Report to

THE INTERNATIONAL JOINT COMMISSION

on

THE DIVISION AND USE MADE OF THE WATERS OF

ST. MARY AND MILK RIVERS

by

VICTOR MEEK
representing Canada

and

C. G. PAULSEN
representing the United States

1948

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The Honourable, The International Joint Commission,
Washington, D.C., and Ottawa, Canada.

Gentlemen:-

In compliance with the Provisions of Clause VIII (c) of your Order of the 4th October, 1921, directing the division of waters of St. Mary and Milk Rivers between Canada and the United States, we are transmitting herewith a report on the operations during the irrigation season ended October 31, 1948.

Respectfully submitted,

Victor Meek,
Accredited Officer of His Majesty.

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

April 5, 1949.

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 1948, by the same group of engineers as in previous years.

Mr. Victor Meek, Controller, Dominion Water and Power Bureau, as accredited officer of His Majesty, was represented in the field by Mr. O.H. Hoover, District Chief Engineer, Calgary, Alberta. The Chief Hydraulic Engineer, United States Geological Survey, Mr. C.G. Paulsen, as accredited officer of the United States was represented by Mr. A.H. Tuttle, District Engineer, Helena, Montana.

The water of the two rivers was divided between the two countries in accordance with the Order of the Commission dated in Ottawa, Canada, on the 4th day of October, 1921.

The hydrometric data on which this report is based were obtained in Canada by engineers of the Dominion Water and Power Bureau under the direction of Mr. Hoover, while those in Montana were collected by engineers of the United States Geological Survey under the supervision of Mr. Tuttle.

The joint international gauging stations were visited frequently by representatives of both countries and the data obtained were jointly approved by the field engineers.

The annual report was compiled and assembled by Mr. S.G. Dawson, Dominion Water and Power Bureau, Ottawa, Canada.

The run-off from the St. Mary River basin during the irrigation season of 1948 was 126.9 per cent of the average for the 45 years of record. The field engineers constantly kept themselves closely informed as to the natural flow of the river, the water stored or released from storage and the quantity diverted by each country. Any discrepancy in the division was adjusted to allow each country its proper share as set forth in the Order of the Commission dated October 4, 1921. Statements showing the daily division of water were prepared and forwarded to the Superintendent, Lethbridge Section, Canadian Pacific Irrigation System; to the Project Manager, United States Bureau of Reclamation, Malta, Montana; and to the Controller, Cominion Water and Power Bureau, Ottawa, Canada.

Division of Water

The United States St. Mary Canal was in operation at the headgates from May 13 to October 1 and water was delivered to the North Branch Milk River from May 16 to October 7.

As seepage from the canal between the intake and the crossing of the St. Mary River is assumed to return to the river and eventually become available to Canada, the discharge of 115,100 acre-feet passing in the canal at St. Mary Crossing during the period May 13 to October 1 is considered as the quantity diverted from the St. Mary River by the United States. During the period of operation of the canal a total of 116,858 acre-feet was diverted from St. Mary River and made available for irrigation in Montana. The slight increase between the St. Mary Crossing and the Hudson Bay Divide, the end of the canal, was probably due to local run-off in excess of evaporation and seepage.

On October 31st, 1947, 23,535 acre-feet of water remained in Sherburne Lake Reservoir. By March 31st, 1948, 35,849 acre-feet was in storage. This was increased to 60,420 acre-feet by July 15th. Water was released during the latter part of April and the first half of May. After July 17th and until October 7th water was released in varying amounts to supplement the flow of St. Mary River. On October 31st, 1948, 5,531 acre-feet remained in storage.

As only a small quantity of water was diverted from Milk River, the natural flow of the river at Eastern Crossing is considered as being delivered to the United States. The natural flow of the river at the Eastern Crossing for the open water period of 1948, March 1st to October 31st, is estimated as 206,000 acre-feet The total measured diversion for irrigation from Milk River in Montana was 263,350 acre-feet.

The quantity delivered to the United States at the International Boundary from the Northern Tributaries of Milk River, during the open water period of 1948, was 68,940 acre-feet. This flow is about fifty-six per cent of the average for the previous 21 years.

During the open water period of 1948, Canada diverted to Cypress Lake Reservoir, 11,480 acre-feet of the flow of Battle Creek, but later returned 4,680 acre-feet, while 7,840 acre-feet was delivered to Montana at the International Boundary. In the Frenchman River basin, Canada stored in Cypress Lake reservoir 2,620 acre-feet of the flow from Belanger Creek and 12,367 acre-feet from the main stream in reservoirs at East End and Val Marie. From this storage 8,790 acre-feet were released to irrigate land in the Frenchman River valley in Canada, while 25,130 acre-feet

of the natural flow of Frenchman River was delivered to Montana. The apportionment during the open water period is shown in Table 3.

The Canadian Pacific Railway canal at Kimball, Alberta, diverted 116,970 acre-feet from the St. Mary River during the period of operation from the first of May to the 29th October and applied 93,861 acre-feet of this diversion to land in Southern Alberta during the irrigation season.

The Dominion Water and Power Bureau is dependent to a large extent upon the irrigators themselves for records of the diversions in Canada from the Northern Tributaries of Milk River as, in the majority of cases, the diversions are too small to justify the expense of appointing and paying gauge observers. Consequently the records are believed to be incomplete and of doubtful value. The total diversions from these tributaries in Canada as reported and shown in table 4 were; from Lodge Creek, no record; from Battle Creek, no record acre-feet; from Frenchman River, no record acre-feet.

Any question as to the proper share of St. Mary River being delivered to either country was decided in the following manner. Records of the daily flow was kept of Swiftcurrent Creek at Many Glacier, but the flow from the other creeks entering Swiftcurrent Creek above the Sherburne

dam was estimated. The total of these creeks gave the inflow into Sherburne Lake Reservoir. The unrecorded inflow was determined by comparison with the recorded flow in Swiftcurrent Creek and with the use of the water levels of Sherburne Lake Reservoir after direct application of the losses by evaporation and seepage was made. A record of the outflow from the reservoir was kept at the gauging station just below the dam. The difference between the inflow and the outflow showed the quantity of water being stored or released from storage. A record of the daily flow in the United States St. Mary Canal at St. Mary Crossing was kept to find the water diverted by the United States and a record of the daily flow in the St. Mary River at Kimball, near the International Boundary, was kept to determine the water being delivered to Canada.

If water was being stored in Sherburne Lake Reservoir the natural flow of St. Mary River at the Boundary was obtained by adding the quantity of water stored to that diverted by the St. Mary Canal and that delivered to Canada, a two-day lag was allowed for stored water to reach the Boundary. If water was being released, the quantity released was deducted from the combined flow of the St. Mary Canal and that in the river at Kimball to determine the natural flow.

The natural flow having been determined, the share to which each country was entitled was calculated on the following basis:-

(1) When the natural flow of the St. Mary River was 666 cubic-feet per second or less, Canada was entitled, by the ruling of the Commission, to three-fourths of that flow and the United States to one-fourth.

(2) When the natural flow of the St. Mary River was greater than 666 cubic-feet per second, Canada was entitled to 500 cubic-feet per second plus one-half of the increase over 666 cubic-feet per second and the United States was entitled to the remainder.

No actual division was made of the waters of Milk River or its Northern Tributaries except those of the Frenchman River and Battle Creek.

Water Supply

In the mountainous areas tributary to the St. Mary River basin, as shown by the twenty-sixth annual international survey of the snow conditions on the headwaters of the Swiftcurrent Creek, an area considered typical of

the headwaters of the St. Mary River, the snow cover of 73.1 inches was about 136 per cent of the mean for the previous twenty-six years, while the water content, 31.5 inches, of this snow cover was about 130 per cent of the mean. The run-off of 75,300 acre-feet from the area surveyed, during May, June and July, was 114 per cent of the average for the previous 26 years.

The natural flow of 724,970 acre-feet of the St. Mary River at the Boundary during the irrigation season of 1948, from the first of April to the end of October, was 127 per cent of the average for the 45 years of record.

The run-off from the prairies, as indicated by the Northern Tributaries of Milk River was about fifty-six per cent of the average for the last 21 years.

Forty-one gauging stations used in the determination of the natural flow of the streams in the St. Mary and Milk River basins were operated jointly as international gauging stations.

An appendix to this report gives the results of current meter measurements, the daily gauge height and the discharge at all gauging stations operated in the two drainage basins during 1948.

Description of Tables

The tables following have been prepared to summarize the data on the division and use made of the waters in the St. Mary and Milk River basins.

Table No. 1 shows the method used to determine the natural flow of St. Mary River during the irrigation season of 1948, the water available for use and used by Canada and the United States. In this table there are four pages for each month from April to October, inclusive.

