351.1	117.9	0	0	+ 117.9
21 - 31	+ 99.5	105.5	- 6.0	29.7	23.7	11.8	+ 17.9
Sept.							
1 - 10	+ 68.9	23.0	+ 45.9	4.2	50.1	25.0	- 20.8
11 - 20	- 70.0	0.0	- 70.0	1.8	0	0	+ 1.8
21 - 30	- 123.0	0.0	- 123.0	0.0	0	0	0.0
Oct.							
1 - 10	- 133.1	0.0	- 133.1	0.0	0	0	0.0
11 - 20	- 108.8	1.6	- 110.4	39.0	0	0	+ 39.0
21 - 31	- 4.6	16.4	- 21.0	81.5	60.5	30.2	+ 51.3
Total	+8,444.6	2,591.1	+5,853.5	30,834.8	38,106.7	19,053.3	+11,781.5
Acre-feet	+16,750	5,139	+11,610	61,160	75,584	37,792	+23,368
Estimated Acre-feet Total of Minor Diversions detailed in appendix to this report.			1,601 *		1,601 *		
			13,211		77,185		

Return flow assumed to be 30 percent of diverted quantities.
* - Includes minor diversions not used in natural flow computations.

DETERMINATION OF NATURAL FLOW OF FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY 1960

Quantities in Second-foot Days

Period at International Boundary	Total Stored or Diverted by Canada	Return Flow	Net Stored or Diverted by Canada	Frenchman River at International Boundary			
				Measured Flow	Natural Flow	United States Share	Received in Excess of Share by U.S.A.
March							
1 - 10	- 59.0	0.0	- 59.0	52.0	0	0	+ 52.0
11 - 20	0.0	0.0	0.0	1,160.0	1,160.0	580.0	+ 580.0
21 - 31	+ 4,056.0	0.0	+ 4,056.0	16,047.0	20,103.0	10,051.5	+5,995.5
April							
1 - 10	+ 2,280.0	0.0	+ 2,280.0	8,008.0	10,288.0	5,144.0	+2,864.0
11 - 20	+ 1,324.6	4.4	+ 1,320.2	850.0	2,170.2	1,085.1	- 235.1
21 - 30	+ 350.6	14.1	+ 336.5	613.3	949.8	474.9	+ 138.4
May							
1 - 10	+ 461.6	0.3	+ 461.3	781.0	1,242.3	621.2	+ 159.8
11 - 20	- 181.3	0.3	- 181.6	1,043.6	862.0	431.0	+ 612.6
21 - 31	- 44.0	63.4	- 107.4	689.0	581.6	290.8	+ 398.2
June							
1 - 10	+ 109.9	401.0	- 291.1	335.4	44.3	22.2	+ 313.2
11 - 20	- 14.1	478.9	- 493.0	288.6	0	0	+ 288.6
21 - 30	+ 227.4	264.1	- 36.7	318.4	281.7	140.8	+ 177.6
July							
1 - 10	+ 333.3	222.9	+ 110.4	144.0	254.4	127.2	+ 16.8
11 - 20	+ 592.2	184.4	+ 407.8	84.3	492.1	246.0	- 161.7
21 - 31	- 601.7	233.2	- 834.9	55.4	0	0	+ 55.4
Aug.							
1 - 10	+ 33.9	370.2	- 336.3	90.7	0	0	+ 90.7
11 - 20	- 144.7	207.4	- 352.1	117.9	0	0	+ 117.9
21 - 31	+ 99.5	105.5	- 6.0	29.7	23.7	11.8	+ 17.9
Sept.							
1 - 10	+ 70.9	23.0	+ 47.9	4.2	52.1	26.0	- 21.8
11 - 20	- 67.0	0.0	- 67.0	1.8	0	0	+ 1.8
21 - 30	- 123.0	0.0	- 123.0	0.0	0	0	0.0
Oct.							
1 - 10	- 133.1	0.0	- 133.1	0.0	0	0	0.0
11 - 20	- 108.8	1.6	- 110.4	39.0	0	0	+ 39.0
21 - 31	- 4.6	16.4	- 21.0	81.5	60.5	30.2	+ 51.3
Total	+8,458.6	2,591.1	+5,867.5	30,834.8	38,565.7	19,282.7	+11,552.1
Acre-feet	+16,777	5,139	+11,638	61,160	76,494	38,247	+22,913
Estimated Acre-feet Total of Minor Diversions detailed in appendix to this report.			1,531 *		1,531 *		
			13,169		78,025		

