

PRAIRIE PROVINCES WATER BOARD

REPORT NO. 1-A

SUMMARY REPORT OF NATURAL YEARLY FLOWS
AT CERTAIN POINTS ON THE SASKATCHEWAN
RIVER SYSTEM, BY CALENDAR YEAR, FOR THE
PERIOD 1912--1963 INCLUSIVE.

May 1966

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In Prairie Provinces Water Board Report No. 1, dated November 1950, computed natural flows were given for the period 1911--1948, on a "water-year" basis, for the main stations in the Saskatchewan River Drainage Basin.

This report brings up-to-date the information in Report No. 1, and converts it to a calendar-year basis.

The assumptions made in the calculations are briefly summarized below:

Natural Flow of South Saskatchewan River at the Alberta-Saskatchewan Boundary

1. As in Report No. 1, the point for which the natural flow was calculated is actually just below the Red Deer Forks, a few miles downstream from the Alberta-Saskatchewan boundary.
2. Assumptions as to inflow and losses between Medicine Hat and the Red Deer Forks are the same as in Report No. 1.
3. Figures for the natural flow of the Bow River at Calgary were supplied by Calgary Power Company. By subtracting from this the recorded flow of the Bow River at Calgary, the change in flow due to Calgary Power Co. operations was arrived at. This was combined with the estimated water use by the City of Calgary (estimated at 8000 ac. ft. per year, since actual use figures were not available to us at present) to give the figures in Column 5 - "Calgary Power operations and Calgary net use". (This format was retained because it had been used in Report No. 1.)

4. There are only partial records for Bow River at Calgary for 1950, 1951, 1952 and 1953. Correlated figures for these years were taken from the "Compilation of Runoff Records for the Canadian Prairies", prepared for the Prairie Provinces Water Board in June, 1961.
 5. Calculations for W.I.D., E.I.D., L.N.I.D., L, A & M.V.I.D. were done as in Report No. 1.
 6. In regard to the Bow River Development (Canada Land & Irrigation Co. in Report No. 1), diversions and return flows from 1957 to 1963 were taken from "Report on Return Flows from Alberta Irrigation Districts, 1964", by the Water Resources Branch, Dept. of Northern Affairs and National Resources.
 7. In calculations for the S.M.M.R.D., the procedure used was the same as in Report No. 1 except that from 1951-1963 figures for "St. Mary Canal near Spring Coulee" were used. (This canal was first put into use in 1951)
 8. The figure of 39,000 acre-feet per year for private irrigation schemes is the same as in Report No. 1.
 9. Figures for the U.S. share of the St. Mary River were supplied by the Water Resources Branch of the Dept. of Northern Affairs and National Resources.
- Natural flows for South Sask. River at Saskatoon. Sask. River at the Forks, and Sask. River at The Pas were calculated as in Report No. 1.

For natural flows of the North Saskatchewan River, figures for recorded flows were used, as in Report No. 1, as it was considered that useage on this stream is still negligible in comparison to the flow.