Page 1 (water stored or released from Sherburne Lake Reservoir) shows the daily inflow and the daily outflow from Sherburne Lake Reservoir. The difference gives the quantity of water stored or released from storage. On this sheet the unrecorded inflow is determined by comparison with the recorded flow in Swiftcurrent Creek and with the use of the water levels of Sherburne Lake Reservoir to give the gain or loss in storage, after direct application of the evaporation and seepage losses has been made. This estimate is put in the column headed "unrecorded inflow".

Page 2 (determination of natural flow of the St. Mary River) shows the actual flow of St. Mary River at Kimball near the International Boundary, the quantity of water diverted, stored or released from storage by the United States and the computed natural flow of St. Mary River,

or that flow which would have crossed the Boundary had there been no interference. It has been determined that two days are required for stored water released from Sherburne Lake Reservoir to influence the flow at International Boundary, consequently a two-day lag has been applied to the stored or released water.

Page 3 (water available for use and used by the United States) shows the water available for use and used by the United States under the ruling of the Order of October 4, 1921, the water diverted and stored and the excess or deficit in the quantity used as compared with the share available.

Page 4 (water available for use and used by Canada) shows the natural flow of St. Mary River at the International Boundary, Canada's share by the ruling of the Commission, the actual discharge of St. Mary River at Kimball, which is the quantity available for use by Canada, the quantity used by Canada and the excess or deficit of the quantity received by Canada as compared with the share.

Table 2 is a statement showing the quantity in acre-feet taken each month by each country and the quantity thereof which is applied to the land, the quantity diverted from the St. Mary River, the loss or waste from canals and the diversions from Milk River in the United States.

Table 3 shows the determination of the natural flow of Frenchman River at the International Boundary. This table consists of three pages: Page 1 shows the quantity used by Canada in Cypress Lake Reservoir and at East End; Page 2 shows the quantity used by Canada at Val Marie; and Page 3 shows the total quantity used by Canada, the natural flow of Frenchman River at the Boundary and the quantity delivered to the United States.

Table 4 shows the available information on the diversions from the Northern Tributaries of Milk River in Canada.

Table 5 gives the measured diversions from the Northern Tributaries of Milk River in the United States. Smaller diversions have not been measured.

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR

APRIL - 1948

Day	Inflow to Sherburne Reservoir: Recorded inflow: Swiftcurrent Creek	Un-recorded inflow est'd	Total inflow	Outflow Swiftcurrent Creek at Sherburne	Stored in Reservior Sec-ft. Gross	Released from Reservoir Sec-ft. Net
1	14				46	---
2	14				46	---
3	14				46	---
4	14				51	---
5	14				48	---
6	15				48	---
7	16				48	---
8	17				48	---
9	18				48	---
10	18				48	---
11	19				48	---
12	19				48	---
13	19				48	---
14	19				48	---
15	27				48	---
16	36			no record	48	---
17	63				51	---
18	149				157	---
19	167				177	---
20	158				164	---
21	155				52	---
22	197				---	---
23	185				---	26
24	173				---	39
25	149				---	33
26	117				---	66
27	101				---	79
28	106				---	301
29	111				---	397
30	122				---	647
Total sec-ft.	2246				1366	1588
Mean	75				46	53
Ac-ft.	4460				2710	3150

DETERMINATION OF NATRAL FLOW OF ST. MARY RIVER

APRIL - 1948

Day	St. Mary River at Kimball	Diverted by U.S.B.R.	Stored by U.S.B.R. Gross	Total in sec-ft.	Stored water released Net	Natural flow St. Mary River at Boundary
1	134	---	46	180	---	180
2	126	---	46	172	---	172
3	122	---	46	168	---	168
4	118	---	46	164	---	164
5	115	---	46	161	---	161
6	114	---	51	165	---	165
7	112	---	48	160	---	160
8	114	---	48	162	---	162
9	115	---	48	163	---	163
10	115	---	48	163	---	163
11	115	---	48	163	---	163
12	115	---	48	163	---	163
13	123	---	48	171	---	171
14	314	---	48	362	---	362
15	595	---	48	643	---	643
16	876	---	48	924	---	924
17	1080	---	48	1128	---	1128
18	1070	---	48	1118	---	1118
19	840	---	51	891	---	891
20	664	---	157	821	---	821
21	678	---	177	855	---	855
22	814	---	164	978	---	978
23	866	---	52	918	---	918
24	947	---	---	947	---	947
25	975	---	---	975	26	949
26	984	---	---	984	39	945
27	1060	---	---	1060	33	1027
28	1160	---	---	1160	66	1094
29	1390	---	---	1390	79	1311
30	1860	---	---	1860	301	1559
Total sec-ft.	17711	---	1458	19169	544	18625
Mean	590	---	49	639	18	621
Ac-ft.	35130	---	2890	38020	1080	36940

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.

APRIL - 1948

Day	Natural flow St.Mary River	Available for use by U.S.A. U.S. share	Released storage Net	Total available	Used by U.S.A. Diverted	Stored Gross	Total Used	Excess of share	Deficit used
1	180	45	--	45	--	46	46	1	--
2	172	43	--	43	--	46	46	3	--
3	168	42	--	42	--	46	46	4	--
4	164	41	--	41	--	46	46	5	--
5	161	40	--	40	--	46	46	6	--
6	165	41	--	41	--	51	51	10	--
7	160	40	--	40	--	48	48	8	--
8	162	40	--	40	--	48	48	8	--
9	163	41	--	41	--	48	48	7	--
10	163	41	--	41	--	48	48	7	--
11	163	41	--	41	--	48	48	7	--
12	163	41	--	41	--	48	48	7	--
13	171	43	--	43	--	48	48	5	--
14	362	90	--	90	--	48	48	--	42
15	643	161	--	161	--	48	48	--	113
16	924	295	--	295	--	48	48	--	247
17	1128	397	--	397	--	48	48	--	349
18	1118	392	--	392	--	48	48	--	344
19	891	279	--	279	--	51	51	--	228
20	821	244	--	244	--	157	157	--	87
21	855	261	--	261	--	177	177	--	84
22	978	322	--	322	--	164	164	--	158
23	918	292	--	292	--	52	52	--	240
24	947	307	--	307	--	--	--	--	307
25	949	308	26	334	--	--	--	--	334
26	945	306	39	345	--	--	--	--	345
27	1027	347	33	380	--	--	--	--	380
28	1094	380	66	446	--	--	--	--	446
29	1311	489	79	568	--	--	--	--	568
30	1559	613	301	914	--	--	--	--	914
Total sec-ft.	18625	6022	544	6566	--	1458	1458	78	5186
Mean	621	201	18	219	--	49	49	2.6	173
Ac-ft.	36940	11940	1080	13020	--	2890	2890	155	10290

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA

APRIL - 1948

Day	Natural flow of St.Mary R. at Boundary	Canada's share Available	St.Mary R. at Kimball Delivered	Diverted by Canada Used	Excess or Deficit of share delivered	
1	180	135	134	--	--	1
2	172	129	126	--	--	3
3	168	126	122	--	--	4
4	164	123	118	--	--	5
5	161	121	115	--	--	6
6	165	124	114	--	--	10
7	160	120	112	--	--	8
8	162	122	114	--	--	8
9	163	122	115	--	--	7
10	163	122	115	--	--	7
11	163	122	115	--	--	7
12	163	122	115	--	--	7
13	171	128	123	--	--	5
14	362	272	314	--	42	--
15	643	482	595	--	113	--
16	924	629	876	--	247	--
17	1128	731	1080	--	349	--
18	1118	726	1070	--	344	--
19	891	612	840	--	228	--
20	821	577	664	--	87	--
21	855	594	678	--	84	--
22	978	656	814	--	158	--
23	918	626	866	--	240	--
24	947	640	947	--	307	--
25	949	641	975	--	334	--
26	945	639	984	--	345	--
27	1027	680	1060	--	380	--
28	1094	714	1160	--	446	--
29	1311	822	1390	--	568	--
30	1559	946	1860	--	914	--
Total sec-ft.	18625	12603	17711	--	5186	78
Mean	621	420	590	--	173	2.6
Ac-ft.	36940	25000	35130	--	10290	155