Return flow assumed to be 30 percent of diverted quantities.

* - Includes minor diversions not used in natural flow computations.

Table 8

DIVERSIONS FROM THE EASTERN TRIBUTARIES OF MILK RIVER IN CANADA
1960

Quantities in Acre-feet

Lodge Creek Tributary Basin

Middle Creek near Alberta Boundary	6,830[a]	
Released to Lodge Creek from Middle Creek Reservoir	0[b]	6,830
Spangler Ditch near Govenlock	1,520	
Estimated return flow from Spangler Ditch	456	1,064
Total of 19 Minor Diversions Detailed in Appendix		285[c]
Total Diverted by Canada		8,179

a - Total flow of this station stored in Middle Creek Reservoir.

b - Released from Middle Creek Reservoir via Bedford Slough.

c - 450 acre-feet diverted by Mitchell Ranching Co. is included in Middle Creek near Alberta Boundary.

(Lodge Creek at International Boundary = 23,920 acre-feet)

Battle Creek Tributary Basin

Diverted by Cypress Lake West Inflow Canal		14,329	
Returned by Cypress Lake West Inflow Canal Drain	2,222		
Returned by Cypress Lake West Outflow Canal	9,658	11,880	2,449
Vidora Ditch near Consul	2,407		
Richardson Ditch near Consul	2,358		
McKinnon Ditch near Consul	2,438		
Stirling and Nash Ditch near Consul	2,889	10,092	
Estimated Return Flow from Irrigated Lands		3,028	7,064
Total of 89 Minor Diversions Detailed in Appendix			2,014
Total Diverted by Canada			11,527

(Battle Creek at International Boundary = 15,689 acre-feet)

9513
25,202

Frenchman River Tributary Basin

Belanger Creek Diversion to Cypress Lake	5,876		
Returned by Cypress Lake East Outflow Canal	5,274	602	
Cypress Lake Natural Overflow		0	602
Stored in Eastend Reservoir		2,299	
Released from Eastend Reservoir		1,926	373
Stored in Val Marie Reservoirs		11,494	
Released from Val Marie Reservoirs		12,851	-1,357
Eastend Irrigation District Canal	6,053		
Val Marie Irrigation District West Canals	4,152		
Val Marie Main Canal	6,926	17,131	
Estimated Return Flow from Irrigated Lands		5,139	11,992
Total of 69 Minor Diversions Detailed in Appendix			1,601[d]
Total Diverted by Canada			13,211

d - Excluding Cypress Cattle Company diversion of 142 acre-feet which is included in the Belanger Creek diversion in the table; also excluding 453 acre-feet of diversions from War Lodge, Oxarat and Sucker Creeks which did not affect Frenchman River.

(Frenchman River at International Boundary = 61,160 acre-feet)

Table 8

DIVERSIONS FROM THE EASTERN TRIBUTARIES OF MILK RIVER IN CANADA
1960

Quantities in Acre-feet

Lodge Creek Tributary Basin

Middle Creek near Alberta Boundary	6,830[a]	
Released to Lodge Creek from Middle Creek Reservoir	0[b]	6,830
Spangler Ditch near Govenlock	1,520	
Estimated return flow from Spangler Ditch	456	1,064
Total of 17 Minor Diversions Detailed in Appendix		233[c]
Total Diverted by Canada		8,127

a - Total flow of this station stored in Middle Creek Reservoir.

b - Released from Middle Creek Reservoir via Bedford Slough.

c - 450 acre-feet diverted by Mitchell Ranching Co. is included in Middle Creek near Alberta Boundary.

