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Report to

THE INTERNATIONAL JOINT COMMISSION

on

THE DIVISION AND USE MADE OF THE WATERS OF

ST. MARY AND MILK RIVERS

by

N. C. GROVER
representing the United States

and

J. T. JOHNSTON
representing Canada

1937

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

Gentlemen:-

In compliance with the Provisions of Clause 10 of your Order of the 4th of 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 of 1937.

Respectfully submitted,

Accredited Officer of the United States.

Accredited Officer of His Majesty.

April 5th, 1938.

It is with deepest regret that we record the sudden death, in Helena, Montana, on February 9, 1938, of Mr. William A. Lamb, District Engineer, United States Geological Survey.

Mr. Lamb has been closely associated with the flows of the waters in the St. Mary and Milk river basins since 1910 as District Engineer in charge of surface waters investigations in Montana and since 1928 as field engineer for the accredited officer for the United States in the matter of the division of the waters of St. Mary and Milk rivers.

Mr. Lamb's intimate knowledge of the international problems involved, his sterling character and his ever ready and able co-operation will be greatly missed.

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 1937, by the same engineers as in previous years.

Mr. N. C. Grover, Chief Hydraulic Engineer, United States Geological Survey, as accredited officer for the United States was represented in the field by Mr. W. A. Lamb, District Engineer, Helena, Montana. Mr. J. T. Johnston, Controller, Dominion Water and Power Bureau, as accredited officer of His Majesty, was represented by Mr. S. G. Dawson, Ottawa, Canada.

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 Montana by engineers of the United States Geological Survey under the personal supervision of Mr. Lamb; while those from streams and ditches in Canada were collected by Mr. W. T. McFarlane, under the direction of Mr. O. H. Hoover, Engineer in charge, Dominion Water and Power Bureau, Calgary, Alberta. The joint international gauging stations were visited frequently by representatives of both countries.

When the natural flow of St.Mary River fell below the combined capacity of the two canals diverting therefrom, and when the demand for water in each country was equivalent to or in excess of its share of the natural flow of St.Mary River, which, this season occurred towards the middle of July and continued until the closing of the season, the field engineers kept 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 therefore discovered and adjustments made to allow each country its proper share as set forth in the Order of the Commission dated October 4th, 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, Dominion Water and Power Bureau.

Division of Water

The United States St.Mary canal was opened at the headgates on April 18th and, except for 16 days in June when it was closed for repairs; was kept in continuous operation until October 7th, water being delivered to the North Branch Milk River on May 3rd. As the loss in the

canal between the intake and the crossing of the St.Mary River, which this year was about 14.7% of the water diverted at the headgates, is assumed to return directly to the river and eventually become available to Canada, the discharge of 141,600 acre-feet passing in the canal at the St.Mary River crossing is considered as the actual quantity diverted from the St.Mary River by the United States. A slight increase to this quantity was delivered to the North Branch Milk River and made available for irrigation in Montana. The increase between the St.Mary River crossing and the Hudson Bay Divide, the end of the canal, was due to local inflow.

On November 1st, 1936, a total of 229 acre-feet of water remained in storage in Sherburne reservoir. Approximately 2,000 acre-feet of water was in storage on April 1st, 1937. The maximum storage reached during the season was 61,300 acre-feet on July 7th. On October 31st, 2,300 acre-feet of water remained in storage.

As only a small quantity of water was diverted in Canada from Milk River, the natural flow of the river is considered as being delivered to the United States at Eastern Crossing. The total diversion for irrigation from the Milk River in Montana was 212,172 acre-feet.

The total recorded flow delivered to the United States at the International Boundary from the Northern

tributaries of Milk River during the year 1937 was 33,800 acre-feet, which is 41.5% of the flow recorded in 1936 and about 20% of the average for the years of record.

For the first time on record, it was necessary to apportion the waters of the Frenchman River at the International Boundary. Canada stored or held back 5,700 acre-feet of the natural flow of Frenchman River for irrigation on lands near East End and Val Marie, Saskatchewan, while 5,120 acre-feet of the natural flow were delivered to Montana. The natural flow of Frenchman River, during 1937, was the lowest on record and only 14% of the mean for the last 22 years.

The Canadian Pacific Railway canal at Kimball, Alberta, diverted 191,300 acre-feet from the St.Mary River during the period of operation from the 15th of April to the fourth of October, 170,000 acre-feet being used to irrigate lands in Southern Alberta.

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.

This year little information on the total diversion from these tributaries is available, however, the diversions reported in Canada are shown in table 3 and were; from Lodge Creek, 335 acre-feet; from Battle Creek, 270 acre-feet; from Frenchman River, 6,000 acre-feet. There were no diversions from the other tributaries.

Any question as to the proper share of the St.Mary River being delivered to either country was decided in the following manner. Record of the daily flow was kept of Swiftcurrent Creek at Many Glacier and of Canyon Creek near Many Glacier, but the flow of the other creeks entering Swiftcurrent Creek above the Sherburne dam were estimated. The total of these creeks gave the inflow into Sherburne Reservoir. The losses by evaporation in the reservoir were considered when estimating the flow from the unrecorded small streams. 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 of the United States' St.Mary canal at St.Mary Crossing was kept to find the water being diverted by the United States and a record of the daily flow of 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 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 stored 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 Frenchman River.

Water Supply

On the foothills and in the mountainous areas forming the headwaters of the St.Mary and Milk Rivers, the precipitation during 1937 was above normal, while on the prairies tributary to the Milk River, it was considerably below normal.

In the mountainous areas tributary to the St.Mary River basin, as shown by the sixteenth annual international survey of the snow conditions on the headwaters of Swiftcurrent Creek, an area considered typical of the headwaters of St.Mary River, the snow cover was the mean of the fifteen years of record while the water content of this snow cover was slightly in excess of the mean. The run-off of 73,000 acre-feet from the area surveyed, during May, June and July was about 109% of the average for the fifteen year period.

The natural flow of 500,70C acre-feet of St.Mary River at the boundary during the irrigation season of 1937, from the first of April to the end of October, was 84% of the average for the 34 years of record.

The run-off from the prairies, as indicated by the Northern tributaries of Milk River, was 20% of the average for the years of record.

The twenty-three international gauging stations previously used in the determination of the daily natural flow of the streams in the St.Mary and Milk River basins were maintained and operated under the joint supervision of the field engineers. Several new stations were established by Canada on the Frenchman River.

An Appendix to this report gives the results of current meter measurements, the daily gauge heights and the discharge at all the gauging stations operated in the two drainage basins during 1937.

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 the St.Mary River during the irrigation season of 1937, the water available for use and used by United States and Canada. In this table there are four pages for each month from April to October, inclusive.

Page 1, (water stored or released from Sherburne reservoir) shows the daily inflow into and outflow from Sherburne 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 flows in Swiftcurrent and Canyon Creeks and with the use of the water levels of Sherburne reservoir to give the gain or loss in storage, after direct application of evaporation and seepage losses has been made. This estimate is put in the column headed "unrecorded inflow".

Page 2, (determination of the 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 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 reservoir to influence the flow at the 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 4th, 1921, the water diverted and stored and the excess or deficit in the quantity used over the quantity 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 the 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 applied to the land, the quantity diverted from St.Mary River, the loss or waste from the 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 at East End and the loss or gain in the river between East End and 50 Mile, page 2 shows the quantity used by Canada at Val Marie and the loss or gain between 50 Mile and Val Marie, page 3 shows the gain or loss between Val Marie

and the International Boundary and the Natural flow of Frenchman River at the Boundary.

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

Table 5 gives the diversions from the Northern tributaries of Milk River in the United States.

