Report to

THE INTERNATIONAL JOINT COMMISSION

on

THE DIVISION AND USE MADE OF THE WATERS OF

ST. MARY AND MILK RIVERS

by

G. L. PARKER
representing the United States

and

J. T. JOHNSTON
representing Canada

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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 ended October 31st, 1939.

Respectfully submitted,

Accredited Officer of the United States.

Accredited Officer of His Majesty.

April 2nd, 1940.

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 1939, by the same groups of engineers as in previous years.

The Chief Hydraulic Engineer, United States Geological Survey, Mr. C. G. Paulsen, in acting charge, to October 16th, 1939, and Mr. G. L. Parker in charge thereafter, as accredited officer of the United States, was represented in the field by Mr. A. H. Tuttle, District Engineer, Helena, Montana. Mr. J. T. Johnston, Controller, Dominion Water and Power Bureau, as accredited officer of His Majesty, was represented by Mr. O. H. Hoover, Engineer-in-Charge, Calgary, Alberta.

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 supervision of Mr. Tuttle; while those from streams and ditches in Canada were collected by engineers of the Dominion Water and Power Bureau, under the direction of Mr. Hoover. The joint international

gauging stations were visited frequently by representatives of both countries.

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

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 occurred this season towards the latter part of June 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, Ottawa, Canada.

Division of Water

The United States St.Mary canal was in operation from April 20th to September 15th, and from October 19th to November 30th, water being delivered to the North Branch Milk River on April 23rd.

As the seepage from the canal between the intake and the crossing of the St.Mary River, which this year was 11% of the water diverted at the headgates, is assumed to return directly to the river and eventually become available to Canada, the discharge of 156,500 acre-feet passing in the canal at St.Mary River crossing, during the period April 21st to September 8th, is considered as the actual quantity diverted from the St.Mary River by the United States. Of this quantity, 156,100 acre-feet was delivered to the North Branch Milk River and made available for irrigation in Montana. The negligible loss of less than 0.3% between the St.Mary River crossing and the Hudson Bay Divide, the end of the canal, indicated that local inflow was practically equal to any losses due to evaporation and seepage.

On November 1st, 1938, approximately 2,500 acre-feet of water remained in Sherburne reservoir, by April 1st, 1939, this was increased to 7,000 acre-feet. The maximum storage reached during the season was 46,930 acre-feet on

June 8th. On October 31st, 1939, 7,390 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 Milk River in Montana was 134,004 acre-feet.

The total flow recorded at the International Boundary from the Northern tributaries of Milk River during the year 1939 was 209,400 acre-feet. This flow is double that recorded in 1938 and about 160% of the average for the last 13 years.

During the open water season of 1939, Canada stored in Cypress Lake reservoir, 6,400 acre-feet of the flow of Battle Creek, while 12,100 acre-feet was delivered at the International Boundary. In the Frenchman River basin, during the open water season, Canada diverted about 2,700 acre-feet from Davis and Belanger Creeks into Cypress Lake and stored at East End and Val Marie, 12,200 acre-feet of the flow and released 9,720 acre-feet of this storage to irrigate lands near East End and Val Marie, while 104,000 acre-feet of the natural flow was delivered to Montana. The apportionment during the irrigation season is shown in Table 3.

The Canadian Pacific Railway Canal at Kimball, Alberta, diverted 152,000 acre-feet from the St.Mary River during the period of operation from the 9th of April to the 16th of October and from the 21st of November to the 5th of December. 122,873 acre-feet of this diversion was applied to lands 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 shown in Table 4 were; from Lodge Creek, 690 acre-feet; from Battle Creek, 7,665 acre-feet; from Frenchman River, 7,525 acre-feet.

Any question as to the proper share of 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, 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 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 those of Frenchman River and Battle Creek.

Water Supply

The precipitation on the foothills and in the mountainous areas forming the headwaters of the St.Mary and Milk Rivers was below normal during 1939, while that on the prairies tributary to Milk River was slightly above normal.

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

headwaters of St.Mary River, the snow cover was 77% of the mean of the previous seventeen years of record while the water content of this snow cover was 85% of the mean. The run-off of 57,100 acre-feet from the area surveyed, during May, June and July, was also 85% of the average for the previous seventeen year period.

The natural flow of 403,000 acre-feet of St.Mary River at the boundary during the irrigation season of 1939, from the first of April to the end of October, was 68% of the average for 36 years of record.

The run-off from the prairies, as indicated by the Northern Tributaries of Milk River, was 60% in excess of the average for the last thirteen years.

Twenty-two 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. The construction of reservoirs and the formation of two irrigation districts in the valley of the Frenchman River in Canada, has necessitated the establishment of a number of new gauging stations on this stream and on Battle Creek.

Consideration is being given to the joint operation of these gauging stations in accordance with the provisions of Articles VI and VII of the Order of the International Joint Commission of October 4th, 1921.

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 1939.

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 1939, 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 Creek and with the use of the water levels of Sherburne 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 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 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 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 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 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 parts; part 1 shows the quantity used by Canada at East End and the loss or gain in the river between East End and Fifty-mile, part 2 shows the quantity used by Canada at Val Marie and the loss or gain between Fifty-mile and Val Marie, part 3 shows the loss or gain 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 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 - 1939.

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					180	--
2					190	
3					170	
4					157	
5					150	
6					140	
7					130	
8					120	
9					114	
10					114	
11					114	
12					114	
13					113	
14					113	
15					113	
16					113	
17	no record available	no record available	no record available	no record available	113	
18					113	
19					161	
20					262	
21				328	272	
22	318	176	494	333	161	
23	355	128	483	479	4	
24	365	200	565	569	--	4
25	305	187	492	569	--	77
26	247	130	377	584	--	207
27	229	138	367	626	--	259
28	321	172	493	610	--	117
29	481	212	693	610	83	--
30	672	321	993	590	403	--
Total sec-ft.	3293 (22-30)	1664 (22-30)	4957 (22-30)	5298 (21-30)	3717	664
Mean	366	185	551	530	124	22.1
Ac-ft.	6530	3300	9830	10510	7379	1315

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER
APRIL - 1939.

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	175	--	120	295	--	295
2	181	--	140	321	--	321
3	189	--	180	369	--	369
4	195	--	190	385	--	385
5	198	--	170	368	--	368
6	208	--	157	365	--	365
7	181	--	150	331	--	331
8	162	--	140	302	--	302
9	187	--	130	317	--	317
10	224	--	120	344	--	344
11	241	--	114	355	--	355
12	256	--	114	370	--	370
13	271	--	114	385	--	385
14	286	--	114	400	--	400
15	310	--	113	423	--	423
16	310	--	113	423	--	423
17	327	--	113	440	--	440
18	335	--	113	448	--	448
19	351	--	113	464	--	464
20	390	--	113	503	--	503
21	426	7	161	594	--	594
22	416	138	262	816	--	816
23	416	344	272	1032	--	1032
24	489	495	161	1145	--	1145
25	685	522	4	1211	--	1211
26	766	535	--	1301	4	1297
27	796	549	--	1345	77	1268
28	845	588	--	1433	207	1226
29	963	607	--	1570	259	1311
30	1190	618	--	1808	117	1691
Total sec-ft.	11969	4403	3491	19863	664	19199
Mean	399	(21-30) 440	116	662	22.1	640
Ac-ft.	23740	8730	6926	39392	1315	38080

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.
APRIL - 1939.

