DIVERSION AND USE OF WATERS OF SUMMER AND MILK RIVERS

REPORT TO THE INTERNATIONAL JOINT COMMISSION

ON

DIVISION AND USE OF WATER OF ST.MARY AND MILK RIVERS

BY

E. F. DRAKE
representing Canada

AND

A. P. DAVIS
representing the United States.

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

Gentlemen:

In compliance with the provisions of clause 11 of your order of the 7th April, 1920, 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 1920.

Respectfully submitted,

E. A. Drake

Accredited Reclamation Officer of His Majesty.

A. P. Davis

Accredited Reclamation Office of the United States.

C O N T E N T S

T A B L E S.

INTRODUCTION.

The field work in the division and administration of the tributaries to the Milk River in 1920 was carried on by Mr. Geo. E. Stratton, Project Manager, U.S.R.S., Malta, and that in connection with the waters of the St. Mary River by Mr. R. M. Snell, Project Manager, U.S.R.S., Browning, Montana, on behalf of Mr. A. P. Davis, representing the United States.

Mr. R. J. Burley and Mr. S. G. Dawson carried on the field work on behalf of Mr. E. F. Drake, representing Canada.

The Hydrometric data in Montana were obtained by the U.S.G.S. under the personal supervision of Mr. W. A. Lamb, while hydrometric data from Canadian streams were collected by the Dominion Water Power Branch under the supervision of Mr. A. L. Ford, District Chief Engineer.

The engineers in the field kept constantly in touch with the conditions relative to the flow of the different streams affected by the Treaty, the amount of water stored or released from storage, and the amounts diverted by each country. Frequent trips of inspection were taken over the irrigated tracts in both countries to determine the use to which the diverted water was put.

DIVISION OF WATER.

The U.S.R.S. St. Mary Canal diverted 71,140 acre feet of water from the St. Mary River during the period of operation from the opening of the headgates on the 25th May to the closing of them for the season on the 31st August. Total U.S.R.S. diversion from Milk River, including St.Mary water and losses in transit amounted to 147,820 acre feet. The opening of the canal was delayed by the lateness of the spring and the abnormal amount of snow which blocked the canals. Timely rains in the Lower Milk River valley during the season lessened the demand on the St.Mary River and allowed an early closing of the project.

The A.R. & I.Company's canal diverted 185,732 acre feet from St.Mary River during the period of operation from the 23rd April to the 8th November.

Any question as to the proper share of the waters of the St.Mary River to be delivered to either country was adjusted by the field engineers by making current meter measurements of the discharge of the headwaters of the St. Mary River, computing the inflow to and measuring the outflow of the Sherburne reservoir, the amount diverted by the U.S.R.S. St.Mary Canal, and the amount delivered to Canada at the boundary.

From these measurements and calculations the natural flow of St.Mary River was computed and the share to which

each country was entitled was determined on the following basis:

1. When the flow was less than 667 second-feet, one-fourth to the United States and three-fourths to Canada.

2. When the flow was between 667 and 1000 second-feet, 500 second-feet to Canada and the remainder to the United States.

3. When the flow was above 1000 second-feet, the water was divided equally between the two countries.

As the discharge of the St. Mary River was above 1000 second-feet until the end of July, little difficulty was experienced in supplying each country with sufficient water to meet the demand.

WATER SUPPLY.

The precipitation on the drainage basins of St. Mary and Milk Rivers during the winter of 1919-20 was slightly above the average. The spring runoff in the Milk River basin was very gradual and continued later in the season than is usual. The discharge during the month of May was the largest on record at the Eastern crossing of the boundary.

The winter's supply of snow in the mountains at the head of the St. Mary River was sufficient to maintain an average flow in the river until August. On the 15th August, a snow survey was made, and it was found that even

at that date there was still evidence of last winter's snowfall.

An average season's flow was recorded on the northern tributaries to Milk River. Lodge Creek maintained a discharge at the boundary until the first of August, Battle Creek was dry at the boundary early in August, while Frenchman River flowed continuously all season but with a very small discharge during September. Storing in the Sherburne reservoir was commenced on the 24th June and the entire flow of Swift current, Canyon and other small creeks was held until the 15th July. It was then decided that due to rains, the United States share of the natural flow of the St. Mary River together with that of the Milk River would be sufficient to meet the light demand in the Lower Milk River valley and consequently the stored water was released.

A certain amount of stored water was retained in the reservoir to facilitate the movement of gravel barges during the construction of the temporary spillway in the dam.

HYDROMETRIC WORK.

The hydrometric data were collected in Montana by the U.S.G.S. under the supervision of Mr. W. A. Lamb, and in Canada by the Dominion Water Power Branch under the supervision of Mr. A. L. Ford. The same gaging stations were maintained by Canada with the exception of those on Boundary Creek, Oxarart Creek and North Branch Frenchman River, which

were abandoned at the end of the season 1919.

The ten international gaging stations were maintained and operated under the joint supervision of the field engineers delegated to represent the undersigned.

The location of the gage on the U.S.R.S. St.Mary canal at Hudson Bay Divide was changed by mutual agreement to a position which it is hoped will give more nearly perfect records. A water stage recorder was installed on the Swiftcurrent creek at Sherburne to obtain more accurate records of the outflow from Sherburne reservoir.

Appendices to this report give the results of current meter measurements, the daily gage heights and the discharge at all the gaging stations operated in the two drainage basins during the season 1920.

DESCRIPTION OF TABLES AND DIAGRAMS.

Several tables and diagrams have been prepared, summarizing the data on the division and the use of the water of the two rivers.

Table 1 - compares the estimated requirements for 1920 with the amount of water actually diverted.

Table 2 - shows the method of determining the natural flow of the St. Mary River during the irrigation season, the water available for use and diverted by the United States, and the water available for use by Canada.

For periods of storing, the table consists of four sheets for the month. Sheet No.1 shows the daily flow into and out of Sherburne reservoir, the difference giving the amount of water stored or released from storage. Sheet No.2 shows the water diverted, stored or released from storage by the United States and the total natural flow of St. Mary River which would cross the boundary if undisturbed. Two days has been estimated as being the time for stored water to reach the boundary from Sherburne reservoir. Sheet No.3 shows the water available for use by the United States, the water used and the excess or deficiency of this quantity over the quantity available. Sheet No.4 shows the natural flow of St. Mary River at Kimball or the boundary, Canada's share and the actual discharge of the river at Kimball which is the quantity of water received by Canada, and the excess or deficiency of the quantity received by Canada as compared with her share.

During periods when there is no storing, the first sheet dealing with the Sherburne reservoir has been omitted.

Table 3 - is the statement showing the quantity of water diverted each month by each country, and the quantity thereof applied to the land, and also the quantity

of water diverted from St.Mary to Milk River and stored or held back by either country, as requested by the Commission in paragraph 11 of its order of the 7th April, 1920. In addition this table shows for St. Mary and Milk Rivers the water available, diverted, used, stored, wasted and the losses in canals and reservoirs.

Table 4 - gives the available data on diversions from the principal northern tributaries of Milk River.

DEVELOPMENTS AND FUTURE REQUIREMENTS.

