

WATER SUPPLY STUDY
For
SOUTH SASKATCHEWAN RIVER PROJECT

By staff of

Prairie Provinces Water Board

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WATER SUPPLY STUDY OF SOUTH SASKATCHEWAN RIVER PROJECT

Two water supply studies were undertaken for the South Saskatchewan River Project based upon different stages of irrigation development in the Province of Alberta. The first study assumed full development of Alberta's irrigation developments up to 1,256,000 acres. The second study assumed fairly full development in Alberta up to 1,700,000 acres. In each case, it was assumed that the Calgary Power Company's plants at Spray Lakes and Bears paw were in full operation.

Main Assumption Common to Both Studies

Acres irrigated in Saskatchewan = 21,000 acres
Evaporation loss at 24 inches annually
Seepage loss at 100 c.f.s. continuously
Qu'Appelle diversion at 200 c.f.s. for seven months
Acres irrigated in this Project = 430,900 acres
Reservoir operated for the best primary power (100% of the time)
Allowable reservoir drawdown: 1825-1785 = 40 feet
Distribution of firm commercial energy by months

January	13%	July	4.5%
February	9%	August	7%
March	7%	September	8%
April	5%	October	11%
May	5%	November	12%
June	4.5%	December	14%

Results

These water supply studies resulted in the following power output in kilowatt hours per year:

Item

Alberta irrigation	1,256,000 acres	1,700,000 acres
Firm commercial	350,000,000 K.W.H.	325,000,000 K.W.H.
Firm pumping	50,000,000 K.W.H.	50,000,000 K.W.H.
Secondary commercial	100,000,000 K.W.H.	100,000,000 K.W.H.

Attached are water supply tables for the second study: the various columns in these water supply tables are explained in detail in the following pages. Also attached is a graph showing the different reservoir levels for the years 1923-48.

It should be noted that the reservoir was operated to give firm power 100% of the time. If it were permissible to so operate the reservoir to allow the firm power be cut off (firmed by steam) in the winter of 1941-42, then the firm output could be increased by about 20,000,000 k.w.hrs. annually. That is, the firm power would be available continuously for at least 40 years (from 1911-1951) with only one period of shortage in the winter of 1941-42.

It should also be noted that this study was done on a very conservative basis -- 80% of 2,150,000 acres irrigated every year during the dry period. If this much land was not irrigated, more water would be available for the production of commercial energy:

EXPLANATION OF COLUMNS IN ATTACHED WATER SUPPLY TABLES

TABLE A - is common to both studies

TABLES B AND C - illustrate the studies made for the 'fairly full development in Alberta'. The table illustrating the first study, is omitted.

TABLE A, Column 2 - This column is taken directly from the Prairie Provinces Water Board's report No. 2 which derived the resultant flows at the Alberta-Saskatchewan boundary after the existing projects in Alberta were fully developed.

TABLE A, Column 3, 4 and 5 - The recorded flows of Swift Current creek at Swift Current were extended by correlation methods to give the complete stream flow picture for our period of record 1923-48. A rough month-by-month study was then done assuming Swift Current Irrigation Project (20,000 acres) plus the existing Duncairn Reservoir were in full operation throughout this period.

It will be noted that the balance of water shown as available from Swift Current creek is zero in most years. It is likely, however, that there will be some small increments of flow coming into this creek below the town of Swift Current.

TABLE A, Column 6 - The difference between the natural flow of the South Saskatchewan River at Saskatoon and at the Alberta-Saskatchewan boundary (Water Board Report No. 1) was termed the natural inflow or loss in this stretch of the River. Ninety percent of this natural inflow or loss was assumed as occurred between the Alberta-Saskatchewan boundary and the main damsite.

TABLE A, Column 7 - Seepage was assumed to occur at a rate of 100 c.f.s. continuously. It was assumed that 25 c.f.s. seeped through the main dam while 75 c.f.s. escaped through the Qu'Appelle Dam (Meridian Dam) and other unknown places in the Reservoir.

The evaporation is assumed to be 24 inches annually which was distributed as follows:

March	0.6	July	5.2
April	1.4	August	4.2
May	4.0	September	2.6
June	4.6	October	1.4

It was further assumed that this occurred at an average reservoir elevation of 1810. [A later correction for change in reservoir elevation is made. Later information appears to indicate that the average annual evaporation is more likely to be 20 and 21 inches.