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	295	74	--	74	--	120	120	46	--
2	321	80	--	80	--	140	140	60	--
3	369	92	--	92	--	180	180	88	--
4	385	96	--	96	--	190	190	94	--
5	368	92	--	92	--	170	170	78	--
6	365	91	--	91	--	157	157	66	--
7	331	83	--	83	--	150	150	67	--
8	302	76	--	76	--	140	140	64	--
9	317	79	--	79	--	130	130	51	--
10	344	86	--	86	--	120	120	34	--
11	355	89	--	89	--	114	114	25	--
12	370	92	--	92	--	114	114	22	--
13	385	96	--	96	--	114	114	18	--
14	400	100	--	100	--	114	114	14	--
15	423	106	--	106	--	113	113	7	--
16	423	106	--	106	--	113	113	7	--
17	440	110	--	110	--	113	113	3	--
18	448	112	--	112	--	113	113	1	--
19	464	116	--	116	--	113	113	--	3
20	503	126	--	126	--	113	113	--	13
21	594	148	--	148	7	161	168	20	--
22	816	241	--	241	138	262	400	159	--
23	1032	349	--	349	344	272	616	267	--
24	1145	406	--	406	495	161	656	250	--
25	1211	439	--	439	522	4	526	87	--
26	1297	482	4	486	535	---	535	49	--
27	1268	467	77	544	549	---	549	5	--
28	1226	446	207	653	588	---	588	--	65
29	1311	489	259	748	607	---	607	--	141
30	1691	679	117	796	618	---	618	--	178
Total sec-ft.	19199	6048	664	6712	4403 (21-30)	3491	7894	1582	400
Mean	640	202	22.1	224	440	116	263	52.7	13.3
Ac-ft.	38080	12020	1315	13335	8730	6926	15656	3136	791

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA
APRIL - 1939.

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	295	221	175	--	--	46
2	321	241	181	--	--	60
3	369	277	189	--	--	88
4	385	289	195	--	--	94
5	368	276	198	--	--	78
6	365	274	208	--	--	66
7	331	248	181	--	--	67
8	302	226	162	--	--	64
9	317	238	187	21	--	51
10	344	258	224	44	--	34
11	355	266	241	94	--	25
12	370	278	256	116	--	22
13	385	289	271	116	--	18
14	400	300	286	123	--	14
15	423	317	310	129	--	7
16	423	317	310	119	--	7
17	440	330	327	125	--	3
18	448	336	335	118	--	1
19	464	348	351	158	3	--
20	503	377	390	241	13	--
21	594	446	426	292	--	20
22	816	575	416	266	--	159
23	1032	683	416	274	--	267
24	1145	739	486	322	--	250
25	1211	772	685	407	--	87
26	1297	815	766	402	--	49
27	1268	801	796	493	--	5
28	1226	780	845	520	65	--
29	1311	822	963	618	141	--
30	1691	1012	1190	618	178	--
Total sec-ft.	19199	13151	11969	5616 (9-30)	400	1582
Mean	640	438	399	255	13.3	52.7
Ac-ft.	38080	26080	23740	11140	791	3136

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR MAY - 1939.

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	541	200	741	453	288	---
2	458	251	709	198	511	
3	522	203	725	3	722	
4	625	233	858	3	855	
5	560	219	779	3	776	
6	418	222	640	2	638	
7	318	127	445	2	443	
8	271	97	368	228	140	
9	274	120	394	375	19	
10	299	129	428	370	58	
11	318	112	430	370	60	
12	345	118	463	365	98	
13	379	100	479	362	117	
14	447	145	592	365	227	
15	568	204	772	236	536	
16	614	182	796	2	794	
17	637	188	825	1	824	
18	587	112	699	1	698	
19	469	168	637	1	636	
20	379	94	473	1	472	
21	325	105	430	1	429	
22	312	139	451	1	450	
23	287	88	375	1	374	
24	253	45	298	1	297	
25	244	120	364	1	363	
26	290	117	407	1	406	
27	365	130	495	1	494	
28	451	239	690	1	689	
29	680	145	825	1	824	
30	926	319	1245	1	1244	
31	587	202	789	2	787	---
Total sec-ft.	13749	4873	18622	3353	15269	---
Mean	444	157	601	108	493	---
Ac-ft.	27270	9654	36926	6640	30286	---

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
MAY - 1939.

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	1360	630	83	2073	--	2073
2	1380	636	403	2419		2419
3	1290	638	288	2216		2216
4	1290	641	511	2442		2442
5	1340	645	722	2707		2707
6	1360	649	855	2864		2864
7	1270	645	776	2691		2691
8	1170	643	638	2451		2451
9	1150	641	443	2234		2234
10	1160	641	140	1941		1941
11	1120	639	19	1778		1778
12	1100	639	58	1797		1797
13	1090	638	60	1788		1788
14	1130	639	98	1867		1867
15	1200	641	117	1958		1958
16	1280	651	227	2158		2158
17	1300	685	536	2521		2521
18	1400	691	794	2885		2885
19	1440	694	824	2958		2958
20	1370	691	698	2759		2759
21	1230	689	636	2555		2555
22	1140	685	472	2297		2297
23	1080	681	429	2190		2190
24	1250	427	450	2127		2127
25	1560	11	374	1945		1945
26	1460	--	297	1757		1757
27	1180	164	363	1707		1707
28	903	497	406	1806		1806
29	999	510	494	2003		2003
30	1300	544	689	2533		2533
31	1480	655	824	2959	--	2959
Total sec-ft.	38782	17880	13724	70386	--	70386
Mean	1251	577	443	2271	--	2271
Ac-ft.	76920	35460	27230	139610	--	139610

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A
MAY - 1939.

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	2073	870	--	870	630	83	713	--	157
2	2419	1043		1043	636	403	1039	--	4
3	2216	941		941	638	288	926	--	15
4	2442	1054		1054	641	511	1152	98	--
5	2707	1187		1187	645	722	1367	180	--
6	2864	1265		1265	649	855	1504	239	--
7	2691	1179		1179	645	776	1421	242	--
8	2451	1059		1059	643	638	1281	222	--
9	2234	950		950	641	443	1084	134	--
10	1941	804		804	641	140	781	--	23
11	1778	772		772	639	19	658	--	64
12	1797	732		732	639	58	697	--	35
13	1788	727		727	638	60	698	--	29
14	1867	767		767	639	98	737	--	30
15	1958	812		812	641	117	758	--	54
16	2158	912		912	651	227	878	--	34
17	2521	1094		1094	685	536	1221	127	--
18	2885	1276		1276	691	794	1485	209	--
19	2958	1312		1312	694	824	1518	206	--
20	2759	1213		1213	691	698	1389	176	--
21	2555	1111		1111	689	636	1325	214	--
22	2297	982		982	685	472	1157	175	--
23	2190	928		928	681	429	1110	182	--
24	2127	897		897	427	450	877	--	20
25	1945	806		806	11	374	385	--	421
26	1757	712		712	--	297	297	--	415
27	1707	687		687	164	363	527	--	160
28	1806	736		736	497	406	903	167	--
29	2003	835		835	510	494	1004	169	--
30	2533	1100		1100	544	689	1233	133	--
31	2959	1313	--	1313	655	824	1479	166	--
Total sec-ft.	70386	30026	--	30026	17880	13724	31604	3039	1461
Mean	2271	969	--	969	577	443	1020	98	47
Ac-ft.	139610	59560	--	59560	35460	27230	62690	6026	2896

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA
MAY - 1939.

