

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
C. G. PAULSEN
representing the United States

1955

WATER SURVEY OF CANADA
CALGARY DISTRICT OFFICE

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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, 1955.

Respectfully submitted,

C. G. Paulsen
Accredited Officer of the United States.

J. D. McLeod
Accredited Officer of Her Majesty.

Mar. 19, 1956.
(date)

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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 1955 by representatives of the Water Resources Branch (Canada) and the United States Geological Survey.

Mr. C. G. Paulsen, Chief Hydraulic Engineer, United States Geological Survey, as accredited officer of the United States, was represented in the field by Mr. C. S. Heidel, Staff Engineer, Helena, Montana. Mr. J. D. McLeod, Chief, Hydraulics Division, 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.

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 38 international stations by engineers of the Water Resources Branch (Canada) under the direction of Mr. Collier and of the United States Geological Survey under the supervision of Mr. Heidel. Data for another 18 stations in Canada and 8 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 another 8 canal stations in Montana.

Complete data for 51 of the stations mentioned above are contained in the appendix to this report; monthly quantities only for 11 canal stations in Montana are shown in Table 2, page 2, and Table 5. Data for 5 stations maintained by the United States Geological Survey in the St. Mary River basin and 5 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 structures at the present gauging stations on both Rock Creek and Horse Creek at the international boundary are in very poor condition and must be rebuilt or replaced if the operation of these stations is continued. Therefore, it is planned to construct a new station during 1956 on Rock Creek below the mouth of Horse Creek. (This will eventually replace the two upper stations and will supply substantially the same information as has heretofore been obtained.)

This report has been compiled jointly by Mr. E. P. Collier and Mr. C. S. Heidel.

Water Supply

St. Mary River

The thirty-fourth annual international survey of snow conditions on the headwaters of Swiftcurrent Creek, a mountainous area considered typical of the headwaters of the St. Mary River, showed the average snow cover at the observation points to be 79.8 inches or 125 percent of 63.9 inches, the mean for the previous 33 years of record. The water content was found to be 34.9 inches or 122 percent of 28.6 inches, the mean for the

previous 33 years of record. The run-off during May, June and July, measured at the gauging station on Swiftcurrent Creek at Many Glacier was 69,650 acre-feet or 103 percent of 67,851 acre-feet, the average of the previous 32 years of record.

The total natural flow of the St. Mary River at the International Boundary for the year November 1, 1954, to October 31, 1955, was 668,998 acre-feet. Of this total, 589,738 acre-feet occurred during the irrigation season, April 1 to October 31. The natural flow during the irrigation season was 100 percent of 588,533 acre-feet, the average of the previous 52 years of record. Of the total natural flow there was delivered to Canada 555,400 acre-feet, 492,610 acre-feet during the irrigation season and 62,790 acre-feet during the balance of the year.

Milk River

The estimated natural flow of the Milk River at its eastern crossing of the International Boundary, during the period March 1 to October 31, 1955, was 159,900 acre-feet or 139 percent of 114,500 acre-feet, the estimated average for the previous 43 years of record.

Eastern Tributaries of Milk River

The third annual snow survey in the basins of the eastern tributaries of the Milk River in Canada was conducted by the Water Resources Branch, Canada, between February 28 and March 4, 1955. The average snow cover at the observation points was found to be 10.4 inches as compared to 4.4 inches in 1954 and 10.3 inches in 1953. The average water content was found to be 2.8 inches as compared to 1.2 inches in 1954 and 2.1 inches in 1953. No attempt will be made to correlate snow cover with subsequent run-off in the

eastern tributaries until data for several more years have been obtained.

The total quantity of water delivered to the United States by the eastern tributaries of the Milk River during the period, March 1 to October 31, 1955, was 398,200 acre-feet or 278 percent of 143,100 acre-feet, the average for the previous 28 years. The quantities delivered to the United States by the various tributaries are listed in Table 6.

During the season a total of 34,744 acre-feet was diverted from the eastern tributaries in Canada to irrigation canals or storage. These diversions are listed in Table 4. The consumptive use was less than the total diversion shown because of return flow from irrigation projects. Measured diversions in Montana amounted to 16,900 acre-feet. These are listed in Table 5.

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 near 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, April 1 to October 31, 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. No such adjustment was necessary during the 1955 season, largely because of the close co-operation given by the United States Bureau of Reclamation officials at Babb, Montana.

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, November 1, 1954, to March 31, 1955, 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 only about 13 percent of the total area of the St. Mary River drainage basin in the United States.

The United States St. Mary Canal was operated between May 12 and September 19 and water was delivered to the North Branch of the Milk River from about May 14 to September 21.

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 110,814 acre-feet which passed the gauging station on the United States St. Mary Canal at St. Mary Crossing between May 12 and September 19 was considered to be the quantity diverted from the St. Mary River by the United States. Failure of the recorder, on the United States St. Mary Canal at Hudson Bay Divide gauging station, for several days after the Canal went into operation, makes it impossible to state the exact quantity of water delivered to the North Branch of Milk River.

Storage in Lake Sherburne was 3,056 acre-feet on October 31, 1954, and had increased to 19,990 acre-feet by March 31, 1955, and to 61,180 acre-feet by July 16, 1955. Thereafter, water was released at varying rates of flow until the end of the season. On October 31, 1955, the storage had been reduced to 4,930 acre-feet.

Canada diverted 189,950 acre-feet of water from the St. Mary River Reservoir in 1955 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 1955. 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.

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 division computations in Table 3 except as an adjustment to the totals for the season. The estimated quantities reported to date for 1955 are, however, shown in Table 4 of this report.

Frenchman River

The Frenchman River was the only one of the Eastern Tributaries on which a formal division was made in 1955. The details of this division are shown in Table 3 of this report.

The computed natural flow of the Frenchman River at the international boundary for the period March 1 to October 31, 1955, was 190,787 acre-feet, of which each country was entitled to fifty percent. Canada used 20,295 acre-feet, including an estimated 2,256 acre-feet in minor diversions as shown in Table 4, and delivered 170,492 acre-feet to the United States.