(Lodge Creek at International Boundary = 23,920 acre-feet)

Battle Creek Tributary Basin

Diverted by Cypress Lake West Inflow Canal		14,329	
Returned by Cypress Lake West Inflow Canal Drain	2,222		
Returned by Cypress Lake West Outflow Canal	9,658	11,880	2,449
Vidora Ditch near Consul	2,407		
Richardson Ditch near Consul	2,358		
McKinnon Ditch near Consul	2,438		
Stirling and Nash Ditch near Consul	2,889	10,092	
Estimated Return Flow from Irrigated Lands		3,028	7,064
Total of 87 Minor Diversions Detailed in Appendix			1,959
Total Diverted by Canada			11,472

(Battle Creek at International Boundary = 15,689 acre-feet)

Frenchman River Tributary Basin

Belanger Creek Diversion to Cypress Lake	5,876		
Returned by Cypress Lake East Outflow Canal	5,274	602	
Cypress Lake Natural Overflow		0	602
Stored in Eastend Reservoir		2,299	
Released from Eastend Reservoir		1,926	373
Stored in Val Marie Reservoirs		11,722	
Released from Val Marie Reservoirs		13,051	-1,329
Eastend Irrigation District Canal	6,053		
Val Marie Irrigation District West Canals	4,152		
Val Marie Main Canal	6,926	17,131	
Estimated Return Flow from Irrigated Lands		5,139	11,992
Total of 62 Minor Diversions Detailed in Appendix			1,531[d] 1601
Total Diverted by Canada			13,169

d - Excluding Cypress Cattle Company diversion of 142 acre-feet which is included in the Belanger Creek diversion in the table; also excluding 453 acre-feet of diversions from War Lodge, Oxarat and Sucker Creeks which did not affect Frenchman River.

(Frenchman River at International Boundary = 61,160 acre-feet)

MEASURED DIVERSIONS FROM THE EASTERN TRIBUTARIES

OF MILK RIVER IN THE UNITED STATES

1960

(Quantities in Acre-feet)

Irrigator	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Total
				Lodge Creek					
North Chinook Canal	2,200	1,510	2,190	487	53	0	0	0	6,440
				Battle Creek					
Matheson Canal	-	-	-	-	-	-	-	-	0
Pumping	-	-	-	-	-	-	-	-	a1,380
				Frenchman River					
Frenchman Canal	476	486	141	2,150	1,900	1,270	308	0	6,730
Total	-	-	-	-	-	-	-	-	14,550

a - Estimated use by pumping from Battle Creek to land under the Matheson Canal.

Table 9 (C

Measured Run-off of Eastern Tributaries of Milk River
at International Boundary for period March to October, 1960
(Quantities in Acre-feet)

STREAM	March	April	May	June	July	Aug.	Sept.	Oct.	Total
Lodge Creek	13,020	3,890	6,240	741	25	0	0	0	23,920
Woodpile Coulee	2,330	38	256	0	0	0	0	0	2,620
Battle Creek	8,390	2,520	2,260	1,010	1,010	471	21	12	15,690
Lyons Coulee	2,350	263	66	0	0	0	0	0	2,680
East Br. Battle Cr.	4,450	25	52	0	0	0	0	0	4,530
Whitewater Creek	3,940	30	22	6	1	0	0	8	4,010
Frenchman River	34,230	18,790	4,990	1,870	563	473	12	239	61,170
McEachern Creek	9,900	560	5	0	0	0	0	0	10,470
Horse Creek	4,740	137	0	0	13	52	0	0	4,940
Rock Creek	13,420	1,190	451	305	104	72	0	30	15,570
Totals	96,770	27,440	14,340	3,930	1,720	1,070	33	281	145,600