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	2073	1203	1360	652	157	--
2	2419	1376	1380	735	4	--
3	2216	1275	1290	849	15	--
4	2442	1388	1290	908	--	98
5	2707	1520	1340	962	--	180
6	2864	1599	1360	974	--	239
7	2691	1512	1270	925	--	242
8	2451	1392	1170	928	--	222
9	2234	1284	1150	945	--	134
10	1941	1137	1160	948	23	--
11	1778	1056	1120	933	64	--
12	1797	1065	1100	925	35	--
13	1788	1061	1090	919	29	--
14	1867	1100	1130	933	30	--
15	1958	1146	1200	977	54	--
16	2158	1246	1280	994	34	--
17	2521	1427	1300	1000	--	127
18	2885	1609	1400	1010	--	209
19	2958	1646	1440	1010	--	206
20	2759	1546	1370	983	--	176
21	2555	1444	1230	974	--	214
22	2297	1315	1140	930	--	175
23	2190	1262	1080	628	--	182
24	2127	1230	1250	430	20	--
25	1945	1139	1560	584	421	--
26	1757	1045	1460	601	415	--
27	1707	1020	1180	601	160	--
28	1806	1070	903	652	--	167
29	2003	1168	999	769	--	169
30	2533	1433	1300	777	--	133
31	2959	1646	1480	769	--	166
Total sec-ft.	70386	40360	38782	26224	1461	3039
Mean	2271	1300	1250	840	47	98
Ac-ft.	139610	80050	76920	52010	2896	6026

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR
JUNE - 1939.

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	396	149	545	2	543	---
2	309	146	455	2	453	---
3	277	156	433	2	431	---
4	274	76	350	2	348	---
5	277	77	354	234	120	---
6	259	112	371	339	32	---
7	250	78	328	382	---	54
8	247	85	332	238	94	---
9	259	91	350	499	---	149
10	265	96	361	499	---	138
11	268	91	359	502	---	143
12	268	91	359	475	---	116
13	265	135	400	440	---	40
14	280	110	390	402	---	12
15	277	126	403	373	30	---
16	271	126	397	373	24	---
17	256	109	365	388	---	23
18	244	109	353	393	---	40
19	265	78	343	399	---	56
20	328	85	413	487	---	74
21	341	122	463	393	70	---
22	338	84	422	573	---	151
23	358	99	457	363	94	---
24	321	94	415	214	201	---
25	280	103	383	214	169	---
26	250	47	297	252	45	---
27	229	58	287	312	---	25
28	238	83	321	312	9	---
29	287	114	401	441	---	40
30	341	81	422	537	---	115
Total sec-ft.	8518	3011	11529	10043	2663	1176
Mean	284	100	384	335	89	40
Ac-ft.	16900	5950	22850	19920	5300	2380

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
JUNE - 1939.

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	1490	696	1244	3430	---	3430
2	1350	704	787	2841	---	2841
3	1190	698	543	2431	---	2431
4	1040	691	453	2184	---	2184
5	912	683	431	2026	---	2026
6	946	685	348	1979	---	1979
7	955	687	120	1762	---	1762
8	929	685	32	1646	---	1646
9	829	679	---	1508	54	1454
10	870	679	94	1643	---	1643
11	870	681	---	1551	149	1402
12	886	679	---	1565	138	1427
13	895	679	---	1574	143	1431
14	963	679	---	1642	116	1526
15	946	679	---	1625	40	1585
16	990	677	---	1667	12	1655
17	920	676	30	1626	---	1626
18	895	676	24	1595	---	1595
19	878	676	---	1554	23	1531
20	845	672	---	1517	40	1477
21	895	677	---	1572	56	1516
22	903	677	---	1580	74	1506
23	972	679	70	1721	---	1721
24	903	676	---	1579	151	1428
25	804	670	94	1568	---	1568
26	751	668	201	1620	---	1620
27	700	664	169	1533	---	1533
28	678	660	45	1383	---	1383
29	664	662	---	1326	25	1301
30	728	676	9	1413	---	1413
Total sec-ft.	27597	20370	4694	52661	1021	51640
Mean	920	679	156	1755	34	1721
Ac-ft.	54740	40400	9290	104430	2023	102407

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.
JUNE - 1939.

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	3430	1548	--	1548	696	1244	1940	392	--
2	2841	1254	--	1254	704	787	1491	237	--
3	2431	1049	--	1049	698	543	1241	192	--
4	2184	925	--	925	691	453	1144	219	--
5	2026	846	--	846	683	431	1114	268	--
6	1979	823	--	823	685	348	1033	210	--
7	1762	714	--	714	687	120	807	93	--
8	1646	656	--	656	685	32	717	61	--
9	1454	560	54	614	679	--	679	65	--
10	1643	655	--	655	679	94	773	118	--
11	1402	534	149	683	681	--	681	--	2
12	1427	547	138	685	679	--	679	--	6
13	1431	549	143	692	679	--	679	--	13
14	1526	596	116	712	679	--	679	--	33
15	1585	626	40	666	679	--	679	13	--
16	1655	661	12	673	677	--	677	4	--
17	1626	646	--	646	676	30	706	60	--
18	1595	631	--	631	676	24	700	69	--
19	1531	599	23	622	676	--	676	54	--
20	1477	572	40	612	672	--	672	60	--
21	1516	591	56	647	677	--	677	30	--
22	1506	586	74	660	677	--	677	17	--
23	1721	694	--	694	679	70	749	55	--
24	1428	547	151	698	676	--	676	--	22
25	1568	617	--	617	670	94	764	147	--
26	1620	643	--	643	668	201	869	226	--
27	1533	600	--	600	664	169	833	233	--
28	1383	525	--	525	660	45	705	180	--
29	1301	484	25	509	662	--	662	153	--
30	1413	540	--	540	676	9	685	145	--
Total sec-ft.	51640	20813	1021	21839	20370	4694	25064	3301	76
Mean	1721	694	34	728	679	156	835	110	2.5
Ac-ft.	102407	41290	2023	43313	40400	9290	49690	6527	150

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA
JUNE - 1939.

