

Report to  
THE INTERNATIONAL JOINT COMMISSION  
on  
THE DIVISION AND USE MADE OF THE WATERS OF  
**ST. MARY AND MILK RIVERS**

by

J. T. JOHNSTON  
representing Canada

and

N. C. GROVER  
representing the United States

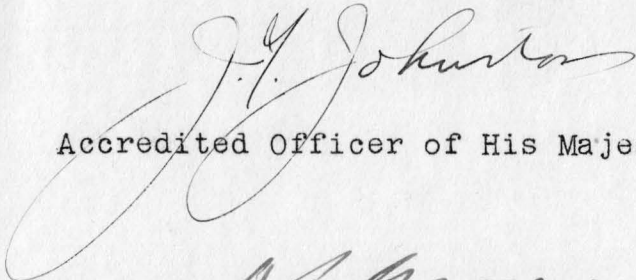
1933

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

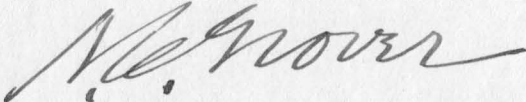
Gentlemen:-

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 1933.

Respectfully submitted,



Accredited Officer of His Majesty,



Accredited Officer of the United States.

April 3rd, 1934.

## 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 1933, 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, Director, Dominion Water Power and Hydrometric Bureau, as accredited officer of His Majesty, was represented by Mr. S. G. Dawson, Ottawa, Ontario.

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, Dominion Water Power and Hydrometric Bureau, Calgary, Alberta. The joint international 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 occurred late in July and continued until the closing of the season, the field engineers were compelled to keep constantly 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 Director, Dominion Water Power and Hydrometric Bureau.

#### Division of Water

The United States St. Mary canal was opened on April 22nd and kept in continuous operation until October 18th, water being first delivered to the North Branch Milk River on April 27th. During the period between September 15th and October 3rd, while water was diverted through the head gates, no water passed the St. Mary Crossing nor was delivered to Milk River. As the loss in the canal between the intake and

the crossing of the St. Mary river, which this year was about 14% of the water diverted at the headgates, is assumed to return directly to the river channel and eventually become available to Canada, the discharge of 151,000 acre-feet passing in the canal at the St. Mary river crossing is, therefore, considered as the actual quantity diverted from the St. Mary river by the United States. Of this quantity, 147,000 acre-feet were delivered to the North Branch of Milk river and made available for irrigation in Montana. The 2% loss in the canal between St. Mary river crossing and Hudson Bay Divide, the end of the canal, was due to evaporation and seepage.

During the period from the beginning of November, 1932 to May, 1933, 21,000 acre-feet of the flow of Swift-current creek was impounded in Sherburne reservoir, but, anticipating the maximum storage requirements to accommodate the heavy run-off as predicted by the annual report on the snow conditions in the drainage basin, this reserve was reduced to 8,700 acre-feet during May. Water was again stored during June and early July. This further conservation made available, by July 11th, approximately 53,000 acre-feet of water which was released at an average rate of 630 acre-feet per day until September 16th to supplement the United States' share of the natural flow of St. Mary river which was used to irrigate lands in the lower Milk River Valley.

As very little water was diverted from Milk River in Canada during this season, 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 193,007 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 of 1933 was 73,283 acre-feet, which is slightly in excess of the flow recorded in 1932 and about 40% of the average for the years of record.

The Canadian Pacific Railway canal at Kimball, Alberta, diverted 183,000 acre-feet from the St. Mary River during the period of operation from the 26th of April to the 14th of October, 157,000 acre-feet being used to irrigate lands in Southern Alberta.

The Dominion Water Power and Hydrometric Bureau is largely dependent 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 and do not show the total diversion.

Diversions reported from the Northern tributaries in Canada are: from Lodge Creek, 940 acre-feet; from Battle Creek, 1,050 acre-feet; from Frenchman River, 1071

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: Current meter measurements were made 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 flow 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 current meter measurement of the outflow from the reservoir was made 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 measurement of the United States' St. Mary Canal at St. Mary Crossing was made to find the water being diverted by the United States, and a measurement of the St. Mary River at Kimball, near the International Boundary, 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 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 and its Northern tributaries.

#### Water Supply

Except in the mountainous areas, the precipitation in the drainage basins of St. Mary and Milk Rivers, during the winter of 1932-33, was again below normal.

In the mountainous areas tributary to the St. Mary River basin, as shown by the twelfth annual international survey of the snow conditions on the headwaters of Swiftcurrent



Creek, an area considered typical of the headwaters of the St. Mary River, the snow cover and its water equivalent was in excess of any previous year of survey. The run-off from the area surveyed, during May, June and July, was about 32% in excess of the average.

The natural flow of St. Mary River at the Boundary during the irrigation season of 1933, from the first of April to the end of October, was 10% in excess of the average flow of the 24 years of record.

On the prairies, forming the major portion of the drainage basin of Milk River and its tributaries in Canada and Montana, the winter precipitation was below normal. In Southern Alberta the year's precipitation was slightly above normal, with a deficiency of rainfall during June, July and September, while in Southern Saskatchewan, there was below normal moisture during July, but a slight excess for the year as a whole. In Montana the precipitation was below normal except for the months of April, May, and August.

The run-off from the prairies, as indicated by the Northern tributaries of Milk River, was about 60% of the average of the last ten years. In general, the spring break-up in these streams was later than usual, occurring towards the end of March. After the spring freshet the streams gradually receded, except for an occasional rise due to local rains, until they became dry towards the end of July. On August 26th a heavy rain in the eastern portion of the basin

started some streams flowing for about two weeks, but they became dry again after the first week in September. Streams towards the Alberta-Saskatchewan boundary remained practically dry from the end of July.

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. Owing to lack of funds, several stations previously maintained by Canada on international streams and canals diverting therefrom were abandoned.

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 1933.

#### 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 1933, the water available for use and used by the 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 the 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 storage curve 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 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 the statement showing the quantity in acre-feet taken in 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 available information on the diversions from the northern tributaries of Milk River in Canada.

Table 4 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 - 1933

Day	Recorded Inflow: Swift-Creek Creek	Un- recorded Inflow : Estimated:	Total Inflow	Outflow Swiftcurrent Creek at Sherburne	Stored in Reservoir Sec.ft. Gross	Released from Reservoir Sec.Ft. Net
1					2	--
2					2	--
3					-	15
4					-	15
5					-	15
6					-	16
7					-	16
8					-	16
9					-	16
10					-	16
11					-	16
12	No records available	No records available	No records available	No records available	-	16
13	No records available	No records available	No records available	No records available	-	16
14	No records available	No records available	No records available	No records available	-	16
15	No records available	No records available	No records available	No records available	-	16
16	No records available	No records available	No records available	No records available	-	16
17	No records available	No records available	No records available	No records available	2	--
18	No records available	No records available	No records available	No records available	2	--
19	No records available	No records available	No records available	No records available	2	--
20	No records available	No records available	No records available	No records available	52	--
21	No records available	No records available	No records available	No records available	52	--
22	No records available	No records available	No records available	No records available	--	144
23	No records available	No records available	No records available	No records available	48	--
24	No records available	No records available	No records available	No records available	154	--
25	No records available	No records available	No records available	No records available	204	--
26	No records available	No records available	No records available	No records available	103	--
27	No records available	No records available	No records available	No records available	143	--
28	No records available	No records available	No records available	No records available	319	--
29	No records available	No records available	No records available	No records available	105	--
30	No records available	No records available	No records available	No records available	156	--
Total Sec.Ft.					1846	365
Mean					61.5	1.2
Ac.Ft.					3660	714