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR
APRIL - 1937

Day	Inflow to Sherburne Reservoir: Recorded inflow: Swift-current Creek	Canyon 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	--
2						14	
3						14	
4						14	
5						14	
6						28	
7						30	
8						30	
9						30	
10						30	
11						30	
12						60	
13						89	
14						94	
15						94	
16						125	
17						131	
18	69					131	
19	67					133	
20	61					68	
21	58					68	
22	63					68	
23	87					204	
24	124					137	
25	159					68	
26	188					70	
27	224					106	
28	256					249	
29	257					18	
30	258					--	18
Total sec-ft.	1871	--	--	--	--	2175	18
Mean	144					72	0.6
Ac-ft.	3710	--	--	--	--	4310	36

no records available

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
APRIL - 1937

Day	St.Mary river at: Kimball	Diverted by U.S.B.R.	Stored by U.S.B.R.	Total in: sec-ft.	Stored Water Released	Natural Flow St.Mary River
1	113	--	8	121	--	121
2	120	--	12	132		132
3	128	--	28	156		156
4	133	--	14	147		147
5	144	--	14	158		158
6	152	--	14	166		166
7	161	--	14	175		175
8	170	--	28	198		198
9	173	--	30	203		203
10	176	--	30	206		206
11	182	--	30	212		212
12	182	--	30	212		212
13	185	--	30	215		215
14	189	--	60	249		249
15	190	--	89	279		279
16	190	--	94	284		284
17	197	--	94	291		291
18	189	--	125	314		314
19	186	--	131	317		317
20	195	--	131	326		326
21	214	--	133	347		347
22	206	--	68	274		274
23	188	--	68	256		256
24	237	--	68	305		305
25	222	--	204	426		426
26	229	--	137	366		366
27	252	--	68	320		320
28	269	--	70	339		339
29	283	--	106	389		389
30	286	92	249	627	--	627
Total sec-ft.	5741	92	2177	8010	--	8010
Mean	191	3.1	73	267	--	267
Ac-ft.	11390	182	4320	15890	--	15890

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.
APRIL - 1937

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	121	30	--	30	--	8	8	--	22
2	132	33		33	--	12	12	--	21
3	156	39		39	--	28	28	--	11
4	147	37		37	--	14	14	--	23
5	158	40		40	--	14	14	--	26
6	166	42		42	--	14	14	--	28
7	175	44		44	--	14	14	--	30
8	198	50		50	--	28	28	--	22
9	203	51		51	--	30	30	--	21
10	206	51		51	--	30	30	--	21
11	212	53		53	--	30	30	--	23
12	212	53		53	--	30	30	--	23
13	215	54		54	--	30	30	--	24
14	249	62		62	--	60	60	--	2
15	279	70		70	--	89	89	19	--
16	284	71		71	--	94	94	23	--
17	291	73		73	--	94	94	21	--
18	314	78		78	--	125	125	47	--
19	317	79		79	--	131	131	52	--
20	326	82		82	--	131	131	49	--
21	347	87		87	--	133	133	46	--
22	274	68		68	--	68	68	--	--
23	256	64		64	--	68	68	4	--
24	305	76		76	--	68	68	--	8
25	426	106		106	--	204	204	98	--
26	366	92		92	--	137	137	45	--
27	320	80		80	--	68	68	--	12
28	339	85		85	--	70	70	--	15
29	389	97		97	--	106	106	9	--
30	627	156	--	156	92	249	341	185	--
Total sec-ft.	8010	2003	--	2003	92	2177	2269	598	332
Mean	267	~~67~~ 66.8	--	67	3.1	73	76	19.9	11.1
Ac-ft.	15890	3975	--	3975	182	4320	4502	1184	660

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA
APRIL - 1937

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	121	91	113	---	22	--
2	132	99	120	---	21	--
3	156	117	128	---	11	--
4	147	110	133	---	23	--
5	158	118	144	---	26	--
6	166	124	152	---	28	--
7	175	131	161	---	30	--
8	198	148	170	---	22	--
9	203	152	173	---	21	--
10	206	155	176	---	21	--
11	212	159	182	---	23	--
12	212	159	182	---	23	--
13	215	161	185	---	24	--
14	249	187	189	---	2	--
15	279	209	190	164	--	19
16	284	213	190	143	--	23
17	291	218	197	149	--	21
18	314	236	189	148	--	47
19	317	238	186	138	--	52
20	326	244	195	152	--	49
21	347	260	214	173	--	46
22	274	206	206	166	--	--
23	256	192	188	135	--	4
24	305	229	237	195	8	--
25	426	320	222	185	--	98
26	366	274	229	193	--	45
27	320	240	252	222	12	--
28	339	254	269	245	15	--
29	389	292	283	269	--	9
30	627	471	286	270	--	185
Total sec.ft.	8010	6007	5741	2947 (15-30)	332	598
Mean	267	200	191	184	11.1	19.9
Ac-ft.	15890	11915	11390	5850	660	1184

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR
MAY - 1937

Day	Inflow to Sherburne Reservoir: Recorded inflow: Swift-current Creek	Canyon 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	258						72	--
2	259			40	299	24	275	--
3	301			50	351	28	323	--
4	374			60	434	422	12	--
5	445			65	510	447	63	--
6	403			70	473	476	--	3
7	352			72	424	482	--	58
8	288			95	383	479	--	96
9	253			125	378	476	--	98
10	259			113	372	450	--	78
11	237			126	363	416	--	53
12	221			123	344	368	--	24
13	256			173	429	363	66	--
14	360			106	466	366	100	--
15	449			260	709	376	333	--
16	403			166	569	382	185	--
17	414			61	475	392	83	--
18	453			359	812	325	487	--
19	482			198	680	228	452	--
20	469			241	710	215	495	--
21	388			155	543	99	444	--
22	363			151	514	79	435	--
23	410			87	497	54	443	--
24	377			98	475	52	423	--
25	366			151	517	54	463	--
26	528			175	703	44	659	--
27	696			147	843	39	804	--
28	654			28	682	39	643	--
29	586			153	742	38	704	--
30	426			75	501	39	462	--
31	356			139	495	40	455	--
Total sec-ft.	12086	--		3865 (2-31)	15951 (2-31)	7294 (2-31)	8881	428 (410)
Mean	390	--		129	532	243	287	13.8
Ac-ft.	23970	--		7664	31638	14470	17647	849

no records available

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
MAY - 1937

Day	St.Mary river at Kimball	Diverted by U.S.B.R.	Stored by U.S.B.R.	Total in sec-ft.	Stored Water Released	Natural Flow St.Mary River
1	364	95	18	477	--	477
2	473	96	--	569	18	551
3	606	100	72	778	--	778
4	659	182	275	1116	--	1116
5	864	206	323	1393	--	1393
6	941	290	12	1243	--	1243
7	799	555	63	1417	--	1417
8	872	580	--	1452	3	1449
9	932	584	--	1516	58	1458
10	976	590	--	1566	96	1470
11	976	590	--	1566	98	1468
12	924	588	--	1512	78	1434
13	881	588	--	1469	53	1416
14	924	586	--	1510	24	1486
15	1010	588	66	1664	--	1664
16	1080	595	100	1775	--	1775
17	1110	616	333	2059	--	2059
18	1150	644	185	1979	--	1979
19	1170	650	83	1903	--	1903
20	1210	662	487	2359	--	2359
21	1220	664	452	2336	--	2336
22	1180	664	495	2339	--	2339
23	1170	662	444	2276	--	2276
24	1120	662	435	2217	--	2217
25	1080	658	443	2181	--	2181
26	1090	660	423	2173	--	2173
27	1150	670	463	2283	--	2283
28	1230	674	659	2563	--	2563
29	1380	684	804	2868	--	2868
30	1450	684	643	2777	--	2777
31	1710	374	704	2788	--	2788
Total sec-ft.	31701	16441	7982	56124	428	55696
Mean	1020	530	257	1810	13.8	1796
Ac-ft.	62880	32610	15830	111320	849	110470