TABLE A, Column 8 - 200 c.f.s. was assumed diverted continuously each and every year from April 1st to October 31st. Such diversion is probably too high inasmuch as no water will be diverted to the Qu'Appelle when the Qu'Appelle River itself is flowing full.

TABLE A, Column 9 - 430,900 acres are assumed irrigated in this project exclusive of the Qu'Appelle. Using the duty of water of 1.5 feet, an irrigation factor of 80% and conveyance losses of 30%, the water required equals 738,500 acre-feet annually. This demand was distributed by months as follows:

April	5%	August	15%
May	15%	September	10%
June	25%	October	5%
July	25%		

(TABLE A, Col. 9 cont'd)

An allowance was made for the probable decreased demand for irrigation water in years of above normal rainfall. This was calculated as follows: when the April-September precipitation was less than 11 inches, the water requirements remain at 100% while, for precipitation greater than this amount the demand was decreased by 2.5% for every inch of precipitation above 11 inches.

TABLE A, Column 10 - The balance remaining in the reservoir available for power production was obtained by taking Column 2 plus Column 5 plus Column 6 minus Column 7 minus Column 8 minus Column 9.

TABLE B

When the reservoir elevation changes, the water required for producing power changes, as does the evaporation requirements. Water demands for commercial power, pumping power and the evaporation correction were calculated for the various months in the year for four different reservoir ranges of 10 feet each.

TABLE B, Column 1 - Firm commercial power - The water required for firm commercial power was assumed converted into electrical energy at an efficiency of 80%. The monthly distribution of energy production was assumed distributed as follows:

January	13%	July	4.5%
February	9%	August	7%
March	7%	September	8%
April	5%	October	11%
May	5%	November	12%
June	4.5%	December	14%

A rough study was undertaken to determine just how much commercial power could be produced. When this was determined, this detailed water supply study was done. The flows given for each month for the four different reservoir stages are calculated for a reservoir elevation at the middle of the stage thus

- Stage I -- reservoir elevation 1820
- Stage II -- reservoir elevation 1810
- Stage III -- reservoir elevation 1800
- Stage IV -- reservoir elevation 1790

TABLE B, Column 2 - Pumping power requirements - monthly pumping requirements were assumed to have the same distribution as irrigation water requirements, thus

April	5%	August	15%
May	15%	September	10%
June	25%	October	5%
July	25%		

It should be noted that some water is pumped from the reservoir which therefore requires varying pumping levels depending on reservoir elevation, while other water is pumped from canals requiring a constant level. Over all efficiencies were assumed to range from 56% for the low lifts to 70% for the high lifts.

It should also be noted that there is an error in the assumed acreage and the required lifts. This error is small and is on the conservative side (i.e. more water is allowed here for pumping power than is necessary).

TABLE B, Column 3 - Evaporation Correction - In Table A the evaporation is calculated for the reservoir elevation at 1810. The correction for the different stages in reservoir elevation corrects the increased or decreased reservoir surface areas due to the changing water level.

TABLE B, Column 4 - Total - This total is arrived at by adding Column 1, 2 and 3.

TABLE C, Column 10 - This is identical to Column 10 in Table A.

TABLE C, Column 11 - To obtain the effect of additional irrigation development in Alberta, a rough month-by-month water supply study was made of the proposed Red Deer Irrigation Project. This study was based on the assumption that the Clearwater River was diverted into the Red Deer River. Column 11, therefore, shows the resulting effect of the Red Deer Irrigation Project on the South Saskatchewan reservoir.

TABLE C, Column 12 - To assume 'fairly full development in Alberta', an additional 64,000 acres in small irrigation projects was assumed in addition to the Red Deer Irrigation Project. The water required for this was distributed over the five summer months and assumed to be the same every year. Actually a 'high rainfall factor' could be allowed for these diversions.

TABLE C, Column 13 - This column gives the balance of water available for power production after allowing for the increased diversions in Alberta. This was obtained by adding Columns 10, 11 and 12.

TABLE C, Column 14 - This was obtained from Table B and depends on the month and the reservoir elevation of the previous month.

TABLE C, Column 15 - This is the excess water not available for primary power production but is available for secondary power production.

TABLE C, Column 16 - This is obtained by adding columns 14 and 15 and subtracting the allowance for evaporation.

TABLE C, Column 17 and 18 - The changes in storage were obtained by the usual storage equation (inflow minus outflow equals change in storage plus spill).