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	3430	1882	1490	742	--	392
2	2841	1587	1350	728	--	237
3	2431	1382	1190	723	--	192
4	2184	1259	1040	696	--	219
5	2026	1180	912	645	--	268
6	1979	1156	946	572	--	210
7	1762	1048	955	491	--	93
8	1646	990	929	491	--	61
9	1454	894	829	484	--	65
10	1643	988	870	467	--	118
11	1402	868	870	395	2	--
12	1427	880	886	386	6	--
13	1431	882	895	375	13	--
14	1526	930	963	318	33	--
15	1585	959	946	256	--	13
16	1655	994	990	191	--	4
17	1626	980	920	163	--	60
18	1595	964	895	170	--	69
19	1531	932	878	159	--	54
20	1477	905	845	152	--	60
21	1516	925	895	174	--	30
22	1506	920	903	157	--	17
23	1721	1027	972	183	--	55
24	1428	881	903	153	22	--
25	1568	951	804	140	--	147
26	1620	977	751	158	--	226
27	1533	933	700	159	--	233
28	1383	858	678	173	--	180
29	1301	817	664	176	--	153
30	1413	873	728	173	--	145
Total sec-ft.	51640	30822	27597	10250	76	3301
Mean	1721	1030	920	342	2.5	110
Ac-ft.	102407	61117	54738	20330	150	6527

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR JULY - 1939.

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	355	63	418	537	--	119
2	325	63	388	439	--	51
3	290	81	371	323	48	--
4	268	95	363	323	40	--
5	259	76	335	247	88	--
6	244	34	278	528	--	250
7	226	26	252	528	--	276
8	218	30	248	450	--	202
9	215	70	285	319	--	34
10	224	66	290	349	--	59
11	250	80	330	462	--	132
12	284	36	320	521	--	201
13	271	62	333	521	--	188
14	241	72	313	518	--	205
15	232	58	290	518	--	228
16	215	50	265	511	--	246
17	185	30	215	548	--	333
18	161	32	193	552	--	359
19	154	27	181	826	--	645
20	148	38	186	810	--	624
21	136	30	166	795	--	629
22	134	25	159	785	--	626
23	144	58	202	765	--	563
24	154	104	258	775	--	517
25	161	59	220	826	--	606
26	169	120	289	826	--	537
27	177	75	252	826	--	574
28	174	48	222	836	--	614
29	174	78	252	842	--	590
30	164	74	238	836	--	598
31	159	57	216	836	--	620
Total sec-ft.	6511	1817	8328	18778	176	10626
Mean	210	59	269	606	5.7	343
Ac-ft.	12910	3603	16513	37250	350	21087

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
JULY - 1939.

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	796	687	--	1483	40	1443
2	853	693	--	1546	115	1431
3	829	691	--	1520	119	1401
4	781	689	--	1470	51	1419
5	736	683	48	1467	---	1467
6	740	681	40	1461	---	1461
7	743	687	88	1518	---	1518
8	743	685	--	1428	250	1178
9	685	674	--	1359	276	1083
10	618	664	--	1282	202	1080
11	598	672	--	1270	34	1236
12	631	681	--	1312	59	1253
13	678	687	--	1365	132	1233
14	707	694	--	1401	201	1200
15	707	694	--	1401	188	1213
16	692	694	--	1386	205	1181
17	685	696	--	1381	228	1153
18	638	693	--	1331	246	1085
19	618	693	--	1311	333	978
20	671	698	--	1369	359	1010
21	678	698	--	1376	645	731
22	671	698	--	1369	624	745
23	631	702	--	1333	629	704
24	618	698	--	1316	626	690
25	605	698	--	1303	563	740
26	605	694	--	1299	517	782
27	624	700	--	1324	606	718
28	624	700	--	1324	537	787
29	631	700	--	1331	574	757
30	638	700	--	1338	614	724
31	624	700	--	1324	590	734
Total sec-ft.	21098	21424	176	42698	9563	33135
Mean	681	691	5.7	1377	308	1069
Ac-ft.	41850	42490	350	84690	18970	65720

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.
JULY - 1939.

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	1443	555	40	595	687	--	687	92	--
2	1431	549	115	664	693	--	693	29	--
3	1401	534	119	653	691	--	691	38	--
4	1419	543	51	594	689	--	689	95	--
5	1467	567	--	567	683	48	731	164	--
6	1461	564	--	564	681	40	721	157	--
7	1518	592	--	592	687	88	775	183	--
8	1178	422	250	672	685	--	685	13	--
9	1083	375	276	651	674	--	674	23	--
10	1080	373	202	575	664	--	664	89	--
11	1236	451	34	485	672	--	672	187	--
12	1253	460	59	519	681	--	681	162	--
13	1233	450	132	582	687	--	687	105	--
14	1200	433	201	634	694	--	694	60	--
15	1213	440	188	628	694	--	694	66	--
16	1181	424	205	629	694	--	694	65	--
17	1153	410	228	638	696	--	696	58	--
18	1085	376	246	622	693	--	693	71	--
19	978	322	333	655	693	--	693	38	--
20	1010	338	359	697	698	--	698	1	--
21	731	199	645	844	698	--	698	--	146
22	745	206	624	830	698	--	698	--	132
23	704	185	629	814	702	--	702	--	112
24	690	178	626	804	698	--	698	--	106
25	740	203	563	766	698	--	698	--	68
26	782	224	517	741	694	--	694	--	47
27	718	192	606	798	700	--	700	--	98
28	787	227	537	764	700	--	700	--	64
29	757	212	574	786	700	--	700	--	86
30	724	195	614	809	700	--	700	--	109
31	734	200	590	790	700	--	700	--	90
Total sec-ft.	33135	11399	9563	20962	21424	176	21600	1696	1058
Mean	1069	368	308	676	691	5.7	697	55	34
Ac-ft.	65720	22610	18970	41580	42490	350	42840	3360	2100

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA
JULY - 1939.

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	1443	888	796	187	--	92
2	1431	882	853	182	--	29
3	1401	867	829	168	--	38
4	1419	876	781	215	--	95
5	1467	900	736	234	--	164
6	1461	897	740	232	--	157
7	1518	926	743	241	--	183
8	1178	756	743	266	--	13
9	1083	708	685	362	--	23
10	1080	707	618	362	--	89
11	1236	785	598	393	--	187
12	1253	793	631	487	--	162
13	1233	783	678	514	--	105
14	1200	767	707	613	--	60
15	1213	773	707	622	--	66
16	1181	757	692	610	--	65
17	1153	743	685	594	--	58
18	1085	709	638	577	--	71
19	978	656	618	565	--	38
20	1010	672	671	618	--	1
21	731	532	678	625	146	--
22	745	539	671	613	132	--
23	704	519	631	577	112	--
24	690	512	618	555	106	--
25	740	537	605	548	68	--
26	782	558	605	543	47	--
27	718	526	624	565	98	--
28	787	560	624	572	64	--
29	757	545	631	582	86	--
30	724	529	638	591	109	--
31	734	534	624	584	90	--
Total sec-ft.	33135	21736	21098	14407	1058	1696
Mean	1069	701	681	465	34	55
Ac-ft.	65720	43110	41850	28580	2100	3360

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR AUGUST - 1939.