Lodge Creek

Canada diverted or stored a total of 17,578 acre-feet in the Lodge Creek basin during the period March 1 to October 31, 1955, and delivered 61,120 acre-feet to the United States. The Canadian use mentioned above includes 1,820 acre-feet diverted into the Spangler ditch near Govenlock, 15,360 acre-feet stored in Middle Creek Reservoir and an additional 398 acre-feet in minor diversions as shown in Table 4. No allowance for return flow from irrigation projects is included in these figures.

Battle Creek

Canada delivered 95,360 acre-feet to the United States, during the period March 1 to October 31, 1955, which included a net release from Canadian storage in Cypress Lake of 12,983 acre-feet. During this period Canada diverted 5,357 acre-feet to the various irrigation projects in the basin and an additional 1,992 acre-feet in minor diversions. No allowance for return flow from irrigation projects is included in these figures which are detailed in Table 4.

Description of Tables

The six 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.

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 near international boundary and the quantity diverted by the United States.

Table 2, Page 1, (upper table), shows the monthly discharge of the St. Mary River near the International Boundary, the contributions by Lee and Rolph Creeks in Canada and the total available to Canada at the St. Mary Reservoir near Spring Coulee.

Table 2, 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 2, Page 2, (upper table), 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 1955.

Table 2, Page 2, (lower table), 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.

Table 3 is a compilation, in ten-day periods, of the natural flow of the Frenchman River at the international boundary. This table consists of three pages. Page 1 shows the quantity used by Canada in Cypress Lake and the East End irrigation project; page 2 shows the quantity used by Canada in the Val Marie irrigation projects; Page 3 shows the total quantity used by Canada, the natural flow of the Frenchman River at international boundary, the United States share thereof and the quantity delivered to the United States.

Table 4 summarizes the available information on the diversions from the Eastern Tributaries of Milk River in Canada in 1955.

Table 5 shows the available information on quantities diverted from the Eastern Tributaries of Milk River in the United States in 1955.

Table 6 shows the measured monthly run-off, in acre-feet, of the Eastern Tributaries of Milk River at the international boundary for the period March 1 to October 31, 1955.

Following the tables is a list of the gauging stations operated jointly by Canada and the United States in the Milk and St. Mary River drainage basins in 1955 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 51 gauging stations operated during 1955 in the St. Mary and Milk River drainage basins. Details of the Canadian minor diversions, as grouped in Table 4 of the report, are included.

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

Table 1.

1955 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 (-) or than share		U.S. share of St. Mary River.	Storage Factors Lake Sherburne (2-day lag applied)		Diverted by U.S. St. Mary Canal	Net Used by United States	U.S. used more (+) or less (-) or than share.	
				+	-		Stored	Reisd.			+	-
1	165	124	120		4	41	45		0	45	4	
2	165	124	140	16		41	25		0	25		16
3	150	112	125	13		38	25		0	25		13
4	140	105	110	5		35	30		0	30		5
5	160	120	130	10		40	30		0	30		10
6	190	142	165	23		48	25		0	25		23
7	255	191	230	39		64	25		0	25		39
8	290	218	260	42		72	30		0	30		42
9	345	259	320	61		86	25		0	25		61
10	410	308	370	62		102	40		0	40		62
11	376	282	310	28		94	66		0	66		28
12	301	226	215		11	75	86		0	86	11	
13	281	211	195		16	70	86		0	86	16	
14	276	207	190		17	69	86		0	86	17	
15	277	208	191		17	69	86		0	86	17	
16	264	198	178		20	66	86		0	86	20	
17	304	228	188		40	76	116		0	116	40	
18	336	252	195		57	84	141		0	141	57	
19	284	213	188		25	71	96		0	96	25	
20	223	167	198	31		56	25		0	25		31
21	246	184	231	47		62	15		0	15		47
22	326	244	306	62		82	20		0	20		62
23	307	230	287	57		77	20		0	20		57
24	287	215	252	37		72	35		0	35		37
25	271	203	221	18		68	50		0	50		18
26	278	208	228	20		70	50		0	50		20
27	261	196	208	12		65	53		0	53		12
28	258	194	214	20		64	44		0	44		20
29	291	218	241	23		73	50		0	50		23
30	302	226	252	26		76	50		0	50		26
31												
Total Sec.-ft.	8,019	6,013	6,458	(652) 445	(207)	2,006	1,561		0	1,561	(207)	(652) 445
Mean	267	200	215	14.8		66.9	52.0		0	52.0		14.8
Ac.-ft.	15,905	11,927	12,809	883		3,979	3,096		0	3,096		883

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

195 5 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 (+) or less (-) or than share		U.S. share of St. Mary River.	Storage Factors Lake Sherburne (2-day lag applied)		Diverted by U.S. St. Mary Canal	Net Used by United States	U.S. used more (+) or less (-) or than share.	
				+	-		Stored	Reled.			+	-
1	348	261	287	26		87	61		0	61		26
2	472	354	394	40		118	78		0	78		40
3	474	356	402	46		118	72		0	72		46
4	530	398	452	54		132	78		0	78		54
5	540	405	473	68		135	67		0	67		68
6	577	433	499	66		144	78		0	78		66
7	700	517	489		28	183	211		0	211	28	
8	689	511	534	23		178	155		0	155		23
9	588	441	494	53		147	94		0	94		53
10	563	422	494	72		141	69		0	69		72
11	603	452	552	100		151	51		0	51		100
12	623	467	570	103		156	46		7	53		103
13	667	500	583	83		167	26		58	84		83
14	737	535	649	114		202	21		67	88		114
15	786	560	677	117		226	51		58	109		117
16	913	623	720	97		290	122		71	193		97
17	1,225	779	860	81		446	295		70	365		81
18	2,461	1,397	1,560	163		1,064	811		90	901		163
19	3,416	1,875	2,300	425		1,541	1,001		115	1,116		425
20	2,478	1,406	1,980	574		1,072	390		108	498		574
21	2,434	1,384	1,920	536		1,050	390		124	514		536
22	2,802	1,568	1,900	332		1,234	757		145	902		332
23	2,770	1,552	1,820	268		1,218	809		141	950		268
24	2,810	1,572	1,980	408		1,238	684		146	830		408
25	2,658	1,496	2,020	524		1,162	477		161	638		524
26	2,584	1,459	1,900	441		1,125	479		205	684		441
27	2,261	1,297	1,770	473		964	253		238	491		473
28	2,099	1,216	1,610	394		883	161		328	489		394
29	2,017	1,175	1,570	395		842	115		332	447		395
30	2,134	1,234	1,820	586		900	108		206	314		586
31	2,261	1,297	2,080	783		964	178		3	181		783
Total Sec.-ft.	46,220	27,942	35,359	(7,445) 7,417	(28)	18,278	8,188		2,673	10,861	(28)	(7,445) 7,417
Mean	1,491	901	1,141	239		590	264		86.2	350		239
Ac.-ft.	91,676	55,422	70,134	14,711		36,254	16,241		5,302	21,542		14,711

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

Table 1.