NATURAL FLOW OF SASKATCHEWAN RIVER IN ACRE FEET

Year	S. Sask. R. Alta.-Sask. Boundary	N. Sask. R. Alta.-Sask. Boundary	S. Sask. R. at Saskatoon	N. Sask. R. at Pr. Albert	Sask. River below the Forks	Sask. River at The Pas
1912	8,682,200	8,139,000	9,118,240	8,739,200	18,227,610	22,512,900
1913	8,429,470	6,945,900	7,797,960	7,913,400	16,119,930	22,413,330
1914	6,448,080	6,228,900	7,012,510	7,273,600	14,535,440	17,362,420
1915	12,686,480	9,302,200	12,830,790	9,928,000	22,893,480	24,893,640
1916	13,389,740	8,164,900	14,593,330	8,888,900	23,896,060	29,870,540
1917	10,203,110	7,184,800	10,384,330	7,969,400	18,684,040	24,575,530
1918	6,069,890	5,200,000	6,255,210	5,170,900	11,769,660	16,816,420
1919	5,085,270	4,083,800	4,938,650	4,121,600	9,249,630	12,080,280
1920	8,627,780	7,058,000	8,941,720	7,892,700	17,018,610	19,622,010
1921	6,055,820	4,850,700	5,979,310	5,776,800	12,229,800	19,059,240
1922	5,611,620	5,071,200	6,038,210	5,009,300	11,568,470	17,951,720
1923	9,149,250	6,834,000	8,853,480	6,984,800	16,122,490	20,227,890
1924	6,167,610	5,117,600	6,394,260	5,201,100	11,757,480	14,041,710
1925	7,893,140	7,360,000	8,111,580	7,537,500	15,911,600	19,738,100
1926	7,039,630	6,263,900	7,330,550	6,437,100	13,991,170	17,276,310
1927	11,719,320	7,831,100	12,905,750	8,422,400	21,711,730	27,309,500
1928	10,863,140	7,343,800	11,299,084	7,464,000	18,957,380	21,638,580
1929	6,070,360	4,070,300	6,519,530	4,178,200	10,747,870	11,489,180
1930	6,058,340	4,654,700	6,384,290	4,796,800	11,286,540	12,975,880
1931	4,126,770	4,846,200	4,112,760	5,044,900	9,337,280	11,951,220
1932	7,089,590	6,246,800	7,486,980	6,530,300	14,292,390	18,218,430
1933	6,808,320	5,366,600	7,044,933	5,591,400	12,971,460	17,843,410
1934	6,567,250	4,436,200	6,270,805	4,662,000	11,468,940	19,295,110
1935	5,764,840	6,277,800	5,935,830	6,501,900	12,633,560	16,043,790
1936	4,720,930	5,492,200	4,897,380	5,887,100	10,965,640	13,573,630
1937	4,786,020	4,224,300	4,663,170	4,137,700	8,929,050	10,766,630
1938	6,904,850	5,707,900	7,203,670	5,882,400	13,253,790	15,282,340
1939	5,333,070	4,602,900	5,683,160	4,532,200	10,474,550	14,229,540
1940	5,421,610	4,569,300	5,737,830	4,767,600	10,659,380	12,835,810
1941	4,214,990	3,639,800	4,429,140	3,493,800	7,980,530	8,855,830
1942	9,070,100	5,832,300	8,701,410	5,936,000	14,799,240	16,941,060
1943	7,335,880	5,644,000	7,486,400	6,177,400	13,898,460	17,325,050
1944	4,558,670	7,346,300	4,613,820	7,362,100	12,189,720	14,653,920
1945	6,720,640	4,603,800	6,273,080	4,499,500	11,063,500	15,264,650
1946	7,067,210	5,493,400	6,847,380	5,320,100	12,364,600	15,360,500
1947	9,326,000	5,778,200	9,477,280	5,717,300	15,414,390	18,614,760
1948	12,495,170	8,767,180	12,560,540	9,595,500	22,485,630	24,902,640
1949	4,493,660	3,507,160	4,438,620	3,705,480	8,513,350	11,221,150
1950	6,803,660	4,574,890	7,031,610	4,834,010	12,180,950	14,493,380
1951	13,054,840	5,934,540	12,960,640	6,495,260	20,010,210	24,075,140
1952	9,572,240	7,004,020	10,266,840	7,380,430	18,248,860	22,660,540
1953	10,891,540	6,618,850	10,742,710	6,819,040	17,897,960	20,363,510
1954	11,474,000	10,293,300	11,747,870	10,500,830	23,104,610	29,381,270
1955	8,106,350	5,692,960	8,354,430	6,556,880	15,731,120	21,743,030
1956	8,036,810	5,500,480	8,037,280	6,491,430	15,178,520	19,943,780
1957	6,459,500	4,773,560	6,398,620	4,923,490	11,820,060	15,471,720
1958	7,551,130	6,118,560	7,005,400	6,384,480	13,756,110	16,441,800
1959	7,436,580	5,069,740	7,761,710	5,205,520	13,303,770	15,771,710
1960	6,271,680	4,567,820	6,547,530	5,268,000	12,172,030	14,786,530
1961	6,016,090	4,616,510	5,848,780	4,728,300	10,724,360	11,804,480
1962	5,800,280	5,310,670	5,975,870	5,697,400	11,765,470	12,441,970
1963	6,656,330	6,015,100	6,712,720	5,952,600	12,840,060	14,121,520