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER  
 APRIL - 1933

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	235	--	42	277	--	277
2	290	--	2	292	--	292
3	260	--	2	262	--	262
4	231	--	2	233	--	233
5	248	--	--	248	15	233
6	265	--	--	265	15	250
7	273	--	--	273	15	258
8	282	--	--	282	16	266
9	259	--	--	259	16	243
10	235	--	--	235	16	219
11	252	--	--	252	16	236
12	269	--	--	269	16	253
13	319	--	--	319	16	303
14	370	--	--	370	16	354
15	400	--	--	400	16	384
16	432	--	--	432	16	416
17	367	--	--	367	16	351
18	303	--	--	303	16	287
19	314	--	2	316	--	316
20	326	--	2	328	--	328
21	353	--	2	355	--	355
22	380	--	52	432	--	432
23	396	--	52	448	--	448
24	413	--	--	413	144	269
25	428	--	48	476	--	476
26	444	--	154	598	--	598
27	600	--	204	804	--	804
28	757	--	103	860	--	860
29	724	7	143	874	--	874
30	690	87	819	1596	--	1596
Total						
Sec.Ft.	11115	94	1629	12838	365	12473
Mean	370	3.1	54	428	12.2	416
Ac.Ft.	22000	184	3210	25400	726	24800

DIVISION OF WATER OF ST. MARY RIVER  
 WATER AVAILABLE FOR USE AND USED BY U.S.A.  
 APRIL - 1933

Day	: Natural : : Flow :	: AVAILABLE :				: USED :			: Excess : : Of Share :	: Deficit : Used :
		: U.S. : : Share :	: Released : : Storage :	: Total : : Avail- : : able :	: Divert- : : ed :	: Stored : : Used :	: Total : : Gross :			
1	277	69	--	69	--	42	42	--	27	
2	292	73	--	73	--	2	2	--	71	
3	262	66	--	66	--	2	2	--	64	
4	233	58	--	58	--	2	2	--	56	
5	233	58	15	73	--	--	--	--	73	
6	250	62	15	77	--	--	--	--	77	
7	258	64	15	79	--	--	--	--	79	
8	266	66	16	82	--	--	--	--	82	
9	243	61	16	77	--	--	--	--	77	
10	219	55	16	71	--	--	--	--	71	
11	236	59	16	75	--	--	--	--	75	
12	253	63	16	79	--	--	--	--	79	
13	303	76	16	92	--	--	--	--	92	
14	354	88	16	104	--	--	--	--	104	
15	384	96	16	112	--	--	--	--	112	
16	416	104	16	120	--	--	--	--	120	
17	351	88	16	104	--	--	--	--	104	
18	287	72	16	88	--	--	--	--	88	
19	316	78	--	78	--	2	2	--	76	
20	328	82	--	82	--	2	2	--	80	
21	355	89	--	89	--	2	2	--	87	
22	432	108	--	108	--	52	52	--	56	
23	448	112	--	112	--	52	52	--	60	
24	269	67	144	211	--	--	--	--	211	
25	476	119	--	119	--	48	48	--	71	
26	598	150	--	150	--	154	154	4	--	
27	804	235	--	235	--	204	204	--	31	
28	860	263	--	263	--	103	103	--	160	
29	874	270	--	270	7	143	150	--	120	
30	1596	631	--	631	87	819	906	275	--	
Total										
Sec.Ft.	12473	3482	365	3847	94	1629	1723	279	2403	
Mean	416	116	12.2	128	3.1	54	57	9.3	80	
Ac.Ft.	24800	6900	726	7620	184	3210	3394	553	4760	

DIVISION OF WATER OF ST. MARY RIVER  
WATER AVAILABLE FOR USE AND USED BY CANADA  
APRIL - 1933

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	277	208	235	--	27
2	292	219	290	--	71
3	262	196	260	--	64
4	233	175	231	--	56
5	233	175	248	--	73
6	250	188	265	--	77
7	258	194	273	--	79
8	266	200	282	--	82
9	243	182	259	--	77
10	219	164	235	--	71
11	236	177	252	--	75
12	253	190	269	--	79
13	303	227	319	--	92
14	354	266	370	--	104
15	384	288	400	--	112
16	416	312	432	--	120
17	351	263	367	--	104
18	287	215	303	--	88
19	316	238	314	--	76
20	328	246	326	--	80
21	355	263	353	--	97
22	432	324	380	--	56
23	448	336	396	--	60
24	269	202	413	--	211
25	476	357	428	--	71
26	598	448	444	7	--
27	804	569	600	82	31
28	860	597	757	210	160
29	874	604	724	172	120
30	1596	965	690	200	--
Total					
Sec. Ft.	12473	8991	11115	671	2403
Mean	416	300	370	134 (26-30)	80
Ac. Ft.	24800	17900	22000	1330	4760
					553



DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER  
 WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR  
 MAY - 1933

Day	Recorded Inflow: Swift-Creek Creek	Un- Canyon Creek Estimated	Total Inflow	Outflow Swift-Creek at Sherburne	Stored in Reservoir Sec.ft. Gross	Released from Reservoir Sec.ft. Net
1	160	97	257	187	70	--
2	165	137	302	408	--	106
3	170	220	390	742	--	352
4	179	298	477	782	--	305
5	188	327	515	893	--	378
6	210	345	555	897	--	342
7	220	360	580	897	--	317
8	226	366	592	939	--	347
9	216	369	585	1020	--	435
10	179	374	553	1020	--	467
11	151	388	539	1020	--	481
12	140	405	545	1020	--	475
13	140	427	567	966	--	399
14	206	430	636	801	--	165
15	340	427	767	801	--	34
16	415	423	838	804	34	--
17	411	412	823	916	--	93
18	344	403	747	920	--	173
19	280	257	537	735	--	198
20	236	262	498	746	--	248
21	233	265	498	742	--	244
22	249	265	514	739	--	225
23	297	265	562	724	--	162
24	333	262	595	721	--	126
25	385	257	642	721	--	79
26	542	251	793	695	98	--
27	635	253	888	725	163	--
28	538	287	825	803	22	--
29	538	293	831	893	--	62
30	787	291	1078	902	176	--
31	1160	285	1445	1010	435	--
Total						
Sec.Ft.	10273	9701	19974	25189	998	6213
Mean	331	313	644	812	32	200
Ac.Ft.	20400	19200	39600	49900	1970	12300

No records available

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER  
 MAY - 1933

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	654	189	105	948	--	948
2	618	278	156	1052	--	1052
3	799	346	70	1215	--	1215
4	1000	408	--	1408	106	1302
5	1140	424	--	1564	352	1212
6	1250	425	--	1675	305	1370
7	1250	425	--	1675	378	1297
8	1300	430	--	1730	342	1388
9	1430	435	--	1865	317	1548
10	1430	435	--	1865	347	1518
11	1390	435	--	1825	435	1390
12	1380	435	--	1815	467	1348
13	1340	436	--	1776	481	1295
14	1340	435	--	1775	475	1300
15	1380	435	--	1815	399	1416
16	1450	435	--	1885	165	1720
17	1530	436	--	1966	34	1932
18	1620	438	34	2092	--	2092
19	1630	438	--	2068	93	1975
20	1600	438	--	2038	173	1865
21	1580	438	--	2018	198	1820
22	1570	438	--	2008	248	1760
23	1600	440	--	2040	244	1796
24	1610	438	--	2048	225	1823
25	1670	438	--	2108	162	1946
26	1850	441	--	2291	126	2165
27	1970	441	--	2411	79	2332
28	2080	444	98	2622	--	2622
29	2250	446	163	2859	--	2859
30	2520	449	22	2991	--	2991
31	3000	449	--	3449	62	3387
Total						
Sec.Ft.	47231	13018	648	60897	6213	54634
Mean	1524	120	20.9	1965	200	1765
Ac.Ft.	93500	25800	1280	121000	12300	108500