1955 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 (-) or than share		U.S. share of St. Mary River.	Storage Factors Lake Sherburne (2-day lag applied)		Diverted by U.S. St. Mary Canal	Net Used by United States	U.S. used more (+) or less (-) or than share.	
				+	-		Stored	Reled.			+	-
1	2,472	1,403	2,070	667		1,069	402		0	402		667
2	2,489	1,411	2,070	659		1,078	419		0	419		659
3	2,417	1,375	2,160	785		1,042	257		0	257		785
4	2,484	1,409	2,290	881		1,075	194		0	194		881
5	2,774	1,554	2,460	906		1,220	314		0	314		906
6	3,080	1,707	2,660	953		1,373	420		0	420		953
7	3,397	1,865	2,800	935		1,532	561		36	597		935
8	3,768	2,051	2,730	679		1,717	658		380	1,038		679
9	3,755	2,044	2,890	846		1,711	455		410	865		846
10	3,750	2,042	2,940	898		1,708	361		449	810		898
11	3,799	2,066	3,000	934		1,733	315		484	799		934
12	4,005	2,169	3,160	991		1,836	359		486	845		991
13	4,278	2,306	3,450	1,144		1,972	441		387	828		1,144
14	4,393	2,363	3,810	1,447		2,030	505		78	583		1,447
15	4,433	2,383	3,530	1,147		2,050	517		386	903		1,147
16	4,621	2,477	3,630	1,153		2,144	580		411	991		1,153
17	4,283	2,308	3,630	1,322		1,975	243		410	653		1,322
18	3,954	2,144	3,530	1,386		1,810	18		406	424		1,386
19	3,597	1,965	3,360	1,395		1,632		167	404	237		1,395
20	3,487	1,910	3,240	1,330		1,577		157	404	247		1,330
21	3,365	1,849	3,150	1,301		1,516		185	400	215		1,301
22	3,402	1,868	3,180	1,312		1,534		178	400	222		1,312
23	3,684	2,009	3,390	1,381		1,675		108	402	294		1,381
24	4,067	2,200	3,670	1,470		1,867		3	400	397		1,470
25	5,232	2,783	4,530	1,747		2,449	279		423	702		1,747
26	5,296	2,815	4,560	1,745		2,481	321		415	736		1,745
27	4,884	2,609	4,310	1,701		2,275	163		411	574		1,701
28	4,311	2,322	4,040	1,718		1,989		135	406	271		1,718
29	3,830	2,082	3,850	1,768		1,748		428	408	- 20		1,768
30	3,345	1,839	3,410	1,571		1,506		499	434	- 65		1,571
31												
Total Sec.-ft.	112,652	61,328	97,500	36,172		51,324	7,782	1,860	9,230	15,152		36,172
Mean	3,755	2,044	3,250	1,206		1,711	259	62.0	308	505		1,206
Ac.-ft.	223,442	121,642	193,388	71,746		101,800	15,435	3,689	18,307	30,054		71,746

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

Table 1.

1955 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 (-) or than share		U.S. share of St. Mary River.	Storage Factors Lake Sherburne (2-day lag applied)		Diverted by U.S. St. Mary Canal	Net Used by United States	U.S. used more (+) or less (-) or than share.	
				+	-		Stored	Reled.			+	-
1	3,026	1,680	2,890	1,210		1,346		380	516	136		1,210
2	2,740	1,537	2,510	973		1,203		248	478	230		973
3	2,488	1,411	2,340	929		1,077		90	238	148		929
4	2,356	1,345	2,240	895		1,011	102		14	116		895
5	2,046	1,190	1,960	770		856	86		0	86		770
6	1,973	1,153	1,720	567		820	235		18	253		567
7	1,937	1,135	1,180	45		802	272		485	757		45
8	1,951	1,142	1,070		72	809	307		574	881	72	
9	1,994	1,164	1,010		154	830	384		600	984	154	
10	2,237	1,285	1,170		115	952	458		609	1,067	115	
11	2,512	1,423	1,350		73	1,089	547		615	1,162	73	
12	2,564	1,449	1,420		29	1,115	527		617	1,144	29	
13	2,703	1,518	1,480		38	1,185	602		621	1,223	38	
14	2,900	1,617	1,500		117	1,283	775		625	1,400	117	
15	2,889	1,611	1,500		111	1,278	761		628	1,389	111	
16	2,981	1,657	1,620		37	1,324	731		630	1,361	37	
17	2,933	1,633	1,830	197		1,300	465		638	1,103		197
18	2,620	1,477	1,960	483		1,143	26		634	660		483
19	2,474	1,404	1,980	576		1,070		134	628	494		576
20	2,495	1,414	1,930	516		1,081		60	625	565		516
21	2,369	1,351	1,830	479		1,018		82	621	539		479
22	2,273	1,303	1,760	457		970		106	619	513		457
23	2,018	1,176	1,590	414		842		183	611	428		414
24	1,972	1,153	1,480	327		819		117	609	492		327
25	1,938	1,136	1,370	234		802		41	609	568		234
26	1,756	1,045	1,270	225		711		118	604	486		225
27	1,705	1,019	1,170	151		686		65	600	535		151
28	1,644	989	1,100	111		655		52	596	544		111
29	1,590	962	1,010	48		628		12	592	580		48
30	1,313	823	923	100		490		206	596	390		100
31	1,285	809	836	27		476		147	596	449		27
Total Sec.-ft.	69,682	40,011	48,999	(9,734) 8,988	(746)	29,671	6,278	2,041	16,446	20,683	(746)	(9,734) 8,988
Mean	2,248	1,291	1,581	290		957	203	65.8	531	667		290
Ac.-ft.	138,212	79,361	97,188	17,827		58,852	12,452	4,048	32,620	41,024		17,827