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.
MAY - 1937

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	477	119	--	119	95	18	113	--	6
2	551	138	18	156	96	--	96	--	60
3	778	222	--	222	100	72	172	--	50
4	1116	391	--	391	182	275	457	66	--
5	1393	530	--	530	206	323	529	--	1
6	1243	455	--	455	290	12	302	--	153
7	1417	542	--	542	555	63	618	76	--
8	1449	558	3	561	580	--	580	19	--
9	1458	562	58	620	584	--	584	--	36
10	1470	568	96	664	590	--	590	--	74
11	1468	567	98	665	590	--	590	--	75
12	1434	550	78	628	588	--	588	--	40
13	1416	541	53	594	588	--	588	--	6
14	1486	576	24	600	586	--	586	--	14
15	1664	665	--	665	588	66	654	--	11
16	1775	721	--	721	595	100	695	--	26
17	2059	863	--	863	616	333	949	86	--
18	1979	823	--	823	644	185	829	6	--
19	1903	785	--	785	650	83	733	--	52
20	2359	1013	--	1013	662	487	1149	136	--
21	2336	1001	--	1001	664	452	1116	115	--
22	2339	1003	--	1003	664	495	1159	156	--
23	2276	971	--	971	662	444	1106	135	--
24	2217	942	--	942	662	435	1097	155	--
25	2181	924	--	924	658	443	1101	177	--
26	2173	920	--	920	660	423	1083	163	--
27	2283	975	--	975	670	463	1133	158	--
28	2563	1115	--	1115	674	659	1333	218	--
29	2868	1267	--	1267	684	804	1488	221	--
30	2777	1222	--	1222	684	643	1327	105	--
31	2788	1227	--	1227	374	704	1078	--	149
Total Sec-ft.	55796	22756	428	23184	16441	7982	24423	1992	753
Mean	1796	734	13.8	748	530	257	787	64	24.3
Ac-ft.	110470	45130	849	45980	32610	15830	48440	3950	1490

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA
MAY - 1937

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	477	358	364	358	6	--
2	551	413	473	469	60	--
3	778	556	606	593	50	--
4	1116	725	659	617	--	66
5	1393	863	864	629	1	--
6	1243	788	941	617	153	--
7	1417	875	799	596	--	76
8	1449	891	872	702	--	19
9	1458	896	932	689	36	--
10	1470	902	976	754	74	--
11	1468	901	976	772	75	--
12	1434	884	924	772	40	--
13	1416	875	881	799	6	--
14	1486	910	924	839	14	--
15	1664	999	1010	877	11	--
16	1775	1054	1080	896	26	--
17	2059	1196	1110	888	--	86
18	1979	1156	1150	912	--	6
19	1903	1118	1170	934	52	--
20	2359	1346	1210	948	--	136
21	2336	1335	1220	968	--	115
22	2339	1336	1180	1000	--	156
23	2276	1305	1170	951	--	135
24	2217	1275	1120	869	--	155
25	2181	1257	1080	869	--	177
26	2173	1253	1090	891	--	163
27	2283	1308	1150	943	--	158
28	2563	1448	1230	985	--	218
29	2868	1601	1380	857	--	221
30	2777	1555	1450	937	--	105
31	2788	1561	1710	915	149	--
Total sec-ft.	55796	~~33040~~ 32940	31701	24946	753	1992
Mean	1796	~~1642~~ 1063	1020	805	24.3	64
Ac-ft.	110470	65340	62880	49480	1490	3950

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR
JUNE - 1937

Day	Inflow to Sherburne Reservoir: Recorded inflow: Swift-current Creek	Canyon 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	381		120	501	40	461	--
2	486		109	595	40	555	
3	667		144	811	41	770	
4	511		138	649	42	607	
5	374		89	463	45	418	
6	374		75	449	47	402	
7	375		314	689	49	640	
8	375		71	446	50	396	
9	376		90	466	50	416	
10	376		179	555	51	504	
11	377		101	478	52	426	
12	414		312	726	53	673	
13	1780		1458	3238	67	3171	
14	1610		406	2016	60	1956	
15	943		645	1588	301	1287	
16	782	121	201	1104	640	464	
17	792	112	266	1170	636	534	
18	631	87	231	949	640	309	
19	631	68	177	876	640	236	
20	719	44	115	878	636	242	
21	757	36	317	1110	535	575	
22	753	50	44	847	288	559	
23	681	61	163	905	292	613	
24	503	57	224	784	292	492	
25	374	52	43	469	292	177	
26	335	48	90	473	295	178	
27	328	49	85	462	295	167	
28	370	56	103	529	276	253	
29	445	63	85	593	220	373	
30	520	75	85	680	228	452	--
Total sec-ft.	18040	979 (16-30)	6480	25499	7193	18306	--
Mean	601	65	216	850	240	610	--
Ac-ft.	35780	1940	12850	50580	14270	36300	--

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
JUNE - 1937

Day	St.Mary River at Kimball	Diverted by U.S.B.R.	Stored by U.S.B.R.	Total in sec-ft.	Stored Water Released	Natural Flow St.Mary River
1	1920	0	462	2382	--	2382
2	1880	0	455	2335		2335
3	1970	0	461	2431		2431
4	1820	201	555	2576		2576
5	1490	612	770	2872		2872
6	1370	620	607	2597		2597
7	1280	636	418	2334		2334
8	1300	636	402	2338		2338
9	1230	636	640	2506		2506
10	1230	646	396	2272		2272
11	1300	646	416	2362		2362
12	1560	652	504	2716		2716
13	4940	628	426	5994		5994
14	5520	205	673	6398		6398
15	5360	0	3171	8531		8531
16	5250	0	1956	7206		7206
17	5050	2	1287	6339		6339
18	4700	1	464	5165		5165
19	4310	0	534	4844		4844
20	4080	0	309	4389		4389
21	3930	0	236	4166		4166
22	3850	0	242	4092		4092
23	3710	0	575	4285		4285
24	3500	0	559	4059		4059
25	3170	0	613	3783		3783
26	2840	0	492	3332		3332
27	2520	23	177	2720		2720
28	1800	589	178	2567		2567
29	1670	630	167	2467		2467
30	1600	652	253	2505	--	2505
Total sec-ft.	86150	8015	18398	112563	--	112563
Mean	2870	267	613	3750	--	3750
Ac-ft.	170900	15900	36490	223300	--	223300

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.
JUNE - 1937

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	2382	1024	--	1024	0	462	462	--	562
2	2335	1001		1001	0	455	455	--	546
3	2431	1049		1049	0	461	461	--	588
4	2576	1121		1121	201	555	756	--	365
5	2872	1269		1269	612	770	1382	113	---
6	2597	1132		1132	620	607	1227	95	---
7	2334	1000		1000	636	418	1054	54	---
8	2338	1002		1002	636	402	1038	36	---
9	2506	1086		1086	636	640	1276	190	---
10	2272	969		969	646	396	1042	73	---
11	2362	1014		1014	646	416	1062	48	---
12	2716	1191		1191	652	504	1156	--	35
13	5994	2830		2830	628	426	1054	--	1776
14	6398	3032		3032	205	673	878	--	2154
15	8531	4098		4098	0	3171	3171	--	927
16	7206	3436		3436	0	1956	1956	--	1480
17	6339	3002		3002	2	1287	1289	--	1713
18	5165	2416		2416	1	464	465	--	1951
19	4844	2255		2255	0	534	534	--	1721
20	4389	2028		2028	0	309	309	--	1719
21	4166	1916		1916	0	236	236	--	1680
22	4092	1879		1879	0	242	242	--	1637
23	4285	1976		1976	0	575	575	--	1401
24	4059	1863		1863	0	559	559	--	1304
25	3783	1725		1725	0	613	613	--	1112
26	3332	1499		1499	0	492	492	--	1007
27	2720	1193		1193	23	177	200	--	993
28	2567	1117		1117	589	178	767	--	350
29	2467	1067		1067	630	167	797	--	270
30	2505	1086	--	1086	652	253	905	--	181
Total Sec-Ft.	112563	51276	--	51276	8015	18398	26413	609	25472
Mean	3750	1709	--	1709	267	613	880	20.3	849
Ac-ft.	223300	101690	--	101690	15900	36490	52390	1210	50520