DIVISION OF WATER OF ST. MARY RIVER  
WATER AVAILABLE FOR USE AND USED BY U.S.A.  
MAY - 1933

Day	Natural Flow	St. Mary River	U.S. Share	Released Storage	Total Avail-able	Divert-ed	Stored Used	Excess Of Share	Deficit Used
	Flow	Share	Storage	Avail-able	ed	Gross			
1	948	307	--	307	189	105	294	--	13
2	1052	359	--	359	278	156	434	75	--
3	1215	441	--	441	346	70	416	--	25
4	1302	484	106	590	408	--	408	--	182
5	1212	439	352	791	424	--	424	--	367
6	1370	518	305	823	425	--	425	--	398
7	1297	482	378	860	425	--	425	--	435
8	1388	527	342	869	430	--	430	--	439
9	1548	607	317	924	435	--	435	--	489
10	1518	592	347	939	435	--	435	--	504
11	1390	528	435	963	435	--	435	--	528
12	1348	507	467	974	435	--	435	--	539
13	1295	481	481	962	436	--	436	--	526
14	1300	483	475	958	435	--	435	--	523
15	1416	541	399	940	435	--	435	--	505
16	1720	693	165	858	435	--	435	--	423
17	1932	799	34	833	436	--	436	--	397
18	2092	879	--	879	438	34	472	--	407
19	1975	821	93	914	438	--	438	--	476
20	1865	766	173	939	438	--	438	--	501
21	1820	743	198	941	438	--	438	--	503
22	1760	713	248	961	438	--	438	--	523
23	1796	731	244	975	440	--	440	--	535
24	1823	745	225	970	438	--	438	--	532
25	1946	806	162	968	438	--	438	--	530
26	2165	916	126	1042	441	--	441	--	601
27	2332	999	79	1078	441	--	441	--	637
28	2622	1144	--	1144	444	98	542	--	602
29	2859	1263	--	1263	446	163	609	--	654
30	2991	1329	--	1329	449	22	471	--	858
31	3387	1527	62	1589	449	--	449	--	1140
Total									
Sec.Ft.	54684	22170	6213	28383	13018	648	13666	75	14792
Mean	1765	715	200	915	420	21	441	2.4	477
Ac.Ft.	109000	44000	12300	56300	25800	1280	27100	148	29300

DIVISION OF WATER OF ST. MARY RIVER  
 WATER AVAILABLE FOR USE AND USED BY CANADA  
 MAY - 1933

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	948	641	654	205	13	--
2	1052	693	618	230	--	75
3	1215	774	799	259	25	--
4	1302	818	1000	256	182	--
5	1212	773	1140	256	367	--
6	1370	852	1250	142	398	--
7	1297	815	1250	125	435	--
8	1388	861	1300	183	439	--
9	1548	941	1430	194	489	--
10	1518	926	1430	195	504	--
11	1390	862	1390	202	528	--
12	1348	841	1380	213	539	--
13	1295	814	1340	208	526	--
14	1300	817	1340	211	523	--
15	1416	875	1380	230	505	--
16	1720	1027	1450	248	423	--
17	1932	1133	1530	253	397	--
18	2092	1213	1620	261	407	--
19	1975	1154	1630	251	476	--
20	1865	1099	1600	221	501	--
21	1820	1077	1580	216	503	--
22	1760	1047	1570	224	523	--
23	1796	1065	1600	234	535	--
24	1823	1078	1610	234	532	--
25	1946	1140	1670	246	530	--
26	2165	1249	1850	266	601	--
27	2332	1333	1970	275	637	--
28	2622	1478	2080	273	602	--
29	2859	1596	2250	302	654	--
30	2991	1662	2520	312	858	--
31	3387	1860	3000	288	1140	--
Total	54684	32514	47231	7213	14792	75
Mean	1765	1050 <sup>49</sup>	1524	233	477	2.4
Ac. Ft.	109000	65000	93500	14300	29300	148

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER  
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR  
JUNE - 1933

Day	INFLOW TO SHERBURNE RESERVOIR			Total Inflow	Outflow	Stored in Reservoir	Released from Reservoir
	Recorded Inflow	Un-recorded Inflow	Estimated Inflow	Swift Creek at Sherburne	Swift Creek at Sherburne	Sec. ft. Gross	Sec. ft. Net
1	1000	72	251	1323	1100	223	--
2	856	74	233	1163	1140	23	--
3	796	76	211	1083	1140	--	57
4	876	84	206	1166	1000	166	--
5	974	110	203	1287	946	341	--
6	871	80	199	1150	960	190	--
7	821	80	197	1098	893	205	--
8	777	80	195	1052	863	189	--
9	1150	130	193	1473	812	661	--
10	1050	82	190	1322	808	514	--
11	743	76	185	1004	846	158	--
12	640	70	179	889	644	245	--
13	757	68	175	1000	496	504	--
14	897	90	151	1138	216	922	--
15	1110	130	69	1309	122	1187	--
16	1300	200	53	1553	112	1441	--
17	1260	160	52	1472	97	1375	--
18	990	130	51	1171	88	1083	--
19	753	100	50	903	89	814	--
20	729	80	51	860	89	771	--
21	713	70	55	838	90	748	--
22	697	69	70	836	91	745	--
23	681	68	85	834	90	744	--
24	613	63	100	776	89	687	--
25	551	63	105	719	89	630	--
26	640	71	106	817	87	730	--
27	617	60	107	784	37	697	--
28	547	60	107	714	88	626	--
29	591	77	104	772	88	684	--
30	613	70	95	778	87	691	--
Total							
Sec. Ft.	24613	2643	4028	31284	13347	17994	57
Mean	820	88	134	1043	445	600	2
Ac. Ft.	48800	5240	7970	62000	26500	35700	120

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER  
JUNE - 1933

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	3320	441	176	3937	--	3937
2	3710	441	435	4586	--	4586
3	3780	443	223	4446	--	4446
4	3900	443	23	4366	--	4366
5	4080	444	--	4524	57	4467
6	4120	443	166	4729	--	4729
7	4020	451	341	4812	--	4812
8	4020	350	190	4560	--	4560
9	4100	21	205	4326	--	4326
10	3830	422	189	4441	--	4441
11	3680	474	661	4815	--	4815
12	3510	474	514	4498	--	4498
13	3350	481	158	3989	--	3989
14	3290	497	245	4032	--	4032
15	3320	501	504	4325	--	4325
16	3490	522	922	4934	--	4934
17	3710	544	1187	5441	--	5441
18	3760	565	1441	5766	--	5766
19	3540	576	1375	5491	--	5491
20	3270	592	1083	4945	--	4945
21	2970	592	814	4376	--	4376
22	2780	596	771	4147	--	4147
23	2610	603	748	3961	--	3961
24	2460	613	745	3818	--	3818
25	2320	618	744	3682	--	3682
26	2270	620	687	3577	--	3577
27	2150	620	630	3400	--	3400
28	2130	620	730	3480	--	3480
29	2140	613	697	3450	--	3450
30	2140	611	626	3377	--	3377
Total						
Sec.Ft.	97770	15231	17230	130231	57	130174
Mean	3260	508	574	4342	2	4340
Ac.Ft.	194000	30200	34200	258000	120	258000