From the reservoir elevation-storage curve, it was found that the maximum available storage was 147,500 c.f.m. while the minimum storage, 40 feet below this level, was 79,500 c.f.m.

TABLE C, Column 19 - This is 10% of the natural inflow or loss between the dam and Saskatoon -- equivalent to column 6 in Table A.

TABLE C, Column 20 - Between the main dam and Saskatoon there are some small irrigation projects taking the water from the river as well as small municipal diversions. In addition, return flow from the main irrigation project contributes water to the river. Column 20 represents the net effect of these small changes.

TABLE C, Column 21 - 100 c.f.s. was assumed as the total reservoir seepage loss. This column indicates that 25 continuous c.f.s. is assumed to seep through the main dam and appear downstream.

TABLE C, Column 22 - The water available at Saskatoon is shown in this column and was obtained by adding columns 16, 19, 20 and 21.

TABLE A

INITIAL WATER SUPPLY STUDY FOR SOUTH SASKATCHEWAN RIVER PROJECT - in C.F.M.

Year and Month	Flow at the Alta-Sask. Boundary after Alberta's request	Natural Flow Swift Current	Required for Swift Current	Balance below Swift Current 3-4	90% of Natural Inflow between Alberta-Sask. Boundary and Saskatoon	Reservoir				Reservoir Balance
						Seepage and Evaporation	Qu'Appelle River diversion	Irrigation diversions		
1	2	3	4	5	6	7	8	9	10	
1921	2,638					100			2,430	
Jan.	2,792	8	8	0	-108	100			2,607	
Feb.	2,438	4	4	0	-85	100			2,239	
Mar.	3,560	69	69	0	-722	160			2,678	
Apr.	4,282	299	299	0	886	240	200	584	4,144	
May	6,392	57	57	0	-3,082	500	200	(1,755)	855	
June	51,060	236	236	0	-8,542	560	200	(2,923)	38,835	
July	18,171	58	58	0	5,078	620	200	(2,923)	19,506	
Aug.	10,874	20	20	0	-176	520	200	(1,755)	8,223	
Sept.	6,447	10	10	0	1,368	360	200	(1,108)	6,087	
1921-24										
Oct.	5,000	19.2	19.2	0	-96	240	200	(584)	3,880	
Nov.	4,202	19.3	19.3	0	-282	100	-	-	3,820	
Dec.	3,212	14.0	14.0	0	455	100	-	-	3,567	
Jan.	2,952	2.9	2.9	0	-22	100	-	-	2,830	
Feb.	3,438	14.6	14.6	0	-307	100	-	-	3,031	
Mar.	3,563	11.7	11.7	0	-139	160	-	-	3,284	
Apr.	2,462	111.0	111.0	0	3,038	240	200	(615)	4,445	
May	7,652	40.6	40.6	0	-2,339	500	200	(1,847)	2,766	
June	13,901	39.9	39.9	0	-1,917	560	200	(3,077)	8,147	
July	8,261	14.9	14.9	0	3,058	620	200	(3,077)	7,422	
Aug.	9,689	30.3	30.3	0	-75	520	200	(1,847)	7,047	
Sept.	5,151	6.8	6.8	0	1,608	360	200	(1,230)	4,969	