During the season 1920, some 17,000 acres, comprising the Taber extension, were added to the irrigable area of the A.R. & I.Co. Water was turned into these canals in early September and it is expected that there will be a heavy demand for water early in the season 1921.

The area to be irrigated by the United States Milk River canals in 1921 shows an increase of 8,600 acres over 1920. Indications point to a very small runoff from the Milk River watershed and it now appears that it will be necessary to begin the operation of the St. Mary canal in 1921 as early in the season as possible and to operate it to capacity until perhaps the middle of September.

T A B L E S .

TABLE 1.

ESTIMATED REQUIREMENTS AND ACTUAL DIVERSIONS.

SEASON, 1920.

CANADA

Month	Estimated Requirements Ac.Ft.	Diverted Ac.Ft.	Wasted Ac.Ft.	Balance Ac.Ft.	Percentage Estimated	Percentage Actual
April	2193	809	-	809	1	0.4
May	26316	7317	3810	3507	12	4.0
June	54825	34155	5225	28930	25	18.9
July	54825	48575	17113	31462	25	26.8
August	43860	32220	4273	27947	20	17.7
September	32895	28800	3773	25027	15	15.9
October	4386	29699	7194	22505	2	16.3
TOTAL	219300	181575	41388	140187	100	100.0

UNITED STATES

Month	Estimated Requirements Ac.Ft.	Diverted (a) Ac.Ft.	Wasted Ac.Ft.	Balance Ac.Ft.	Percentage Estimated	Percentage Actual
March	-	4210	630	3580	-	2.9
April	2200	16300	2390	13910	1	11.0
May	26400	17040	2500	14540	12	11.5
June	55000	38685	8380	30305	25	26.2
July	55000	34780	2330	32450	25	23.5
August	44000	30705	4650	26055	20	20.8
September	33000	6100	2820	3280	15	4.1
October	4400	-	-	-	2	-
TOTAL	220000	147820	23700	124120	100	100.0

(a) Water diverted from Milk River plus St. Mary River water lost by seepage and evaporation in transit.

Note: Flow of Milk River [illegible] 16/3/21

Table 2.

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER
April - 1920.

Day	St.Mary River at Kimball	Diverted by U.S.R.S.	Stored by U.S.R.S.	Total	Stored water released	Natural flow St.Mary River at Kimball
	Sec. ft.	Sec. ft.	Sec. ft.	Sec.ft.	Sec.ft.	Sec.ft.
1	347	0	0	347	0	347
2	104	0	0	104	0	104
3	107			107		107
4	135			135		135
5	148			148		148
6	170			170		170
7	170			170		170
8	194			194		194
9	234			234		234
10	234			234		234
11	234			234		234
12	300			300		300
13	481			481		481
14	886			886		886
15	750			750		750
16	730			730		730
17	840			840		840
18	875			875		875
19	887			887		887
20	570			570		570
21	300			300		300
22	332			332		332
23	350			350		350
24	392			392		392
25	372			372		372
26	372			372		372
27	548			548		548
28	724			724		724
29	562			562		562
30	520			520		520
TOTAL	12868	0	0	12868	0	12868
MEAN	429	0	0	429	0	429
Ac.ft.	25527	0	0	25527	0	25527

Table 2.

DIVISION OF WATER OF ST. MARY RIVER
WATER USED BY UNITED STATES
April - 1920

Day	Natural Flow: St. Mary River at Kimball Sec.ft.	Available for use by U.S.: U. S. Share Sec.ft.	Stored Water Released Sec.ft.	Total Sec.ft.	Used: Diverted Sec.ft.	Stored Sec.ft.	Total Sec.ft.	Excess Sec.ft.	Waste defi-ciency Sec.ft.
1	347	87	0	87	0	0	0	0	87
2	104	26		26					26
3	107	27		27					27
4	135	34		34					34
5	148	37		37					37
6	170	42		42					42
7	170	43		43					43
8	194	48		48					48
9	234	58		58					58
10	234	58		58					58
11	234	59		59					59
12	300	75		75					75
13	481	120		120					120
14	886	386		386					386
15	750	250		250					250
16	730	230		230					230
17	840	340		340					340
18	875	375		375					375
19	887	387		387					387
20	570	142		142					142
21	300	75		75					75
22	332	83		83					83
23	350	87		87					87
24	392	98		98					98
25	372	93		93					93
26	372	93		93					93
27	548	137		137					137
28	724	224		224					224
29	562	140		140					140
30	520	130		130					130
TOTAL	12868	3984		3984					3984
MEAN	429	132.8		132.8					132.8
Ac.ft.	25527	7902		7902					7902

Table 2.

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE BY CANADA
April - 1920.

Day	Natural Flow St. Mary River at Kimball Sec. ft.	Canada's Share Sec. ft.	St. Mary River at Kimball Sec. ft.	Waste Excess Sec. ft.	Deficiency Sec. ft.
1	347	260	347	87	
2	104	78	104	26	
3	107	80	107	27	
4	135	101	135	34	
5	148	111	148	37	
6	170	128	170	42	
7	170	127	170	43	
8	194	146	194	48	
9	234	176	234	58	
10	234	176	234	58	
11	234	175	234	59	
12	300	225	300	75	
13	481	361	481	120	
14	886	500	886	386	
15	750	500	750	250	
16	730	500	730	230	
17	840	500	840	340	
18	875	500	875	375	
19	887	500	887	387	
20	570	428	570	142	
21	300	225	300	75	
22	332	249	332	83	
23	350	263	350	87	
24	392	294	392	98	
25	372	279	372	93	
26	372	279	372	93	
27	548	411	548	137	
28	724	500	724	224	
29	562	420	562	140	
30	520	390	520	130	
Sec. ft.	12868	8882	12868	3984	
Mean	429	296	429	132.8	
Ac. ft.	25527	17613	25527	7902	

Table 2.

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER
May - 1920.

Day	St. Mary River at Kimball Sec. ft.	Diverted by: U.S.R.S. Sec. ft.	Stored by: U.S.R.S. Sec.ft.	Total Sec. ft.	Stored water released Sec. ft.	Natural Flow St. Mary River at Kimball Sec. ft.
1	472	0	0	472	0	472
2	416			416		416
3	476			476		476
4	535			535		535
5	681			681		681
6	918			918		918
7	1188			1188		1188
8	1458			1458		1458
9	1353			1353		1353
10	1191			1191		1191
11	1288			1288		1288
12	1693			1693		1693
13	1676			1676		1676
14	1660			1660		1660
15	1761			1761		1761
16	1807			1807		1807
17	2090			2090		2090
18	2424			2424		2424
19	2475			2475		2475
20	2614			2614		2614
21	2758			2758		2758
22	2740			2740		2740
23	2650			2650		2650
24	2758			2758		2758
25	2424	44		2468		2468
26	2148	209		2357		2357
27	1930	220		2150		2150
28	1715	282		1997		1997
29	1515	303		1818		1818
30	1420	330		1750		1750
31	1362	333		1695		1695
Sec. ft.	51596	1721	0	53317	0	53317
Mean	1664	246	0	1720	0	1720
Act ft.	102315	3416	0	105760	0	105760