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

1955 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 (+) less (-) or than share		U.S. share of St. Mary River.	Storage Factors Lake Sherburne (2-day lag applied)		Diverted by U.S. St. Mary Canal	Net Used by United States	U.S. used more (+) less (-) or than share.	
				+	-		Stored	Rlsd.			+	-
1	1,360	847	772		75	513		6	594	588	75	
2	1,317	825	728		97	492		5	594	589	97	
3	1,292	813	705		108	479		9	596	587	108	
4	1,257	795	691		104	462		28	594	566	104	
5	1,251	792	691		101	459		36	596	560	101	
6	1,062	698	670		28	364		204	596	392	28	
7	1,038	686	642		44	352		202	598	396	44	
8	998	666	616		50	332		214	596	382	50	
9	976	655	609		46	321		231	598	367	46	
10	949	641	616		25	308		267	600	333	25	
11	853	593	616	23		260		365	602	237		23
12	840	587	602	15		253		362	600	238		15
13	825	579	590	11		246		367	602	235		11
14	797	565	596	31		232		403	604	201		31
15	756	545	590	45		211		438	604	166		45
16	712	523	576	53		189		466	602	136		53
17	706	520	552	32		186		446	600	154		32
18	654	490	522	32		164		466	598	132		32
19	617	463	505	42		154		482	594	112		42
20	633	475	505	30		158		468	596	128		30
21	620	465	522	57		155		500	598	98		57
22	577	433	528	95		144		549	598	49		95
23	563	422	516	94		141		551	598	47		94
24	573	430	505	75		143		528	596	68		75
25	563	422	494	72		141		525	594	69		72
26	566	424	484	60		142		512	594	82		60
27	544	408	468	60		136		518	594	76		60
28	462	346	447	101		116		579	594	15		101
29	453	340	427	87		113		566	592	26		87
30	508	381	417	36		127		499	590	91		36
31	457	343	398	55		114		531	590	59		55
Total Sec.-ft.	24,779	17,172	17,600	(1,106) 428	(678)	7,607		11,323	18,502	7,179	(678)	(1,106) 428
Mean	799	554	568	13.8		245		365	597	232		13.8
Ac.-ft.	49,148	34,060	34,909	849		15,088		22,459	36,698	14,239		849

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

Table 1.

1955 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 (-) or than share		U.S. share of St. Mary River.	Storage Factors Lake Sherburne (2-day lag applied)		Diverted by U.S. St. Mary Canal	Net Used by United States	U.S. used more (+) or less (-) or than share.	
				+	-		Stored	Reled.			+	-
1	447	335	384	49		112		525	588	63		49
2	455	341	371	30		114		502	586	84		30
3	457	343	350	7		114		475	582	107		7
4	436	327	358	31		109		508	586	78		31
5	450	338	366	28		112		500	584	84		28
6	394	296	376	80		98		570	588	18		80
7	432	324	371	47		108		525	586	61		47
8	425	319	371	52		106		534	588	54		52
9	441	331	376	45		110		523	588	65		45
10	485	364	380	16		121		481	586	105		16
11	419	314	362	48		105		525	582	57		48
12	407	305	354	49		102		519	572	53		49
13	406	304	366	62		102		508	548	40		62
14	394	296	394	98		98		504	504	0		98
15	367	275	442	167		92		511	436	- 75		167
16	391	293	535	242		98		458	314	- 144		242
17	352	264	691	427		88		475	136	- 339		427
18	368	276	758	482		92		439	49	- 390		482
19	338	254	772	518		84		449	15	- 434		518
20	269	202	758	556		67		489	0	- 489		556
21	308	231	765	534		77		457	0	- 457		534
22	407	305	820	515		102		413	0	- 413		515
23	304	228	852	624		76		548	0	- 548		624
24	257	193	860	667		64		603	0	- 603		667
25	274	206	844	638		68		570	0	- 570		638
26	280	210	836	626		70		556	0	- 556		626
27	256	192	788	596		64		532	0	- 532		596
28	213	160	750	590		53		537	0	- 537		590
29	215	161	720	559		54		505	0	- 505		559
30	229	172	698	526		57		469	0	- 469		526
31												
Total Sec.-ft.	10,876	8,159	17,068	8,909		2,717		15,210	9,018	-6,192		8,909
Mean	363	272	569	297		90.6		507	301	- 206		297
Ac.-ft.	21,572	16,183	33,854	17,671		5,389		30,169	17,887	-12,282		17,671

NATURAL FLOW OF ST. MARY RIVER AT INTERNATIONAL BOUNDARY AND ITS DIVISION BETWEEN CANADA AND UNITED STATES (C.F. per sec.)

Table 1.

1955 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 (-) or than share		U.S. share of St. Mary River.	Storage Factors Lake Sherburne (2-day lag applied)		Diverted by U.S. St. Mary Canal	Net Used by United States	U.S. used more (+) or less (-) or than share.	
				+	-		Stored	Reled.			+	-
1	204	153	628	475		51		424	0	- 424		475
2	289	217	552	335		72		263	0	- 263		335
3	354	266	484	218		88		130	0	- 130		218
4	356	267	437	170		89		81	0	- 81		170
5	369	277	407	130		92		38	0	- 38		130
6	378	284	394	110		94		16	0	- 16		110
7	362	272	371	99		90		9	0	- 9		99
8	351	263	358	95		88		7	0	- 7		95
9	373	280	376	96		93		3	0	- 3		96
10	398	298	398	100		100		0	0	0		100
11	580	435	499	64		145	81		0	+ 81		64
12	1,242	788	720		68	454	522		0	+ 522	68	
13	1,533	933	887		46	600	646		0	+ 646	46	
14	1,145	739	986	247		406	159		0	+ 159		247
15	907	620	1,020	400		287		113	0	- 113		400
16	889	611	1,060	449		278		171	0	- 171		449
17	933	633	1,080	447		300		147	0	- 147		447
18	964	649	1,070	421		315		106	0	- 106		421
19	928	631	1,050	419		297		122	0	- 122		419
20	955	644	1,090	446		311		135	0	- 135		446
21	1,052	693	1,160	467		359		108	0	- 108		467
22	1,230	782	1,180	398		448	50		0	+ 50		398
23	1,190	762	1,180	418		428	10		0	+ 10		418
24	1,119	726	1,180	454		393		61	0	- 61		454
25	1,111	722	1,170	448		389		59	0	- 59		448
26	1,035	684	1,090	406		351		55	0	- 55		406
27	961	647	1,020	373		314		59	0	- 59		373
28	1,016	675	986	311		341	30		0	+ 30		311
29	1,046	690	941	251		356	105		0	+ 105		251
30	965	649	852	203		316	113		0	+ 113		203
31	864	599	742	143		265	122		0	+ 122		143
Total Sec.-ft.	25,099	16,889	25,368	(8,365) 8,479	(114)	8,210	1,838	2,107	0	- 269	(114)	(8,365) 8,479
Mean	810	545	818	274		265	59.3	68.0	0	- 8.68		274
Ac.-ft.	49,783	33,499	50,317	16,818		16,284	3,646	4,179	0	- 534		16,818