Approx average = 7,560,000

SOUTH SASK. NATURAL FLOW AT ALBERTA-SASK. BOUNDARY IN ACRE FEET

Year	Recorded Flow				Net Uses By Irrigation Interests								Total Alberta use	U.S. Diversion	Total Natural Flow	U.S. Share St. Mary's	Total Canadian share Natural Flow	
	Empress	Medicine Hat	Estimated inflow below Medicine Hat	Loss - Medicine Hat to Empress	W.I.D.	F.I.D.	(Bow) C.L. & I.	L.N.I.D.	S.M.M.R.D.	U.I.D.	L.A. & M.V.	Private						
948	3,208,400	9,009,400	91,960	48,000	-38,030	49,460	380,130	48,480	54,780	96,190	4,260	5,930	39,000	642,200	92,380	12,996,340	326,090	12,669,410
949	807,100	2,356,900	2,260	48,000	-99,020	89,300	449,400	119,900	117,500	156,980	29,320	5,830	39,000	904,310	175,790	4,698,390	204,688	4,493,610
950	943,700	5,075,300	5,660	46,000	128,020	70,700	415,600	72,160	116,650	203,485	13,720	7,280	39,000	1,066,615	141,650	7,184,925	381,265	6,803,610
951	2,312,500	10,674,700	93,140	48,000	-85,050	26,450	303,400	2,400	30,160	51,400	2,620	360	39,000	369,940	79,500	13,481,780	426,937	13,054,810
952	2,622,800	6,387,300	177,840	48,000	-17,640	30,575	326,800	2,850	55,200	117,250	8,540	5,220	39,000	567,795	100,420	9,808,155	235,915	9,572,210
953	2,196,300	8,345,700	75,020	48,000	11,160	26,025	237,400	70,080	60,990	105,800	12,510	5,300	39,000	568,205	121,860	11,259,065	367,540	10,891,510
954	3,506,800	7,114,900	14,880	48,000	226,050	32,700	344,500	204,500	84,190	195,700	14,100	4,430	39,000	1,145,110	108,830	11,842,950	368,519	11,474,000
955	2,017,100	5,621,100	97,460	48,000	-143,260	34,100	340,100	83,260	62,160	152,100	14,220	4,920	39,000	586,000	112,650	8,386,910	279,959	8,106,950
956	1,762,800	5,559,900	21,080	48,000	56,330	39,200	395,100	55,700	61,350	181,750	15,580	4,400	39,000	848,410	193,830	8,338,020	301,210	8,036,810
957	1,224,250	4,200,400	56,970	48,000	69,816	42,200	433,900	146,070	107,290	235,300	22,340	6,750	39,000	1,102,666	173,910	6,710,195	250,695	6,459,500
958	1,541,860	5,143,000	9,180	48,000	-68,210	49,700	424,400	177,640	80,640	241,680	15,520	5,230	39,000	965,600	184,440	7,796,080	244,946	7,551,130
959	1,182,690	5,283,400	13,060	48,000	196,570	48,800	369,500	145,210	77,680	227,240	24,980	5,790	39,000	1,134,680	205,970	7,771,800	335,225	7,436,570
960	1,320,000	3,952,600	26,140	48,000	-2,360	50,300	397,500	157,360	108,720	289,240	23,250	5,810	39,000	1,068,220	174,550	6,493,510	221,828	6,271,680
961	903,860	3,873,900	0	48,000	-21,850	73,800	449,300	257,050	145,830	344,220	32,480	10,080	39,000	1,329,910	205,020	6,269,690	253,599	6,016,090
962	1,018,390	3,603,800	3,960	48,000	-144,380	85,600	432,500	245,170	129,500	412,020	31,030	15,050	39,000	1,245,490	204,090	6,027,730	227,446	5,800,280
963	1,326,420	4,047,000	3,600	48,000	76,100	76,600	399,900	179,010	106,860	424,970	34,770	15,870	39,000	1,353,080	209,910	6,892,010	235,683	6,656,320