Table 2

DIVISION OF WATER OF ST. MARY RIVER
WATER USED BY UNITED STATES
May - 1920

Day	Natural Flow: St. Mary River at Kimball Sec.ft.	Available for use by U.S.: U.S. Share Sec.ft.	Available for use by U.S.: Stored Water Released Sec.ft.	Available for use by U.S.: Total Sec.ft.	Used: Diverted Sec.ft.	Used: Stored Sec.ft.	Used: Total Sec.ft.	Excess Sec.ft.	Waste defi-ciency Sec.ft.
1	472	118	0	118	0	0	0	0	118
2	416	104		104					104
3	476	119		119					119
4	535	134		134					134
5	681	181		181					181
6	918	418		418					418
7	1188	594		594					594
8	1458	729		729					729
9	1353	676		676					676
10	1191	596		596					596
11	1288	644		644					644
12	1693	846		846					846
13	1676	838		838					838
14	1660	830		830					830
15	1761	880		880					880
16	1807	904		904					904
17	2090	1045		1045					1045
18	2424	1212		1212					1212
19	2475	1238		1238					1238
20	2614	1307		1307					1307
21	2758	1379		1379					1379
22	2740	1370		1370					1370
23	2650	1325		1325					1325
24	2758	1379		1379					1379
25	2468	1234		1234	44		44	0	1190
26	2357	1178		1178	209		209		969
27	2150	1075		1075	220		220		855
28	1997	998		998	282		282		716
29	1818	909		909	303		303		606
30	1750	875		875	330		330		545
31	1695	848		848	333		333		515
Sec.ft.	53317	25983	0	25983	1721	0	1721	0	24262
Mean	1720	838.2	0	838.2	246	0	246	0	782.6
Ac.ft.	105760	51539	0	51539	3416	0	3416	0	48119

Table 2.

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE BY CANADA
May - 1920.

Day	Natural Flow St. Mary River at Kimball Sec. ft.	Canada's share Sec. ft.	St. Mary River at Kimball Sec. ft.	Excess Sec. ft.	Deficiency Sec. ft.
1	472	354	472	118	
2	416	312	416	104	
3	476	357	476	119	
4	535	401	535	134	
5	681	500	681	181	
6	918	500	918	418	
7	1188	594	1188	594	
8	1458	729	1458	729	
9	1353	677	1353	676	
10	1191	595	1191	596	
11	1288	644	1288	644	
12	1693	847	1693	846	
13	1676	838	1676	838	
14	1660	830	1660	830	
15	1761	881	1761	881	
16	1807	903	1807	904	
17	2090	1045	2090	1045	
18	2424	1212	2424	1212	
19	2475	1237	2475	1238	
20	2614	1307	2614	1307	
21	2758	1379	2758	1379	
22	2740	1370	2740	1370	
23	2650	1325	2650	1325	
24	2758	1379	2758	1379	
25	2468	1234	2424	1190	
26	2357	1179	2148	969	
27	2150	1075	1930	855	
28	1997	999	1715	716	
29	1818	909	1515	606	
30	1750	875	1420	545	
31	1695	847	1362	515	
Sec.ft.	53317	27334	51596	24262	
Mean	1720	881.7	1664	782.6	
Ac.ft.	105760	54214	102315	48119	

Table 2.

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER
WATER STORED AND REALEASED BY UNITED STATES
June - 1920.

Day	Inflow into Sherburne Reservoir: Swift Current Cr. at Many Glacier Sec. ft.	Canyon Creek Sec.ft.	Other Creeks (Estimated) Sec.ft.	Total Inflow Sec. ft.	Swift Current Creek below Sherburne Sec. ft.	Stored Sec.ft.	Released from Storage Sec. ft.
1	171	25	14	210	356	---	146
2	161	24	13	198	356	---	154
3	178	29	14	221	103	118	---
4	263	32	21	316	91	225	---
5	386	48	31	465	529	---	64
6	530	61	42	633	695	---	52
7	638	68	51	757	864	---	107
8	843	76	66	985	942	43	---
9	796	75 e.	63	934	1020	---	86
10	592	64	47	703	1070	---	367
11	638	67	51	756	1030	---	274
12	632	67	50	749	1050	---	301
13	580	63	46	689	1030	---	341
14	714	71	56	841	1050	---	209
15	896	79	70	1045	1090	---	45
16	968	83	75	1126	1150	---	124
17	902	80	71	1053	1190	---	137
18	867	78	69	1014	1190	---	176
19	778	74	61	913	1190	---	257
20	661	68	53	782	1150	---	368
21	708	70	56	834	1110	---	276
22	755	73	60	888	1070	---	182
23	594	64	48	706	1050	---	344
24	432	53	35	520	322	198	---
25	411	51 e.	33	495	81	414	---
26	367	44	30	441	86	355	---
27	377	46	30	453	88	365	---
28	406	50	33	489	93	396	---
29	486	58	39	583	0	583	---
30	569	66	46	681	0	681	---
Sec.ft.	17299	1807	1374	20480	21046	3378	4010
Mean	577	60.2	45.8	683	702	337.8	200.5
Ac.ft.	34300	3582	2725	40641	41800	6560	7934

Table 2.

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER

June - 1920.

Day	St.Mary River at Kimball Sec. ft.	Diverted by U.S.R.S. Sec. ft.	Stored by U.S.R.S. Sec.ft.	Total Sec. ft.	Stored Water Released Sec.ft.	Natural Flow St.Mary River at Kimball Sec.ft.
1	1344	337	---	1681	---	1681
2	1270	316	---	1586	---	1586
3	1191	332	---	1523	146	1377
4	1108	345	---	1453	154	1299
5	1297	297	118	1712	---	1712
6	1486	345	225	2056	---	2056
7	1761	322	---	2083	64	2019
8	2266	359	---	2625	52	2573
9	2925	352	---	3277	107	3170
10	3324	308	43	3675	---	3675
11	3457	352	---	3809	86	3723
12	3590	355	---	3945	367	3578
13	3628	355	---	3983	274	3709
14	3780	311	---	4091	301	3790
15	3989	324	---	4313	341	3972
16	4255	367	---	4622	209	4413
17	4331	380	---	4711	45	4666
18	4445	321	---	4766	124	4642
19	4218	380	---	4598	137	4461
20	3904	402	---	4306	176	4130
21	3813	402	---	4215	257	3958
22	3633	406	---	4039	368	3671
23	3633	335	---	3968	276	3692
24	3525	387	---	3912	182	3730
25	2867	410	---	3277	344	2933
26	2452	350	198	3000	---	3000
27	2053	412	414	2879	---	2879
28	1879	418	355	2652	---	2652
29	1855	391	365	2611	---	2611
30	1831	398	396	2625	---	2625
Sec.ft.	85110	10769	2114	97993	4010	93983
Mean	2837	359	264.2	3266	200.5	3133
Ac.ft.	168813	21362	4189	194340	7913	186427

Table 2.