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR

MAY - 1948

Day	Inflow to Sherburne Reservoir: Recorded inflow: Swiftcurrent Creek		Un-recorded inflow est'd	Total inflow	Outflow Swiftcurrent Creek at Sherburne	Stored in Reservoir Sec-ft. Gross	Released from Reservoir Sec-ft. Net
1	143		---	---	---	---	674
2	155		---	---	---	---	598
3	127		---	---	---	---	331
4	117		184	301	488	---	187
5	106		171	277	488	---	211
6	106		223	329	485	---	156
7	144		285	429	500	---	71
8	185		292	477	515	---	38
9	167		170	337	629	---	292
10	149		302	451	659	---	208
11	127		381	508	476	32	---
12	111		474	585	432	153	---
13	133		222	355	130	225	---
14	127		99	226	73	153	---
15	127		43	170	73	97	---
16	144		123	267	73	194	---
17	203		195	398	74	324	---
18	405		194	599	75	524	---
19	625		353	978	76	902	---
20	746		463	1209	440	769	---
21	712		365	1077	704	373	---
22	981		699	1680	960	720	---
23	1040		625	1665	973	692	---
24	854		443	1297	827	470	---
25	828		375	1203	661	542	---
26	876		389	1265	575	690	---
27	890		409	1299	582	717	---
28	759		335	1094	586	508	---
29	763		301	1064	593	471	---
30	675		266	941	593	348	---
31	670		269	939	593	346	---
Total sec-ft.	13201		8650	21420	13333	9250	2766
Mean	426	(4-31)	279	691	(4-31) 430	298	89
Ac-ft.	26180		17160	42490	26450	18360	5490

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER

MAY - 1948

Day	St. Mary River at Kimball	Diverted by U.S.B.R.	Stored by U.S.B.R. Gross	Total in sec-ft.	Stored water released Net	Natural flow St.Mary River at Boundary
1	1860	---	---	1860	397	1463
2	1770	---	---	1770	647	1123
3	1740	---	---	1740	674	1066
4	1580	---	---	1580	598	982
5	1450	---	---	1450	331	1119
6	1410	---	---	1410	187	1223
7	1560	---	---	1560	211	1349
8	1930	---	---	1930	156	1774
9	1820	---	---	1820	71	1749
10	1800	---	---	1800	38	1762
11	1720	---	---	1720	292	1428
12	1590	---	---	1590	208	1382
13	1460	1	32	1493	---	1493
14	1330	10	153	1493	---	1493
15	1190	28	225	1443	---	1443
16	1080	97	153	1330	---	1330
17	1060	115	97	1272	---	1272
18	994	243	194	1431	---	1431
19	1340	262	324	1926	---	1926
20	1900	276	524	2700	---	2700
21	2190	276	902	3368	---	3368
22	3550	287	769	4606	---	4606
23	5290	232	373	5895	---	5895
24	5380	224	720	6324	---	6324
25	5420	220	692	6332	---	6332
26	5470	229	470	6169	---	6169
27	5700	234	542	6476	---	6476
28	5310	222	690	6222	---	6222
29	5100	220	717	6037	---	6037
30	4940	220	508	5668	---	5668
31	4570	217	471	5258	---	5258
Total sec-ft.	83504	3613	8556	95673	3810	91863
Mean	2690	(13-31) 190	276	3086	123	2960
Ac-ft.	165600	7170	16970	189740	7560	182200

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.

MAY - 1948

Day	Natural flow St.Mary River	Available for use by U.S.A. U.S. share	Released storage Net	Total available	Used by U.S.A. Diverted	Stored Gross	Total Used	Excess of share	Deficit used
1	1463	565	397	962	---	---	---	--	962
2	1123	395	647	1042	---	---	---	--	1042
3	1066	366	674	1040	---	---	---	--	1040
4	982	324	598	922	---	---	---	--	922
5	1119	393	331	724	---	---	---	--	724
6	1223	445	187	632	---	---	---	--	632
7	1349	508	211	719	---	---	---	--	719
8	1774	720	156	876	---	---	---	--	876
9	1749	708	71	779	---	---	---	--	779
10	1762	714	38	752	---	---	---	--	752
11	1428	547	292	839	---	---	---	--	839
12	1382	524	208	732	---	---	---	--	732
13	1493	580	---	580	1	32	33	--	547
14	1493	580	---	580	10	153	163	--	417
15	1443	555	---	555	28	225	253	--	302
16	1330	498	---	498	97	153	250	--	248
17	1272	469	---	469	115	97	212	--	257
18	1431	549	---	549	243	194	437	--	112
19	1926	796	---	796	262	324	586	--	210
20	2700	1183	---	1183	276	524	800	--	383
21	3368	1517	---	1517	276	902	1178	--	339
22	4606	2136	---	2136	287	769	1056	--	1080
23	5895	2780	---	2780	232	373	605	--	2175
24	6324	2995	---	2995	224	720	944	--	2051
25	6332	2999	---	2999	220	692	912	--	2087
26	6169	2918	---	2918	229	470	699	--	2219
27	6476	3071	---	3071	234	542	776	--	2295
28	6222	2944	---	2944	222	690	912	--	2032
29	6037	2851	---	2851	220	717	937	--	1914
30	5668	2667	---	2667	220	508	728	--	1939
31	5258	2462	---	2462	217	471	688	--	1774
Total sec-ft.	91863	40759	3810	44569	3613	8556	12169	--	32400
Mean	2960	1310	123	1433	(13-31) 190	276	393	--	1050
Ac-ft.	182200	80840	7560	88400	7170	16970	24140	--	64260

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA

MAY - 1948

Day	Natural flow of St.Mary R. at Boundary	Canada's share Available	St.Mary R. at Kimball Delivered	Diverted by Canada Used	Excess or Deficit of share delivered
1	1463	898	1860	64	962	--
2	1123	728	1770	62	1042	--
3	1066	700	1740	81	1040	--
4	982	658	1580	101	922	--
5	1119	726	1450	108	724	--
6	1223	778	1410	106	632	--
7	1349	841	1560	81	719	--
8	1774	1054	1930	21	876	--
9	1749	1041	1820	--	779	--
10	1762	1048	1800	--	752	--
11	1428	881	1720	--	839	--
12	1382	858	1590	--	732	--
13	1493	913	1460	--	547	--
14	1493	913	1330	--	417	--
15	1443	888	1190	62	302	--
16	1330	832	1080	--	248	--
17	1272	803	1060	--	257	--
18	1431	882	994	71	112	--
19	1926	1132	1340	149	210	--
20	2700	1517	1900	145	383	--
21	3368	1851	2190	147	339	--
22	4606	2470	3550	132	1080	--
23	5895	3115	5290	163	2175	--
24	6324	3329	5380	161	2051	--
25	6332	3333	5420	189	2087	--
26	6169	3251	5470	212	2219	--
27	6476	3405	5700	239	2295	--
28	6222	3278	5310	238	2032	--
29	6037	3186	5100	246	1914	--
30	5668	3001	4940	256	1939	--
31	5258	2796	4570	277	1774	--
Total sec-ft.	91863	51104	83504	3311	32400	--
Mean	2960	1650	2690	107	1050	--
Ac-ft.	182200	101400	165600	6570	64260	--

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR

JUNE - 1948

Day	Inflow to Sherburne Reservoir: Recorded inflow: Swiftcurrent Creek	Un-recorded inflow est'd	Total inflow	Outflow: Swiftcurrent Creek at Sherburne	Stored in Reservoir Sec-ft. Gross	Released from Reservoir Sec-ft. Net
1	832	290	1122	600	522	---
2	854	290	1144	604	540	---
3	881	482	1363	646	717	---
4	1190	561	1751	1160	591	---
5	958	411	1369	1300	69	---
6	881	351	1232	1300	---	68
7	872	259	1131	1140	---	9
8	876	298	1174	882	292	---
9	850	273	1123	852	271	---
10	634	290	924	924	---	---
11	501	305	806	942	---	136
12	481	245	726	937	---	211
13	454	217	671	853	---	182
14	427	131	558	514	44	---
15	435	221	656	262	394	---
16	650	623	1273	602	671	---
17	912	835	1747	1270	477	---
18	798	553	1351	1350	1	---
19	601	431	1032	1340	---	308
20	513	346	859	1190	---	331
21	501	314	815	1100	---	285
22	442	287	729	1090	---	361
23	431	255	686	805	---	119
24	431	252	683	687	---	4
25	423	269	692	687	5	---
26	369	184	553	661	---	108
27	369	176	545	551	---	6
28	352	117	469	411	58	---
29	359	157	516	137	379	---
30	376	142	518	137	381	---
Total sec-ft.	18653	9565	28218	24934	5412	2128
Mean	622	319	941	831	180	71
Ac-ft.	37000	18970	55970	49460	10730	4230

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER

JUNE - 1948

Day	St. Mary River at Kimball	Diverted by U.S.B.R.	Stored by U.S.B.R. Gross	Total in sec-ft.	Stored water released Net	Natural flow St.Mary River at Boundary
1	4440	220	348	5008	---	5008
2	4240	392	346	4978	---	4978
3	4310	504	522	5336	---	5336
4	5580	539	540	6659	---	6659
5	6470	498	717	7685	---	7685
6	6400	478	591	7469	---	7469
7	6160	471	69	6700	---	6700
8	5720	476	---	6196	68	6128
9	5120	516	---	5636	9	5627
10	4810	534	292	5636	---	5636
11	4640	534	271	5445	---	5445
12	4660	536	---	5196	---	5196
13	4170	527	---	4697	136	4561
14	3670	557	---	4227	211	4016
15	3100	557	---	3657	182	3475
16	4970	554	44	5568	---	5568
17	8390	165	394	8949	---	8949
18	8180	62	671	8913	---	8913
19	7260	34	477	7771	---	7771
20	6490	28	1	6519	---	6519
21	5800	25	---	5825	308	5517
22	5540	26	---	5566	331	5235
23	5630	39	---	5669	285	5384
24	5180	35	---	5215	361	4854
25	4710	28	---	4738	119	4619
26	4240	20	---	4260	4	4256
27	3880	22	5	3907	---	3907
28	3460	24	---	3484	108	3376
29	3040	17	---	3057	6	3051
30	2680	8	58	2746	---	2746
Total sec-ft.	152940	8426	5346	166712	2128	164584
Mean	5098	281	178	5557	71	5486
Ac-ft.	303400	16710	10600	330710	4220	326490

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.