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA
JUNE - 1937

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	2382	1358	1920	901	562	---
2	2335	1334	1880	979	546	---
3	2431	1382	1970	971	588	---
4	2576	1455	1820	951	365	---
5	2872	1603	1490	968	---	113
6	2597	1465	1370	954	---	95
7	2334	1334	1280	943	---	54
8	2338	1336	1300	962	---	36
9	2506	1420	1230	1010	---	190
10	2272	1303	1230	1010	---	73
11	2362	1348	1300	976	---	48
12	2716	1525	1560	796	35	---
13	5994	3164	4940	346	1776	---
14	6398	3366	5520	299	2154	---
15	8531	4433	5360	514	927	---
16	7206	3770	5250	586	1480	---
17	6339	3337	5050	659	1713	---
18	5165	2749	4700	629	1951	---
19	4844	2589	4310	666	1721	---
20	4389	2361	4080	669	1719	---
21	4166	2250	3930	669	1680	---
22	4092	2213	3850	741	1637	---
23	4285	2309	3710	788	1401	---
24	4059	2196	3500	858	1304	---
25	3783	2058	3170	847	1112	---
26	3332	1833	2840	828	1007	---
27	2720	1527	2520	856	993	---
28	2567	1450	1800	856	350	---
29	2467	1400	1670	1040	270	---
30	2505	1419	1600	1060	181	---
Total sec-ft.	112563	61287	86150	24332	25472	609
Mean	3750	2043	2870	811	849	20.3
Ac-ft.	223300	121610	170900	48260	50520	1210

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR
JULY - 1937

Day	Inflow to Sherburne Reservoir: Recorded inflow: Swift-current Creek	Canyon Creek	Unrecorded inflow est'd	Total inflow	Outflow Swiftcurrent Creek at Sherburne	Stored in Reservoir sec-ft. Gross	Released from Reservoir sec-ft. Net
1	474	68	94	636	274	362	---
2	414	59	70	543	245	298	---
3	352	51	32	435	245	190	---
4	318	47	48	413	395	18	---
5	322	51	40	413	392	21	---
6	295	48	67	410	394	16	---
7	256	43	80	379	394	--	15
8	231	39	16	286	337	--	51
9	221	36	28	285	234	51	---
10	224	36	47	307	318	--	11
11	218	32	91	341	394	--	53
12	209	13	88	310	509	--	199
13	200	22	81	303	604	--	301
14	206	36	32	274	597	--	323
15	200	32	19	251	597	--	346
16	194	35	114	343	563	--	220
17	203	36	52	291	495	--	204
18	194	33	18	245	488	--	243
19	194	31	71	296	482	--	186
20	188	32	5	225	498	--	273
21	176	28	68	272	615	--	343
22	168	17	133	318	629	--	311
23	159	6	92	257	686	--	429
24	153	7	62	222	729	--	507
25	153	11	27	191	667	--	476
26	148	19	75	242	674	--	432
27	145	22	54	221	705	--	484
28	134	21	30	185	694	--	509
29	131	20	50	201	682	--	481
30	124	19	39	182	698	--	516
31	114	19	69	202	765	--	563
Total sec-ft.	6718	969	1792	9479	15999	956	7476
Mean	217	31.2	57.8	306	516	30.8	241
Ac-ft	13320	1920	3550	18790	31730	1890	14830

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
JULY - 1937

Day	St.Mary River at Kimball	Diverted by U.S.B.R.	Stored by U.S.B.R.	Total in sec-ft.	Stored Water Released	Natural Flow St.Mary River
1	1600	676	373	2649	--	2649
2	1580	682	452	2714	--	2714
3	1500	682	362	2544	--	2544
4	1420	699	298	2417	--	2417
5	1380	695	190	2265	--	2265
6	1320	691	18	2029	--	2029
7	1240	688	21	1949	--	1949
8	1130	688	16	1834	--	1834
9	959	693	--	1652	15	1637
10	799	693	--	1492	51	1441
11	752	695	51	1498	--	1498
12	752	697	--	1449	11	1438
13	815	703	--	1518	53	1465
14	856	705	--	1561	199	1362
15	847	705	--	1552	301	1251
16	864	691	--	1555	323	1232
17	924	586	--	1510	346	1164
18	839	576	--	1415	220	1195
19	783	567	--	1350	204	1146
20	775	544	--	1319	243	1076
21	750	532	--	1282	186	1096
22	606	668	--	1274	273	1001
23	606	674	--	1280	343	937
24	612	676	--	1288	311	977
25	606	684	--	1290	429	861
26	581	684	--	1265	507	758
27	556	686	--	1242	476	766
28	545	697	--	1242	432	810
29	533	699	--	1232	484	748
30	504	701	--	1205	509	696
31	488	705	--	1193	481	712
Total sec-ft.	27522	20762	1781	50065	6397	43668
Mean	888	670	57	1615	206	1410
Ac-ft.	54590	41180	3530	99300	12690	86610

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.
JULY - 1937

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 share used
1	2649	1158	---	1158	676	373	1049	---	109
2	2714	1190	---	1190	682	452	1134	---	56
3	2544	1105	---	1105	682	362	1044	---	61
4	2417	1042	---	1042	699	298	997	---	45
5	2265	966	---	966	695	190	885	---	81
6	2029	848	---	848	691	18	709	---	139
7	1949	808	---	808	688	21	709	---	99
8	1834	750	---	750	688	16	704	---	46
9	1637	652	15	667	693	--	693	26	--
10	1441	554	51	605	693	--	693	88	--
11	1498	582	---	582	695	51	746	164	--
12	1438	552	11	563	697	--	697	134	--
13	1465	566	53	619	703	--	703	84	--
14	1362	514	199	713	705	--	705	---	8
15	1251	459	301	760	705	--	705	---	55
16	1232	449	323	772	691	--	691	---	81
17	1164	415	346	761	586	--	586	---	175
18	1195	431	220	651	576	--	576	---	75
19	1146	406	204	610	567	--	567	---	43
20	1076	371	243	614	544	--	544	---	70
21	1096	381	186	567	532	--	532	---	55
22	1001	334	273	607	668	--	668	61	--
23	937	302	343	645	674	--	674	29	--
24	977	322	311	633	676	--	676	43	--
25	861	264	429	693	684	--	684	---	9
26	758	212	507	719	684	--	684	---	35
27	766	216	476	692	686	--	686	---	6
28	810	238	432	670	697	--	697	27	--
29	748	207	484	691	699	--	699	8	--
30	696	181	509	690	701	--	701	11	--
31	712	189	481	670	705	--	705	35	--
Total sec-ft.	43668	16664	6397	23061	20762	1781	22543	710	1228
Mean	1410	538	206	744	670	57	727	22.9	39.6
Ac-ft.	86610	33050	12690	45740	41180	3530	44710	1410	2440

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA
JULY - 1937

Day	Natural flow of St.Mary R. at Boundary	Canada's share Available	St.Mary R. at Kimball Delivered	Liverted by Canada Used	Excess of share delivered	Excess or deficit of share delivered
1	2649	1491	1600	1070	109	---
2	2714	1524	1580	1060	56	---
3	2544	1439	1500	1050	61	---
4	2417	1375	1420	1060	45	---
5	2265	1299	1380	1070	81	---
6	2029	1181	1320	1090	139	---
7	1949	1141	1240	1080	99	---
8	1834	1084	1130	1040	46	---
9	1637	985	959	926	---	26
10	1441	887	799	793	---	88
11	1498	916	752	731	---	164
12	1438	886	752	728	---	134
13	1465	899	815	775	---	84
14	1362	848	856	826	8	---
15	1251	792	847	804	55	---
16	1232	783	864	796	81	---
17	1164	749	924	864	175	---
18	1195	764	839	793	75	---
19	1146	740	783	736	43	---
20	1076	705	775	713	70	---
21	1096	715	750	735	35	---
22	1001	667	606	568	---	61
23	937	635	606	581	---	29
24	977	655	612	596	---	43
25	861	597	606	593	9	---
26	758	546	581	568	35	---
27	736	550	556	545	6	---
28	810	572	545	533	---	27
29	748	541	533	522	---	8
30	696	515	504	494	---	11
31	712	523	488	473	---	35
Total sec-ft.	43668/	27004	27522	24211	1228	710
Mean	1410	871	888	781	39.6	22.9
Ac-ft.	86610	53560	54590	48020	2440	1410