DIVISION OF WATER OF ST. MARY RIVER
WATER USED BY UNITED STATES
June - 1920

Day	Natural Flow St.Mary River at Kimball	AVAILABLE FOR USE BY U.S. U.S. Share	Stored Water Released	Total	USED Diverted	Stored	Total	Excess	Waste Defi-cienc
	Sec. ft.	Sec.ft.	Sec.ft.	Sec.ft.	Sec. ft.	Sec.ft.	Sec.ft.	Sec.ft.	Sec.f
1	1681	840	---	840	337	---	337	0	503
2	1586	793	---	793	316	---	316		477
3	1377	688	146	834	332	---	332		502
4	1299	649	154	803	345	---	345		458
5	1712	856	---	856	297	118	415		441
6	2056	1028	---	1028	345	225	570		458
7	2019	1010	64	1074	322	---	322		752
8	2573	1286	52	1338	359	---	359		979
9	3170	1585	107	1692	352	---	352		1340
10	3675	1838	---	1838	308	43	351		1487
11	3723	1861	86	1947	352	---	352		1595
12	3578	1789	367	2156	355	---	355		1801
13	3709	1854	274	2128	355	---	355		1773
14	3790	1895	301	2196	311	---	311		1885
15	3972	1986	341	2327	324	---	324		2003
16	4413	2206	209	2415	367	---	367		2048
17	4666	2333	45	2378	380	---	380		1998
18	4642	2321	124	2445	321	---	321		2124
19	4461	2230	137	2367	380	---	380		1987
20	4130	2065	176	2241	402	---	402		1839
21	3958	1979	257	2236	402	---	402		1834
22	3671	1836	368	2204	406	---	406		1798
23	3692	1846	276	2122	335	---	335		1787
24	3730	1865	182	2047	387	---	387		1660
25	2933	1467	344	1811	410	---	410		1401
26	3000	1500	---	1500	350	198	548		952
27	2879	1439	---	1439	412	414	826		613
28	2652	1326	---	1326	418	355	773		553
29	2611	1306	---	1306	391	365	756		550
30	2625	1312	---	1312	398	396	794		518
Sec.ft.	93983	46989	4010	50999	10769	2114	12883	0	38116
Mean	3133	1566	200.5	1700	359	264	429	0	1270
Ac.ft.	186427	93214	7913	101157	21362	4189	25551	0	75570

Table 2.

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE BY CANADA.
June - 1920

Day	Natural Flow St.Mary River at Kimball Sec. ft.	Canada's Share Sec. ft.	St. Mary River at Kimball Sec. ft.	Excess Sec. ft.	Deficiency Sec. ft.
1	1681	841	1344	503	
2	1586	793	1270	477	
3	1377	689	1191	502	
4	1299	650	1108	458	
5	1712	856	1297	441	
6	2056	1028	1486	458	
7	2019	1009	1761	752	
8	2573	1287	2266	979	
9	3170	1585	2925	1340	
10	3675	1837	3324	1487	
11	3723	1862	3457	1595	
12	3578	1789	3590	1801	
13	3709	1855	3628	1773	
14	3790	1895	3780	1885	
15	3972	1986	3989	2003	
16	4413	2207	4255	2048	
17	4666	2333	4331	1998	
18	4642	2321	4445	2124	
19	4461	2231	4218	1987	
20	4130	2065	3904	1839	
21	3958	1979	3813	1834	
22	3671	1835	3633	1798	
23	3692	1846	3633	1787	
24	3730	1865	3525	1660	
25	2933	1466	2867	1401	
26	3000	1500	2452	952	
27	2879	1440	2053	613	
28	2652	1326	1879	553	
29	2611	1305	1855	550	
30	2625	1313	1831	518	
Sec.ft.	93983	46994	85110	38116	
Mean	3133	1566	2837	1270	
Ac. ft.	186427	93214	168813	75570	

Table 2.

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER

WATER STORED AND RELEASED BY UNITED STATES
July - 1920.

Day	INFLOW INTO SHERBURNE RESER. Swift Current Creek at Many Glacier Sec. ft.	Canyon Creek Sec. ft.	Other Creeks (Estimated) Sec. ft.	Total Sec.ft.	Swift Current Creek below Sherburne Sec. ft.	Stored Sec. ft.	Released from Storage Sec. ft.
1	696	77	65	838	---	838	---
2	761	76	65	902	---	902	---
3	714	68	51	833	---	833	---
4	632	62	46	740	---	740	---
5	552	56	39	647	---	647	---
6	416	53	34	503	---	503	---
7	339	48	31	418	---	418	---
8	320	48	31	399	---	399	---
9	382	45	28	455	---	455	---
10	422	46	30	498	---	498	---
11	442	46	30	518	---	518	---
12	480	45	28	553	---	553	---
13	496	45	28	569	---	569	---
14	427	45	28	500	---	500	---
15	406	46	30	482	336	146	---
16	448	46	30	524	413	111	---
17	469	44	27	540	736	---	196
18	432	43	26	501	1100	---	599
19	372	41	25	438	791	---	353
20	362	41	25	428	766	---	338
21	372	40	24	436	732	---	296
22	382	39	24	445	717	---	272
23	325	37	23	385	845	---	460
24	271	35	22	328	986	---	658
25	246	34	22	302	1110	---	808
26	230	33	21	314	1090	---	776
27	218	32	21	271	1170	---	899
28	218	31	20	269	350	---	81
29	226	39	23	288	361	---	73
30	302	62	46	410	43	367	--
31	302	46	30	378	1330	---	952
Sec.ft.	12660	1449	973	15112	12876	8997	6761
Mean	408	46.7	31.4	487.0	757	529.2	483
Ac. ft.	25111	2872	1961	29944	25500	17843	13410

Table 2.

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER
July - 1920.

Day	St.Mary River at Kimball	Diverted by U.S.R.S.	Stored by U.S.R.S.	Total	Stored Water Released	Natural Flow St.Mary River at Kimball
	Sec. ft.	Sec. ft.	Sec. ft.	Sec. ft.	Sec. ft.	Sec. ft.
1	1927	373	583	2883	---	2883
2	2118	366	681	3165	---	3165
3	2200	374	838	3412	---	3412
4	2226	420	902	3548	---	3548
5	2118	422	833	3373	---	3373
6	2066	420	740	3226	---	3226
7	1939	391	647	2977	---	2977
8	1691	422	503	2616	---	2616
9	1530	430	418	2378	---	2378
10	1468	430	399	2297	---	2297
11	1405	430	455	2290	---	2290
12	1446	432	498	2376	---	2376
13	1658	436	518	2612	---	2612
14	1572	434	553	2559	---	2559
15	1499	434	569	2502	---	2502
16	1572	428	500	2500	---	2500
17	1691	436	146	2273	---	2273
18	1915	436	111	2462	---	2462
19	2200	436	---	2636	196	2440
20	2213	434	---	2647	599	2048
21	2172	436	---	2608	353	2255
22	1988	440	---	2428	338	2090
23	1939	440	---	2379	296	2083
24	1927	440	---	2367	272	2095
25	1903	440	---	2343	460	1883
26	1903	440	---	2343	658	1685
27	1819	442	---	2261	808	1453
28	1724	440	---	2164	776	1388
29	1446	436	---	1882	899	983
30	1315	438	---	1753	81	1672
31	1125	438	---	1563	73	1490
Sec.ft.	55715	13214	9894	78823	5809	73014
Mean	1797	426	550	2543	447	2355
Ac. ft.	110493	26194	19658	156345	11545	144800

Table 2.