DIVISION OF FLOW OF ST. MARY RIVER
1955

Water Available to Canada at Spring Coulee
(Acre-feet)

Month	St. Mary River Int. Boundary	Rolph Creek Kimball	Lee Creek Cardston	Total Avail- able at Spring Coulee
April	12,810	4,690	7,380	24,880
May	70,130	4,770	26,800	101,700
June	193,400	811	16,680	210,891
July	97,190	655	6,210	104,055
August	34,910	320	1,090	36,320
September	33,850	289	642	34,781
October	50,320	136	964	51,420
Total	492,610	11,671	59,766	564,047

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	11,927	55	0	55	11,872
May	55,422	1,350	14	1,364	54,058
June	121,642	44,040	636	44,676	76,966
July	79,361	29,070	426	29,496	49,865
August	34,060	50,690	2,610	53,300	- 19,240
September	16,183	35,950	1,410	37,360	- 21,177
October	33,499	23,230	469	23,699	9,800
Total	352,094	184,385	5,565	189,950	162,144

Storage in St. Mary Reservoir March 31, Elev. 3595.60 = 157,140 acre-feet
October 31, Elev. 3604.40 = 204,246 acre-feet

DIVISION OF FLOWS OF ST. MARY AND MILK RIVERS
1955

Table 2
Page 2

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	Lake Sherburne		Total Available for	Diverted to Milk River Basin	Unused	Measured Flow at Eastern Crossing*
	Nat. Flow	Stored	Reled.	Diversion			
April	3,979	3,096	0	883	0	883	48,145
May	36,254	16,241	0	20,013	5,302	14,711	54,046
June	101,800	15,435	3,689	90,054	18,307	71,747	35,024
July	58,852	12,452	4,048	50,448	32,620	17,828	57,882
Aug.	15,088	0	22,459	37,547	36,698	849	35,238
Sept.	5,389	0	30,169	35,558	17,887	17,671	24,998
Oct.	16,284	3,646	4,179	16,817	0	16,817	5,010
Total	237,646	50,870	64,544	251,320	110,814	140,506	260,343*

* 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 = 19,990 acre-feet

October 31 = 4,930 acre-feet

Storage in Fresno Reservoir on March 31 = 76,238 acre-feet

October 31 = 76,828 acre-feet

DIVERSIONS FROM MILK RIVER
UNITED STATES
1955

(Acre-feet)

Month	Fort Belknap Canal	Paradise Canal	Harlem Canal	Harlem No. 2	Agency Canal	Dodson North	Dodson South	Van-dalia Canal	Total
April	-	-	-	-	-	397	8,850	-	9,247
May	-	-	-	-	-	1,750	7,210	311	9,271
June	6,440	3,510	2,980	565	738	3,760	9,720	4,890	32,603
July	10,640	5,420	2,180	188	2,090	4,600	15,370	8,590	49,078
Aug.	20,860	7,640	4,520	980	2,380	4,910	15,370	4,830	61,490
Sept.	17,820	5,320	2,580	226	555	3,090	14,880	5,950	50,421
Oct.	6,790	2,260	754	-	-	496	12,630	5,950	28,880
Nov.	-	-	-	-	-	89	536	-	625
Total	62,550	24,150	13,014	1,959	5,763	19,092	84,566	30,521	241,615

Storage in Nelson Reservoir on March 31, 47,480 acre-feet

on October 31, 46,703 acre-feet

DETERMINATION OF NATURAL FLOW OF FRONCEMAN RIVER
AT INTERNATIONAL BOUNDARY
1955

Water used by Canada at Cypress Lake and East End
Quantities in Second-foot-Days

Date at Int'l Boundary	Used at Cypress		Used at East End				Total Used
	Stored	Released	Stored	Released	Diverted	Return Flow	
March							
1 - 10	0.0	20.0	0.0		0.0	0.0	- 20.0
11 - 20	0.0	20.0	0.0		0.0	0.0	- 20.0
21 - 31	0.0	32.0		5.0	0.0	0.0	- 37.0
April							
1 - 10	23.0	28.0	75.0		0.0	0.0	+ 70.0
11 - 20	678.0	120.0	193.0		0.0	0.0	+ 751.0
21 - 30	492.9	778.8		49.0	0.0	0.0	- 334.9
May							
1 - 10	904.9	937.0	131.0		0.0	0.0	+ 98.9
11 - 20	1,873.0	967.6	69.0		0.0	0.0	+ 974.4
21 - 31	1,679.1	694.9	95.0		0.0	0.0	+ 1,079.2
June							
1 - 10	755.5	154.3	98.0		0.0	0.0	+ 699.2
11 - 20	408.8	61.1	135.0		88.5	26.6	+ 544.6
21 - 30	540.2	113.9	12.0		416.9	125.1	+ 730.1
July							
1 - 10	107.3	51.9	94.0		210.0	63.0	+ 296.4
11 - 20	211.9	146.1	34.0		0.0	0.0	+ 99.8
21 - 31	335.7	331.3		234.0	0.0	0.0	- 229.6
Aug.							
1 - 10	164.1	75.0		5.0	0.0	0.0	+ 84.1
11 - 20	107.0	42.3		3.0	19.2	5.8	+ 75.1
21 - 31	57.0	167.2		328.0	142.0	42.6	- 338.8
Sept.							
1 - 10	21.0	175.7		113.0	0.0	0.0	- 267.7
11 - 20	3.0	11.1		2.0	33.8	10.1	+ 13.6
21 - 30	0.0	23.2		8.0	0.0	0.0	- 31.2
Oct.							
1 - 10	0.0	23.0	3.0		0.0	0.0	- 20.0
11 - 20	0.0	20.1	4.0		0.0	0.0	- 16.1
21 - 31	0.0	21.2	4.0		0.0	0.0	- 17.2
Total	8,362.4	5,015.7	947.0	747.0	910.4	273.2	+ 4,183.9
Mean	34.1	20.5	3.87	3.05	3.72	1.12	17.1
Acre-feet	16,587	9,948	1,878	1,482	1,806	542	8,299