DIVISION OF WATER OF ST. MARY RIVER  
WATER AVAILABLE FOR USE AND USED BY U.S.A.  
JUNE - 1933

Day	Natural Flow	St. Mary River	U.S. Share	Released Storage Net	Total Available	Diverted	Stored Used	Total Used	Excess Of Share	Deficit Used
1	3937	1802	--	1802	441	176	617	--	1185	
2	4586	2126	--	2126	441	435	876	--	1250	
3	4446	2056	--	2056	443	223	666	--	1390	
4	4366	2016	--	2016	443	23	466	--	1550	
5	4467	2067	57	2124	444	--	444	--	1680	
6	4729	2198	--	2198	443	166	609	--	1589	
7	4812	2239	--	2239	451	341	792	--	1447	
8	4560	2113	--	2113	350	190	540	--	1573	
9	4326	1996	--	1996	21	205	226	--	1770	
10	4441	2054	--	2054	422	189	611	--	1443	
11	4815	2241	--	2241	474	661	1135	--	1106	
12	4498	2082	--	2082	474	514	988	--	1094	
13	3989	1828	--	1828	481	158	639	--	1189	
14	4032	1849	--	1849	497	245	742	--	1107	
15	4325	1996	--	1996	501	504	1005	--	991	
16	4934	2300	--	2300	522	922	1444	--	856	
17	5441	2554	--	2554	544	1187	1731	--	823	
18	5766	2716	--	2716	565	1441	2006	--	710	
19	5491	2579	--	2579	576	1375	1951	--	628	
20	4945	2306	--	2306	592	1083	1675	--	631	
21	4376	2021	--	2021	592	814	1406	--	615	
22	4147	1907	--	1907	596	771	1367	--	540	
23	3961	1814	--	1814	603	748	1351	--	463	
24	3818	1742	--	1742	613	745	1358	--	384	
25	3682	1674	--	1674	618	744	1362	--	312	
26	3577	1622	--	1622	620	687	1307	--	315	
27	3400	1533	--	1533	620	630	1250	--	283	
28	3480	1573	--	1573	620	730	1350	--	223	
29	3450	1558	--	1558	613	697	1310	--	248	
30	3377	1522	--	1522	611	626	1237	--	285	
Total	Sec.Ft.	130174	60084	57	60141	15231	17230	32461	--	27680
Mean	4340	2003	2	2005	508	574	1082	--	923	
Ac.Ft.	258000	119000	120	119000	30200	34200	64400	--	54900	

DIVISION OF WATER OF ST. MARY RIVER  
WATER AVAILABLE FOR USE AND USED BY CANADA  
JUNE - 1933

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	3937	2135	3320	383	1185	--
2	4586	2460	3710	390	1250	--
3	4446	2390	3780	466	1390	--
4	4366	2350	3900	503	1550	--
5	4467	2400	4080	619	1680	--
6	4729	2531	4120	638	1589	--
7	4812	2573	4020	631	1447	--
8	4560	2447	4020	662	1573	--
9	4326	2330	4100	652	1770	--
10	4441	2387	3830	688	1443	--
11	4815	2574	3680	700	1106	--
12	4498	2416	3510	760	1094	--
13	3989	2161	3350	830	1189	--
14	4032	2183	3290	918	1107	--
15	4325	2329	3320	970	991	--
16	4934	2634	3490	962	856	--
17	5441	2887	3710	944	823	--
18	5766	3050	3760	920	710	--
19	5491	2912	3540	954	628	--
20	4945	2639	3270	946	631	--
21	4376	2355	2970	967	615	--
22	4147	2240	2780	965	540	--
23	3961	2147	2610	967	463	--
24	3818	2076	2460	949	384	--
25	3682	2008	2320	936	312	--
26	3577	1955	2270	933	315	--
27	3400	1867	2150	941	283	--
28	3480	1907	2130	944	223	--
29	3450	1892	2140	941	248	--
30	3377	1855	2140	931	285	--
Total						
Sec. Ft.	130174	70090	97770	24010	27680	--
Mean	4339 4340	2336	3260	800	923	--
A.S. Ft.	258000	139000	194000	47600	54900	--



DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER  
 WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR  
 JULY - 1933

Day	INFLOW TO SHERBURNE RESERVOIR			Outflow	Stored	Released	
	Recorded Inflow:	Un-	Total:	Swiftcurrent:	in	from	
	Swift-Canyon	recorded	Inflow:	Creek at	Reservoir:	Reservoir:	
	current: Creek	Inflow	:	Sherburne	Sec.ft.	Sec.ft.	
	Creek :	Estimated:	:	:	Gross	Net	
	:	:	:	:	:	:	
1	560	62	41	663	87	576	--
2	573	67	40	680	87	593	--
3	608	69	46	723	88	635	--
4	551	57	50	658	88	570	--
5	513	55	55	623	88	535	--
6	439	51	60	550	255	295	--
7	396	50	65	511	351	160	--
8	400	51	69	520	354	166	--
9	407	52	70	529	357	172	--
10	455	50	73	578	350	219	--
11	435	50	76	561	420	141	--
12	388	50	77	515	548	--	33
13	404	47	78	529	544	--	15
14	385	47	76	508	540	--	32
15	347	47	71	465	527	--	62
16	329	44	66	439	477	--	38
17	322	44	60	426	467	--	41
18	318	44	49	411	432	--	21
19	315	41	37	393	376	17	--
20	290	41	28	359	373	--	14
21	249	41	23	313	322	--	9
22	220	38	21	279	279	--	--
23	203	38	21	262	302	--	40
24	203	38	23	264	376	--	112
25	216	35	25	276	405	--	129
26	236	35	27	298	486	--	188
27	262	35	28	325	530	--	205
28	259	32	29	320	513	--	193
29	229	32	32	293	517	--	224
30	197	32	37	266	530	--	264
31	179	32	42	253	544	--	291
Total							
Sec.Ft.	10888	1407	1495	13790	11622	4079	1911
Mean	351	45.4	48.2	445	357	132	62
Ac.Ft.	21600	2790	2960	27300	22000	8110	3810

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER  
 JULY - 1933

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	2100	611	684	3395	--	3395
2	2030	609	691	3330	--	3330
3	1990	607	576	3173	--	3173
4	1960	607	593	3160	--	3160
5	1900	609	635	3144	--	3144
6	1830	607	570	3007	--	3007
7	1820	609	535	2964	--	2964
8	1790	609	295	2694	--	2694
9	1720	611	160	2491	--	2491
10	1710	613	166	2489	--	2489
11	1700	609	172	2481	--	2481
12	1740	613	219	2572	--	2572
13	1740	611	141	2492	--	2492
14	1750	613	--	2363	33	2330
15	1670	624	--	2294	15	2279
16	1600	624	--	2224	32	2192
17	1520	634	--	2154	62	2092
18	1430	634	--	2064	38	2026
19	1330	630	--	1960	41	1919
20	1240	626	--	1866	21	1845
21	1150	624	17	1791	--	1791
22	1020	622	--	1642	14	1628
23	903	620	--	1523	9	1514
24	814	626	--	1440	--	1440
25	771	626	--	1397	40	1357
26	764	630	--	1394	112	1282
27	792	632	--	1424	129	1295
28	814	632	--	1446	188	1258
29	807	636	--	1443	205	1238
30	764	632	--	1396	193	1203
31	744	630	--	1374	224	1150
Total						
Sec.Ft.	43913	19220	5454	68587	1356	67231
Mean	1420	620	176	2213	43.7	2169
Ac.Ft.	87300	38100	10800	136000	2690	133000