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	148	35	183	826	--	643
2	141	78	219	836		617
3	129	81	210	836		626
4	124	82	206	831		625
5	119	31	150	836		686
6	114	98	212	852		640
7	109	17	126	836		710
8	96	36	132	836		704
9	91	36	127	731		604
10	86	20	106	634		528
11	84	24	108	610		502
12	91	28	119	566		447
13	93	30	123	508		385
14	100	26	126	486		360
15	98	20	118	394		276
16	96	20	116	383		267
17	96	12	108	368		260
18	96	18	114	373		259
19	89	12	101	358		257
20	80	10	90	294		204
21	76	18	94	272		178
22	74	17	91	263		172
23	67	10	77	237		160
24	67	10	77	241		164
25	69	10	79	270		191
26	80	24	104	280		176
27	82	10	92	210		118
28	82	19	101	178		77
29	74	28	102	169		67
30	61	15	76	120		44
31	59	5	64	115		51
Total sec-ft.	2871	880	3751	14749	--	10998
Mean	93	28.4	121	476	--	355
Ac-ft.	5690	1750	7440	29250	--	21790

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER
AUGUST - 1939.

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	612	696	--	1308	598	710
2	598	696		1294	620	674
3	580	694		1274	643	631
4	568	693		1261	617	644
5	550	693		1243	626	617
6	527	691		1218	625	593
7	527	691		1218	686	532
8	500	689		1189	640	549
9	500	693		1193	710	483
10	454	681		1135	704	431
11	416	651		1067	604	463
12	364	645		1009	528	481
13	310	636		946	502	444
14	286	600		886	447	439
15	351	506		857	385	472
16	298	486		784	360	424
17	294	449		743	276	467
18	275	425		700	267	433
19	279	393		672	260	412
20	343	328		671	259	412
21	298	320		618	257	361
22	286	306		592	204	388
23	275	288		563	178	385
24	282	247		529	172	357
25	318	204		522	160	362
26	322	202		524	164	360
27	318	201		519	191	328
28	302	198		500	176	324
29	290	179		469	118	351
30	314	132		446	77	369
31	294	119	--	413	67	346
Total sec-ft.	11931	14432	--	26363	12121	14242
Mean	385	466	--	851	392	459
Ac-ft.	23660	28630	--	52290	24040	28250

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.
AUGUST - 1939.

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	710	188	598	786	696	--	696	--	90
2	674	170	620	790	696		696	--	94
3	631	158	643	801	694		694	--	107
4	644	161	617	778	693		693	--	85
5	617	154	626	780	693		693	--	87
6	593	148	625	773	691		691	--	82
7	532	133	686	819	691		691	--	128
8	549	137	640	777	689		689	--	88
9	483	121	710	831	693		693	--	138
10	431	108	704	812	681		681	--	131
11	463	116	604	720	651		651	--	69
12	481	120	528	648	645		645	--	3
13	444	111	502	613	636		636	23	--
14	439	110	447	557	600		600	43	--
15	472	118	385	503	506		506	3	--
16	424	106	360	466	486		486	20	--
17	467	117	276	393	449		449	56	--
18	433	108	267	375	425		425	50	--
19	412	103	260	363	393		393	30	--
20	412	103	259	362	328		328	--	34
21	361	90	257	347	320		320	--	27
22	388	97	204	301	306		306	5	--
23	385	96	178	274	288		288	14	--
24	357	89	172	261	247		247	--	14
25	362	90	160	250	204		204	--	46
26	360	90	164	254	202		202	--	52
27	328	82	191	273	201		201	--	72
28	324	81	176	257	198		198	--	59
29	351	88	118	206	179		179	--	27
30	369	92	77	169	132		132	--	37
31	346	86	67	153	119	--	119	--	34
Total sec-ft.	14242	3571	12121	15692	14432	--	14432	244	1504
Mean	459	115	392	507	466	--	466	8	49
Ac-ft.	28250	7080	24040	31120	28630	--	28630	490	2980

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA
AUGUST - 1939.

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	deficit delivered
1	710	522	612	567	90	--
2	674	504	598	548	94	--
3	631	473	580	532	107	--
4	644	483	568	516	85	--
5	617	463	550	485	87	--
6	593	445	527	467	82	--
7	532	399	527	472	128	--
8	549	412	500	449	88	--
9	483	362	500	445	138	--
10	431	323	454	406	131	--
11	463	347	416	373	69	--
12	481	361	364	322	3	--
13	444	333	310	274	--	23
14	439	329	296	253	--	43
15	472	354	351	315	--	3
16	424	318	298	270	--	20
17	467	350	294	265	--	56
18	433	325	275	245	--	50
19	412	309	279	248	--	30
20	412	309	343	308	34	--
21	361	271	298	270	27	--
22	388	291	286	256	--	5
23	385	289	275	241	--	14
24	357	268	282	251	14	--
25	362	272	318	283	46	--
26	360	270	322	284	52	--
27	328	246	318	278	72	--
28	324	243	302	265	59	--
29	351	263	290	252	27	--
30	369	277	314	275	37	--
31	346	260	294	258	34	--
Total sec-ft.	14242	10671	11931	10681	1504	244
Mean	459	344	385	345	49	8
Ac-ft.	28250	21170	23660	21190	2980	490

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR SEPTEMBER - 1939.

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	59	14	73	108	--	35
2	58	14	72	109	--	37
3	52	22	74	52	22	--
4	50	36	86	3	83	--
5	58	30	88	3	85	--
6	71	22	93	3	90	--
7	67	27	94	3	91	--
8	54	21	75	2	73	--
9	50	22	72	2	70	--
10	49	19	68	2	66	--
11	49	19	68	2	66	--
12	50	24	74	2	72	--
13	52	24	76	2	74	--
14	49	20	69	2	67	--
15	49	20	69	2	67	--
16	45	20	65	1	64	--
17	49	20	69	1	68	--
18	49	20	69	1	68	--
19	49	27	76	1	75	--
20	50	38	88	1	87	--
21	52	14	66	1	65	--
22	52	46	98	1	97	--
23	52	55	107	1	106	--
24	61	56	117	1	116	--
25	59	20	79	1	78	--
26	50	48	98	0	98	--
27	41	24	65	0	65	--
28	42	15	57	0	57	--
29	39	19	58	0	58	--
30	37	10	47	0	47	--
Total sec-ft.	1544	766	2310	307	2075	72
Mean	51	26	77	10.2	69.2	2.4
Ac-ft.	3065	1517	4582	607	4118	143

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
SEPTEMBER - 1939.

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	290	100	--	390	44	346
2	275	98	--	373	51	322
3	286	88	--	374	35	339
4	302	29	--	331	37	294
5	282	23	22	327	--	327
6	294	19	83	396	--	396
7	271	18	85	374	--	374
8	256	7	90	353	--	353
9	245	--	91	336	--	336
10	234	--	73	307	--	307
11	221	--	70	291	--	291
12	217	--	66	283	--	283
13	224	--	66	290	--	290
14	214	--	72	286	--	286
15	214	--	74	288	--	288
16	201	--	67	268	--	268
17	187	--	67	254	--	254
18	178	--	64	242	--	242
19	175	--	68	243	--	243
20	170	--	68	238	--	238
21	167	--	75	242	--	242
22	167	--	87	254	--	254
23	167	--	65	232	--	232
24	187	--	97	284	--	284
25	205	--	106	311	--	311
26	189	--	116	305	--	305
27	187	--	78	265	--	265
28	192	--	98	290	--	290
29	187	--	65	252	--	252
30	178	--	57	235	--	235
Total sec-ft.	6562	382 (1-8)	1970	8914	167	8747
Mean	218	47.8	66	297	5.5	292
Ac-ft.	13020	750	3910	17680	330	17350

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.
SEPTEMBER - 1939.