DETERMINATION OF NATURAL FLOW OF FRENCHMAN RIVER
AT INTERNATIONAL BOUNDARY
1955

Water used by Canada at Val Marie
quantities in Second-foot Days

Date at Int'l Boundary	Used at Upper Val Marie			Used at Lower Val Marie			Return Flow	Total Used
	Stored	Rls'd	Diverted	Stored	Rls'd	Diverted		
March								
1 - 10	0		0.0	0		0.0	0.0	0.0
11 - 20	10		0.0	0		0.0	0.0	+ 10.0
21 - 31		3	0.0	79		0.0	0.0	+ 76.0
April								
1 - 10	262		0.0	2,299		18.9	5.7	+2,574.2
11 - 20	113		0.0		579	3.1	0.9	- 463.8
21 - 30	29		0.0	674		5.6	1.7	+ 706.9
May								
1 - 10	201		0.0		185	6.0	1.8	+ 20.2
11 - 20		115	0.0		518	0.0	0.0	- 633.0
21 - 31	214		8.2	1,180		0.0	2.5	+1,399.7
June								
1 - 10		17	232.2		591	1.2	70.0	- 444.6
11 - 20		107	251.8		707	372.2	187.2	- 377.2
21 - 30		21	150.2		527	804.0	286.3	+ 119.9
July								
1 - 10	259		33.6	250		330.1	109.1	+ 763.6
11 - 20	64		0.0	1,825		59.1	17.7	+1,930.4
21 - 31		162	0.0		1,406	0.0	0.0	-1,568.0
Aug.								
1 - 10	0		2.1	364		0.0	0.6	+ 365.5
11 - 20		233	231.3	48		0.0	69.4	- 23.1
21 - 31	116		274.8		114	31.6	91.9	+ 216.5
Sept.								
1 - 10	99		158.1		124	76.4	70.4	+ 139.1
11 - 20		131	67.0	53		14.1	24.3	- 21.2
21 - 30	155		13.1		49	52.8	19.8	+ 152.1
Oct.								
1 - 10	158		0.0		153	57.0	17.1	+ 44.9
11 - 20		245	0.0	176		43.7	13.1	- 38.4
21 - 31		157	0.0	118		0.0	0.0	- 39.0
Total	1,680	1,191	1,422.4	7,066	4,953	1,875.8	989.5	4,910.7
Mean	6.86	4.86	5.81	28.8	20.2	7.66	4.04	20.0
Acre-feet	3,332	2,362	2,821	14,015	9,824	3,721	1,963	9,740

DETERMINATION OF NATURAL FLOW OF FRENCHMAN RIVER
AT INTERNATIONAL BOUNDARY
1955

Quantities in Second-foot Days

Date at Int'l Boundary	Used by Canada		Total Used by Canada	Frenchman River		United States	
	Cypress East End.	Val Marie		Flow at Bdy.	Natural Flow	Share	Received + or -
March							
1 - 10	- 20.0	0.0	- 20.0	211.0	191.0	95.5	+ 115.5
11 - 20	- 20.0	+ 10.0	- 10.0	156.0	146.0	73.0	+ 83.0
21 - 31	- 37.0	+ 76.0	+ 39.0	940.0	979.0	489.5	+ 450.5
April							
1 - 10	+ 70.0	+2,574.2	+2,644.2	13,293.0	15,937.2	7,968.6	+ 5,324.4
11 - 20	+ 751.0	- 463.8	+ 287.2	16,140.0	16,427.2	8,213.6	+ 7,926.4
21 - 30	- 334.9	+ 706.9	+ 372.0	12,485.0	12,857.0	6,428.5	+ 6,056.5
May							
1 - 10	+ 98.9	+ 20.2	+ 119.1	11,047.0	11,166.1	5,583.0	+ 5,464.0
11 - 20	+ 974.4	- 633.0	+ 341.4	4,501.0	4,842.4	2,421.2	+ 2,079.8
21 - 31	+ 1,079.2	+1,399.7	+2,478.9	2,479.0	4,957.9	2,479.0	0.0
June							
1 - 10	+ 699.2	- 444.6	+ 254.6	2,503.0	2,757.6	1,378.8	+ 1,124.2
11 - 20	+ 544.6	- 377.2	+ 167.4	323.3	490.7	245.4	+ 77.9
21 - 30	+ 730.1	+ 119.9	+ 850.0	408.0	1,258.0	629.0	- 221.0
July							
1 - 10	+ 296.4	+ 763.6	+1,060.0	3,372.4	4,432.4	2,216.2	+ 1,156.2
11 - 20	+ 99.8	+1,930.4	+2,030.2	12,384.0	14,414.2	7,207.1	+ 5,176.9
21 - 31	- 229.6	-1,568.0	-1,797.6	2,894.7	1,097.1	548.6	+ 2,346.1
Aug.							
1 - 10	+ 84.1	+ 365.5	+ 449.6	231.0	680.6	340.3	- 109.3
11 - 20	+ 75.1	- 23.1	+ 52.0	835.8	887.8	443.9	+ 391.9
21 - 31	- 338.8	+ 216.5	- 122.3	265.2	142.9	71.4	+ 193.8
Sept.							
1 - 10	- 267.7	+ 139.1	- 128.6	259.1	130.5	65.2	+ 193.9
11 - 20	+ 13.6	- 21.2	- 7.6	203.0	195.4	97.7	+ 105.3
21 - 30	- 31.2	+ 152.1	+ 120.9	263.9	384.8	192.4	+ 71.5
Oct.							
1 - 10	- 20.0	+ 44.9	+ 24.9	255.0	279.9	140.0	+ 115.0
11 - 20	- 16.1	- 38.4	- 54.5	262.7	208.2	104.1	+ 158.6
21 - 31	- 17.2	- 39.0	- 56.2	243.2	187.0	93.5	+ 149.7