DIVISION OF WATER OF ST. MARY RIVER  
WATER AVAILABLE FOR USE AND USED BY U.S.A.  
JULY - 1933

Day	Natural Flow	St. Mary River	U.S. Share	Released Storage Net	Total Available	Diverted	Used Gross	Stored Used	Total Used	Excess of Share	Deficit Used
1	3395	1531	--	1531	611	684	1295	--	236		
2	3330	1498	--	1498	609	691	1300	--	198		
3	3173	1420	--	1420	607	576	1183	--	237		
4	3160	1413	--	1413	607	593	1200	--	213		
5	3144	1405	--	1405	609	635	1244	--	161		
6	3007	1337	--	1337	607	570	1177	--	160		
7	2964	1315	--	1315	609	535	1144	--	171		
8	2694	1180	--	1180	609	295	904	--	276		
9	2491	1079	--	1079	611	160	771	--	308		
10	2489	1078	--	1078	613	166	779	--	299		
11	2481	1074	--	1074	609	172	781	--	293		
12	2572	1119	--	1119	613	219	832	--	287		
13	2492	1079	--	1079	611	141	752	--	327		
14	2330	998	33	1031	613	--	613	--	418		
15	2279	973	15	988	624	--	624	--	364		
16	2192	929	32	961	624	--	624	--	337		
17	2092	879	62	941	634	--	634	--	307		
18	2026	846	38	884	634	--	634	--	250		
19	1919	793	41	834	630	--	630	--	204		
20	1845	756	21	777	626	--	626	--	151		
21	1791	729	--	729	624	17	641	--	88		
22	1628	647	14	661	622	--	622	--	39		
23	1514	590	9	599	620	--	620	21	--		
24	1440	553	--	553	626	--	626	73	--		
25	1357	512	40	552	626	--	626	74	--		
26	1282	474	112	586	630	--	630	44	--		
27	1295	481	129	610	632	--	632	22	--		
28	1258	462	188	650	632	--	632	--	18		
29	1238	452	205	657	636	--	636	--	21		
30	1203	435	193	628	632	--	632	4	--		
31	1150	408	224	632	630	--	630	--	2		
Total	Sec.Ft.	67231	28445	1356	29801	19220	5454	24674	238	5365	
Mean		2169	918	43.7	961	620	176	796	7.7	173	
Ac.Ft.		133000	56400	2690	59100	38100	10800	48900	473	10600	

DIVISION OF WATER OF ST. MARY RIVER  
 WATER AVAILABLE FOR USE AND USED BY CANADA  
 JULY - 1933

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	3395	1864	2100	882	236	--
2	3330	1832	2030	895	198	--
3	3173	1753	1990	865	237	--
4	3160	1747	1960	878	213	--
5	3144	1739	1900	875	161	--
6	3007	1670	1830	862	160	--
7	2964	1649	1820	862	171	--
8	2694	1514	1790	865	276	--
9	2491	1412	1720	862	308	--
10	2489	1411	1710	870	299	--
11	2481	1407	1700	870	293	--
12	2572	1453	1740	878	287	--
13	2492	1413	1740	880	327	--
14	2330	1332	1750	868	418	--
15	2279	1306	1670	838	364	--
16	2192	1263	1600	822	337	--
17	2092	1213	1520	830	307	--
18	2026	1180	1430	870	250	--
19	1919	1126	1330	830	204	--
20	1845	1089	1240	815	151	--
21	1791	1062	1150	822	88	--
22	1628	981	1020	838	39	--
23	1514	924	903	810	--	21
24	1440	887	814	778	--	73
25	1357	845	771	720	--	74
26	1282	808	764	660	--	44
27	1295	814	792	710	--	22
28	1258	796	814	710	18	--
29	1238	786	807	705	21	--
30	1203	768	764	698	--	4
31	1150	742	744	686	2	--
Total						
Sec.Ft.	67231	38786	43913	25322	5365	238
Mean	2169	1251	1420	817	173	7.7
Ac.Ft.	133000	76900	87300	50200	10600	473

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER  
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR  
AUGUST - 1933

Day	INFLOW TO SHERBURNE RESERVOIR				Outflow	Stored	Released
	Recorded Inflow	Un- Swift- current: Creek	Canyon :recorded Inflow : Estimated:	Total :Inflow : :	Swift Creek at Sherburne	in Reservoir: Sec.ft. Gross	from Reservoir: Sec.ft. Net
1	153	29	48	230	554	--	324
2	138	29	50	217	562	--	345
3	135	29	51	215	576	--	361
4	153	26	59	238	590	--	352
5	173	26	59	258	579	--	321
6	176	26	52	254	608	--	354
7	159	25	50	232	630	--	398
8	153	23	50	226	622	--	396
9	156	23	55	234	615	--	381
10	159	24	60	243	615	--	372
11	159	23	61	243	648	--	405
12	151	22	61	234	673	--	439
13	148	21	61	230	669	--	439
14	145	21	61	227	666	--	439
15	140	21	58	219	666	--	447
16	135	21	55	211	669	--	458
17	133	20	55	208	673	--	465
18	128	20	59	207	669	--	462
19	123	20	63	206	662	--	456
20	128	20	66	214	666	--	452
21	123	19	70	212	673	--	461
22	107	16	71	194	691	--	497
23	99	16	72	187	695	--	508
24	103	18	73	194	691	--	497
25	103	18	74	195	655	--	460
26	89	16	73	178	633	--	455
27	78	16	72	166	622	--	456
28	71	16	68	155	604	--	449
29	73	16	61	150	601	--	451
30	86	16	51	153	594	--	441
31	96	16	51	163	583	--	420
Total							
Sec.Ft.	3973	650	1870	6493	19654	--	13161
Mean	128	21	60	209	632	--	425
Ac.Ft.	7870	1300	3690	12800	38900	--	26100

DETERMINATION OF NATURAL FLOW OF ST.MARY RIVER  
AUGUST - 1933

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	703	628		1331	264	1067
2	670	630		1300	291	1009
3	631	632		1263	324	939
4	637	632		1269	345	924
5	637	632		1269	361	908
6	631	632		1263	352	911
7	625	634		1259	321	938
8	612	636		1248	354	894
9	587	634		1221	398	823
10	569	632		1201	396	805
11	563	632		1195	381	814
12	563	632		1195	372	823
13	569	632		1201	405	796
14	563	634		1197	439	758
15	581	634		1215	439	776
16	556	632		1188	439	749
17	563	634		1197	447	750
18	550	632		1182	458	724
19	538	634		1172	465	707
20	515	628		1143	462	681
21	509	626		1135	456	679
22	492	630		1122	452	670
23	492	628		1120	461	659
24	563	624		1187	497	690
25	625	576		1201	508	693
26	600	534		1134	497	637
27	563	528		1091	460	631
28	515	526		1041	455	586
29	486	528		1014	456	558
30	503	526		1029	449	580
31	486	526		1012	451	561
No water stored during August						
Total						
Sec.Ft.	17697	18898		36595	12855	23740
Mean	571	610		1181	415	766
Ac.Ft.	35100	37500		72600	25500	47100