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	346	86	44	130	100	--	100	--	30
2	322	80	51	131	98	--	98	--	33
3	339	85	35	120	88	--	88	--	32
4	294	74	37	111	29	--	29	--	82
5	327	82	--	82	23	22	45	--	37
6	396	99	--	99	19	83	102	3	--
7	374	94	--	94	18	85	103	9	--
8	353	88	--	88	7	90	97	9	--
9	336	84	--	84	--	91	91	7	--
10	307	77	--	77	--	73	73	--	4
11	291	73	--	73	--	70	70	--	3
12	283	71	--	71	--	66	66	--	5
13	290	72	--	72	--	66	66	--	6
14	286	72	--	72	--	72	72	--	--
15	288	72	--	72	--	74	74	2	--
16	268	67	--	67	--	67	67	--	--
17	254	64	--	64	--	67	67	3	--
18	242	60	--	60	--	64	64	4	--
19	243	61	--	61	--	68	68	7	--
20	238	60	--	60	--	68	68	8	--
21	242	60	--	60	--	75	75	15	--
22	254	64	--	64	--	87	87	23	--
23	232	58	--	58	--	65	65	7	--
24	284	71	--	71	--	97	97	26	--
25	311	78	--	78	--	106	106	28	--
26	305	76	--	76	--	116	116	40	--
27	265	66	--	66	--	78	78	12	--
28	290	72	--	72	--	98	98	26	--
29	252	63	--	63	--	65	65	2	--
30	235	59	--	59	--	57	57	--	2
Total sec-ft.	8747	2188	167	2355	382 (1-8)	1970	2358	231	234
Mean	292	73	5.5	78	47.8	66	79	7.7	7.8
Ac-ft.	17350	4340	330	4670	750	3910	4660	458	464

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA
SEPTEMBER - 1939.

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	346	260	290	252	30	--
2	322	242	275	241	33	--
3	339	254	286	233	32	--
4	294	220	320	266	82	--
5	327	245	282	248	37	--
6	396	297	294	252	--	3
7	374	280	271	234	--	9
8	353	265	256	226	--	9
9	336	252	245	215	--	7
10	307	230	234	209	4	--
11	291	218	221	197	3	--
12	283	212	217	194	5	--
13	290	218	224	196	6	--
14	286	214	214	191	--	--
15	288	216	214	193	--	2
16	268	201	201	181	--	--
17	254	190	187	172	--	3
18	242	182	178	166	--	4
19	243	182	175	160	--	7
20	238	178	170	160	--	8
21	242	182	167	155	--	15
22	254	190	167	150	--	23
23	232	174	167	155	--	7
24	284	213	187	163	--	26
25	311	233	205	183	--	28
26	305	229	189	169	--	40
27	265	199	187	169	--	12
28	290	218	192	172	--	26
29	252	189	187	168	--	2
30	235	176	178	166	2	--
Total sec-ft.	8747	6559	6562	5836	234	231
Mean	292	219	219	195	7.8	7.7
Ac-ft.	17350	13010	13020	11580	464	458

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR
OCTOBER - 1939.

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	37	11	48	0	48	--
2	37	23	60	0	60	--
3	34	19	53	0	53	--
4	32	16	48	0	48	--
5	39	20	59	0	59	--
6	42	25	67	0	67	--
7	41	11	52	0	52	--
8	37	10	47	0	47	--
9	32	9	41	0	41	--
10	29	31	60	0	60	--
11	29	27	56	0	56	--
12	26	8	34	0	34	--
13	28	6	34	0	34	--
14	30	7	37	0	37	--
15	28	12	40	0	40	--
16	30	25	55	0	55	--
17	29	30	59	0	59	--
18	29	30	59	0	59	--
19	28	24	52	0	52	--
20	29	10	39	35	4	--
21	19	10	29	56	--	27
22	23	10	33	47	--	14
23	28	10	38	48	--	10
24	39	10	49	64	--	15
25	39	7	46	73	--	27
26	35	23	58	73	--	15
27	34	31	65	73	--	8
28	32	41	73	73	--	--
29	37	21	58	73	--	15
30	35	20	55	98	--	43
31	35	20	55	118	--	63
Total sec-ft.	1002	557	1559	831	965	237
Mean	32.3	18.0	50.3	26.8	31.1	7.6
Ac-ft.	1990	1110	3100	1650	1920	470

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER
OCTOBER - 1939.

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	170	--	58	228	--	228
2	164	--	47	211	--	211
3	162	--	48	210	--	210
4	162	--	60	222	--	222
5	162	--	53	215	--	215
6	154	--	48	202	--	202
7	154	--	59	213	--	213
8	150	--	67	217	--	217
9	144	--	52	196	--	196
10	142	--	47	189	--	189
11	140	--	41	181	--	181
12	138	--	60	198	--	198
13	129	--	56	185	--	185
14	127	--	34	161	--	161
15	127	--	34	161	--	161
16	127	--	37	164	--	164
17	125	--	40	165	--	165
18	123	--	55	178	--	178
19	118	--	59	177	--	177
20	111	36	59	206	--	206
21	96	100	52	248	--	248
22	81	94	4	179	--	179
23	66	94	--	160	27	133
24	51	91	--	142	14	128
25	35	118	--	153	10	143
26	94	103	--	197	15	182
27	94	121	--	215	27	188
28	58	137	--	195	15	180
29	71	137	--	208	8	200
30	40	140	--	180	--	180
31	58	145	--	203	15	188
Total sec-ft.	3573	1316 (20-31)	1070	5959	131	5828
Mean	115	110	34.5	192	4.2	188
Ac-ft.	7090	2610	2120	11820	260	11560

DIVISION OF WATER OF ST.MARY RIVER
WATER AVAILABLE FOR USE AND USED BY U.S.A.
OCTOBER - 1939.

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	228	57	--	57	--	58	58	1	--
2	211	53	--	53	--	47	47	--	6
3	210	52	--	52	--	48	48	--	4
4	222	56	--	56	--	60	60	4	--
5	215	54	--	54	--	53	53	--	1
6	202	50	--	50	--	48	48	--	2
7	213	53	--	53	--	59	59	6	--
8	217	54	--	54	--	67	67	13	--
9	196	49	--	49	--	52	52	3	--
10	189	47	--	47	--	47	47	--	--
11	181	45	--	45	--	41	41	--	4
12	198	50	--	50	--	60	60	10	--
13	185	46	--	46	--	56	56	10	--
14	161	40	--	40	--	34	34	--	6
15	161	40	--	40	--	34	34	--	6
16	164	41	--	41	--	37	37	--	4
17	165	41	--	41	--	40	40	--	1
18	178	44	--	44	--	55	55	11	--
19	177	44	--	44	--	59	59	15	--
20	206	52	--	52	36	59	95	43	--
21	248	62	--	62	100	52	152	90	--
22	179	45	--	45	94	4	98	53	--
23	133	33	27	60	94	--	94	34	--
24	128	32	14	46	91	--	91	45	--
25	143	36	10	46	118	--	118	72	--
26	182	46	15	61	103	--	103	42	--
27	188	47	27	74	121	--	121	47	--
28	180	45	15	60	137	--	137	77	--
29	200	50	8	58	137	--	137	79	--
30	180	45	0	45	140	--	140	95	--
31	188	47	15	62	145	--	145	83	--
Total sec-ft.	5828	1456	131	1587	1316 (20-31)	1070	2386	833	34
Mean	188	47	4.2	51	110	34.5	77	27	1
Ac-Ft.	11560	2890	260	3150	2610	2120	4730	1640	62

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE AND USED BY CANADA
OCTOBER - 1939.