1	2	3	4	5	6	7	8	9	10
<u>1924-25</u>									
Oct.	3,342	25.3	25.3	0	745	240	200	615	3,032
Nov.	3,849	17.8	17.8	0	-479	100	-	-	3,270
Dec.	3,417	14.5	14.5	0	-42	100	-	-	3,275
Jan.	3,206	4.0	4.0	0	-322	100	-	-	2,784
Feb.	3,536	13.7	13.7	0	-211	100	-	-	3,225
Mar.	7,823	683.0	683.0	0	-3,758	160	-	-	3,905
Apr.	15,612	431.0	431.0	0	5,236	240	200	600	19,808
May	12,730	64.0	64.0	0	-2,614	500	200	1,800	7,616
June	14,914	50.0	50.0	0	3,994	560	200	3,000	11,749
July	7,698	11.9	11.9	0	-601	620	200	1,800	7,872
Aug.	7,228	7.2	7.2	0	662	520	200	1,200	4,107
Sept.	7,238	14.2	14.2	0	-1,185	360	200	600	6,140
<u>1925-26</u>									
Oct.	8,470	31.7	31.7	0	367	240	200	-	6,245
Nov.	5,330	22.2	22.2	0	-12	100	-	-	5,597
Dec.	4,311	5.8	5.8	0	107	100	-	-	4,199
Jan.	3,549	5.1	5.1	0	145	100	-	-	3,556
Feb.	3,529	7.9	7.9	0	-57	160	-	-	3,574
Mar.	9,239	570.0	570.0	0	1,798	240	200	615	9,022
Apr.	7,262	41.6	41.6	0	1,709	500	200	1,847	8,003
May	6,264	25.4	25.4	0	-4311	560	200	3,077	2,444
June	6,663	10.1	10.1	0	3,978	620	200	3,077	-1,884
July	4,811	4.7	4.7	0	868	520	200	1,847	6,744
Aug.	19,600	14.6	14.6	0	-3,787	360	200	1,230	3,112
Sept.				0			200		14,023
<u>1926-27</u>									
Oct.	12,895	20	20	0	1,546	240	200	615	13,386
Nov.	6,936	11	11	0	1,655	100	-	-	8,491
Dec.	4,956	4	4	0	-312	100	-	-	4,544
Jan.	4,020	3	3	0	-153	100	-	-	3,767
Feb.	3,915	0	0	0	-141	100	-	-	3,674
Mar.	5,938	59	59	0	-179	160	-	-	5,599
Apr.	14,192	710	681	29	7,226	240	200	553	20,454
May	17,626	332	189	143	-2,579	500	200	1,662	13,828
June	38,898	163	163	0	-309	560	200	(2,769)	35,060
July	21,317	152	139	13	5,305	620	200	(2,769)	23,046
Aug.	15,367	29	29	0	780	520	200	(1,662)	13,765
Sept.	17,581	23	23	0	722	360	200	(1,107)	16,636

	1	2	3	4	5	6	7	8	9	10
<u>1927-28</u>										
Oct.	10,372	35	35	35	0	4,630	240	200	281	14,009
Nov.	6,218	18	18	18	0	254	100		553	6,372
Dec.	4,925	9	9	9	0	030	100			5,455
Jan.	7,970	199	199	114	85	1,008	100			8,963
Feb.	5,312	76	76	0	76	-220	100			5,068
Mar.	13,433	352	352	0	352	-3,949	160			9,676
Apr.	9,516	124	124	43	81	5,593	240	200	615	14,135
May	13,986	56	56	56	0	-1,948	500	200	(1,847)	9,491
June	36,752	74	74	74	0	-3,766	560	200	(3,077)	29,169
July	30,273	65	65	65	0	5,479	620	200	(3,077)	31,855
Aug.	8,097	18	18	18	0	2,730	520	200	(1,847)	8,260
Sept.	5,982	13	13	13	0	739	360	200	(1,230)	4,931
<u>1928-29</u>										
Oct.	5,798	25	25	25	0	-615	240	200	615	4,128
Nov.	5,122	21	21	21	0	350	100			5,372
Dec.	3,468	12	12	12	0	248	100			3,616
Jan.	3,909	8	8	8	0	57	100			3,866
Feb.	3,668	3	3	3	0	-207	100			3,361
Mar.	6,205	126	126	126	0	-113	160			5,932
Apr.	3,809	166	166	166	0	2,256	240	200	615	5,010
May	11,558	70	70	70	0	-3,859	500	200	(1,847)	5,152
June	24,293	48	48	48	0	3,440	560	200	(3,077)	23,896
July	3,079	15	15	15	0	3,505	620	200	(3,077)	2,687
Aug.	2,541	2	2	2	0	934	520	200	(1,847)	908
Sept.	2,559	4	4	4	0	878	360	200	(1,230)	1,647
<u>1929-30</u>										
Oct.	3,173	15	15	15	0	387	240	200	615	2,595
Nov.	3,396	15	15	15	0	-103	100			3,193
Dec.	3,577	5	5	5	0	-877	100			2,600
Jan.	3,104	2	2	2	0	-33	100			2,971
Feb.	5,976	231	231	231	0	-2,306	100			3,570
Mar.	5,635	151	151	151	0	1,052	160			6,527
Apr.	7,626	243	243	243	0	688	240	200	615	7,259
May	8,622	54	54	54	0	-1,006	500	200	(1,847)	5,069
June	10,831	34	34	34	0	-7	560	200	(3,077)	6,987
July	7,115	19	19	19	0	1,441	620	200	(3,077)	4,659
Aug.	3,009	2	2	2	0	1,861	520	200	(1,847)	2,303
Sept.	3,111	19	19	19	0	1,439	360	200	(1,230)	2,793