Total	+ 4,183.9	+4,910.7	+9,094.6	85,956.3	95,050.9	47,525.5	+ 38,430.8
Mean	17.1	20.0	37.1	351	388	194	157
Acre-feet	8,299	9,740	18,039	170,492	188,531	94,265	76,226
Estimated Acre-feet Total of Minor Diversions shown in Table 4							

2,256

20,295

2,256

190,787

95,394

75,098

DIVERSIONS FROM THE EASTERN TRIBUTARIES
OF MILK RIVER IN CANADA

Quantities in Acre-feet

Lodge Creek Tributary Basin

Spangler Ditch near Govenlock		1820
Middle Creek near Alberta Boundary	+ 16030	
Released to Lodge Creek from Middle Creek Reservoir via Bedford Slough	670	15360
Total of 14 Minor Diversions Detailed in Appendix		# 398
Total Diverted by Canada		<u>17578</u>

900 acre-feet diverted by Mitchell Ranching Co. and listed as a Minor Diversion in Appendix is included in Middle Creek near Alberta Boundary.

+ Total flow of this station stored in Middle Creek Reservoir.
(Lodge Creek at International Boundary = 61,120 acre-feet)

Battle Creek Tributary Basin

Diverted by Cypress Lake West Inflow Canal	+ 467	
Returned by Cypress Lake West Outflow Canal	- 3100	
Returned by Cypress Lake West Inflow Canal Drain	<u>-10350</u>	
Vidora Ditch near Consul		1700
Richardson Ditch near Consul		1340
McKinnon Ditch near Consul		817
Stirling and Nash Ditch near Consul		1500
Total of 41 Minor Diversions Detailed in Appendix		<u>1992</u>
Total Diverted by Canada		<u>5634</u>

(Battle Creek at International Boundary = 95,360 acre-feet)

Frenchman River Tributary Basin

Belanger Creek Diversion to Cypress Lake (includes natural overflow stored)	16587	
Returned by Cypress Lake East Outflow Canal	9948	6639
Diverted to East End Reservoir	<u>1878</u>	
Released from East End Reservoir	1482	396
Diverted to Val Marie Reservoirs	<u>17347</u>	
Released from Val Marie Reservoirs	12186	5161
East End Irrigation District Canal	<u>1806</u>	
Val Marie Irrigation District West Canals	2821	
Val Marie Main Canal	<u>3721</u>	
	8348	
Estimated Return Flow	<u>2505</u>	5843
Total of 47 Minor Diversions Detailed in Appendix		<u>2256</u>
Total Diverted by Canada		<u>20295</u>

(Frenchman River at International Boundary = 170,492 acre-feet)

Table 5

MEASURED DIVERSIONS FROM THE EASTERN TRIBUTARIES
OF MILK RIVER IN THE UNITED STATES
1955
(Quantities in Acre-feet)

Irrigator	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Total
<u>Lodge Creek</u>									
North Chinook Canal	18	3,780	1,790	181	747	0	0	0	6,520
<u>Battle Creek</u>									
Matheson Canal	0	0	0	0	0	0	0	0	^a 0
Pumping	-	-	-	-	-	-	-	-	^b 200
<u>Frenchman River</u>									
Frenchman Canal	0	4,280	1,510	941	2,350	524	421	152	10,180
Total	-	-	-	-	-	-	-	-	16,900

a Land under Matheson Canal was watered by flood water overflow from Battle Creek during April and July and by excessive rains during the season.

b Estimated use by pumping from Battle Creek to land under the Matheson canal.

Table 5

Table 6

Measured Run-off of Eastern Tributaries of Milk River
at International Boundary for period March to October, 1955
(Quantities in Acre-feet)

STREAM	March	April	May	June	July	Aug.	Sept.	Oct.	Total
Lodge Creek	958	38,060	10,360	885	10,680	125	0	50.0	61,120
Woodpile Coulee	555	4,790	177	6.0	1,700	9.1	6.3	6.1	7,250
Battle Creek	2,070	40,980	25,390	5,670	15,380	2,280	1,390	2,200	95,360
Lyons Coulee	387	3,270	32	231	6,100	36	0	0	10,060
East Br. Battle Cr.	825	5,840	189	2.6	4,610	41	0	0	11,510
Whitewater Creek	1,900	2,820	155	15	1,580	5.4	2.2	6.1	6,480
Frenchman River	2,590	83,140	35,760	6,420	36,990	2,640	1,440	1,510	170,500
McEachern Creek	209	8,900	1,910	20	0	0	0	0	11,040
Horse Creek	4	4,400	906	21	0	0	0	0	5,330
Rock Creek	365	15,050	3,210	414	276	54	63	172	19,600
Totals	9,863	207,250	78,089	13,684.6	77,316	5,190.5	2,901.5	3,944.2	398,200

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

- 1955 -

Map Index	Stream and Location	Remarks
<u>St. Mary River Basin</u>		
5AE ₁	St. Mary River near International Boundary	Int. ^a
5AE _{0.5}	Swiftcurrent Creek at Many Glacier, Mont.	Int. ^a
5AE _{0.9}	Lake Sherburne at Sherburne, Montana	Int. ^a R
5AE _{0.6}	Swiftcurrent Creek at Sherburne, Mont.	Int. ^a
5AE _{0.2}	United States St. Mary Canal at St. Mary Crossing, near Babb, Mont.	Int. ^a
5AE _{0.3}	United States St. Mary Canal at Hudson Bay Divide near Browning, Mont.	Int. ^a
<u>Milk River Basin</u>		
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, Mont.	Int. ^a
11AA ₁	North Branch of Milk River near Int. Bdy.	Int. ^a
11AA ₂₅	South Branch of Milk River near Int. Bdy.	Int. ^a
11AD _{0.1}	Whitewater Creek near International Bdy.	Int. ^a
<u>Lodge Creek Tributary Basin</u>		
11AB ₈₃	Lodge Creek below McRae Coulee at Int. Bdy.	Int. ^a
<u>Battle Creek Tributary Basin</u>		
11AB ₇₆	Battle Creek above Cypress Lake West Inflow Canal near West Plains, Sask.	Int. ^a
11AB ₂₇	Battle Creek at International Boundary	Int. ^a
11AB _{0.1}	Woodpile Coulee near International Bdy.	Int. ^a