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	228	171	170	157	--	1
2	211	158	164	157	6	--
3	210	158	162	150	4	--
4	222	166	162	157	--	4
5	215	161	162	151	1	--
6	202	152	154	149	2	--
7	213	160	154	146	--	6
8	217	163	150	143	--	13
9	196	147	144	137	--	3
10	189	142	142	133	--	--
11	181	136	140	131	4	--
12	198	148	138	125	--	10
13	185	139	129	120	--	10
14	161	121	127	120	6	--
15	161	121	127	120	6	--
16	164	123	127	119	4	--
17	165	124	125	---	1	--
18	178	134	123	---	--	11
19	177	133	118	---	--	15
20	206	154	111	---	--	43
21	248	186	96	---	--	90
22	179	134	81	---	--	53
23	133	100	66	---	--	34
24	128	96	51	---	--	45
25	143	107	35	---	--	72
26	182	136	94	---	--	42
27	188	141	94	---	--	47
28	180	135	58	---	--	77
29	200	150	71	---	--	79
30	180	135	40	---	--	95
31	188	141	58	---	--	83
Total sec-ft.	5828	4372	3573	2215 (1-16)	34	833
Mean	188	161	115	138	1	27
Ac-ft.	11560	8~~4~~670	7090	4390	62	1640

DIVISION OF ST. MARY RIVER

CANADA

1939

Water available in Acre-Feet.

Month	St. Mary R. at Kimball	Rolph Creek	Lee Creek	Pothole Creek	Combined Flow
April	23,740	191	2,430	7	26,368
May	76,920	65	1,660	--	78,645
June	54,740	254	3,070	37	58,101
July	41,850	20	779	--	42,649
August	23,660	--	212	--	23,872
September	13,020	2	424	--	13,446
October	7,090	20	700[e]	--	7,810
Total	241,020	552	9,275	44	250,891[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	11,140	- 359	3,831	6,950	16,720
May	52,010	- 225	8,345	43,440	35,350
June	20,330	+ 674	11,314	9,690	51,340
July	28,580	+ 678	3,498	25,760	15,460
August	21,190	+ 256	118	21,328	1,070
September	11,580	- 118	174	11,288	1,250
October	4,390	+ 874	847	4,417	3,700[e]
Total	149,220[b]	+ 1,780[c]	28,127[d]	122,873[f]	124,890[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 diversions by laterals.
x - Below all points of diversion.

DIVISION OF ST. MARY RIVER
UNITED STATES
1939
Water available in Acre-Feet

Month	St. Mary River: U. S. Share	St. Mary River: Sherburne Res. Stored	St. Mary River: Sherburne Res. Released	St. Mary River: Total Available for Diversion	Diverted	Unused	Total Flow Milk River Eastern Crossing
April	12,020	6,926	1,315	13,335	8,730	4,605	9,930
May	59,560	27,230		59,560	35,460	24,100	37,050
June	41,290	9,290	2,023	43,313	40,400	2,913	44,520
July	22,610	350	18,970	41,580	42,490	- 1,910	41,280
August	7,080		24,040	31,120	28,630	2,490	31,110
September	4,340	3,910	330	4,670	750	3,920	4,190
October	2,890	2,120	260	3,150	2,610	540	810
Total	149,790	49,826	46,938	196,728	159,070	37,658	168,890

DIVERSIONS FROM MILK RIVER IN UNITED STATES
1939
(Quantities in Acre-Feet)

Month	Fort Belknap Canal	Paradise Canal	Harlem Canal	Harlem No. 2	Agency Canal	Dodson North	Dodson South	Van-dalia Canal	Total
April									
May	8,541	3,945	2,434	317	2,303	1,948	13,059	1,410	33957
June	4,376	1,486	881			752	12,355		19850
July	7,097	3,439	2,733	571	1,993	2,898	11,048	3,441	33220
August	9,143	4,534	2,805	984	524	2,640	9,499	4,502	34630
September	1,559	1,384	1,097	95		978	2,811	3,233	11157
October								1,190	1190
Total	30,715	14,788	9,950	1,967	4,820	9,216	48,772	13,776	134004

DETERMINATION OF NATURAL FLOW OF FRENCHMAN RIVER AT THE INTERNATIONAL BOUNDARY

1939

Quantities in second-feet

Date at Intern'l Boundary	Frenchman River below Belanger Creek	Used by Canada at East End: Corrected for Evaporation: Store	Release	Diverted	Return flow	Total Used	Frenchman River at 50 Mile
April							
1 - 10	7.7	194	0	0	0	194.0	3264.0
11 - 20	9.4	237	0	49.6	0	286.6	895.0
21 - 30	7.9	119	0	120.5	0	239.5	979.0
May							
1 - 10	4.8	152	0	21.6	0	173.6	640.2
11 - 20	5.2	0	20	57.9	0	37.9	326.2
21 - 31	27.5	0	77	146.2	0	69.2	915.2
June							
1 - 10	33.8	0	20	5.4	0	- 14.6	607.1
11 - 20	35.4	0	43	5.0	0	- 38.0	730.0
21 - 30	24.5	36	0	0	0	36.0	2128.0
July							
1 - 10	3.9	0	132	0	0	-132.0	879.7
11 - 20	29.5	0	6	23.3	0	17.3	223.2
21 - 31	46.9	0	66	208.8	0	142.8	202.9
August							
1 - 10	29.4	0	181	268.3	6.9	80.4	79.5
11 - 20	25.1	0	118	191.7	0.4	73.3	57.1
21 - 31	13.0	0	46	91.5	0	45.5	16.8
September							
1 - 10	2.6	0	62	43.9	19.0	- 37.1	0.7
11 - 20	2.5	35	0	7.8	4.1	38.7	0
21 - 30	7.1	24	0	5.0	0	29.0	0
October							
1 - 10	15.9	31	0	5.0	3.6	32.4	0
11 - 20	19.2	31	0	23.2	2.7	51.5	0.4
21 - 31	14.5	0	50	69.5	5.5	14.0	4.1
Total sec-ft.	365.8	859	821	1344.2	42.2	1340.0	11949.1
Daily Mean	1.7	4.0	3.8	6.3	0.2	6.3	55.8
Ac-ft.	726	1704	1628	2666	84	2660	23701