	1	2	3	4	5	6	7	8	9	10
<u>1930-31</u>										
Oct.	3,802	33	33	33	0	-166	240	200	100%	2,581
Nov.	3,710	36	36	36	0	684	100	200	(615	4,294
Dec.	3,731	22	22	22	0	198	100			3,829
Jan.	3,223	16	16	16	0	-179	100			2,944
Feb.	3,019	22	22	22	0	450	100			3,369
Mar.	3,099	33	33	33	0	356	160			3,295
Apr.	2,385	50	50	50	0	1,117	240	200	(615	2,447
May	2,520	28	28	28	0	-1,665	500	200	(1,847	-1,692
June	5,830	19	19	19	0	-3,302	560	200	(3,077	-1,309
July	4,994	11	11	11	0	1,430	620	200	(3,077	2,527
Aug.	2,209	4	4	4	0	1,292	520	200	(1,847	934
Sept.	2,834	4	4	4	0	689	360	200	(1,230	1,733
<u>1931-32</u>										
Oct.	4,101	13	13	13	0	-34	240	200	(615	3,012
Nov.	3,030	14	14	14	0	-271	100			2,659
Dec.	2,829	5	5	5	0	-910	100			2,419
Jan.	2,798	9	9	9	0	-350	100			2,348
Feb.	2,746	14	14	14	0	-531	100			2,115
Mar.	3,906	131	131	131	0	-316	160	200	(615	3,430
Apr.	5,838	165	165	165	0	1,114	240	200	(1,847	5,897
May	11,421	44	44	44	0	-498	500	200	(3,077	8,376
June	29,487	31	31	31	0	-302	560	200	(3,077	25,348
July	8,538	18	18	18	0	3,758	620	200	(3,077	8,399
Aug.	3,113	5	5	5	0	737	520	200	(1,847	1,283
Sept.	5,202	9	9	9	0	1,399	360	200	(1,230	4,811
<u>1932-33</u>										
Oct.	3,774	18	18	18	0	597	240	200	(615	3,316
Nov.	4,131	10	10	10	0	-144	100			3,887
Dec.	3,654	5	5	5	0	14	100			3,568
Jan.	3,278	7	7	7	0	-142	100			3,036
Feb.	3,216	12	12	12	0	-305	100			2,811
Mar.	4,132	117	117	117	0	-852	160	200	(615	3,120
Apr.	6,169	100	100	100	0	3,864	240	200	(1,847	8,978
May	19,340	54	54	54	0	-7,473	500	200	(3,077	9,320
June	16,596	23	23	23	0	-429	560	200	(3,077	12,330
July	6,702	30	30	30	0	3,954	620	200	(3,077	6,759
Aug.	2,109	6	6	6	0	2,140	520	200	(1,847	1,682
Sept.	2,459	23	23	23	0	2,133	360	200	(1,230	2,812