DIVISION OF WATER OF ST. MARY RIVER  
WATER AVAILABLE FOR USE AND USED BY U.S.A.  
AUGUST -- 1933

Day	Natural Flow	St. Mary River Share	U.S. Released Storage Net	AVAILABLE FOR USE BY U.S.A. Total Avail-able	Diverted	USED BY U.S.A. Stored Used Gross	Excess Of Share	Deficit Used
1	1067	367	264	631	628	--	628	-- 3
2	1009	338	291	629	630	--	630	1 --
3	939	303	324	627	632	--	632	5 --
4	924	295	345	640	632	--	632	-- 8
5	908	287	361	648	632	--	632	-- 16
6	911	289	352	641	632	--	632	-- 9
7	938	302	321	623	634	--	634	11 --
8	894	280	354	634	636	--	636	2 --
9	823	245	398	643	634	--	634	-- 9
10	805	236	396	632	632	--	632	-- --
11	814	240	381	621	632	--	632	11 --
12	823	245	372	617	632	--	632	15 --
13	796	231	405	636	632	--	632	-- 4
14	758	212	439	651	634	--	634	-- 17
15	776	221	439	660	634	--	634	-- 26
16	749	208	439	647	632	--	632	-- 15
17	750	208	447	655	634	--	634	-- 21
18	724	195	458	653	632	--	632	-- 21
19	707	187	465	652	634	--	634	-- 18
20	681	174	462	636	628	--	628	-- 3
21	679	173	456	629	626	--	626	-- 3
22	670	168	452	620	630	--	630	10 --
23	659	165	461	626	628	--	628	2 --
24	690	178	497	675	624	--	624	-- 51
25	693	180	508	688	576	--	576	-- 112
26	637	159	497	656	534	--	534	-- 122
27	631	158	460	618	528	--	528	-- 90
28	586	146	455	601	526	--	526	-- 75
29	558	139	456	595	528	--	528	-- 67
30	580	145	449	594	526	--	526	-- 68
31	561	140	451	591	526	--	526	-- 65
Total	23740	6814	12855	19669	18398	--	18898	57 828
Mean	766	220	415	635	610	--	610	2 27
Ac.Ft.	47100	13500	25500	39000	37500	--	37500	110 1640

DIVISION OF WATER OF ST. MARY RIVER  
WATER AVAILABLE FOR USE AND USED BY CANADA  
AUGUST - 1933

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	1067	700	703	688	3	--
2	1009	671	670	660	--	1
3	939	636	631	628	--	5
4	924	629	637	628	8	--
5	908	621	637	624	16	--
6	911	622	631	619	9	--
7	938	636	625	616	--	11
8	894	614	612	604	--	2
9	823	578	587	585	9	--
10	805	569	569	569	--	--
11	814	574	563	558	--	11
12	823	578	563	558	--	15
13	796	565	569	569	4	--
14	758	546	563	560	17	--
15	776	555	581	578	26	--
16	749	541	556	553	15	--
17	750	542	563	558	21	--
18	724	529	550	549	21	--
19	707	520	538	537	18	--
20	681	507	515	510	8	--
21	679	506	509	499	3	--
22	670	502	492	490	--	10
23	659	492	492	490	--	2
24	690	512	563	551	51	--
25	693	513	625	619	112	--
26	637	478	600	595	122	--
27	631	473	563	553	90	--
28	586	440	515	512	75	--
29	558	419	486	484	67	--
30	580	435	503	495	68	--
31	561	421	486	477	65	--
Total						
Sec. Ft.	23740	16926	17697	17516	828	57
Mean	766	546	571	565	27	2
Ac. Ft.	47100	33600	35100	34700	1640	110



DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER  
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR  
SEPTEMBER - 1933

Day	INFLOW TO SHERBURNE RESERVOIR			Total Inflow	Outflow	Stored in Reservoir	Released from Reservoir
	Recorded Inflow	Un-recorded Inflow	Estimated Inflow		Swift Creek at Sherburne	Sec.ft. Gross	Sec.ft. Net
1	101	14	52	167	586	--	419
2	96	14	53	163	590	--	427
3	84	14	52	150	597	--	447
4	78	14	51	143	594	--	451
5	74	14	50	138	597	--	459
6	76	12	50	138	597	--	459
7	73	12	50	135	586	--	451
8	67	12	51	130	590	--	460
9	66	12	53	131	583	--	452
10	73	12	54	139	590	--	451
11	76	12	57	145	590	--	445
12	78	12	58	148	586	--	438
13	76	12	59	147	583	--	436
14	76	12	59	147	454	--	307
15	79	12	59	150	110	40	--
16	87	15	59	161	107	54	--
17	84	15	56	155	107	48	--
18	96	15	52	163	107	56	--
19	121	15	49	185	105	80	--
20	115	15	47	177	101	76	--
21	110	17	44	171	98	73	--
22	105	17	40	162	95	67	--
23	99	17	37	153	90	63	--
24	93	17	34	144	89	55	--
25	87	17	33	137	87	50	--
26	79	20	32	131	86	45	--
27	81	20	30	131	83	48	--
28	81	20	28	129	78	51	--
29	92	20	27	139	75	64	--
30	98	20	25	143	74	69	--
Total	2601	450	1401	4452	9615	939	6102
Mean	87	15	47	148	320	31.3	203
Ac.Ft.	5180	893	2800	8870	19000	1860	12100

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER  
SEPTEMBER - 1933

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	449	524	--	973	441	532
2	449	524	--	973	420	553
3	444	524	--	968	419	549
4	444	522	--	966	427	539
5	433	520	--	953	447	506
6	409	519	--	928	451	477
7	386	519	--	905	459	446
8	372	517	--	889	459	430
9	368	519	--	887	451	436
10	386	522	--	908	460	448
11	364	520	--	884	452	432
12	355	517	--	872	451	421
13	355	517	--	872	445	427
14	347	510	--	857	438	419
15	737	100	--	837	436	401
16	683	--	--	683	307	376
17	587	--	40	627	--	627
18	533	--	54	592	--	592
19	509	--	48	557	--	557
20	492	--	56	548	--	548
21	475	--	80	555	--	555
22	492	--	76	568	--	568
23	480	--	73	553	--	553
24	454	--	67	521	--	521
25	444	--	63	507	--	507
26	433	--	55	488	--	488
27	423	--	50	473	--	473
28	418	--	45	463	--	463
29	418	--	48	466	--	466
30	413	--	51	464	--	464
Total						
Sec. Ft.	13557	7374	806	21737	6963	14774
Mean	452	246	27	725	232	492
Ac. Ft.	26900	14600	1600	43100	13800	29300