Table 10

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

- 1960 -

Map Index	Stream and Location	Remarks
	St. Mary River Basin	
$5AE_{27}$	St. Mary River at International Boundary	Int.[a]
$5AE_{0.5}$	Swiftcurrent Creek at Many Glacier, Montana	Int.[a]
$5AE_{0.9}$	Lake Sherburne at Sherburne, Montana	Int.R[a]
$5AE_{0.6}$	Swiftcurrent Creek at Sherburne, Montana	Int.[a]
$5AE_{0.2}$	United States St. Mary Canal at St. Mary Crossing, near Babb, Montana	Int.[a]
$5AE_{0.3}$	United States St. Mary Canal at Hudson Bay Divide near Browning, Montana	Int.[a]
	Milk River Basin	
$11AA_{5}$	Milk River at Milk River, Alberta	Int.[a]
$11AA_{0.2}$	Milk River at Eastern Crossing of International Boundary	Int.[a]
$11AA_{0.3}$	North Branch of Milk River above St. Mary Canal, near Browning, Montana	Int.[a]
$11AA_{1}$	North Branch of Milk River near International Boundary	Int.[a]
$11AA_{25}$	South Branch of Milk River near International Boundary	Int.[a]
$11AD_{0.1}$	Whitewater Creek near International Boundary	Int.[a]
	Lodge Creek Tributary Basin	
$11AB_{83}$	Lodge Creek below McRae Coulee at International Boundary	Int.[a]
	Battle Creek Tributary Basin	
$11AB_{76}$	Battle Creek above Cypress Lake West Inflow Canal near West Plains, Saskatchewan	Int.[a]
$11AB_{27}$	Battle Creek at International Boundary	Int.[a]

Map Index	Stream and Location	Remarks
	Battle Creek Tributary Basin	
$11AB_{0.1}$	Woodpile Coulee near International Boundary	Int.[a]
$11AB_{0.3}$	East Branch of Battle Creek near International Boundary	Int.[a]
$11AB_{75}$	Lyons Coulee at International Boundary	Int.[a]
$11AB_{78}$	Cypress Lake West Inflow Canal	Int.[a]
$11AB_{77}$	Cypress Lake West Outflow Canal	Int.[a]
	Frenchman River Tributary Basin	
$11AC_{37}$	Cypress Lake Reservoir near Vidora, Saskatchewan	Int.R[a]
$11AC_{64}$	Belanger Creek Diversion to Cypress Lake	Int.[a]
$11AC_{60}$	Cypress Lake East Outflow Canal	Int.[a]
$11AC_{18}$	Frenchman River above East End Reservoir	Int.[a]
$11AC_{55}$	East End Reservoir at East End, Saskatchewan	Int.R[a]
$11AC_{52}$	East End Canal at East End, Saskatchewan	Int.[a]
$11AC_{1}$	Frenchman River below East End Reservoir	Int.[a]
$11AC_{63}$	Val Marie West Reservoir, near Val Marie, Saskatchewan	Int.R[a]
$11AC_{65}$	Val Marie West Gravity Canal	Int.[a]
$11AC_{56}$	Val Marie Reservoir near Val Marie, Saskatchewan	Int.R[a]
$11AC_{54}$	Val Marie Main Canal	Int.[a]
$11AC_{41}$	Frenchman River at International Boundary	Int.[a]
	Rock Creek Tributary Basin	
$11AE_{0.2}$	Rock Creek at International Boundary	Int.[a]
$11AE_{0.6}$	Rock Creek below Horse Creek near International Boundary	Int.[a]
$11AE_{0.3}$	Horse Creek near International Boundary	Int.[a]
$11AE_{0.4}$	McEachern Creek near International Boundary	Int.[a]