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR
AUGUST - 1937

Day	Inflow to Sherburne Reservoir: Recorded inflow: Swift-current Creek	Canyon 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	126	25	33	184	849	---	665
2	142	26	35	203	765		562
3	131	26	44	201	705		504
4	131	23	14	168	705		537
5	129	22	33	184	709		525
6	129	22	30	181	721		540
7	124	23	30	177	733		556
8	112	22	30	164	725		561
9	104	22	30	156	729		573
10	100	20	30	150	745		595
11	96	19	30	145	733		588
12	91	19	30	140	741		601
13	87	19	30	136	765		629
14	83	19	30	132	769		637
15	78	18	30	126	782		656
16	74	15	20	109	790		681
17	70	12	20	102	782		680
18	69	13	20	102	790		688
19	70	12	20	102	806		704
20	70	11	20	101	794		693
21	67	11	20	98	790		692
22	69	11	20	100	786		686
23	74	13	20	107	782		675
24	72	12	20	104	798		694
25	60	11	20	91	806		715
26	54	9	10	73	802		729
27	56	10	10	76	790		714
28	61	10	10	81	778		697
29	55	9	10	74	721		647
30	50	8	10	68	659		591
31	50	8	10	68	594		526
Total sec-ft.	2684	500	719	3903	23444	---	19541
Mean	87	16.3	23.2	126	756	---	630
Ac-ft.	5320	1000	1430	7750	46500	---	38750

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
AUGUST - 1937

Day	St.Mary River at Kimball	Diverted by U.S.B.R.	Stored by U.S.B.R.	Total in sec-ft.	Stored Water Released	Natural Flow St.Mary River
1	594	714	--	1308	516	792
2	612	720		1332	563	769
3	568	716		1284	665	619
4	516	714		1230	562	668
5	473	705		1178	504	674
6	447	705		1152	537	615
7	452	705		1157	525	632
8	443	705		1148	540	608
9	428	703		1131	556	575
10	419	703		1122	561	561
11	414	703		1117	573	544
12	405	701		1106	595	511
13	401	703		1104	588	516
14	405	703		1108	601	507
15	401	703		1104	629	475
16	397	703		1100	637	463
17	389	703		1092	656	436
18	380	701		1081	681	400
19	384	707		1091	680	411
20	384	710		1094	688	406
21	368	707		1075	704	371
22	357	705		1062	693	369
23	353	716		1069	692	377
24	353	712		1065	686	379
25	331	707		1038	675	363
26	324	705		1029	694	335
27	334	691		1025	715	310
28	317	682		999	729	270
29	310	678		988	714	274
30	277	662		939	697	242
31	320	565	--	885	647	238
Total sec-ft.	12556	21657	--	34213	19503	14710
Mean	405	699	--	1104	629	475
Ac-ft.	24900	42960	--	67860	38680	29180

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.
AUGUST - 1937

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	792	229	516	745	714	--	714	--	31
2	769	218	563	781	720		720	--	61
3	619	155	665	820	716		716	--	104
4	668	167	562	729	714		714	--	15
5	674	170	504	674	705		705	31	--
6	615	154	537	691	705		705	14	--
7	632	158	525	683	705		705	22	--
8	608	152	540	692	705		705	13	--
9	575	144	556	700	703		703	3	--
10	561	140	561	701	703		703	2	--
11	544	136	573	709	703		703	--	6
12	511	128	595	723	701		701	--	22
13	516	129	588	717	703		703	--	14
14	507	127	601	728	703		703	--	25
15	475	119	629	748	703		703	--	45
16	463	116	637	753	703		703	--	50
17	436	109	656	765	703		703	--	62
18	400	100	681	781	701		701	--	80
19	411	103	680	783	707		707	--	76
20	406	102	688	790	710		710	--	80
21	371	93	704	797	707		707	--	90
22	369	92	693	785	705		705	--	80
23	377	94	692	786	716		716	--	70
24	379	95	686	781	712		712	--	69
25	363	91	675	766	707		707	--	59
26	335	84	694	778	705		705	--	73
27	310	78	715	793	691		691	--	102
28	270	68	729	797	682		682	--	115
29	274	68	714	782	678		678	--	104
30	242	60	697	757	662		662	--	95
31	238	60	647	707	565	--	565	--	142
Total sec-ft.	14710	3739	19503	23242	21657	--	21657	85	1670
Mean	475	121	629	750	699	--	699	2.7	53.9
Ac-ft.	29180	7420	38680	46100	42960	--	42960	168	3310

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA
AUGUST - 1937

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	792	563	594	556	31	--
2	769	551	612	591	61	--
3	619	464	568	556	104	--
4	668	501	516	505	15	--
5	674	504	473	463	--	31
6	615	461	447	435	--	14
7	632	474	452	439	--	22
8	608	456	443	433	--	13
9	575	431	428	423	--	3
10	561	421	419	415	--	2
11	544	408	414	405	6	--
12	511	383	405	393	22	--
13	516	387	401	389	14	--
14	507	380	405	387	25	--
15	475	356	401	382	45	--
16	463	347	397	378	50	--
17	436	327	389	374	62	--
18	400	300	380	362	80	--
19	411	308	384	363	76	--
20	406	304	384	367	80	--
21	371	278	368	353	90	--
22	369	277	357	341	80	--
23	377	283	353	334	70	--
24	379	284	353	339	69	--
25	363	272	331	314	59	--
26	335	251	324	310	73	--
27	310	232	334	321	102	--
28	270	202	317	304	115	--
29	274	206	310	294	104	--
30	242	182	277	263	95	--
31	238	178	320	294	142	--
Total sec-ft.	14710	10971	12556	12083	1670	85
Mean	475	354	405	390	53.9	2.7
Ac-ft.	29180	21760	24900	23970	3310	168

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR
SEPTEMBER - 1937

Day	Inflow to Sherburne Reservoir: Recorded inflow: Swift-current Creek	Canyon 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	49	7	10	66	520	--	454
2	46	7	18	71	450	--	379
3	49	7	34	90	389	--	299
4	50	7	22	79	319	--	240
5	54	8	30	92	265	--	173
6	58	9	40	107	228	--	121
7	52	9	52	113	200	--	87
8	49	8	86	143	171	--	28
9	48	7	68	123	150	--	27
10	46	7	50	103	131	--	28
11	46	7	43	96	119	--	23
12	48	7	28	83	108	--	25
13	50	7	15	72	97	--	25
14	52	7	10	69	86	--	17
15	54	7	10	71	84	--	13
16	52	7	34	93	91	2	--
17	52	7	8	67	93	--	26
18	54	7	44	105	103	2	--
19	54	7	7	68	95	--	27
20	50	7	10	67	105	--	38
21	50	7	53	110	137	--	27
22	49	6	41	96	144	--	48
23	48	6	10	64	93	--	29
24	44	5	10	59	81	--	22
25	35	4	40	79	79	--	--
26	33	3	5	41	63	--	22
27	33	3	10	46	56	--	10
28	33	2	17	52	52	--	--
29	34	3	17	54	54	--	--
30	33	1	19	53	53	--	--
Total sec-ft.	1405	186	841	2432	4616	4	2186
Mean	46.8	6.2	28	81	154	0.1	73
Ac-ft.	2780	370	1670	4820	9160	7	4330