DIVISION OF WATER OF ST. MARY RIVER  
WATER AVAILABLE FOR USE AND USED BY U.S.A.  
SEPTEMBER - 1933

Day	Natural Flow	St. Mary River	U.S. Share	Released Storage	Total Available	Diverted	Stored	Total Used	Excess of Share	Deficient Used
			Net				Gross			
1	532	133	441	574	524	--	524	--	50	
2	553	138	420	558	524	--	524	--	34	
3	549	137	419	556	524	--	524	--	32	
4	539	135	427	562	522	--	522	--	40	
5	506	126	447	573	520	--	520	--	53	
6	477	119	451	570	519	--	519	--	51	
7	446	112	459	571	519	--	519	--	52	
8	430	108	459	567	517	--	517	--	50	
9	436	109	451	560	519	--	519	--	41	
10	448	112	460	572	522	--	522	--	50	
11	432	108	452	560	520	--	520	--	40	
12	421	105	451	556	517	--	517	--	39	
13	427	107	445	552	517	--	517	--	35	
14	419	105	438	543	510	--	510	--	33	
15	401	100	436	536	100	--	100	--	436	
16	376	94	307	401	--	--	--	--	401	
17	627	157	--	157	--	40	40	--	117	
18	592	148	--	148	--	54	54	--	94	
19	557	139	--	139	--	48	48	--	91	
20	548	137	--	137	--	56	56	--	81	
21	555	139	--	139	--	80	80	--	59	
22	568	142	--	142	--	76	76	--	66	
23	553	138	--	138	--	73	73	--	65	
24	521	130	--	130	--	67	67	--	63	
25	507	127	--	127	--	63	63	--	64	
26	488	122	--	122	--	55	55	--	67	
27	473	118	--	118	--	50	50	--	68	
28	463	116	--	116	--	45	45	--	71	
29	466	116	--	116	--	48	48	--	68	
30	464	116	--	116	--	51	51	--	65	
Total										
Sec.Ft.	14774	3693	6963	10656	7374	806	8180	--	2476	
Mean	492	123	232	355	246	27	273	--	82	
Ac.Ft.	29300	7320	13800	21100	14600	1600	16200	--	4880	

DIVISION OF WATER OF ST. MARY RIVER  
WATER AVAILABLE FOR USE AND USED BY CANADA  
SEPTEMBER - 1933

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	532	399	449	441	50	--
2	553	415	449	433	34	--
3	549	412	444	419	32	--
4	539	404	444	407	40	--
5	506	380	433	386	53	--
6	477	358	409	381	51	--
7	446	334	386	375	52	--
8	430	322	372	361	50	--
9	436	327	368	354	41	--
10	448	336	386	372	50	--
11	432	324	364	354	40	--
12	421	316	355	341	39	--
13	427	320	355	332	35	--
14	419	314	347	324	33	--
15	401	301	737	481	436	--
16	376	282	683	574	401	--
17	627	470	587	556	117	--
18	592	444	538	499	94	--
19	557	418	509	477	91	--
20	548	411	492	464	81	--
21	555	416	475	448	59	--
22	568	426	492	456	66	--
23	553	415	480	456	65	--
24	521	391	454	431	63	--
25	507	380	444	425	64	--
26	488	366	433	415	67	--
27	473	355	423	406	68	--
28	463	347	418	400	71	--
29	466	350	418	396	68	--
30	464	348	413	392	65	--
Total						
Sec. Ft.	14774	11081	13557	12556	2476	--
Mean	492	369	452	419	82	--
Ac. Ft.	29300	22000	26900	24900	4880	--

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER  
WATER STORED OR RELEASED FROM SHERBURNE RESERVOIR  
OCTOBER - 1933

Day	INFLOW TO SHERBURNE RESERVOIR			Total Inflow	Outflow	Stored in Reservoir	Released from Reservoir
	Recorded Inflow	Unrecorded Inflow	Estimated Inflow		Swift Creek at Sherburne	Sec.ft. Gross	Sec.ft. Net
1	94	22	25	141	74	67	--
2	87	22	25	134	118	16	--
3	91	22	28	141	383	--	242
4	98	22	29	149	597	--	448
5	105	22	33	160	640	--	480
6	107	23	39	169	637	--	468
7	103	23	38	164	366	--	202
8	101	23	30	154	78	76	--
9	101	23	20	144	78	63	--
10	98	24	17	139	74	65	--
11	89	25	17	131	74	57	--
12	84	22	17	123	72	51	--
13	74	20	17	111	68	43	--
14	68	20	16	104	66	38	--
15	66	19	15	100	67	33	--
16	64	17	15	96	68	28	--
17	61	15	15	91	67	24	--
18	71	14	14	99	67	32	--
19	73	14	14	101	67	34	--
20	73	13	15	101	67	34	--
21	64	13	15	92	58	34	--
22	62	13	16	91	54	37	--
23	74	13	18	105	53	52	--
24	89	20	18	127	53	74	--
25	206	44	381	631	54	577	--
26	480	95	87	662	53	609	--
27	530	89	227	846	51	795	--
28	831	124	112	1067	48	1019	--
29	927	138	112	1177	46	1131	--
30	644	115	21	780	48	732	--
31	411	77	151	639	381	258	--
Total							
Sec.Ft.	6026	1146	1597	8769	4627	5982	1840
Mean	194	37	52	283	149	193	59
Ac.Ft.	11900	2280	3200	17400	9160	11900	3630

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER  
OCTOBER - 1933

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	404	--	64	468	--	468
2	400	--	69	469	--	469
3	390	16	67	473	--	473
4	232	277	16	525	--	525
5	206	417	--	623	242	381
6	326	424	--	750	448	302
7	498	344	--	842	480	362
8	683	88	--	771	468	303
9	556	72	--	628	202	426
10	480	70	76	626	--	626
11	428	68	66	562	--	562
12	390	68	65	523	--	523
13	368	64	57	489	--	489
14	359	56	51	466	--	466
15	330	50	43	423	--	423
16	377	10	38	425	--	425
17	300	51	33	384	--	384
18	330	31	28	389	--	389
19	377	--	24	401	--	401
20	368	--	32	400	--	400
21	364	--	34	398	--	398
22	355	--	34	389	--	389
23	355	--	34	389	--	389
24	372	--	37	409	--	409
25	433	--	52	485	--	485
26	503	--	74	577	--	577
27	600	--	577	1177	--	1177
28	850	--	609	1459	--	1459
29	1170	--	795	1965	--	1965
30	1430	--	1019	2449	--	2449
31	1600	--	1131	2731	--	2731
Total						
Sec.Ft.	15834	2106	5125	23065	1840	21225
Mean	511	117	165	744	59	685
Ac.Ft.	31400	(1-18) 4180	10100	45700	3630	42100

DIVISION OF WATER OF ST. MARY RIVER  
WATER AVAILABLE FOR USE AND USED BY U.S.A.  
OCTOBER - 1933

Day	Natural Flow	U.S. Share	Released Storage	U.S.A. Available	Diverted	Used BY U.S.A.	Stored	U.S.A. Total Used	Excess Of Share	Deficit Used
1	468	117	--	117	--	64	64	--	53	
2	469	117	--	117	--	69	69	--	48	
3	473	118	--	118	16	67	83	--	35	
4	525	131	--	131	277	16	293	162	--	
5	381	95	242	337	417	--	417	80	--	
6	302	76	448	524	424	--	424	--	100	
7	362	90	480	570	344	--	344	--	226	
8	303	76	468	544	88	--	88	--	456	
9	426	106	202	308	72	--	72	--	236	
10	626	156	--	156	70	76	146	--	10	
11	562	140	--	140	68	66	134	--	6	
12	523	131	--	131	68	65	133	2	--	
13	489	122	--	122	64	57	121	--	1	
14	466	116	--	116	56	51	107	--	9	
15	423	106	--	106	50	43	93	--	13	
16	425	106	--	106	10	38	48	--	58	
17	384	96	--	96	51	33	84	--	12	
18	389	97	--	97	31	28	59	--	38	
19	401	100	--	100	--	24	24	--	76	
20	400	100	--	100	--	32	32	--	68	
21	398	100	--	100	--	34	34	--	66	
22	389	97	--	97	--	34	34	--	63	
23	389	97	--	97	--	34	34	--	63	
24	409	102	--	102	--	37	37	--	65	
25	485	121	--	121	--	52	52	--	69	
26	577	144	--	144	--	74	74	--	70	
27	1177	422	--	422	--	577	577	155	--	
28	1459	563	--	563	--	609	609	46	--	
29	1965	816	--	816	--	795	795	--	21	
30	2449	1058	--	1058	--	1019	1019	--	39	
31	2731	1199	--	1199	--	1131	1131	--	68	
Total										
Sec.Ft.	21225	6915	1840	8755	2106	5125	7231	445	1969	
Mean	685	223	59	282	117	165		14.4	64	
Ac.Ft.	42100	13700	3630	17300	4180	10100	14300	885	3930	