JUNE - 1948

Day	Natural flow St.Mary River	Available for use by U.S.A. U.S. share	Released storage Net	Total available	Used by U.S.A. Diverted	Stored Gross	Total Used	Excess of share	Deficit used
1	5008	2337	--	2337	220	348	568	--	1769
2	4978	2322	--	2322	392	346	738	--	1584
3	5336	2501	--	2501	504	522	1026	--	1475
4	6659	3163	--	3163	539	540	1079	--	2084
5	7685	3675	--	3675	498	717	1215	--	2460
6	7469	3578	--	3568	478	591	1069	--	2499
7	6700	3183	--	3183	471	69	540	--	2643
8	6128	2897	68	2965	476	--	476	--	2489
9	5627	2647	9	2656	516	--	516	--	2140
10	5636	2651	--	2651	534	292	826	--	1825
11	5445	2555	--	2555	534	271	805	--	1750
12	5196	2431	--	2431	536	--	536	--	1895
13	4561	2114	136	2250	527	--	527	--	1723
14	4016	1841	211	2052	557	--	557	--	1495
15	3475	1571	182	1753	557	--	557	--	1196
16	5568	2617	--	2617	554	44	598	--	2019
17	8949	4307	--	4307	165	394	559	--	3748
18	8913	4290	--	4290	62	671	733	--	3557
19	7771	3718	--	3718	34	477	511	--	3207
20	6519	3093	--	3093	28	1	29	--	3064
21	5517	2591	308	2899	25	--	25	--	2874
22	5235	2451	331	2782	26	--	26	--	2756
23	5384	2525	285	2810	39	--	39	--	2771
24	4854	2260	361	2621	35	--	35	--	2586
25	4619	2143	119	2262	28	--	28	--	2234
26	4256	1961	4	1965	20	--	20	--	1945
27	3907	1787	--	1787	22	5	27	--	1760
28	3376	1521	108	1629	24	--	24	--	1605
29	3051	1359	6	1365	17	--	17	--	1348
30	2746	1206	--	1206	8	58	66	--	1140
Total sec-ft.	164584	77285	2128	79413	8426	5346	13772	--	65641
Mean	5486	2576	71	2647	281	178	459	--	2188
Ac-ft.	326490	153300	4220	157500	16710	10600	27310	--	130200

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA

JUNE - 1948

Day	Natural flow of St.Mary R. at Boundary	Canada's share Available	St.Mary R. at Kimball Delivered	Diverted by Canada Used	Excess or Deficit of share delivered
1	5008	2671	4440	331	1769	--
2	4978	2656	4240	326	1584	--
3	5336	2835	4310	319	1475	--
4	6659	3496	5580	319	2084	--
5	7685	4010	6470	322	2460	--
6	7469	3901	6400	310	2499	--
7	6700	3517	6160	331	2643	--
8	6128	3231	5720	424	2489	--
9	5627	2980	5120	435	2140	--
10	5636	2985	4810	425	1825	--
11	5445	2890	4640	422	1750	--
12	5196	2765	4660	418	1895	--
13	4561	2447	4170	410	1723	--
14	4016	2175	3670	427	1495	--
15	3475	1904	3100	406	1196	--
16	5568	2951	4970	377	2019	--
17	8949	4642	8390	65	3748	--
18	8913	4623	8180	--	3557	--
19	7771	4053	7260	--	3207	--
20	6519	3426	6490	--	3064	--
21	5517	2926	5800	--	2874	--
22	5235	2784	5540	--	2756	--
23	5384	2859	5630	--	2771	--
24	4854	2594	5180	--	2586	--
25	4619	2476	4710	--	2234	--
26	4256	2295	4240	36	1945	--
27	3907	2120	3880	170	1760	--
28	3376	1855	3460	178	1605	--
29	3051	1692	3040	167	1348	--
30	2746	1540	2680	171	1140	--
Total sec-ft.	164584	87299	152940	6789	65641	--
Mean	5486	2910	5098	226	2188	--
Ac-ft.	326490	173190	303400	13470	130200	--

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR

JULY - 1948

Day	Inflow to Sherburne Reservoir: Recorded inflow: Swiftcurrent Creek	Un-recorded inflow est'd	Total inflow	Outflow Swiftcurrent Creek at Sherburne	Stored in Reservoir Sec-ft. Gross	Released from Reservoir Sec-ft. Net
1	373	134	507	129	378	---
2	332	97	429	77	352	---
3	283	119	402	77	325	---
4	246	111	357	77	280	---
5	240	93	333	77	256	---
6	227	83	310	77	233	---
7	224	163	387	77	310	---
8	200	21	221	77	144	---
9	176	57	233	77	156	---
10	167	72	239	77	162	---
11	155	82	237	77	160	---
12	147	62	209	79	130	---
13	147	48	195	79	116	---
14	149	73	222	79	143	---
15	149	99	248	200	48	---
16	141	69	210	360	---	150
17	133	61	194	358	---	164
18	127	57	184	358	---	174
19	127	87	214	358	---	144
20	155	122	277	420	---	143
21	191	74	265	454	---	189
22	191	45	236	451	---	215
23	194	76	270	451	---	181
24	191	47	238	451	---	213
25	161	52	213	451	---	238
26	138	68	206	448	---	242
27	130	52	182	448	---	266
28	158	86	244	448	---	204
29	283	125	408	446	---	38
30	312	142	454	446	8	---
31	262	69	331	446	---	115
Total sec-ft.	6109	2546	8655	8130	3201	2676
Mean	197	82	279	262	103	86
Ac-ft.	12120	5050	17170	16130	6350	5310

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER

JULY - 1948

Day	St. Mary River at Kimball	Diverted by U.S.B.R.	Stored by U.S.B.R. Gross	Total in sec-ft.	Stored water released Net	Natural flow St.Mary River at Boundary
1	2430	64	379	2873	---	2873
2	2170	283	381	2834	---	2834
3	1980	287	378	2645	---	2645
4	1840	286	352	2478	---	2478
5	1720	283	325	2328	---	2328
6	1590	280	280	2150	---	2150
7	1380	339	256	1975	---	1975
8	1120	530	233	1883	---	1883
9	1000	545	310	1855	---	1855
10	902	550	144	1596	---	1596
11	840	545	156	1541	---	1541
12	764	543	162	1469	---	1469
13	685	537	160	1382	---	1382
14	642	537	130	1309	---	1309
15	603	545	116	1264	---	1264
16	621	557	143	1321	---	1321
17	664	561	48	1273	---	1273
18	671	563	---	1234	150	1084
19	656	563	---	1219	164	1055
20	823	567	---	1390	174	1216
21	875	568	---	1443	144	1299
22	840	567	---	1407	143	1264
23	814	565	---	1379	189	1190
24	797	567	---	1364	215	1149
25	772	565	---	1337	181	1156
26	732	563	---	1295	213	1082
27	708	561	---	1269	238	1031
28	708	561	---	1269	242	1027
29	902	567	---	1469	266	1203
30	1080	565	---	1645	204	1441
31	956	563	---	1519	38	1481
Total sec-ft.	32285	15177	3953	51415	2561	48854
Mean	1041	490	128	1659	83	1576
Ac-ft.	64040	30100	7840	101980	5080	96900

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.