	1	2	3	4	5	6	7	8	9	10
1932-34										
Oct.	2,220	18	18	18	0	705	240	200	100%	1,870
Nov.	5,578	8	8	8	0	38	100			5,516
Dec.	4,096	4	4	4	0	-418	100			3,578
Jan.	4,281	6	6	6	0	-851	100			3,330
Feb.	4,631	10	10	10	0	202	100			4,733
Mar.	5,019	90	90	90	0	531	160			5,390
Apr.	8,498	105	105	105	0	-1,892	240	200	(615	5,551
May	15,567	29	29	29	0	-1,996	500	200	(1,847	11,024
June	17,161	36	36	36	0	-1,927	560	200	(3,077	11,397
July	4,266	5	5	5	0	1,600	620	200	(3,077	1,989
Aug.	1,868	0	0	0	0	445	520	200	(1,847	-254
Sept.	2,271	1	1	1	0	641	360	200	(1,230	1,122
1934-35										
Oct.	3,991	17	17	17	0	184	240	200	(615	3,120
Nov.	5,502	16	16	16	0	-1,364	100			4,038
Dec.	3,515	8	8	8	0	-430	100			2,985
Jan.	3,536	12	12	12	0	-1,145	100			2,291
Feb.	4,488	19	19	19	0	-1,058	100			3,330
Mar.	4,004	179	179	179	0	73	160			3,917
Apr.	5,976	235	235	235	0	2,457	240	200	(600	7,393
May	5,845	61	61	61	0	-1,364	500	200	(1,800	1,981
June	12,509	33	33	33	0	-1,256	560	200	(3,000	7,493
July	8,405	33	33	33	0	1,814	620	200	(3,000	6,399
Aug.	5,143	8	8	8	0	2,065	520	200	(1,800	4,687
Sept.	3,304	2	2	2	0	655	360	200	(1,200	2,199
1935-36										
Oct.	3,216	6	6	6	0	-275	240	200	(600	1,901
Nov.	3,297	26	26	26	0	-302	100			2,895
Dec.	2,773	9	9	9	0	176	100			2,845
Jan.	2,763	17	17	17	0	-566	100			2,097
Feb.	2,678	26	26	26	0	-609	100			1,969
Mar.	5,744	257	257	257	0	-1,036	160			4,548
Apr.	13,524	512	512	512	0	-470	240	200	(615	11,999
May	6,521	68	68	68	0	1,336	500	200	(1,847	5,310
June	7,685	17	17	17	0	1,234	560	200	(3,077	5,082
July	2,143	1	1	1	0	1,034	620	200	(3,077	-720
Aug.	1,906	0	0	0	0	99	520	200	(1,847	-562
Sept.	1,903	0	0	0	0	896	360	200	(1,230	1,009

	1	2	3	4	5	6	7	8	9	10
<u>1926-27</u>										
Oct.	1,834	4	4	4	0	466	240	200	100%	1,245
Nov.	2,577	7	7	7	0	-555	100			1,922
Dec.	1,648	2	2	2	0	-43	100			1,505
Jan.	1,844	4	4	4	0	-103	100			1,641
Feb.	2,212	7	7	7	0	-132	100			1,980
Mar.	3,224	27	27	27	0	-1,114	160			1,950
Apr.	4,123	147	147	147	0	980	240	200	(615	4,048
May	2,659	29	29	29	0	-1,426	500	200	(1,847	-1,314
June	11,654	11	11	11	0	-3,309	560	200	(3,077	4,508
July	3,029	2	2	2	0	2,739	620	200	(3,077	1,871
Aug.	2,215	0	0	0	0	513	520	200	(1,847	161
Sept.	2,787	0	0	0	0	252	360	200	(1,230	1,249
<u>1927-28</u>										
Oct.	3,325	0	0	0	0	63	240	-200	(615	2,333
Nov.	4,088	22	22	22	0	-425	100			3,563
Dec.	3,733	7	7	7	0	-177	100			3,456
Jan.	3,485	14	14	14	0	-625	100			2,760
Feb.	2,821	22	22	22	0	-194	100			2,527
Mar.	5,159	347	347	347	0	-2,189	160			2,810
Apr.	7,645	255	255	255	0	2,960	240	200	(615	9,550
May	11,469	78	78	78	0	-5,351	500	200	(1,847	3,571
June	16,798	28	28	28	0	4,935	560	200	(3,077	17,896
July	10,917	10	10	10	0	4,311	620	200	(3,077	11,331
Aug.	4,303	3	3	3	0	977	520	200	(1,847	2,713
Sept.	4,616	2	2	2	0	-209	360	200	(1,230	2,617
<u>1928-29</u>										
Oct.	4,287	6	6	6	0	-239	240	200	(615	2,993
Nov.	3,850	24	24	24	0	-301	100			3,449
Dec.	3,325	8	8	8	0	-223	100			3,002
Jan.	2,862	16	16	16	0	-131	100			2,631
Feb.	2,576	24	24	24	0	-67	100			2,409
Mar.	5,090	420	420	420	0	-2,181	160			2,749
Apr.	4,458	79	79	79	0	4,428	240	200	(615	7,831
May	3,824	58	58	58	0	-1,115	500	200	(1,847	162
June	14,826	202	202	202	0	-4,473	560	200	(3,077	6,516
July	7,448	35	35	35	0	7,834	620	200	(3,077	11,385
Aug.	2,605	7	7	7	0	615	520	200	(1,847	653
Sept.	3,113	6	6	6	0	359	360	200	(1,230	1,682