DIVISION OF WATER OF ST. MARY RIVER
WATER USED BY UNITED STATES
July - 1920

Day	Natural Flow: St. Mary River at Kimball	AVAILABLE FOR USE BY U. S.: U.S. Share	Stored Water Released	Total	USED: Diverted	Stored	Total	Excess	Waste Defi-ciency
	Sec. ft.	Sec. ft.	Sec. ft.	Sec.ft.	Sec.ft.	Sec.ft.	Sec.ft.	Sec.ft.	Sec.ft.
1	2863	1442	---	1442	373	583	956	0	486
2	3165	1582	---	1582	366	681	1047		535
3	3412	1706	---	1706	374	838	1212		494
4	3548	1774	---	1774	420	902	1322		452
5	3373	1686	---	1686	422	833	1255		431
6	3226	1613	---	1613	420	740	1160		453
7	2977	1488	---	1488	391	647	1038		450
8	2616	1308	---	1308	422	503	925		383
9	2378	1189	---	1189	430	418	848		341
10	2297	1148	---	1148	430	399	829		319
11	2290	1145	---	1145	430	455	885		260
12	2376	1188	---	1188	432	498	930		258
13	2612	1306	---	1306	436	518	954		352
14	2559	1279	---	1279	434	553	987		292
15	2502	1251	---	1251	434	569	1003		248
16	2500	1250	---	1250	428	500	928		322
17	2273	1136	---	1136	436	146	582		554
18	2462	1231	---	1231	436	111	547		684
19	2440	1220	196	1416	436	---	436		980
20	2048	1024	599	1623	434	---	434		1189
21	2255	1128	353	1481	436	---	436		1045
22	2090	1045	338	1383	440	---	440		943
23	2083	1042	296	1338	440	---	440		898
24	2095	1047	272	1319	440	---	440		879
25	1883	942	460	1402	440	---	440		962
26	1685	842	658	1500	440	---	440		1060
27	1453	726	808	1534	442	---	442		1092
28	1388	694	776	1470	440	---	440		1030
29	983	492	899	1391	436	---	436		955
30	1672	836	81	917	438	---	438		479
31	1490	745	73	818	438	---	438		380
Sec.ft.	73014	36505	5809	42314	13214	9894	23108	0	19206
Mean	2355	1177	1447	1365	1426	550	745		619
Ac. ft.	144800	72374	11545	83929	26194	19658	45852		38077

Table 2.

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE BY CANADA
July - 1920.

Day	Natural flow St. Mary River at Kimball Sec. ft.	Canada's Share Sec. ft.	St. Mary River at Kimball Sec. ft.	Excess Sec. ft.	Deficiency Sec. ft.
1	2883	1441	1927	486	0
2	3165	1583	2118	535	
3	3412	1706	2200	494	
4	3548	1774	2226	452	
5	3373	1687	2118	431	
6	3226	1613	2066	453	
7	2977	1489	1939	450	
8	2616	1308	1691	383	
9	2378	1189	1530	341	
10	2297	1149	1468	319	
11	2290	1145	1405	260	
12	2376	1188	1446	258	
13	2612	1306	1658	352	
14	2559	1280	1572	292	
15	2502	1251	1499	248	
16	2500	1250	1572	322	
17	2273	1137	1691	554	
18	2462	1231	1915	684	
19	2440	1220	2200	980	
20	2048	1024	2213	1189	
21	2255	1127	2172	1045	
22	2090	1045	1988	943	
23	2083	1041	1939	898	
24	2095	1048	1927	879	
25	1883	941	1903	962	
26	1685	843	1903	1060	
27	1453	727	1819	1092	
28	1388	694	1724	1030	
29	983	491	1446	955	
30	1672	836	1315	479	
31	1490	745	1125	380	
Sec.ft.	73014	36509	55715	19206	
Mean	2355	1177	1797	619	
Ac.ft.	144800	72374	110493	38077	

Table 2.

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER
WATER STORED AND RELEASED BY UNITED STATES

August - 1920

Day	INFLOW INTO SHERBURNE RESERVR: Swift Current Creek at Many Glacier Sec.ft.	Canyon Creek Sec.ft.	Other Creeks (Estimated) Sec. ft.	Total Sec.ft.	Swift Current Creek below Sherburne Sec. ft.	Stored Sec.ft.	Released from Storage Sec. ft.
1	271	37	23	331	1250	---	919
2	251	32	18	301	1290	---	989
3	230	29	16	275	1490	---	1215
4	215	27	15	257	598	---	341
5	199	27	15	241	145	96	---
6	188	26	15	229	145	84	---
7	181	26	15	222	230	---	8
8	174	26	14	214	230	---	16
9	178	26	14	218	250	---	32
10	171	25	13	209	251	---	42
11	164	27	13	204	515	---	311
12	168	25	12	205	780	---	575
13	164	25	11	200	735	---	535
14	181	27	10	218	705	---	487
15	181	26	8	215	675	---	460
16	171	25	6	202	325	---	123
17	150	23	6	179	239	---	60
18	129	20	5	154	253	---	99
19	108	14.8	4	127	150	---	23
20	102	13.4	4	119	140	---	21
21	98	12.5	4	115	133	---	18
22	102	12.5	4	119	127	---	8
23	108	13.0	4	125	127	---	2
24	108	13.4	4	125	121	4	-
25	112	13.4	4	129	121	8	-
26	118	13.8	4	136	146	---	10
27	115	13.0	3	131	146	---	15
28	110	12.5	3	126	133	---	7
29	94	11.1	2	107	121	---	14
30	87	11.4	2	100	110	---	10
31	83	11.8	2	97	105	---	8
Sec.ft.	4711	645.6	273	5630	11786	192	6348
Mean	152	20.8	8.8	181.6	380	48	235
Ac.ft.	9350	1280	541	11171	23400	381	12593

Table 2.

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER
August - 1920.

Day	St. Mary River at Kimball Sec. ft.	Diverted by U.S.R.S. Sec. ft.	Stored by U.S.R.S. Sec. ft.	Total Sec. ft.	Stored Water Released Sec. ft.	Natural Flow St. Mary River at Kimball Sec. ft.
1	1144	440.0	367	1951	---	1951
2	1335	436.0	---	1771	952	819
3	1405	452.0	---	1857	919	938
4	1395	459.0	---	1854	989	865
5	1125	461.0	---	1586	728	858
6	817	461.0	---	1278	341	937
7	620	475.0	96	1191	---	1191
8	515	480.0	84	1079	---	1079
9	490	469.0	---	959	8	951
10	530	434.0	---	964	16	948
11	535	434.0	---	969	32	937
12	620	434.0	---	1054	42	1012
13	757	434.0	---	1191	311	880
14	809	432.0	---	1241	575	666
15	809	432.0	---	1241	535	706
16	778	432.0	---	1210	487	723
17	620	434.0	---	1054	460	594
18	500	436.0	---	936	123	813
19	428	406.0	---	834	60	774
20	368	404.0	---	772	99	673
21	304	402.0	---	706	23	683
22	420	231.0	---	651	21	630
23	467	174.0	---	641	18	623
24	462	153.0	---	615	8	607
25	449	152.0	---	601	2	599
26	472	99.0	4	575	---	575
27	476	91.0	8	575	---	575
28	568	17.7	---	586	10	576
29	546	4.8	---	551	15	536
30	557	3.2	---	560	7	553
31	525	2.0	---	527	14	513
Sec.ft.	20846	10174.7	559	31580	6795	24785
Mean	672	328	112	1019	261	799
Ac.ft.	41320	20168	1151	62639	13466	49161