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
SEPTEMBER - 1937

Day	St.Mary River at Kimball	Diverted by U.S.B.R.	Stored by U.S.B.R.	Total in sec-ft.	Stored Water Released	Natural Flow St.Mary River
1	393	464	--	857	591	266
2	342	453	--	795	526	269
3	283	444	--	727	454	273
4	243	389	--	632	379	253
5	462	156	--	618	299	319
6	488	139	--	627	240	387
7	424	135	--	559	173	386
8	372	131	--	503	121	382
9	334	128	--	462	87	375
10	307	118	--	425	28	397
11	287	110	--	397	27	370
12	267	108	--	375	28	347
13	246	106	--	352	23	329
14	231	107	--	338	25	313
15	214	105	--	319	25	294
16	203	105	--	308	17	291
17	195	105	--	300	13	287
18	190	105	2	297	--	297
19	187	105	--	292	26	266
20	185	105	2	292	--	292
21	177	105	--	282	27	255
22	187	106	--	293	38	255
23	193	106	--	299	27	272
24	187	108	--	295	48	247
25	180	108	--	288	29	259
26	167	108	--	275	22	253
27	160	96	--	256	--	256
28	246	18	--	264	22	242
29	255	7	--	262	10	252
30	255	6	--	261	--	261
Total sec-ft.	7860	4386	4	12250	3305	8945
Mean	262	146	0.1	408	110	298
Ac-ft.	15590	8700	7	24300	6560	17740

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.
SEPTEMBER - 1937

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	266	66	591	657	464	--	464	--	193
2	269	67	526	593	453	--	453	--	140
3	273	68	454	522	444	--	444	--	78
4	253	63	379	442	389	--	389	--	53
5	319	80	299	379	156	--	156	--	223
6	387	97	240	337	139	--	139	--	198
7	386	96	173	269	135	--	135	--	134
8	382	96	121	217	131	--	131	--	86
9	375	94	87	181	128	--	128	--	53
10	397	99	28	127	118	--	118	--	9
11	370	92	27	119	110	--	110	--	9
12	347	87	28	115	108	--	108	--	7
13	329	82	23	105	106	--	106	1	--
14	313	78	25	103	107	--	107	4	--
15	294	74	25	99	105	--	105	6	--
16	291	73	17	90	105	--	105	15	--
17	287	72	13	85	105	--	105	20	--
18	297	74	--	74	105	2	107	33	--
19	266	66	26	92	105	--	105	13	--
20	292	73	--	73	105	2	107	34	--
21	255	64	27	91	105	--	105	14	--
22	255	64	38	102	106	--	106	4	--
23	272	68	27	95	106	--	106	11	--
24	247	62	48	110	108	--	108	--	2
25	259	65	29	94	108	--	108	14	--
26	253	63	22	85	108	--	108	23	--
27	256	64	--	64	96	--	96	32	--
28	242	60	22	82	18	--	18	--	64
29	252	63	10	73	7	--	7	--	66
30	261	65	--	65	6	--	6	--	59
Total sec-ft.	8945	2235	3305	5540	4386	4	4390	224	1374
Mean	298	74.5	110	184	146	0.1	146	7.5	45.8
Ac-ft.	17740	4430	6560	10999	8700	7	8710	446	2735

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA
SEPTEMBER - 1937

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	266	200	393	376	193	---
2	269	202	342	321	140	---
3	273	205	283	263	78	---
4	253	190	243	213	53	---
5	319	239	462	437	223	---
6	387	290	488	469	198	---
7	386	290	424	409	134	---
8	382	286	372	356	86	---
9	375	281	334	317	53	---
10	397	298	307	286	9	---
11	370	278	287	270	9	---
12	347	260	267	246	7	---
13	329	247	246	225	---	1
14	313	235	231	205	---	4
15	294	220	214	190	---	6
16	291	218	203	180	---	15
17	287	215	195	172	---	20
18	297	223	190	165	---	33
19	266	200	187	162	---	13
20	292	219	185	160	---	34
21	255	191	177	155	---	14
22	255	191	187	162	---	4
23	272	204	193	165	---	11
24	247	185	187	161	2	---
25	259	194	180	154	---	14
26	253	190	167	148	---	23
27	256	192	160	144	---	32
28	242	182	246	210	64	---
29	252	189	255	228	66	---
30	261	196	255	221	59	---
Total sec-ft.	8945	6710	7860	7170	1374	224
Mean	298	224	262	239	45.8	7.5
Ac-ft.	17740	13310	15590	14220	2735	446

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR
OCTOBER - 1937

Day	Inflow to Sherburne Reservoir: Recorded inflow: Swift-current Creek	Canyon Creek	Unrecorded inflow est'd	Total inflow	Outflow: Swiftcurrent Creek at Sherburne	Stored in Reservoir: sec-ft. Gross	Released from Reservoir: sec-ft. Net
1	32	1	10	43	52	--	9
2	38	4	10	52	52	--	--
3	50	9	5	64	57	7	--
4	56	11	5	72	65	7	--
5	54	11	3	68	68	--	--
6	50	11	13	74	74	--	--
7	47	11	13	71	71	--	--
8	46	11	14	71	71	--	--
9	46	11	11	68	68	--	--
10	48	11	8	67	67	--	--
11	49	11	3	63	63	--	--
12	47	10	6	63	63	--	--
13	49	9	5	63	63	--	--
14	46	8	9	63	63	--	--
15	44	8	11	63	63	--	--
16	44	9	20	73	59	14	--
17	49	14	30	93	59	34	--
18	50	11	30	91	59	32	--
19	49	11	40	100	59	41	--
20	46	10	40	96	59	37	--
21	47	11	45	103	55	48	--
22	50	11	45	106	55	51	--
23	56	11	45	112	55	57	--
24	60	12	40	112	55	57	--
25	65	13	31	109	55	54	--
26	67	13	30	110	51	59	--
27	61	15	31	107	51	56	--
28	61	18	29	107	51	56	--
29	142	53	30	225	51	174	--
30	200	48	30	278	51	227	--
31	200	40	30	270	51	219	--
Total sec-ft.	1949	437	672	3058	1836	1230	9
Mean	63	14.1	21.7	98.8	59.2	40	0.3
Ac-ft.	3870	870	1330	6070	3640	2460	18

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
OCTOBER - 1937

Day	St.Mary River at Kimball	Diverted by U.S.B.R.	Stored by U.S.B.R.	Total in sec-ft.	Stored Water Released	Natural Flow St.Mary River
1	243	5	--	248	--	248
2	240	5	--	245	--	245
3	255	4	--	259	9	250
4	267	3	--	270	--	270
5	255	3	7	265	--	265
6	258	2	7	267	--	267
7	258	1	--	259	--	259
8	261	--	--	261	--	261
9	261	--	--	261	--	261
10	255	--	--	255	--	255
11	255	--	--	255	--	255
12	255	--	--	255	--	255
13	255	--	--	255	--	255
14	252	--	--	252	--	252
15	252	--	--	252	--	252
16	252	--	--	252	--	252
17	255	--	--	255	--	255
18	255	--	14	269	--	269
19	255	--	34	289	--	289
20	258	--	32	290	--	290
21	255	--	41	296	--	296
22	252	--	37	289	--	289
23	252	--	48	300	--	300
24	255	--	51	306	--	306
25	249	--	57	306	--	306
26	252	--	57	309	--	309
27	258	--	54	312	--	312
28	283	--	59	342	--	342
29	287	--	56	343	--	343
30	290	--	56	346	--	346
31	317	--	174	491	--	491
Total sec-ft.	8047	23 (1-7)	784	8854	9	8845
Mean	260	3.3	25.3	286	0.3	285
Ac-ft.	15960	46	1560	17560	18	17540