JULY - 1948

Day	Natural flow St.Mary River	Available for use by U.S.A. U.S. share	Released storage Net	Total available	Used by U.S.A. Diverted	Stored Gross	Total Used	Excess of share	Deficit used
1	2873	1270	--	1270	64	379	443	--	827
2	2834	1250	--	1250	283	381	664	--	586
3	2645	1156	--	1156	287	378	665	--	491
4	2478	1072	--	1072	286	352	638	--	434
5	2328	997	--	997	283	325	608	--	389
6	2150	908	--	908	280	280	560	--	348
7	1975	821	--	821	339	256	595	--	226
8	1883	775	--	775	530	233	763	--	12
9	1855	761	--	761	545	310	855	94	--
10	1596	631	--	631	550	144	694	63	--
11	1541	604	--	604	545	156	701	97	--
12	1469	568	--	568	543	162	705	137	--
13	1382	524	--	524	537	160	697	173	--
14	1309	488	--	488	537	130	667	179	--
15	1264	465	--	465	545	116	661	196	--
16	1321	494	--	494	557	143	700	206	--
17	1273	470	--	470	561	48	609	139	--
18	1084	375	150	525	563	--	563	38	--
19	1055	361	164	525	563	--	563	38	--
20	1216	441	174	615	567	--	567	--	48
21	1299	483	144	627	568	--	568	--	59
22	1264	465	143	608	567	--	567	--	41
23	1190	428	189	617	565	--	565	--	52
24	1149	408	215	623	567	--	567	--	56
25	1156	411	181	592	565	--	565	--	27
26	1082	374	213	587	563	--	563	--	24
27	1031	349	238	587	561	--	561	--	26
28	1027	347	242	589	561	--	561	--	28
29	1203	435	266	701	567	--	567	--	134
30	1441	554	204	758	565	--	565	--	193
31	1481	574	38	612	563	--	563	--	49
Total sec-ft.	48854	19259	2561	21820	15177	3953	19130	1360	4050
Mean	1576	621	83	704	490	128	617	44	131
Ac-ft.	96900	38200	5080	43280	30100	7840	37940	2700	8030

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA

JULY - 1948

Day	Natural flow of St.Mary R. at Boundary	Canada's share Available	St.Mary R. at Kimball Delivered	Diverted by Canada Used	Excess or Deficit of share	Deficit delivered
1	2873	1603	2430	175	827	--
2	2834	1584	2170	217	586	--
3	2645	1489	1980	275	491	--
4	2478	1406	1840	270	434	--
5	2328	1331	1720	311	389	--
6	2150	1242	1590	464	348	--
7	1975	1154	1380	541	226	--
8	1883	1108	1120	540	12	--
9	1855	1094	1000	590	--	94
10	1596	965	902	736	--	63
11	1541	937	840	681	--	97
12	1469	901	764	652	--	137
13	1382	858	685	631	--	173
14	1309	821	642	598	--	179
15	1264	799	603	580	--	196
16	1321	827	621	596	--	206
17	1273	803	664	643	--	139
18	1084	709	671	645	--	38
19	1055	694	656	633	--	38
20	1216	775	823	755	48	--
21	1299	816	875	799	59	--
22	1264	799	840	786	41	--
23	1190	762	814	773	52	--
24	1149	741	797	760	56	--
25	1156	745	772	736	27	--
26	1082	708	732	708	24	--
27	1031	682	708	676	26	--
28	1027	680	708	681	28	--
29	1203	768	902	566	134	--
30	1441	887	1080	494	193	--
31	1481	907	956	454	49	--
Total sec-ft.	48854	29595	32285	17968	4050	1360
Mean	1576	955	1041	580	130	44
Ac-ft.	96900	58700	64040	35640	8030	2690

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR

AUGUST - 1948

Day	Inflow to Sherburne Reservoir: Recorded inflow: Swiftcurrent Creek	Un-recorded inflow est'd	Total inflow	Outflow Swiftcurrent Creek at Sherburne	Stored in Reservoir Sec-ft. Gross	Released from Reservoir Sec-ft. Net
1	221	56	277	446	---	169
2	194	97	291	446	---	155
3	170	63	233	446	---	213
4	149	59	208	443	---	235
5	147	65	212	443	---	231
6	133	39	172	440	---	268
7	122	73	195	438	---	243
8	106	28	134	438	---	304
9	94	63	157	435	---	278
10	94	37	131	435	---	304
11	99	61	160	432	---	272
12	101	38	139	479	---	340
13	94	18	112	575	---	463
14	94	55	149	575	---	426
15	92	27	119	572	---	453
16	92	16	108	568	---	460
17	92	3	95	565	---	470
18	90	34	124	558	---	434
19	92	13	105	555	---	450
20	90	25	115	555	---	440
21	76	55	131	551	---	420
22	72	48	120	548	---	428
23	85	36	121	541	---	420
24	74	20	94	535	---	441
25	127	15	142	531	---	389
26	155	33	188	528	---	340
27	138	26	164	522	---	358
28	114	4	118	519	---	401
29	99	10	109	515	---	406
30	94	15	109	515	---	406
31	87	15	102	559	---	457
Total sec-ft.	3487	1147	4634	15708	---	11074
Mean	112	37	150	507	---	357
Ac-ft.	6920	2270	9190	31160	---	21970

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER

AUGUST - 1948

Day	St. Mary River at Kimball	Diverted by U.S.B.R.	Stored by U.S.B.R. Gross	Total in sec-ft.	Stored water released Net	Natural flow St.Mary River at Boundary
1	875	563	8	1146	---	1446
2	832	563	--	1395	115	1280
3	780	563	--	1343	169	1174
4	732	561	--	1293	155	1138
5	693	559	--	1252	213	1039
6	649	555	--	1204	235	969
7	615	554	--	1169	231	938
8	580	552	--	1132	268	864
9	563	552	--	1115	243	872
10	542	548	--	1090	304	786
11	521	541	--	1062	278	784
12	502	525	--	1027	304	723
13	506	525	--	1031	272	759
14	532	527	--	1059	340	719
15	547	527	--	1074	463	611
16	568	528	--	1096	426	670
17	563	523	--	1086	453	633
18	552	521	--	1073	460	613
19	532	521	--	1053	470	583
20	516	519	--	1035	434	601
21	502	518	--	1020	450	570
22	492	516	--	1008	440	568
23	478	516	--	994	420	574
24	468	519	--	987	428	559
25	459	519	--	978	420	558
26	446	516	--	962	441	521
27	454	518	--	972	389	583
28	454	519	--	973	340	633
29	454	518	--	972	358	614
30	446	518	--	964	401	563
31	432	518	--	950	406	544
Total sec-ft.	17285	16522	8	33815	10326	23489
Mean	558	533	--	1091	333	758
Ac-ft.	34280	32770	16	67070	20480	46590

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.

AUGUST - 1948

Day	Natural flow St. Mary River	Available for use by U.S.A. U.S. share	Released storage Net	Total available	Used by U.S.A. Diverted	Stored Gross	Total Used	Excess of share	Deficit used
1	1446	556	--	556	563	8	571	15	--
2	1280	473	115	588	563	--	563	--	25
3	1174	420	169	589	563	--	563	--	26
4	1138	402	155	557	561	--	561	4	--
5	1039	353	213	566	559	--	559	--	7
6	969	318	235	553	555	--	555	2	--
7	938	302	231	533	554	--	554	21	--
8	864	265	268	533	552	--	552	19	--
9	872	269	243	512	552	--	552	40	--
10	786	226	304	530	548	--	548	18	--
11	784	225	278	503	541	--	541	38	--
12	723	195	304	499	525	--	525	26	--
13	759	213	272	485	525	--	525	40	--
14	719	193	340	533	527	--	527	--	6
15	611	153	463	616	527	--	527	--	89
16	670	168	426	594	528	--	528	--	66
17	633	158	453	611	523	--	523	--	88
18	613	153	460	613	521	--	521	--	92
19	583	146	470	616	521	--	521	--	95
20	601	150	434	584	519	--	519	--	65
21	570	142	450	592	518	--	518	--	74
22	568	142	440	582	516	--	516	--	66
23	574	144	420	564	516	--	516	--	48
24	559	140	428	568	519	--	519	--	49
25	558	140	420	560	519	--	519	--	41
26	521	130	441	571	516	--	516	--	55
27	583	146	389	535	518	--	518	--	17
28	633	158	340	498	519	--	519	21	--
29	614	154	358	512	518	--	518	6	--
30	563	141	401	542	518	--	518	--	24
31	544	136	406	542	518	--	518	--	24
Total sec-ft.	23489	6911	10326	17237	16522	8	16530	250	957
Mean	758	223	333	556	533	--	533	8	31
Ac-ft.	46590	13710	20480	34190	32770	16	32790	500	1900