Table 2

DIVISION OF WATER OF ST. MARY RIVER
WATER USED BY UNITED STATES

August -- 1920

Day	Natural flow St. Mary River at Kimball	AVAILABLE FOR USE BY U.S. U. S. Share	Stored Water Released	Total	USED Diverted	Stored	Total	Excess	Waste Deficiency
	Sec. ft.	Sec.ft.	Sec. ft.	Sec.ft.	Sec.ft.	Sec.ft.	Sec.ft.	Sec.ft.	Sec.ft.
1	1951	976	---	976	440.0	367	807	0	169
2	819	319	952	1271	436.0	---	436		835
3	938	438	919	1357	452.0	---	452		905
4	865	365	989	1354	459.0	---	459		895
5	858	358	728	1086	461.0	---	461		625
6	937	437	341	778	461.0	---	461		317
7	1191	595	---	595	475.0	96	571		24
8	1079	540	---	540	480.0	84	564	24	---
9	951	451	8	459	469.0	---	469	10	---
10	948	448	16	464	434.0	---	434	--	30.
11	937	437	32	469	434.0	---	434	--	35
12	1012	506	42	548	434.0	---	434	--	114
13	880	380	311	691	434.0	---	434	--	257
14	666	167	575	742	432.0	---	432	--	310
15	706	206	535	741	432.0	---	432	--	309
16	723	223	487	710	432.0	---	432	--	278
17	594	148	460	608	434.0	---	434	--	174
18	813	313	123	436	436.0	---	436	--	---
19	774	274	60	334	406.0	---	406	72	----
20	673	173	99	272	404.0	---	404	132	---
21	683	183	23	206	402.0	---	402	196	---
22	630	158	21	179	231.0	---	231	52	---
23	623	156	18	174	174.0	---	174	---	---
24	607	152	8	160	153.0	---	153	---	--7
25	599	150	2	152	152.0	---	152	---	---
26	575	144	---	144	99.0	4	103	---	41
27	575	144	---	144	91.0	8	99	---	45
28	576	144	10	154	17.7	---	18	---	136
29	536	134	15	149	4.8	---	5	---	144
30	553	138	7	145	3.2	---	3	---	142
31	513	128	14	142	2.0	---	2	---	140
Sec.ft.	24785	9385	6795	16180	10174.7	559	10734	486	5932
Mean	799	302.7	261	522	328	112	346.3	81	269.6
Ac.ft.	49161	18612	13466	32078	20168	1125	21293	978	11763

Table 2

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE BY CANADA
August — 1920

Day	Natural Flow St. Mary River at Kimball Sec. ft.	Canada's Share Sec. ft.	St. Mary River at Kimball Sec. ft.	Excess Sec. ft.	Deficiency Sec. ft.
1	1951	975	1144	169	0
2	819	500	1335	835	
3	938	500	1405	905	
4	865	500	1395	895	
5	858	500	1125	625	
6	937	500	817	317	
7	1191	596	620	24	
8	1079	539	515	---	24
9	951	500	490	---	10
10	948	500	530	30	--
11	937	500	535	35	--
12	1012	506	620	114	--
13	880	500	757	257	--
14	666	499	809	310	--
15	706	500	809	309	--
16	723	500	778	278	--
17	594	446	620	174	--
18	813	500	500	---	--
19	774	500	428	---	72
20	673	500	368	---	132
21	683	500	304	---	196
22	630	472	420	---	52
23	623	467	467	---	---
24	607	455	462	7	---
25	599	449	449	---	---
26	575	431	472	41	---
27	575	431	476	45	---
28	576	432	568	136	---
29	536	402	546	144	---
30	553	415	557	142	---
31	513	385	525	140	---
Sec.ft.	24785	15400	20846	5932	486
Mean	799	496.8	672	269.6	81
Ac. ft.	49161	30549	41320	11763	978

Table 2.

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER
WATER STORED AND RELEASED BY UNITED STATES
September -- 1920.

Day	INFLOW INTO SHERBURNE RESERVOIR: Swift Current Creek at Many Glacier Sec. ft.	Canyon Creek Sec.ft.	Other Creeks (Estimated) Sec. ft.	Total Sec.ft.	Swift Current Creek below Sherburne Sec. ft.	Stored Sec.ft.	Released from Storage Sec.ft.
1	77	11.4	1	89	102	---	13
2	81	10.8	1	93	90	3	---
3	94	10.4	1	105	90	15	---
4	171	10.8	1	183	90	93	---
5	442	11.1	1	454	90	364	---
6	396	11.4	2	409	84	325	---
7	343	11.1	2	356	84	272	---
8	259	10.4	2	271	88	183	---
9	230	10.0	2	242	91	151	---
10	234	10.0	2	246	91	155	---
11	218	16.1	3	237	63	174	---
12	185	50.0	4	239	26	213	---
13	171	64.0	5	240	475	---	235
14	157	47.0	4	208	585	---	377
15	134	39.0	3	176	590	---	414
16	118	37.0	2	157	631	---	474
17	110	20.0 e.	1	131	239	---	108
18	100	20.0 e.	1	121	368	---	247
19	98	20.0 e.	1	119	361	---	242
20	100	20.0 e.	1	121	361	---	240
21	90 e.	20.0 e.	1	111	332	---	221
22	90 e.	20.0e.	1	111	332	---	221
23	90 e.	20.0 e.	1	111	197	---	86
24	90 e.	20.0 e.	1	111	193	---	82
25	90 e.	20.0 e.	1	111	188	---	77
26	90 e.	20.0 e.	1	111	178	---	67
27	90.e.	20.0 e.	1	111	161	---	60
28	90 e.	20.0 e.	1	111	146	---	45
29	90 e.	20.0 e.	1	111	146	---	45
30	90 e.	20.0.e.	1	111	146	---	45
Sec. ft.	4618	640.5	50	5308	6618	1948	3299
Mean	154	21.4	1.7	176.9	220.6	177	173.6
Ac. ft.	9160	1270	84	10514	13126	3867	6545

Table 2

DETERMINATION OF NATURAL FLOW OF ST. MARY RIVER
September -- 1920

Day	St. Mary River at Kimball Sec. ft.	Diverted by U.S.R.S. Sec. ft.	Stored by U.S.R.S. Sec. ft.	Total Sec.ft.	Stored Water Released Sec. ft.	Natural flow St. Mary River at Kimball Sec. ft.
1	485	0	---	485	10	475
2	490		---	490	8	482
3	495		---	495	13	482
4	462		3	465	---	465
5	449		15	464	---	464
6	436		93	529	---	529
7	416		364	780	---	780
8	408		325	733	---	733
9	400		272	672	---	672
10	392		183	575	---	575
11	384		151	535	---	535
12	380		155	535	---	535
13	380		174	554	---	554
14	436		213	649	---	649
15	650		---	650	235	415
16	841		---	841	377	464
17	942		---	942	414	528
18	933		---	933	474	459
19	908		---	908	108	800
20	899		---	899	247	652
21	942		---	942	242	700
22	899		---	899	240	659
23	849		---	849	221	628
24	801		---	801	221	580
25	743		---	743	86	657
26	676		---	676	82	594
27	608		---	608	77	531
28	568		---	568	67	501
29	602		---	602	60	542
30	574		---	574	45	529
Sec.ft.	18448	0	1948	20396	3227	17169
Mean	615	0	177	680	169.8	572.3
Ac. ft.	36595	0	3867	40462	6408	34054

Table 2.