Map Index	Stream and Location	Remarks
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Battle Creek Tributary Basin

11AB _{0.3}	East Branch of Battle Creek near Int. Bdy.	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, Sask.	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, Sask.	Int. R ^a
11AC ₅₂	East End Canal at East End, Sask.	Int. ^a
11AC ₁	Frenchman River below East End Reservoir	Int. ^a
11AC ₅₇	Frenchman River at Morrison's near East End, Saskatchewan.	Int. ^a
11AC ₂₃	Frenchman River at 50 Mile near Bracken, Sask.	Int. ^a
11AC ₆₃	Val Marie West Reservoir, near Val Marie, Sask.	Int. R ^a
11AC ₆₅	Val Marie West Gravity Canal	Int. ^a
11AC ₅₆	Val Marie Reservoir near Val Marie, Sask.	Int. R ^a
11AC ₅₄	Val Marie Main Canal	Int. ^a
11AC ₅₁	Frenchman River below Val Marie, Sask.	Int. ^a
11AC ₄₁	Frenchman River at International Boundary	Int. ^a

Map Index	Stream and Location	Remarks
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Rock Creek Tributary Basin

11AE _{0.2}	Rock Creek at 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

- 1955 -

St. Mary River Basin

	Grinnell Creek near Many Glacier	U.S. ^c
	St. Mary River near Babb, Montana	U.S. ^c
	St. Mary Lake near St. Mary, Montana	U.S. ^c
	Lower St. Mary Lake near Babb, Montana	U.S. ^c
5AE _{0.1}	United States St. Mary Canal at Intake near Babb, Montana	U.S. ^c
5AE ₆	St. Mary River near Lethbridge	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, Alta.	Canada R ^a
5AE ₂₆	Canadian St. Mary Canal near Spring Coulee	Canada ^a
5AE ₂₁	Magrath Irrigation District Canal near Spring Coulee, Alberta	Canada ^a
5AE ₁₆	Pothole Creek at Russells Ranch	Canada ^c
5AD ₂₀	Six Mile Coulee Spillway near Lethbridge	Canada ^c

Map Index	Stream and Location	Remarks
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Milk River Basin

Lodge Creek Tributary Basin

11AB ₈₂	Lodge Creek near Alberta Boundary	Canada ^c
11AB ₉	Middle Creek near Alberta Boundary	Canada ^a
11AB ₆₀	Spangler Ditch near Govenlock, Sask.	Canada ^a
2	North Chinook Canal near Havre, Montana	U.S. ^b

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, Sask.	Canada ^a
11AB ₅₈	Richardson Ditch near Consul, Sask.	Canada ^a
11AB ₄₄	McKinnon Ditch near Consul, Sask.	Canada ^a
11AB ₁₈	Stirling and Nash Ditch near Consul, Sask.	Canada ^a
3	Matheson Canal near Chinook, Montana	U.S. ^b

Frenchman River Tributary Basin

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

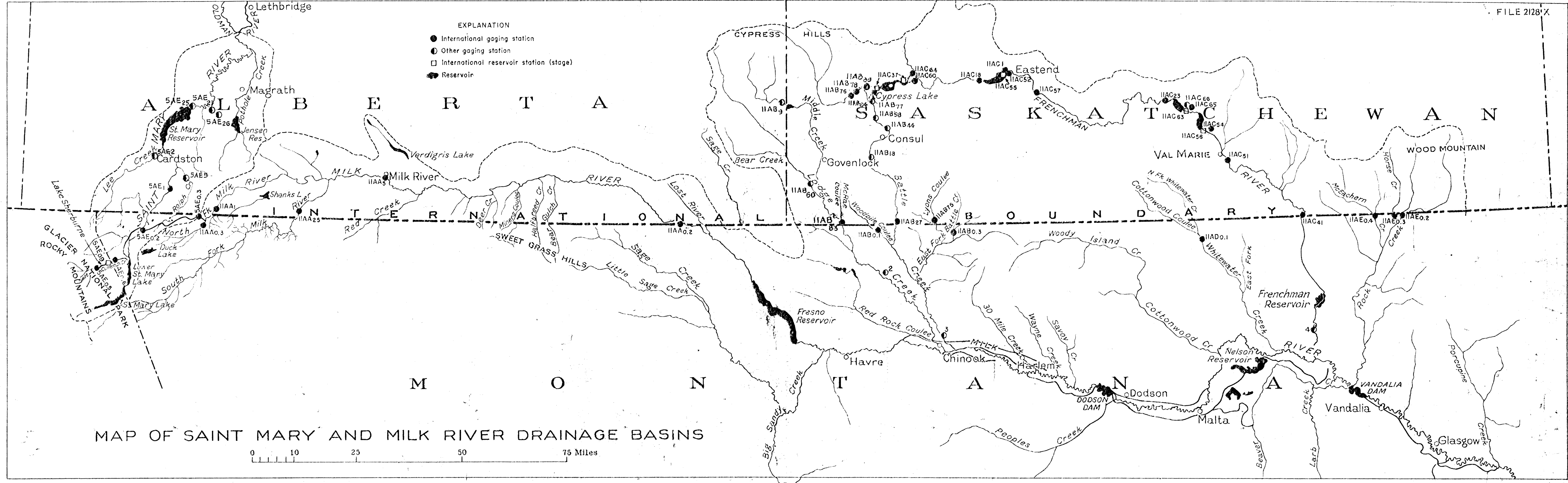
United States - Denotes operation by United States
Geological Survey.

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 report.

c - Data not used for division purposes and not
included in report or appendix.



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