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA

AUGUST - 1948

Day	Natural flow of St.Mary R. at Boundary	Canada's share Available	St.Mary R. at Kimball Delivered	Diverted by Canada Used	Excess of share	or Deficit delivered
1	1446	890	875	462	--	15
2	1280	807	832	464	25	--
3	1174	754	780	464	26	--
4	1138	736	732	462	--	4
5	1039	686	693	464	7	--
6	969	651	649	466	--	2
7	938	636	615	462	--	21
8	864	599	580	462	--	19
9	872	603	563	450	--	40
10	786	560	542	474	--	18
11	784	559	521	518	--	38
12	723	528	502	500	--	26
13	759	546	506	504	--	40
14	719	526	532	510	6	--
15	611	458	547	506	89	--
16	670	502	568	516	66	--
17	633	475	563	512	88	--
18	613	460	552	516	92	--
19	583	437	532	508	95	--
20	601	451	516	488	65	--
21	570	428	502	472	74	--
22	568	426	492	460	66	--
23	574	430	478	450	48	--
24	559	419	468	452	49	--
25	558	418	459	441	41	--
26	521	391	446	414	55	--
27	583	437	454	431	17	--
28	633	475	454	435	--	21
29	614	460	454	433	--	6
30	563	422	446	424	24	--
31	544	408	432	414	24	--
Total sec-ft.	23489	16578	17285	14534	957	250
Mean	758	535	558	469	31	8
Ac-ft.	46590	32880	34280	28830	1900	500

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR

SEPTEMBER - 1948

Day	Inflow to Sherburne Reservoir: Recorded inflow: Swiftcurrent Creek	Un recorded inflow est'd	Total inflow	Outflow Swiftcurrent Creek at Sherburne	Stored in Reservoir Sec-ft. Gross	Released from Reservoir Sec-ft. Net
1	80	29	109	586	--	477
2	76	15	91	579	--	488
3	74	2	76	619	--	543
4	63	19	82	638	--	556
5	59	5	64	630	--	566
6	56	5	61	619	--	558
7	52	15	67	607	--	540
8	50	15	65	597	--	532
9	50	32	82	589	--	507
10	50	1	51	623	--	572
11	51	25	76	638	--	562
12	52	15	67	627	--	560
13	54	2	56	611	--	555
14	52	20	72	600	--	528
15	54	11	65	586	--	521
16	46	5	51	572	--	521
17	45	23	68	555	--	487
18	44	11	55	538	--	483
19	40	15	55	551	--	496
20	42	5	47	551	--	504
21	38	5	43	531	--	488
22	36	5	41	506	--	465
23	40	5	45	509	--	464
24	40	5	45	482	--	437
25	38	5	43	363	--	320
26	36	15	51	251	--	200
27	34	5	39	162	--	123
28	32	10	42	274	--	232
29	31	33	64	366	--	302
30	30	20	50	333	--	283
Total sec-ft.	1445	378	1823	15693	--	13870
Mean	48	13	61	523	--	462
Ac-ft.	2870	750	3620	31130	--	27510

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER

SEPTEMBER - 1948

Day	St. Mary River at Kimball	Diverted by U.S.B.R.	Stored by U.S.B.R. Gross	Total in sec-ft.	Stored water Released Net	Natural flow St.Mary River at Boundary
1	436	518	--	954	406	548
2	436	519	--	955	457	498
3	432	519	--	951	477	474
4	432	519	--	951	488	463
5	423	523	--	946	543	403
6	419	523	--	942	556	386
7	406	521	--	927	566	361
8	393	519	--	912	558	354
9	380	518	--	898	540	358
10	360	516	--	876	532	344
11	360	516	--	876	507	369
12	351	514	--	865	572	293
13	351	516	--	867	562	305
14	339	514	--	853	560	293
15	331	512	--	843	555	288
16	319	510	--	829	528	301
17	299	509	--	808	521	287
18	287	505	--	792	521	271
19	287	503	--	790	487	303
20	283	505	--	788	483	305
21	272	503	--	775	496	279
22	252	500	--	752	504	248
23	240	498	--	738	488	250
24	217	492	--	709	465	244
25	202	487	--	689	464	225
26	164	453	--	617	437	180
27	221	365	--	586	320	266
28	191	306	--	497	200	297
29	295	210	--	505	123	382
30	359	159	--	518	232	286
Total sec-ft.	9737	14272	--	24009	14148	9861
Mean	325	476	--	800	472	329
Ac-ft.	19310	28310	--	47620	28060	19560

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.

SEPTEMBER - 1948

Day	Natural flow St.Mary River	Available for use by U.S.A. U.S. share	Released storage Net	Total available	Used by U.S.A. Diverted	Stored Gross	Total Used	Excess of share used	Deficit used
1	548	137	406	543	518	--	518	--	25
2	498	124	457	581	519	--	519	--	62
3	474	118	477	595	519	--	519	--	76
4	463	116	488	604	519	--	519	--	85
5	403	101	543	644	523	--	523	--	121
6	386	96	556	652	523	--	523	--	129
7	361	90	566	656	521	--	521	--	135
8	354	88	558	646	519	--	519	--	127
9	358	90	540	630	518	--	518	--	112
10	344	86	532	618	516	--	516	--	102
11	369	92	507	599	516	--	516	--	83
12	293	73	572	645	514	--	514	--	131
13	305	76	562	638	516	--	516	--	122
14	293	73	560	633	514	--	514	--	119
15	288	72	555	627	512	--	512	--	115
16	301	75	528	603	510	--	510	--	93
17	287	72	521	593	509	--	509	--	84
18	271	68	521	589	505	--	505	--	84
19	303	76	487	563	503	--	503	--	60
20	305	76	483	559	505	--	505	--	54
21	279	70	496	566	503	--	503	--	63
22	248	62	504	566	500	--	500	--	66
23	250	62	488	550	498	--	498	--	52
24	244	61	465	526	492	--	492	--	34
25	225	56	464	520	487	--	487	--	33
26	180	45	437	482	453	--	453	--	29
27	266	66	320	386	365	--	365	--	21
28	297	74	200	274	306	--	306	32	--
29	382	96	123	219	210	--	210	--	9
30	286	72	232	304	159	--	159	--	145
Total sec-ft.	9861	2463	14148	16611	14272	--	14272	32	2371
Mean	329	82	472	554	476	--	476	1	79
Ac-ft.	19560	4890	28060	32950	28310	--	28310	60	4700

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA

SEPTEMBER - 1948

Day	Natural flow of St.Mary R. at Boundary	Canada's share Available	St.Mary R. at Kimball Delivered	Diverted by Canada Used	Excess of share	or Deficit delivered
1	548	411	436	416	25	--
2	498	374	436	418	62	--
3	474	356	432	412	76	--
4	463	347	432	418	85	--
5	403	302	423	416	121	--
6	386	290	419	408	129	--
7	361	271	406	397	135	--
8	354	266	393	389	127	--
9	358	268	380	374	112	--
10	344	258	360	358	102	--
11	369	277	360	353	83	--
12	293	220	351	349	131	--
13	305	229	351	345	122	--
14	293	220	339	338	119	--
15	288	216	331	322	115	--
16	301	226	319	308	93	--
17	287	215	299	283	84	--
18	271	203	287	263	84	--
19	303	227	287	250	60	--
20	305	229	283	241	54	--
21	279	209	272	229	63	--
22	248	186	252	214	66	--
23	250	188	240	201	52	--
24	244	183	217	183	34	--
25	225	169	202	178	33	--
26	180	135	164	157	29	--
27	266	200	221	197	21	--
28	297	223	191	169	--	32
29	382	286	295	260	9	--
30	286	214	359	319	145	--
Total sec-ft.	9861	7398	9737	9165	2371	32
Mean	329	247	325	306	79	1
Ac-ft.	19560	14670	19310	18180	4700	60

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR

OCTOBER - 1948

Day	Inflow to Sherburne Reservoir: Recorded inflow: Swiftcurrent Creek	Un-recorded inflow est'd	Total inflow	Outflow Swiftcurrent Creek at Sherburne	Stored in Reservoir Sec-ft. Gross	Released from Reservoir Sec-ft. Net
1	28	20	48	247	--	199
2	27	30	57	165	--	108
3	25	40	65	116	--	51
4	28	41	69	117	--	48
5	31	29	60	107	--	47
6	32	9	41	88	--	47
7	42	30	72	87	--	15
8	49	30	79	64	15	--
9	55	30	85	66	19	--
10	54	30	84	67	17	--
11	52	20	72	64	8	--
12	50	20	70	67	3	--
13	49	20	69	64	5	--
14	46	20	66	26	40	--
15	46	10	56	1	55	--
16	45	9	54	1	53	--
17	41	17	58	1	57	--
18	38	23	61	0	61	--
19	36	21	57	0	57	--
20	34	26	60	0	60	--
21	33	21	54	0	54	--
22	31	27	58	0	58	--
23	31	27	58	0	58	--
24	25	26	51	0	51	--
25	27	4	31	0	31	--
26	25	9	34	0	34	--
27	25	9	34	0	34	--
28	23	11	34	0	34	--
29	23	8	31	0	31	--
30	21	9	30	0	30	--
31	21	9	30	0	30	--
Total sec-ft.	1093	635	1728	1348	895	515
Mean	35	20	55	43	29	17
Ac-ft.	2170	1260	3430	2670	1780	1020