DIVISION OF WATER OF ST. MARY RIVER
WATER USED BY UNITED STATES
September -- 1920.

Day	Natural Flow St. Mary River at Kimball	AVAILABLE FOR USE BY U. S. U.S. Share	Stored Water Released	Total	Diverted	USED Stored	Total	Excess	Waste Deficiency
	Sec. ft.	Sec. ft.	Sec. ft.	Sec. ft.	Sec. ft.	Sec.ft.	Sec.ft.	Sec.ft.	Sec.ft.
1	475	119	10	129	0	---	---	---	129
2	482	120	8	128		---	---	---	128
3	482	120	13	133		---	---	---	133
4	465	116	---	116		3	3	---	113
5	464	116	---	116		15	15	---	101
6	529	132	---	132		93	93	---	49
7	780	280	---	280		364	364	84	---
8	733	233	---	233		325	325	92	---
9	672	172	---	172		272	272	100	---
10	575	144	---	144		183	183	39	---
111	535	134	---	134		151	151	17	---
12	535	134	---	134		155	155	21	---
13	554	138	---	138		174	174	36	---
14	649	162	---	162		213	213	51	---
15	415	104	235	339		---	---	---	339
16	464	116	377	493		---	---	---	493
17	528	132	414	546		---	---	---	546
18	459	115	474	589		---	---	---	589
19	800	300	108	408		---	---	---	408
20	652	163	247	410		---	---	---	410
21	700	200	242	442		---	---	---	442
22	659	165	240	405		---	---	---	405
23	628	157	221	378		---	---	---	378
24	580	145	221	366		---	---	---	366
25	657	164	86	250		---	---	---	250
26	594	148	82	230		---	---	---	230
27	531	132	77	209		---	---	---	209
28	501	125	67	192		---	---	---	192
29	542	135	60	195		---	---	---	195
30	529	132	45	177		---	---	---	177
Sec.ft.	17169	4553	3227	7780	0	1948	1948	440	6282
Mean	572.3	151.7	169.8	259.3	0	177	177	55	285.4
Ac. ft.	34054	9027	6408	15435	0	3867	3867	872	12440

Table 2

DIVISION OF WATER OF ST. MARY RIVER
WATER AVAILABLE FOR USE BY CANADA
September -- 1920.

Day	Natural Flow St. Mary River at Kimball Sec. ft.	Canada's Share Sec. ft.	St. Mary River at Kimball Sec. ft.	Excess Sec. ft.	Deficiency Sec. ft.
1	475	356	485	129	
2	482	362	490	128	
3	482	362	495	133	
4	465	349	462	113	
5	464	348	449	101	
6	529	397	436	49	
7	780	500	416	---	84
8	733	500	408	---	92
9	672	500	400	---	100
10	575	431	392	---	39
11	535	401	384	---	17
12	535	401	380	---	21
13	554	416	380	---	36
14	649	487	436	---	51
15	415	311	650	339	---
16	464	348	841	493	---
17	528	396	942	546	---
18	459	344	933	589	---
19	800	500	908	408	---
20	652	489	899	410	---
21	700	500	942	442	---
22	659	494	899	405	---
23	628	471	849	378	---
24	580	435	801	366	---
25	657	493	743	250	---
26	594	446	676	230	---
27	531	399	608	209	---
28	501	376	568	192	---
29	542	407	602	195	---
30	529	397	574	177	---
Sec. ft.	17169	12616	18448	6282	440
Mean	572.3	420.5	615	285.6	55
Ac. ft.	34054	25027	36595	12440	872

Table 2.

DIVISION OF ST. MARY RIVER
October -- 1920.

Day	St. Mary River at Kimball Sec. ft.	Canada's Share Sec. ft.	Excess Sec. ft.
1	568	426	142
2	574	429	145
3	574	429	145
4	596	447	149
5	632	474	158
6	702	500	202
7	771	500	271
8	793	500	293
9	809	500	309
10	857	500	357
11	857	500	357
12	809	500	309
13	778	500	278
14	689	500	189
15	620	465	155
16	562	420	142
17	562	420	142
18	535	402	133
19	505	378	127
20	562	420	142
21	620	465	155
22	689	500	189
23	715	500	215
24	715	500	215
25	602	450	152
26	505	378	127
27	424	318	106
28	404	303	101
29	372	279	93
30	364	273	91
31	356	267	89
Sec. ft.	19121	13443	5678
Mean	617 557	433.7	183.3
Ac. ft.	37938	26667	11271

Note:
There was no diversion made by the U.S.R.S. during October. The flow recorded at Kimball is taken as natural flow of St. Mary River.

Note.
Water was stored & released in Sherburne Res. during Oct. 1920
Mean Nat. Flow for Oct. 557

See original computation in final step #4 for Oct 1920
Feb 22/60

TABLE 3.

ST.MARY RIVER DIVISION, 1920.

CANADA

WATER AVAILABLE

Month	St.Mary River Kimball Ac.Ft.	Rolph Creek Ac.Ft.	Pothole Cr. Ac.Ft.	Lee Creek Ac.Ft.	Combined Flow Ac. Ft.
April	25527	2083	7140	5117	39867
May	102315	2214	5226	18323	128078
June	168813	339	190	11127	180469
July	110493	121	85	4058	114757
Aug.	41320	234	-	1168	42722
Sept.	36595	137	-	541	37273
Oct.	37938	34	-	500[e]	38472
Total	523001	5162[d]	12641[b]	40834	581638[c]

DISPOSITION.

Month	Diverted by A.R. & I.Co. Ac.Ft.	Wasted by A.R.& I.Co. Ac.Ft.	Losses A.R.& I.Co. Ac.Ft.	Stored in Chin Reser Ac.Ft.	St.Mary River Lethbridge Ac.Ft.
April	809	---	809		47008
May	7317	3810	2418		138654
June	34155	5225	2915		152330
July	48575	17131	4673		83562
Aug.	32220	4273	984		16048
Sept.	28800	3773	300		13150
Oct.	29699	7194	1845		13000[e]
Total	181575	41406	13944[x]		463752[a]

a - Below all points of diversion.
b - Natural flow only.
c - Computed.
d - Includes seepage losses from St. Mary Canal, U.S.R.S.
e - Estimated.
x - Only includes evaporation and seepage between headgate and Spring Coulee.