DETERMINATION OF NATURAL FLOW OF FRENCHMAN RIVER AT THE INTERNATIONAL BOUNDARY

1939

Quantities in second-feet

Gain or loss Belanger to 50 Mile	Used by Canada at Val Marie: Corrected for: Evaporation: Store	Release	Diverted	Return flow	Total Used	Frenchman River below Val Marie	Gain or loss 50 Mile to Val Marie
3450.3	0	268	25.0	13.0	- 256.0	5367.0	1847.0
1172.2	7	0	30.1	15.0	22.1	860.2	- 12.7
1210.6	690	0	0.8	1.0	689.8	399.2	110.0
809.0	0	506	95.6	45.0	- 455.4	1139.6	44.0
358.9	87	0	190.7	40.0	237.7	208.7	120.2
956.7	271	0	76.0	23.4	323.6	1821.3	1229.9
558.7	0	292	119.5	104.0	- 276.5	989.5	105.9
656.6	913	0	105.1	105.0	913.1	1920.6	2103.7
2139.5	0	1192	18.6	19.0	-1192.4	8106.0	4785.6
743.8	8	0	32.1	32.1	8.0	1023.0	151.3
211.0	0	185	190.7	100.0	- 94.3	268.3	- 49.2
298.8	0	563	308.5	130.0	- 384.5	513.4	- 274.0
130.5	0	400	134.3	124.0	- 389.7	207.4	- 261.8
105.3	0	169	190.7	132.0	- 110.3	147.3	- 20.1
49.3	0	245	164.0	80.0	- 161.0	94.7	- 83.1
-39.0	0	54	61.5	40.0	- 32.5	57.9	24.7
36.2	0	38	19.1	16.0	- 34.9	31.5	- 3.4
21.9	0	32	28.6	0.0	- 3.4	14.9	11.5
16.5	0	43	15.6	3.0	- 30.4	18.3	- 12.1
32.7	0	30	4.4	8.0	- 33.6	23.5	- 10.5
3.6	0	61	61.0	40.0	- 40.0	56.3	12.2
12923.1	1976	4078	1871.9	1070.5	-1300.6	23068.6	9819.1
60.4	9.2	19	8.7	5.0	6.1	107.8	45.9
25633	3919	8089	3724	2123	2580	45756	19476

DETERMINATION OF NATURAL FLOW OF FRENCHMAN RIVER
AT THE INTERNATIONAL BOUNDARY

1939

Quantities in second-feet

'renchman iver at elanger Creek	Gain or loss Belanger to 50 Mile	Gain or loss 50 Mile to Val Marie	Gain or loss Val Marie to Boundary	Natural flow at Intern'l Boundary	United States Share	Frenchman River at Intern'l Boundary
397.7	3450.3	1847.0	- 1624.0	4071.0	2035.5	3743.0
81.1	1172.2	- 12.7	113.1	1353.7	676.8	973.3
128.0	1210.6	110.0	182.9	1631.5	815.8	582.1
98.6	809.0	44.0	- 26.9	924.7	462.4	1112.7
81.6	358.9	120.2	398.7	959.4	479.7	607.4
98.8	956.7	1229.9	3195.7	5481.1	2740.6	5017.0
77.4	558.7	105.9	378.5	1120.5	560.2	1368.0
64.0	656.6	2103.7	4999.4	7823.7	3911.8	6920.0
189.8	2139.5	4785.6	- 1668.0	5446.9	2723.4	6438.0
99.5	743.8	151.3	250.8	1245.4	622.7	1273.8
60.1	211.0	- 49.2	- 9.7	212.2	106.1	258.6
55.6	298.8	- 274.0	- 48.8	31.6	15.8	264.6
35.7	130.5	- 261.8	- 20.3	- 115.9	- 58.0	187.1
26.7	105.3	- 20.1	- 6.3	105.6	52.8	141.0
17.8	49.3	- 83.1	- 26.7	- 42.7	- 21.4	68.0
18.0	- 39.0	24.7	- 21.0	- 17.3	- 8.6	36.9
20.9	36.2	- 3.4	- 27.3	26.4	13.2	4.2
24.1	21.9	11.5	- 13.7	43.8	21.9	1.2
25.0	16.5	- 12.1	- 18.0	11.4	5.7	0.3
26.5	32.7	- 10.5	- 23.5	25.2	12.6	0
28.7	3.6	12.2	- 30.7	13.8	6.9	25.6
1655.6	12923.1	9819.1	5954.2	30352.0	15175.9	29022.8
7.7	60.4	45.9	27.8	141.8	70.9	135.6
3284	25633	19476	11810	60202	30101	57566

Table 4

ESTIMATED DIVERSION FROM THE NORTHERN TRIBUTARIES
OF MILK RIVER IN CANADA.

1939

Quantities in Acre-feet.

Irrigator	Source of Supply	Estimated Diversion
Lodge Creek Basin		
Hillman, W.	Thelma Creek	600
Hartt, J.E.	Suiste Coulee	50
Jahn, B.A.	Middle Creek	40
Total diverted from Lodge Creek		690
Flow of Lodge Creek at boundary		28,930
Battle Creek Basin		
Lindner Bros.	Battle Creek	200
Patterson, W.G.	Battle Creek	100
Marshall and Gaff	Battle Creek	140
Gaff, J.A.	Battle Creek	20
Fondrick, G.	Battle Creek	35
McKinnon, J.	Battle Creek	200
Stirling and Nash	Battle Creek	300
Spangler, J.M.	Sixmile Coulee	200
Shepherd Bros.	Halfway Coulee	80
Battle Creek diversion to Cypress Lake		6,390
Total diverted from Battle Creek		7,665
Flow of Battle Creek at boundary		12,080
Frenchman River Basin		
Wylie, D.J.	Oxarart Creek	640
Gilchrist Bros.	Davis Creek	100
Caton, W.E.	Fairwell Creek	200
Armstrong	Clarence Coulee	75
Hensman, S.A.	N.B. Frenchman River	100
Kokott, T.	Calf Creek	20
Pearse, S.	Concrete Coulee	90
Bolingbroke, J.E.	Bolingbroke Creek	5
Bate, A.E.	Garden Creek	25
East End Irrigation	Frenchman River	2,550
Val Marie Irrigation	Frenchman River	3,720
Total diverted from Frenchman River		7,525
Flow of Frenchman River at boundary		104,000

Table 5

MEASURED DIVERSIONS FROM THE NORTHERN TRIBUTARIES

OF MILK RIVER IN THE UNITED STATES

1939

(Quantities in Acre-Feet)

Irrigator	Mar.	Apr.	May	June	July	Aug.	Total
			Lodge Creek				
North Chinook Canal	1,040	1,890	98	1,080	458	0	4,566
			Battle Creek				
Matheson Canal		101	252	186	.2	0	539.2
			Frenchman River				
Frenchman Canal	265	0	367	355	563	431	1,981

During part of the period Mar. 20-31 flood waters overflowed the right bank of Battle Creek submerging Matheson Canal at the gage. During this period the discharge which has not been determined was not an intentional diversion, but merely a part of the Battle Creek overflow.