ACREAGE ACTUALLY IRRIGATED IN ALBERTA 1911 - 1963

YEAR	ST. MARY	WESTERN I.O.	EASTERN I.D.	BOW RIV. DEVELOP.	L. N. I.D.	U.I.D.	M. V. I.O.	L.I.D.	A. I.D.	MACLEOD I.O.	ROSS CR. I.O.	TOTAL
1911	47,000	500										47,500
12	76,200	500										76,700
13	76,200	2,600										78,800
14	76,200	8,448	7,806									92,454
15	76,200	512	7,800									84,512
16	71,281	859	1,497									73,637
17	91,780	3,657	9,005									104,442
18	102,900	25,191	24,440									152,531
19	112,569	31,908	43,460									187,937
1920	62,893	4,083	60,762	4,240								131,978
21	85,902	33,619	88,299	9,400								217,220
22	88,680	49,752	93,375	9,509								241,316
23	75,968	3,074	42,928	11,249	6,963							140,182
24	84,751	24,297	84,200	9,720	29,991	5,264						238,223
25	94,562	5,384	72,994	13,252	43,628	10,000						239,840
26	92,782	19,561	74,401	13,467	56,395	10,026						266,632
27	22,176	1,273	7,921	810	10,012	41						42,233
28	31,924	3,892	45,677	19,361	33,436	2,576						136,866
29	46,441	37,395	78,610	29,260	61,231	3,102						256,039
1930	98,483	41,570	89,913	27,102	70,007	5,847						332,922
31	100,403	47,593	90,724	29,803	70,408	12,983	300					352,214
32	99,788	6,680	90,651	26,379	41,842	11,500	800					279,640
33	104,854	40,812	96,019	21,917	82,416	10,500	1,168					337,686
34	105,490	31,131	101,566	22,208	54,200	10,000	1,950					326,545
35	93,471	19,109	143,997	22,694	73,022	12,000	3,000					367,293
36	111,397	44,614	111,781	26,660	62,790	18,000	2,900					378,142
37	113,546	50,866	124,645	30,107	70,020	17,500	3,500					410,184
38	112,629	35,755	133,928	33,326	73,297	10,000	3,500					402,435
39	110,677	11,647	141,688	34,984	56,712	10,000	3,200					368,908
1940	115,030	20,134	138,462	37,908	76,492	10,500	3,000					401,524
41	109,148	21,144	156,501	35,312	63,575	11,000	3,300					399,960
42	103,183	9,194	166,453	32,946	31,102	12,000	3,400					358,278
43	112,142	7,666	168,496	35,143	67,777	14,000	3,254					408,478
44	112,550	20,000	167,094	37,266	75,927	13,000	3,400	526				429,763
45	112,484	20,000	167,100	38,838	57,126	13,000	3,300	1,000				412,848
46	112,734	19,000	166,326	42,457	64,894	7,453	3,300	1,300				417,464
47	110,848	20,000	168,580	43,594	57,434	7,453	3,300	1,300				412,509
48	109,571	12,000	172,200	44,160	55,374	2,970	3,700	1,500				401,475
49	107,150	26,197	180,000	44,050	72,807	21,000	3,300	1,500				456,004
1950	111,513	23,079	180,000	36,508	78,721	9,758	3,500	2,500				445,579
51	104,571	1,000	153,804	24,283	21,979	1,869	(100)	200		0	0	307,806
52	117,261	700	149,289	40,416	35,314	6,072	3,350	940		1,800	850	355,792
53	112,779	500	114,776	(40,000)	37,409	8,894	3,380	980		1,800	1,100	321,618
54	152,489	1,900	156,884	(40,000)	58,745	10,033	3,392	254		2,600	2,100	428,397
55	123,679	2,500	148,892	(40,000)	31,753	10,115	3,132	423			1,500	361,994
56	142,156	6,000	190,976	109,400	31,588	11,082	2,773	852			1,800	496,627
57	161,292	4,500	189,928	65,000	51,809	15,886	2,773	2,779	0	0	0	495,652
58	168,794	9,870	189,845	60,185	51,916	11,032	2,759	1,542	0	0	0	497,443
59	241,090	9,330	163,993	54,514	46,459	17,761	2,789	1,542	380	0	(1,400)	539,238
1960	179,477	12,000	167,597	71,390	71,006	16,536	2,789	1,542	440	0	405	523,184
61	206,547	23,200	170,413	78,260	73,637	23,095	2,760	1,542	1,800	0	200	583,454
62	217,029	30,000	176,695	63,910	73,317	28,465	2,760	4,187	2,178	0	200	618,741
63	229,652	25,000	170,776	78,695	64,510	27,012	2,769	4,511	2,315	0	200	605,460
64												
65												
66												
67												
68												
69												
1970												
71												
72												

NOTE Acreage figures from early Irrigation Company annual reports, except as noted below.

(1) From "Report on Return Flows from Irrigation Districts in Alberta, 1951 to 1962" by Water Resources Branch, Department of Northern Affairs and National Resources, Calgary, March 7, 1963

(2) Information by letter from Alberta Water Resources Office, Edmonton.

E. No records - estimated -