TABLE 3.

ST.MARY AND MILK RIVERS

USE OF WATER FOR IRRIGATION
APRIL TO OCTOBER, 1920.

UNITED STATES

WATER AVAILABLE

Month	Natural Flow St.Mary River at Kimball	Diverted St.Mary River to Milk River	Total Natural Flow North and South Forks Milk River at Boundary (a)	Milk River at Eastern Crossing	Milk River at Havre
	Ac.Ft.	Ac.Ft.	Ac.Ft.	Ac.Ft.	Ac.Ft.
April	25,527	-	13,000	56,100	71,400
May	102,315	3,416	35,500	79,300	78,100
June	168,813	21,362	30,700	30,900	35,900
July	110,493	26,194	29,900	32,700	28,500
Aug.	41,320	20,168	22,800	24,800	24,300
Sept.	36,595	-	1,700	2,900	4,200
Oct.	37,938	-	1,900	1,400	2,000
Total	523,001	71,140	135,500	228,100	244,400

DISPOSITION

Month	Diverted by Milk River Canals (b)	Applied to the land gross (c)	Stored or Released Nelson Reservoir (d)	In Nelson Reservoi at end of month
	Ac.Ft.	Ac.Ft.	Ac.Ft.	Ac.Ft.
April	20,500(e)	6,100	+8,640	33,000
May	15,100	13,130	-530	30,100
June	30,700	21,360	+960	27,900
July	23,100	18,100	+2,670	28,800
Aug.	19,200	12,450	+2,100	27,900
Sept.	6,000	1,460	+1,220	26,000
Oct.	-	-	-1,780	21,300
Total	114,600	72,600		

(a) This total was obtained by adding the natural flow of North Fork of Milk River near International Boundary to theflow of South Fork of Milk River near International Boundary.
(b) Fort Belknap Canal near Chinook; Agency Ditch near Harlem; Paradise Canal near Chinook; Dodson North and South canals near Dodson; Harlem Canal near Zurich; Vandalia Canal near Vandalia.
(c) Water diverted by the Milk River canals less that which was wasted or stored. It does not include losses of St.Mary River water in passing down Milk River. (d) Water turned into the reservoir was assumed to include rainfall and tributary runoff. Thecolumn headed "stored or released" shows the difference between the inflow and outflow, including waste over spillway, for the month. This difference when combined with the losses, gives the changes in amount in the reservoir at the end of each month, as shown in the next column.
(e) Includes 4,200 ac.ft. diverted in March.

TABLE 3.

ST.MARY AND MILK RIVERS

USE OF WATER FOR IRRIGATION
APRIL TO OCTOBER,1920.

UNITED STATES

Month	LOSSES: Carriage Losses in St.Mary Canal and Milk River (h)	LOSSES: Nelson Reservoir Seepage and Evaporation Losses	LOSSES: Total Losses	WASTED: Milk River Canals (f)	Milk River at Vandalia (g)
	Ac.Ft.	Ac.Ft.	Ac.Ft.	Ac.Ft.	Ac.Ft.
April	--	1,260	1,260	2,390	152,000
May	1,940	2,370	4,310	2,500	178,000
June	7,985	3,160	11,145	8,380	102,000
July	11,680	1,770	13,450	2,330	35,000
Aug.	11,505	3,000	14,505	4,650	13,200
Sept.	100	3,120	3,220	2,820	11,700
Oct.	-	2,920	2,920	(k)3,250	6,460
Total	33,210	17,600	50,810	26,320	

(f) This water was returned to the river by the canals and includes the water wasted by Dodson North, Dodson South, Bowdoin, Nelson Reservoir South and Vandalia South Canals and waste from Nelson Reservoir.

(g) This column shows the flow below Vandalia dam, which is the only water wasted in Milk River valley without chance of further use.

(h) These losses occurred between the point of measurement of the United States Reclamation Service St.Mary canal at St. Mary Crossing and the gaging station at Havre, Mont. Havre is about 20 miles upstream from the first important diversion in the United States, the Fort Belknap canal heading near Lohman, Mont. The results given are based on stream flow records of St.Mary canal at St.Mary Crossing, North and South Forks of Milk River near International Boundary, North Fork of Milk River above the outlet of St. Mary canal, Milk River at Havre and the estimated tributary inflow not otherwise measured.

(k) Used in sluicing operations. Includes 1,250 ac.ft. in November.

TABLE 4

DIVERSIONS FROM NORTHERN TRIBUTARIES, MILK RIVER.

Quantities in acre feet.

FRENCHMAN RIVER BASIN.

CANADA

IRRIGATOR	April	May	June	July	August	Sept.	Oct.	TOTAL
Strong, East	190	55	11	--	--	--	--	256
Maple Cr. Cattle Co.	--	--	105	68	42	--	--	215
Morrison Bros.	--	--	98	--	--	--	--	98
G. N. Morrison	--	--	137	--	--	--	--	137
F. Cross	--	40	262	115	--	--	--	417
A. M. Cross	--	46	77	20	--	--	--	143
V. J. Bull	--	115	173	92	--	--	--	380
Armstrong, West	--	82	23	--	--	--	--	105
A. E. Bate, South	--	--	1	--	3	--	--	4

UNITED STATES

No records

LODGE CREEK

CANADA

J. English	7	96	37	--	--	--	--	140
J. Read	Diverted small amount in June.							
A. J. Suiste, South	--	75	--	--	--	--	--	75
A. J. Suiste, North	--	4	--	--	--	--	--	4
Wm. Mitchell, Lower	Diverted small amount in July							
J. M. Spangler	"	"	"	" June				
H. T. Clarke, South	13	18	11	1	--	--	--	43
J. E. Hartt	--	23	26	--	--	--	--	49
								311

UNITED STATES

Chinook North canal	10,000 e	--	--	--	--	--	--	10,000e

e - Estimated

DIVERSIONS FROM NORTHERN TRIBUTARIES, MILK RIVER.

Quantities in acre feet

BATTLE CREEK

CANADA IRRIGATOR	April	May	June	July	August	Sept.	Oct.	TOTAL
Harmon & Henderson	--	--	109	76	--	--	--	185
Marshall & Gaff	96	113	298	74	--	--	--	581
Gaff	--	59	209	--	--	--	--	268
W. S. Wilson	Diverted a small amount in May							
J. McKinnon	89	101	162	26	--	--	--	378
L.E. & S.J. Richardson	--	29	53	67	--	--	--	149
W. G. Patterson	136	--	--	--	--	--	--	136
Henry, East	23	--	--	--	--	--	--	23
Stirling and Nash	137	--	504	411	65	--	--	1117
Wood & Anderson, West	--	16	--	--	--	--	--	16
" " " South	--	87	10	--	--	--	--	97
" " " North	--	50	--	--	--	--	--	50
J. Leslie, West	--	--	31	--	--	--	--	31
R.W. & W.L. Wilkes	12	18	15	11	--	--	--	56
								3087
UNITED STATES								
Matheson Canal	--	--	390	120	--	--	--	510

ROCK CREEK

Report to the International Joint Commission on the division and use of the waters of the St. Mary and Milk Rivers...

HD
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1920

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