GAUGING STATIONS OPERATED INDEPENDENTLY
BY CANADA OR UNITED STATES

IN ST. MARY AND MILK RIVER DRAINAGE BASINS

- 1960 -

Map Index	Stream and Location	Remarks
	St. Mary River Basin	
	Grinnell Creek at Grinnell Glacier near Many Glacier, Montana	U.S.[c]
	Grinnell Creek near Many Glacier, Montana	U.S.[c]
	St. Mary River near Babb, Montana	U.S.[c]
	St. Mary Lake near St. Mary, Montana	U.S.[c]
$5AE_6$	St. Mary River near Lethbridge, Alberta	Canada[c]
$5AE_5$	Rolph Creek near Kimball, Alberta	Canada[a]
$5AE_2$	Lee Creek at Cardston, Alberta	Canada[a]
$5AE_{25}$	St. Mary Reservoir near Spring Coulee, Alberta	Canada R[a]
$5AE_{26}$	Canadian St. Mary Canal near Spring Coulee, Alberta	Canada[a]
$5AF_{28}$	Canadian St. Mary Canal at Drop 1	Canada[c]
$5AE_{21}$	Magrath Irrigation District Canal near Spring Coulee, Alberta	Canada[a]
	Milk River Basin	
	Lodge Creek Tributary Basin	
$11AB_{82}$	Lodge Creek near Alberta Boundary	Canada[a]
$11AB_{88}$	Lodge Creek below Spangler Project	Canada[a]
$11AB_{86}$	Walburger Coulee below Diversions	Canada[a]
$11AB_9$	Middle Creek near Alberta Boundary	Canada[a]
$11AB_{87}$	Middle Creek near Battle Creek	Canada[a]
$11AB_{80}$	Middle Creek Reservoir	Canada R[a]
$11AB_{89}$	Altawan Reservoir near Govenlock, Saskatchewan	Canada R[a]
$11AB_{60}$	Spangler Ditch near Govenlock, Saskatchewan	Canada[a]
2	North Chinook Canal near Havre, Montana	U.S.[b]

Map Index	Stream and Location	Remarks
	Battle Creek Tributary Basin	
$11AB_{81}$	Battle Creek at Ranger Station	Canada[c]
$11AB_{85}$	Cypress Lake West Inflow Canal Drain	Canada[a]
$11AB_{84}$	Vidora Ditch near Consul, Saskatchewan	Canada[a]
$11AB_{58}$	Richardson Ditch near Consul, Saskatchewan	Canada[a]
$11AB_{44}$	McKinnon Ditch near Consul, Saskatchewan	Canada[a]
$11AB_{18}$	Stirling and Nash Ditch near Consul, Saskatchewan	Canada[a]
3	Matheson Canal near Chinook, Montana	U.S.[b]
	Frenchman River Tributary Basin	
$11AC_{51}$	Frenchman River below Val Marie, Saskatchewan	Canada[c]
$11AC_{66}$	Val Marie West Pumping Canal near Val Marie, Saskatchewan	Canada[a]
4	Frenchman Canal near Saco, Montana	U.S.[b]