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.
OCTOBER - 1937

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	248	62	--	62	5	--	5	--	57
2	245	61	--	61	5	--	5	--	56
3	250	62	9	71	4	--	4	--	67
4	270	68	--	68	3	--	3	--	65
5	265	66	--	66	3	7	10	--	56
6	267	67	--	67	2	7	9	--	58
7	259	65	--	65	1	--	1	--	64
8	261	65	--	65	--	--	--	--	65
9	261	65	--	65	--	--	--	--	65
10	255	64	--	65	--	--	--	--	65
11	255	64	--	64	--	--	--	--	64
12	255	64	--	64	--	--	--	--	64
13	255	64	--	64	--	--	--	--	64
14	252	63	--	63	--	--	--	--	63
15	252	63	--	63	--	--	--	--	63
16	252	63	--	63	--	--	--	--	63
17	255	64	--	64	--	--	--	--	64
18	269	67	--	67	--	14	14	--	53
19	289	72	--	72	--	34	34	--	38
20	290	72	--	72	--	32	32	--	40
21	296	74	--	74	--	41	41	--	33
22	289	72	--	72	--	37	37	--	35
23	300	75	--	75	--	48	48	--	27
24	306	76	--	76	--	51	51	--	25
25	306	76	--	76	--	57	57	--	19
26	309	77	--	77	--	57	57	--	20
27	312	78	--	78	--	54	54	--	24
28	342	86	--	86	--	59	59	--	27
29	343	86	--	86	--	56	56	--	30
30	346	86	--	86	--	56	56	--	30
31	491	123	--	123	--	174	174	51	--
Total sec-ft.	8845	2210	9	2219	23 (1-7)	784	807	51	1463
Mean	285	71.3	0.3	71	3.3	25.3	26	1.7	47.2
Ac-ft.	17540	4380	18	4400	46	1560	1610	100	2890

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA
OCTOBER - 1937

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	248	186	243	215	57	--
2	245	184	240	212	56	--
3	250	188	255	225	67	--
4	270	202	267	102	65	--
5	265	199	255	---	66	--
6	267	200	258	---	58	--
7	259	194	258	---	64	--
8	261	196	261	---	65	--
9	261	196	261	---	65	--
10	255	191	255	---	64	--
11	255	191	255	---	64	--
12	255	191	255	---	64	--
13	255	191	255	---	64	--
14	252	189	252	---	63	--
15	252	189	252	---	63	--
16	252	189	252	---	63	--
17	255	191	255	---	64	--
18	269	202	255	---	53	--
19	289	217	255	---	38	--
20	290	218	258	---	40	--
21	296	222	255	---	33	--
22	289	217	252	---	35	--
23	300	225	252	---	27	--
24	306	230	255	---	25	--
25	306	230	249	---	19	--
26	309	232	252	---	20	--
27	312	234	258	---	24	--
28	342	256	283	---	27	--
29	343	257	287	---	30	--
30	346	260	290	---	30	--
31	491	368	317	---	--	51
Total sec-ft.	8845	6635	8047	754 (1-4)	1463	51
Mean	285	214	260	188	47.2	1.7
Ac-ft.	17540	13160	15960	1500	2890	100

Table 2

DIVISION OF ST.MARY RIVER

CANADA

Water Available in Acre-feet

1937

Month	St.Mary R. at Kimball	Rolph Creek	Lee Creek	Pothole Creek	Combined Flow
April	11,390	672	3,140	2,690	17,892
May	62,880	240	4,390	278	67,788
June	170,900	1,530	15,620	1,920	189,970
July	54,590	15	2,270	4	56,879
August	24,900	7	569	---	25,476
September	15,590	12	356	---	15,958
October	15,960	123	900[e]	---	16,983
Total	356,210	2,599	27,245	4,892	390,946[a]

DISPOSITION

Month	Diverted by A.R. & I. Co.		Gain or Loss	Wasted by A.R. & I. Co.	Applied to Land	St.Mary R. Lethbridge
April	5,850	+	397	3,337	5,600	16,610
May	49,480	-	1,459	5,576	42,723	26,000
June	48,260	+	4,442	16,760	37,862	144,300
July	48,020	-	232	2,742	45,050	11,920
August	23,970	-	883	131	22,976	2,820
September	14,220	-	22	182	14,016	2,300
October	1,500	+	835	682	1,653	
Total	191,300[b]	+	3,078[c]	29,410[d]	169,880[f]	x

a - Computed. b - Diverted by A.R.&I.Co. at Kimball.
c - Loss or gain between Kimball and Magrath.
d - Wasted in Pinepound and Pothole Creeks.
e - Estimated.
f - Flow in canal at Magrath plus diversion by laterals.
x - Below all points of diversion.

DIVISION OF ST.MARY RIVER

UNITED STATES

Water available in Acre-Feet

1937

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	3,975	4,320		3,975	182	3,793	34,800
May	45,130	15,830	849	45,980	32,610	13,370	44,140
June	101,690	36,490	-	101,690	15,900	85,790	40,850
July	33,050	3,530	12,690	45,740	41,180	4,560	39,830
Aug.	7,420	-	38,680	46,100	42,960	3,140	40,940
Sept.	4,430	7	6,560	10,999	8,700	2,299	15,870
Oct.	4,380	1,560	18	4,400	46	4,354	4,530
Total	200,075	61,737	58,797	258,884	141,578	117,306	220,960

DIVERSIONS FROM MILK RIVER IN THE UNITED STATES

(Quantities in Acre-Feet)

Month	Ft. Belknap Canal	Paradise Canal	Harlem Canal	Agency Canal	Dodson North Canal	Dodson South Canal	Van-dalia Canal	Total
March						1,260		1,260
April	2,372	696	1,134	2,570	1,480	15,352		23,604
May	10,211	4,715	3,872	6,811	2,963	6,458	4,909	39,939
June	3,773	1,801	1,654	6,575	1,261	15,751	2,633	33,248
July	6,413	3,128	2,830	2,639	3,316	9,638	6,200	34,164
Aug.	8,243	4,931	3,142	909	3,501	12,789	5,870	39.385
Sept.	2,325	696	1,321	7,255	1,926	12,646	2,568	28,737
Oct.				4,623		7,212		11,835
Total	33,337	15,767	13,953	31,382	14,447	81,106	22,180	212,172

DETERMINATION OF NATURAL FLOW OF FRENCHMAN RIVER AT THE INTERNATIONAL BOUNDARY 1937

Date at Intern'l Boundary	Frenchman above East End	Used by Canada at East End: corrected for evaporation: store	evaporation: release	diverted	total used	Frenchman below East End	Gain or loss East End :- 50 Mile
April							
1 - 10	69.0	69	0	0	69.0	68.9	68.9
11 - 20	2426.0	182	0	26.1	208.1	2300.2	82.3
21 - 30	1354.0	247	0	71.7	318.7	1020.0	-15.3
May							
1 - 10	505.1	120	0	122.8	242.8	282.3	20.0
11 - 20	313.2	34	0	94.2	128.2	98.4	-86.6
20 - 31	229.2	0	26	145.1	119.1	104.2	- 5.9
June							
1 - 10	162.9	0	41	90.5	49.5	36.7	-76.7
11 - 20	89.0	0	73	84.3	11.3	54.6	-23.1
21 - 31	73.9	0	25	53.8	28.8	27.3	-17.8
July							
1 - 10	43.8	0	58	49.3	- 8.7	0.9	-51.6
11 - 20	18.3	0	70	40.1	-29.9	0	-48.2
21 - 31	159.4	0	2	57.5	55.5	0	-103.9
Aug.							
1 - 10	19.0	0	79	79.7	0.7	0	-18.3
11 - 20	23.9	0	39	29.6	- 9.4	0	-33.3
21 - 31	13.5	0	47	41.3	- 5.7	0	-19.2
Sept.							
1 - 10	18.3	0	41	31.3	- 9.7	0	-28.0
11 - 20	41.2	0	0	4.6	4.6	0	-45.8
21 - 30	21.8	0	0	0	0	0	-21.8
Oct.							
1 - 10	49.6	0	0	0	0	0	-49.6
11 - 20	60.8	0	0	0	0	0	-60.8
21 - 31	80.0	0	0	0	0	0	-80.0
Total sec-ft.	5771.9	652	501	1021.9	1162.9	3993.5	-652.8
Mean Ac-ft.	11436	1293	993	2026	2306	7919	-1294