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER

OCTOBER - 1948

Day	St. Mary River at Kimball	Diverted by U.S.B.R.	Stored by U.S.B.R. Gross	Total in sec-ft.	Stored water released Net	Natural flow St.Mary River at Boundary
1	516	5	--	521	302	219
2	487	--	--	487	283	204
3	446	--	--	446	199	247
4	414	--	--	414	108	306
5	393	--	--	393	51	342
6	368	--	--	368	48	320
7	347	--	--	347	47	300
8	331	--	--	331	47	284
9	319	--	--	319	15	304
10	307	--	15	322	--	322
11	299	--	19	318	--	318
12	287	--	17	304	--	304
13	283	--	8	291	--	291
14	283	--	3	286	--	286
15	272	--	5	277	--	277
16	260	--	40	300	--	300
17	256	--	55	311	--	311
18	240	--	53	293	--	293
19	233	--	57	290	--	290
20	225	--	61	286	--	286
21	217	--	57	274	--	274
22	206	--	60	266	--	266
23	194	--	54	248	--	248
24	187	--	58	245	--	245
25	187	--	58	245	--	245
26	176	--	51	227	--	227
27	168	--	31	199	--	199
28	153	--	34	187	--	187
29	153	--	34	187	--	187
30	157	--	34	191	--	191
31	153	--	31	184	--	184
Total sec-ft.	8517	5	835	9357	1100	8257
Mean	275	--	27	302	35	266
Ac-ft.	16890	10	1660	18560	2180	16380

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.

OCTOBER - 1948

Day	Natural flow St.Mary River	Available for use by U.S.A. U.S. share	Released storage Net	Total available	Used by U.S.A. Diverted	Stored Gross	Total Used	Excess of share used	Deficit
1	219	55	302	357	5	--	5	--	352
2	204	51	283	334	--	--	--	--	334
3	247	62	199	261	--	--	--	--	261
4	306	76	108	184	--	--	--	--	184
5	342	86	51	137	--	--	--	--	137
6	320	80	48	128	--	--	--	--	128
7	300	75	47	122	--	--	--	--	122
8	284	71	47	118	--	--	--	--	118
9	304	76	15	91	--	--	--	--	91
10	322	80	--	80	--	15	15	--	65
11	318	80	--	80	--	19	19	--	61
12	304	76	--	76	--	17	17	--	59
13	291	73	--	73	--	8	8	--	65
14	286	72	--	72	--	3	3	--	69
15	277	69	--	69	--	5	5	--	64
16	300	75	--	75	--	40	40	--	35
17	311	78	--	78	--	55	55	--	23
18	293	73	--	73	--	53	53	--	20
19	290	72	--	72	--	57	57	--	15
20	286	72	--	72	--	61	61	--	11
21	274	68	--	68	--	57	57	--	11
22	266	66	--	66	--	60	60	--	6
23	248	62	--	62	--	54	54	--	8
24	245	61	--	61	--	58	58	--	3
25	245	61	--	61	--	58	58	--	3
26	227	57	--	57	--	51	51	--	6
27	199	50	--	50	--	31	31	--	19
28	187	47	--	47	--	34	34	--	13
29	187	47	--	47	--	34	34	--	13
30	191	48	--	48	--	34	34	--	14
31	184	46	--	46	--	31	31	--	15
Total sec-ft.	8257	2065	1100	3165	5	835	840	--	2325
Mean	266	67	35	102	--	27	27	--	75
Ac-ft.	16380	4100	2180	6280	10	1660	1670	--	4610

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA

OCTOBER - 1948

Day	Natural flow of St.Mary R. at Boundary	Canada's share Available	St.Mary R. at Kimball Delivered	Diverted by Canada Used	Excess or Deficit of share	Excess or Deficit delivered
1	219	164	516	512	352	--
2	204	153	487	478	334	--
3	247	185	446	439	261	--
4	306	230	414	397	184	--
5	342	256	393	374	137	--
6	320	240	368	347	128	--
7	300	225	347	322	122	--
8	284	213	331	302	118	--
9	304	228	319	282	91	--
10	322	242	307	270	65	--
11	318	238	299	260	61	--
12	304	228	287	252	59	--
13	291	218	283	248	65	--
14	286	214	283	248	69	--
15	277	208	272	235	64	--
16	300	225	260	224	35	--
17	311	233	256	215	23	--
18	293	220	240	206	20	--
19	290	218	233	198	15	--
20	286	214	225	186	11	--
21	274	206	217	182	11	--
22	266	200	206	172	6	--
23	248	186	194	165	8	--
24	245	184	187	158	3	--
25	245	184	187	156	3	--
26	227	170	176	152	6	--
27	199	149	168	99	19	--
28	187	140	153	69	13	--
29	187	140	153	51	13	--
30	191	143	157	--	14	--
31	184	138	153	--	15	--
Total sec-ft.	8257	6192	8517	7199	2325	--
Mean	266	200	275 (1-29)	248	75	--
Ac-ft.	16380	12280	16890	14280	4610	--

DIVISION OF ST. MARY RIVER
CANADA
1948

Water available in acre-feet

Month	St.Mary R. at Kimball	Rolph Creek at Kimball	Lee Creek at Cardston	Pothole Creek at Magrath	Combined flow
April	35130	4200	12050	7970	59350
May	165600	2390	30990	2970	201950
June	303400	7500	43490	5170	359560
July	64040	1050	8330	146	73566
August	34280	579	2540	--	37399
September	19310	235	885	--	20430
October	16890	202	726	--	17818
Total	638650	16156	99011	16256	770073 [a]

DISPOSITION

Month	Canada's share	Diverted by Canada	Unused by Canada	Gain or loss in Canal	Wasted from Canal	Applied to Land
April	25000	--	25000	9900	9900	--
May	101360	6570	94790	2560	6170	2960
June	173190	13470	159720	2980	8840	7610
July	58700	35640	23060	- 2100	3060	30480
August	32880	28830	4050	- 188	1770	26872
September	14670	18180	- 3510	- 1051	613	16516
October	12280	14280	- 2000	3257	600	9423
Total	418080	116970 [b]	301110 [c]	7844 [d]	30953 [e]	93861 [f]

a - Computed. b - Diverted by A.R.&I. Co. at Kimball.
c - Difference between Canada's share and quantity of share diverted.
d - Gain or loss in canal between Kimball and Magrath.
e - Wasted in Pothole Creek.
f - Flow in canal at Magrath plus diversion by laterals.

DIVISION OF ST. MARY RIVER
UNITED STATES
1948

Water available in acre-feet.

Month	St. Mary River						Total flow Milk River Eastern Crossing
	U. S. Share	Sherburne Res. Stored	Sherburne Res. Released	Total Available for Diversion	Diverted	Unused	
April	11940	2890	1080	10130	--	10130	66510
May	80840	16970	7560	71430	7170	64260	43460
June	153300	10600	4220	146920	16710	130210	76400
July	38200	7840	5080	35440	30100	5340	44220
August	13710	16	20480	34174	32770	1404	41160
September	4890	---	28060	32950	28310	4640	31860
October	4100	1660	2180	4620	10	4610	9320
Total	306980	39976	68660	335664	115070	220594	312930

Storage in Sherburne Lake Reservoir on March 31, 35,849 acre-feet.
on October 31, 5,531 acre-feet.
Storage in Fresno Reservoir on March 31, 77,417 acre-feet.
on October 31, 74,863 acre-feet.
The water stored in Sherburne Lake Reservoir includes the amount lost by evaporation.

DIVERSIONS FROM MILK RIVER
UNITED STATES
1948

Quantities in acre-feet

Month	Fort Belknap Canal	Paradise Canal	Harlem Canal	Harlem No.2	Agency Canal	Dodson North	Dodson South	Vandalia Canal	Total
April	4120	1190	397	301	1390	762	5860	---	14020
May	10410	4700	2940	1170	6150	3310	14700	3690	47070
June	7200	3890	2380	490	3460	2890	14230	1350	35890
July	13990	6800	2940	641	3010	5370	13880	6830	53460
August	11700	7160	3410	1060	2390	4650	11700	5280	47350
September	9720	4230	1740	904	1010	3840	7540	4760	33740
October	6150	595	2460	1090	1700	2440	9220	4360	28020
November	397	---	1350	151	595	119	---	1190	3800
Total	63690	28560	17620	5810	19700	23380	77130	27460	263350

Storage in Nelson Reservoir on March 31, 32,159 acre-feet.
on October 31, 40,279 acre-feet.