Int. - International Gauging Station

Int.R - International Station on Reservoir

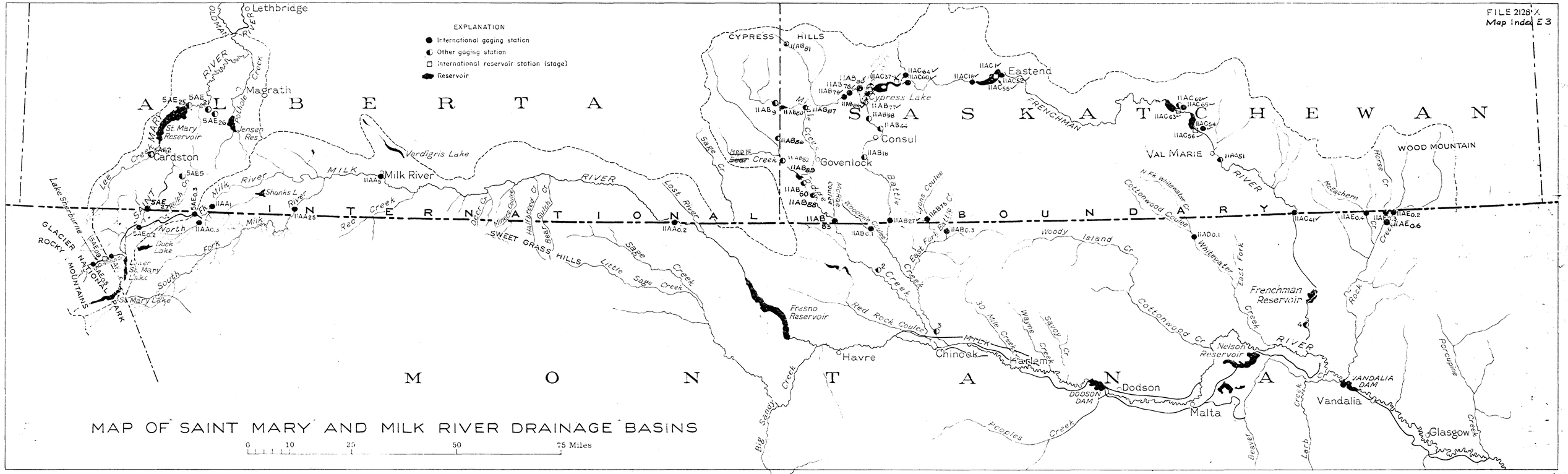
U.S. - Denotes operation by United States Geological Survey.

Canada - Denotes operation by Water Resources Branch, Canada.

a - Monthly and daily discharge data and stream measurements contained in Appendix.

b - Monthly Discharge data only tabulated in this report.

c - Data not included in this report or appendix.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Map Index E 3
EXPLANATION
International gaging station
Other gaging station
International reservoir station (stage)
Reservoir
ALBERTA
SASKATCHEWAN
MONTANA
INTERNATIONAL BOUNDARY
Lethbridge
OLDMAN RIVER
Magrath
Pothole Creek
Jensen Res.
MARY RIVER
St. Mary Reservoir
Lee Creek
Cardston
Verdigris Lake
Milk River
MILK River
Shanks L.
Spring Coulee
Deer Cr.
Miners Coulee
Halfcreek Cr.
Gulch
Beaver Creek
SWEET GRASS HILLS
Little Sage Creek
Sage Creek
Lost River
Lake Sherburne
GLACIER NATIONAL PARK
ROCKY MOUNTAINS
Upper St. Mary Lake
Duck Lake
South Fork
North Fork
St. Mary Lake
Milk River
Fresno Reservoir
Red Rock Coulee
Big Sandy Creek
Havre
CYPRESS HILLS
Eastend
Cypress Lake
Consul
Govenlock
Sage Cr.
Battle Creek
Lyons Coulee
Woodpile Coulee
Woodpile Coulee
East Fork Battle Cr.
Woody Island Cr.
FRENCHMAN RIVER
VAL MARIE
WOOD MOUNTAIN
N. Fk. Whitewater Cr.
Cottonwood Coulee
Whitewater Creek
East Fork
Frenchman Reservoir
Rock Creek
Horse Cr.
Nozachern
Cottonwood Cr.
30 Mile Creek
Wayne Creek
Savoy Cr.
MILK River
Chinook
Harlem
Nelson Reservoir
RIVER
Porcupine
Dodson
DODSON DAM
Malta
Peoples Creek
Beaver Creek
Larb Creek
VANDALIA DAM
Vandalia
Glasgow
Poplar River
MAP OF SAINT MARY AND MILK RIVER DRAINAGE BASINS
0 10 25 50 75 Miles

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1960

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