(1-18)

DIVISION OF WATER OF ST. MARY RIVER  
WATER AVAILABLE FOR USE AND USED BY CANADA  
OCTOBER - 1933

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	468	351	404	381	53	--
2	469	352	400	379	48	--
3	473	355	390	381	35	--
4	525	394	232	208	--	162
5	381	286	206	148	--	80
6	302	226	326	287	100	--
7	362	272	498	450	226	--
8	303	227	683	638	456	--
9	426	320	556	523	236	--
10	626	470	480	448	10	--
11	562	422	428	404	6	--
12	523	392	390	373	--	2
13	489	367	368	350	1	--
14	466	350	359	161	9	--
15	423	317	330	--	13	--
16	425	319	377	--	58	--
17	384	288	300	--	12	--
18	389	292	330	--	38	--
19	401	301	377	--	76	--
20	400	300	368	--	68	--
21	398	298	364	--	66	--
22	389	292	355	--	63	--
23	389	292	355	--	63	--
24	409	307	372	--	65	--
25	485	364	433	--	69	--
26	577	433	503	--	70	--
27	1177	755	600	--	--	155
28	1459	896	850	--	--	46
29	1965	1149	1170	--	21	--
30	2449	1391	1430	--	39	--
31	2731	1532	1600	--	68	--
Total Sec. Ft.	21225	14310	15834	5131	1969	445
Mean	685	462	51	342 (1-15)	64	14.4
Ac. Ft.	42100	28400	31400	10200	3930	885



DIVISION OF ST.MARY RIVER

Table 2

CANADA

Water Available in Acre-Feet

1933

Month	St.Mary R. at Kimball	Rolph Creek	Lee Creek	Pothole Creek	Combined Flow
April	22,000		4,220	no record	26,220
May	93,500		11,900	535	105,935
June	194,000	No record	6,600	6	200,606
July	87,300		1,330	--	88,630
August	35,100		430	--	35,530
September	26,900		458	--	27,358
October	31,400		400 <sup>e</sup>	--	31,800
Total	490,200		25,338 <sup>b</sup>	541 <sup>b</sup>	516,079 <sup>c</sup>

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	1,330	+ 3,510	4,840	--	28,100
May	14,300	- 465	6,005	7,830	99,000
June	47,600	+ 1,615	6,695	42,520	173,000
July	50,200	- 1,965	4,045	44,190	43,500
August	34,700	- 1,713	677	32,310	27,300
September	24,900	- 912	3,000	20,980	45,800
October	10,200	+ 515	1,297	9,418	No record
Total	183,000 <sup>d</sup>	+ 585 <sup>f</sup>	26,554 <sup>g</sup>	157,256 <sup>h</sup>	x

b - Natural flow only.

c - Computed.

d - Diverted by A.R. & I. Co. at Kimball.

e - Estimated.

f - Gain between Kimball and Magrath.

g - Wasted in Pinepound and Pothole Creeks.

h - Flow in Canal at Magrath plus diversion by Laterals.

x - Below all points of diversion.

Table 2

DIVISION OF ST. MARY RIVER  
UNITED STATES  
Water Available in Acre-Feet  
1933

Month	St. Mary River						: Total Flow : Milk River : Eastern : Crossing
	: U. S. : Share	: Sherburne Res. : Stored	: Released	: Total : Available : for : Diversion	: Diverted	: Unused	
April	6,900	3,484	--	4,416	184	4,232	38,000
May	44,000	--	11,020	55,020	25,800	29,180	48,300
June	119,000	34,080	--	84,920	30,200	54,720	37,500
July	56,400	8,110	--	48,290	38,100	10,190	35,000
Aug.	13,500	--	25,500	39,000	37,500	1,500	33,900
Sept.	7,320	--	12,200	19,520	14,600	4,920	20,400
Oct.	13,700	6,470	--	7,230	4,190	3,040	7,070
Total	260,820	51,144	48,720	258,396	150,574	107,782	220,170

Note: Water stored in Sherburne Reservoir May 4 = 19,300 Acre-Feet.  
" " " " " " Oct. 31 = 19,790 " "

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	--	--	--	1,067	151	75	--	1,293
April	250	1,101	1,694	5,502	2,218	16,463	232	27,430
May	9,033	3,778	1,553	5,653	802	11,508	4,277	36,604
June	9,473	3,606	3,489	4,306	3,364	8,737	6,085	39,060
July	8,837	4,300	3,279	2,104	3,352	12,012	4,888	38,772
Aug.	5,936	3,063	2,646	841	2,322	7,228	3,223	25,259
Sept.	1,172	982	198	1,487	1,327	17,471	694	23,331
Oct.	1,228	--	--	--	--	--	--	1,228
Total	35,929	16,830	12,859	20,960	13,536	73,494	19,399	193,007

DISPOSITION OF THE WATERS OF THE NORTHERN TRIBUTARIES  
OF MILK RIVER IN CANADA  
1933

Quantities in Acre-Feet

Irrigator : April: May : June : July: Aug.:Sept.:Oct.: Total

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Lodge Creek

Hillman, E.D.	400
Roth, R.L.	40
Spangler, J.M.	500
Total Reported as Diverted in Canada	940

Flow at the Boundary : 2,400 : 2,610 : 583 : 1,030 : 15 : 1 : -- : 6,639

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Battle Creek

Lindner Bros.	150
Patterson, W.G.	30
Gaff, J.A.	150
Shepherd Bros.	15
McKinnon, J.	180
Stirling & Nash	375
Spangler, J.M.	150
Total Reported as Diverted in Canada	1,050

Flow at the Boundary : 6,430 : 4,860 : 750 : 560 : -- : -- : -- : 12,600

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Frenchman River

Wylie, D.J.	350
Gilchrist Bros.	465
Reid, R.C.	100
Pearse, S.	90
Bolingbrooke	12
Caton, W.E.	25
Bate, A.E.	29
Total Reported as Diverted in Canada	1,071

Flow at the Boundary : 11,500 : 5,470 : 1,790 : 904 : 1,080 : 113 : 363 : 21,220

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Table 4

## DIVERSIONS FROM THE NORTHERN TRIBUTARIES

Acre-Feet

1933

Irrigator	March	April	May	June	July	Aug.	Sept.	Total
<u>Lodge Creek</u>								
N. Chinook Canal	1,130	1,950	1,690	121	615	95	0	5,601
<u>Battle Creek</u>								
Matheson Canal		251	236	30	46	16		579
<u>Frenchman River</u>								
Frenchman Canal	119	494	830	478	279	19		2,219
Total	1,249	2,695	2,756	629	940	130	0	8,399