DETERMINATION OF NATURAL FLOW OF FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY 1948

Water used by Canada at Cypress Lake and East End.
Quantities in second-feet.

Date at Intern'l Boundary	Used at Cypress: Stored	Used at Cypress: Released	Used at East End: Stored	Used at East End: Released	Used at East End: Diverted	Used at East End: Return flow	Total used
March							
1 - 10	0.0	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	0.0
21 - 31	0.0	0.0	4.0	0.0	0.0	0.0	4.0
April							
1 - 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 - 20	11.0	0.0	11.0	0.0	0.0	0.0	22.0
21 - 30	943.0	0.0	566.0	0.0	0.0	0.0	1509.0
May							
1 - 10	279.7	1.0	367.0	0.0	0.0	0.0	645.7
11 - 20	45.4	10.0	88.0	0.0	44.2	13.3	154.3
21 - 31	33.1	15.0	86.0	0.0	57.6	17.3	144.4
June							
1 - 10	2.7	21.8	0.0	136.0	241.0	72.3	13.6
11 - 20	1.5	50.9	0.0	22.0	270.3	81.1	117.8
21 - 30	2.3	28.9	0.0	120.0	257.5	77.2	33.7
July							
1 - 10	0.5	13.3	0.0	213.0	326.6	98.0	2.8
11 - 20	0.0	52.6	0.0	141.0	337.1	101.1	42.4
21 - 31	0.0	93.7	72.0	0.0	292.9	87.9	183.3
August							
1 - 10	0.0	2.5	0.0	112.0	211.1	63.3	33.3
11 - 20	0.0	0.0	0.0	115.0	218.1	65.4	37.7
21 - 31	0.0	0.0	0.0	80.0	99.9	30.0	- 10.1
September							
1 - 10	0.0	0.0	0.0	82.0	55.3	16.6	- 43.3
11 - 20	0.0	0.0	13.0	0.0	0.0	0.0	13.0
21 - 30	0.0	0.0	8.0	0.0	0.0	0.0	8.0
October							
1 - 10	0.0	5.3	21.0	0.0	0.0	0.0	15.7
11 - 20	0.0	9.1	0.0	0.0	0.0	0.0	- 9.1
21 - 31	0.0	0.0	50.0	0.0	0.0	0.0	50.0
Total sec-ft.	1319.2	304.1	1286.0	1021.0	2411.6	723.5	2968.2
Mean	5.4	1.2	5.2	4.2	9.8	3.0	12.1
Ac-ft.	2617	603	2551	2025	4783	1435	5888

DETERMINATION OF NATURAL FLOW OF FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY 1948

Water used by Canada at Val Marie
Quantities in second-feet.

Upper Val Marie			Lower Val Marie				Total used
Stored	Released	Diverted	Stored	Released	Diverted	Return flow	
March							
9.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0
142.0	0.0	0.0	36.0	0.0	0.0	0.0	178.0
179.0	0.0	0.0	815.0	0.0	0.0	0.0	994.0
April							
0.0	42.0	0.0	976.0	0.0	0.0	0.0	934.0
169.0	0.0	0.0	1055.0	0.0	0.0	0.0	1224.0
569.0	0.0	0.0	117.0	0.0	0.0	0.0	686.0
May							
28.0	0.0	0.0	391.0	0.0	0.0	0.0	419.0
0.0	28.0	0.0	411.0	0.0	0.0	0.0	383.0
0.0	17.0	2.8	0.0	128.0	290.2	87.9	60.1
June							
27.0	0.0	54.8	0.0	232.0	702.8	227.3	325.3
11.0	0.0	69.7	0.0	286.0	378.7	134.5	38.9
2.0	0.0	62.9	12.0	0.0	99.7	48.8	127.8
July							
0.0	94.0	42.5	0.0	38.0	86.7	38.7	- 41.5
0.0	91.0	25.1	0.0	262.0	392.3	125.3	- 60.9
0.0	24.0	13.7	0.0	342.0	340.3	106.2	- 118.2
August							
0.0	13.0	0.0	0.0	399.0	392.3	117.7	- 137.4
0.0	16.0	23.0	0.0	119.0	267.1	87.1	68.0
0.0	24.0	23.5	0.0	250.0	183.6	62.1	- 129.0
September							
0.0	15.0	0.2	0.0	159.0	128.7	38.7	- 83.8
0.0	17.0	0.0	0.0	174.0	99.7	29.9	- 121.2
0.0	36.0	0.0	0.0	115.0	84.8	25.4	- 91.6
October							
0.0	52.0	0.0	0.0	87.0	55.1	16.5	- 100.4
0.0	2.0	0.0	0.0	34.0	3.2	1.0	- 33.8
0.0	0.0	0.0	0.0	11.0	0.0	0.0	- 11.0
1136.0	471.0	318.2	3813.0	2636.0	3505.2	1147.1	4518.3
4.6	1.9	1.3	15.6	10.8	14.3	4.7	18.4
2253	934	631	7563	5228	6952	2275	8962

DETERMINATION OF NATURAL FLOW OF FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY 1948

Quantities in second-feet.

Date at Intern'l Boundary	Used by Canada: Cypress Lake and East End	Used by Canada: Val Marie	Used by Canada: Total Used	Frenchman River: Flow Boundary	Frenchman River: Natural flow	United States: Share	United States: Received +or -
March							
1 - 10	0.0	9.0	9.0	29.0	38.0	19.0	10.0
11 - 20	0.0	178.0	178.0	176.0	354.0	177.0	- 1.0
21 - 31	4.0	994.0	998.0	1420.0	2418.0	1209.0	211.0
April							
1 - 10	0.0	934.0	934.0	1117.0	2051.0	1025.5	91.5
11 - 20	22.0	1224.0	1246.0	2208.0	3454.0	1727.0	481.0
21 - 30	1509.0	686.0	2195.0	3290.0	5485.0	2742.5	547.5
May							
1 - 10	645.7	419.0	1064.7	1483.0	2547.7	1273.8	209.2
11 - 20	154.3	383.0	537.3	544.9	1082.2	541.1	3.8
21 - 31	144.4	60.1	204.5	510.7	715.2	357.6	153.1
June							
1 - 10	13.6	325.3	338.9	208.5	547.4	273.7	- 65.2
11 - 20	117.8	38.9	156.7	209.5	366.2	183.1	26.4
21 - 30	33.7	127.8	161.5	155.5	317.0	158.5	- 3.0
July							
1 - 10	2.8	- 41.5	- 38.7	62.0	23.0	11.6	50.4
11 - 20	42.4	- 60.9	- 18.5	217.9	199.4	99.7	118.2
21 - 31	183.3	- 118.2	65.1	196.8	261.9	131.0	65.8
August							
1 - 10	33.3	- 137.4	-104.1	433.4	329.3	164.6	268.8
11 - 20	37.7	68.0	105.7	233.0	338.7	169.4	63.6
21 - 31	- 10.1	- 129.0	-139.1	108.7	- 30.4	- 15.2	123.9
September							
1 - 10	- 43.3	- 83.8	-127.1	49.1	- 78.0	- 39.0	88.1
11 - 20	13.0	- 121.2	-108.2	13.8	- 94.4	- 47.2	61.0
21 - 30	8.0	- 91.6	- 83.6	2.8	- 80.8	- 40.4	43.2
October							
1 - 10	15.7	- 100.4	- 84.7	0.0	- 84.7	- 42.4	42.4
11 - 20	- 9.1	- 33.8	- 42.9	0.0	- 42.9	- 21.4	21.4
21 - 31	50.0	- 11.0	39.0	0.0	39.0	19.5	- 19.5
Total sec-ft.	2968.2	4518.3	7486.5	12669.6	20156.1	10078.0	2591.6
Mean	12.1	18.4	30.6	51.7	82.3	41.1	10.6
Ac-ft.	5888	8962	14849	25130	39979	19989	5140

Table 5

MEASURED DIVERSIONS FROM THE NORTHERN TRIBUTARIES

OF MILK RIVER IN THE UNITED STATES

1948

(Quantities in acre-feet)

Irrigator	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Total
				Lodge Creek					
North Chinook Canal	0	3,730	2,520	226	0	0	0	0	6,476
				Battle Creek					
Matheson Canal	0	8	293	120	46	0	27	[a]39	533
				Frenchman River					
Frenchman Canal	89	1,730	1,270	[a]1,520	[a]957	[a]1,470	[a]184	0	7,220
Total	89	5,468	4,083	1,866	1,003	1,470	211	39	14,229

[a] Provisional or partly estimated record.