DETERMINATION OF NATURAL FLOW OF FRENCHMAN RIVER AT THE INTERNATIONAL BOUNDARY
1937

Date at Intern'l Boundary:	Frenchman River at 50 Mile	Used by Canada at ValMarie: corrected for evaporation store	release	divert-ed	total used	Frenchman River below Val Marie	Gain or loss 50 Mile Val Marie
April							
1 - 10	68.9	0	0	0	0	7.2	- 61.7
11 - 20	2300.2	1879		0	1879.0	42.4	-378.8
21 - 30	1020.0	337		79.7	416.7	320.6	-282.7
May							
1 - 10	282.3	159		284.2	443.2	70.3	231.2
11 - 20	98.4	0	11	42.4	31.4	0.2	- 66.8
21 - 31	104.2	0	103	106.6	3.6	1.3	-101.9
June							
1 - 10	36.7	0	259	145.7	-113.3	82.1	- 67.9
11 - 20	54.6	0	137	97.1	- 39.9	95.4	0.9
21 - 30	27.3	0	166	46.4	-119.6	55.6	- 91.3
July							
1 - 10	0.9	0	625	23.2	-601.8	650.7	48.0
11 - 20	0.0	0	435	0.0	-435.0	624.3	189.3
21 - 31	0.0	0	93	0.0	- 93.0	148.2	55.2
Aug.							
1 - 10	0.0	0	0	0	0	8.6	8.6
11 - 20	0.0	0	0	0	0	1.6	1.6
21 - 31	0.0	0	0	0	0	0.0	0.0
Sept.							
1 - 10	0.0	0	0	0	0	0	0
11 - 20	0	0	0	0	0	0	0
21 - 30	0	0	0	0	0	0	0
Oct.							
1 - 10	0	0	0	0	0	0	0
11 - 20	0	0	0	0	0	0	0
21 - 31	0	0	0	0	0	0	0
Total sec-ft.	3993.5	2375	1829	825.3	1371.3	2108.5	-516.3
Mean							
Ac-ft.	7919	4710	3630	1640	2720	4181	-1024

DETERMINATION OF NATURAL FLOW OF FRENCHMAN RIVER AT THE INTERNATIONAL BOUNDARY 1937

Date at Intern'l Boundary:	Frenchman River above East End:	Gain or loss: East End 50 Mile	Gain or loss: 50 Mile Val Marie	Gain or loss: Val Marie Boundary	Natural flow at Intern'l Boundary
April					
1 - 10	69.0	68.9	- 61.7	432.3	508.5
11 - 20	2426.0	82.3	-378.8	227.0	2356.5
21 - 30	1354.0	-15.3	-282.7	- 25.8	1030.2
May					
1 - 10	505.1	20.0	231.2	8.1	764.4
11 - 20	313.2	-86.6	66.8	- 0.2	159.6
21 - 31	229.2	- 5.9	-101.9	0.0	121.4
June					
1 - 10	162.9	-76.7	- 67.9	- 82.1	---
11 - 20	89.0	-23.1	0.9	- 85.0	---
21 - 30	73.9	-17.8	- 91.3	- 54.3	---
July					
1 - 10	43.8	-51.6	48.0	-160.5	---
11 - 20	18.3	-48.2	189.3	82.2	241.6
21 - 31	159.4	-103.9	55.2	- 78.5	32.2
Aug.					
1 - 10	19.0	- 18.3	8.6	- 8.6	0.7
11 - 20	23.9	- 33.3	1.6	- 1.6	---
21 - 31	13.5	- 19.2	0.0	0.0	---
Sept.					
1 - 10	18.3	- 28.0	--	--	---
11 - 20	41.2	- 45.8	--	--	---
21 - 30	21.8	- 21.8	--	--	---
Oct.					
1 - 10	49.6	- 49.6	--	0.7	0.7
11 - 20	60.8	- 60.8	--	--	---
21 - 31	80.0	- 80.0	--	--	---
Total sec-ft.	5771.9	-652.8	-516.3	253.6	5215.8
Mean					
Ac-ft.	11436	-1294	-1024	503	10343

Table 4

DISPOSITION OF THE WATERS OF THE NORTHERN TRIBUTARIES
OF MILK RIVER IN CANADA
1937

Quantities in Acre-Feet

Irrigator	Source of Supply	Estimated Diversion
Lodge Creek Drainage Basin		
Roth, R.L.	Lodge Creek	No data available
Mitchell, Wm.	Lodge Creek	No data available
Spangler, J.M.	Lodge Creek	No data available
Spangler, C.B.	Lodge Creek	No data available
Hillman, W.	Thelma Creek	150
Hartt, J.E.	Thelma Creek	15
Mitchell, Wm.	Shell Creek	30
Hartt, J.E.	Suiste Coulee	No data available
Hartt, J.E.	Cobblestone Coulee	15
Shock, J.J.	Shock Coulee	25
Read, J.	Read Creek	No data available
Mudie, H.	Sexton Creek	No data available
Clarke, T.S.	Sexton Creek	No data available
Jahn, B.A.	Middle Creek	No data available
Mitchell, Bros.	Middle Creek	100
Legge, G.A.	Middle Creek	No data available
Sturm, A.	Middle Creek	No data available
Legge, G.A.	Grant Creek	No data available
	Total from Lodge Creek Basin	335
Battle Creek Drainage Basin		
Lindner Bros.	Battle Creek	200
Patterson, W.G.	Battle Creek	40
Marshall & Gaff	Battle Creek	No data available
Gaff, J.A.	Battle Creek	No data available
Shepherd Bros.	Battle Creek	No data available
Fondrisk, G.	Battle Creek	30
Wilkes Bros.	Battle Creek	No data available
Wylie & Lindner	Battle Creek	No data available
McKinnon, J.	Battle Creek	No data available
Stirling & Nash	Battle Creek	No data available

Quantities in Acre-Feet

Irrigator	Source of Supply	Estimated Diversion
Parsonage, E.J.	Shafer Creek	No data available
Wood & Anderson	Fort Walsh Creek	No data available
Wood & Anderson	Whitemud Coulee	No data available
Leslie, J.	Sixmile Coulee	No data available
Spangler, J.M.	Sixmile Coulee	No data available
Shepherd Bros.	Halfway Coulee	No data available
	Total from Battle Creek Basin	270

Frenchman River Drainage Basin

Morrison, A.A.	Frenchman River	No data available
Morrison, G.N.	Frenchman River	No data available
Wylie, D.J.	Oxarart Creek	300
Gilchrist Bros.	Davis Creek	25
Gilchrist Bros.	Belanger Creek	200
Caton, W.A.	Fairwell Creek	No data available
Hensman, S.A.	N.B. Frenchman River	60
Armstrong,	Clarence Coulee	20
Armstrong,	Armstrong Creek	20
Kokott, T.	Calf Creek	20
Pearse, S.	Concrete Coulee	45
Bolingbroke, J.E.	Bolingbroke Creek	8
Bate, A.E.	Bate Creek	20
Bate, A.E.	Garden Creek	3
	Total from Frenchman River Basin	701

St.Mary River Basin

Salt, G.	Boundary Creek	75
Vaughn	Rolph Creek	No data Available
	Total	75

Milk River Basin

Deer Creek Cattle Company	Deer Creek	No data available

Table 5

DIVERSIONS FROM THE NORTHERN TRIBUTARIES

OF MILK RIVER IN THE UNITED STATES

1937

(Quantities in Acre-Feet)

Irrigator	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Total
				Lodge Creek					
N. Chinook Canal	*	*1,080	347	5.0	0	0	0	0	*1,432
				Battle Creek					
Matheson Canal	0	245	226	85	126	5.6	0	0	688
				Frenchman River					
Frenchman Canal	0	105	148	0	645	0	0	0	898

* No record Mar. 1 to Apr. 19

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