	1	2	3	4	5	6	7	8	9	10
1939-40										
Oct.	3,143	5	5	5	0	234	240	200	100%	2,322
Nov.	3,936	27	27	27	0	-906	100		(615	2,930
Dec.	2,931	9	9	9	0	-314	100			2,517
Jan.	2,757	18	18	18	0	-106	100			2,551
Feb.	2,725	27	27	27	0	-186	100			2,439
Mar.	4,793	145	145	145	0	-2,008	160			2,625
Apr.	12,132	652	652	652	0	1,998	240		(615	13,075
May	8,946	55	55	55	0	970	500		(1,847	7,369
June	5,076	31	31	31	0	2,448	560		(3,077	3,687
July	3,666	3	3	3	0	249	620		(3,077	18
Aug.	3,108	3	3	3	0	884	520		(1,847	1,425
Sept.	4,773	1	1	1	0	-1,162	360		(1,230	1,821
1940-41										
Oct.	5,035	16	16	16	0	914	240		(615	4,894
Nov.	4,353	15	15	15	0	-482	100			3,771
Dec.	3,421	7	7	7	0	277	100			3,598
Jan.	2,846	11	11	11	0	380	100			3,126
Feb.	3,058	18	18	18	0	125	100			3,083
Mar.	5,358	175	175	175	0	-2,327	160			3,071
Apr.	4,358	219	219	219	0	4,975	240			8,278
May	2,028	59	59	59	0	163	500		(615	-356
June	3,656	42	42	42	0	-523	560		(1,847	-704
July	3,241	25	25	25	0	421	620		(3,077	-135
Aug.	2,964	9	9	9	0	-461	520		(1,847	-64
Sept.	4,376	11	11	11	0	141	360		(1,230	2,727
1941-42										
Oct.	4,833	12	12	12	0	-32	240		(615	3,746
Nov.	3,856	11	11	11	0	76	100			3,832
Dec.	2,865	5	5	5	0	-218	100			2,547
Jan.	2,793	8	8	8	0	-349	100			2,344
Feb.	2,386	13	13	13	0	-256	100			2,030
Mar.	3,055	127	127	127	0	-518	160			2,377
Apr.	3,896	159	159	159	0	387	240			3,320
May	17,111	43	43	43	0	-7,569	500		(523	7,273
June	26,732	30	30	30	0	-75	560		(1,569	23,282
July	20,200	18	18	18	0	2,127	620		(2,615	18,692
Aug.	12,328	6	6	6	0	862	520		(1,569	10,901
Sept.	9,848	8	8	8	0	-264	360		(1,046	7,978

	1	2	3	4	5	6	7	8	9	10
1942-43										
Oct.	7,022	28	28	28	0	860	240	200	85.2	6,917
Nov.	4,690	26	26	26	0	-608	100		(525	3,922
Dec.	3,471	13	13	13	0	-492	100			2,879
Jan.	3,097	20	20	20	0	-255	100			2,742
Feb.	3,848	31	31	31	0	-586	100			3,162
Mar.	6,457	302	302	302	0	-2,749	160			3,548
Apr.	21,877	379	379	379	0	630	240	200	(615	21,452
May	6,407	102	102	102	0	904	500	200	(1,847	4,764
June	15,079	71	71	71	0	-1,407	560	200	(3,077	9,895
July	12,907	44	44	44	0	1,578	620	200	(3,077	10,588
Aug.	4,830	15	15	15	0	2,140	520	200	100%	4,409
Sept.	2,636	19	19	19	0	996	360	200	100%	1,842
1943-44										
Oct.	2,977	29	29	29	0	100	240	200	(615	2,022
Nov.	3,045	10	10	10	0	181	100			3,126
Dec.	3,072	3	3	3	0	-336	100			2,636
Jan.	2,962	6	6	6	0	-320	100			2,542
Feb.	2,849	9	9	9	0	109	100			2,858
Mar.	3,114	82	82	82	0	-72	160			2,882
Apr.	3,313	63	63	63	0	1,754	240	200	(615	4,012
May	2,032	28	28	28	0	-476	500	200	(1,847	-991
June	9,063	23	23	23	0	-2,830	560	200	(3,077	2,396
July	5,607	19	19	19	0	2,008	620	200	(3,077	3,718
Aug.	7,392	39	39	39	0	-944	520	200	(1,847	3,681
Sept.	3,553	21	21	21	0	1,340	360	200	100%	3,103
1944-45										
Oct.	2,628	29	29	29	0	577	240	200	(615	2,150
Nov.	3,138	12	12	12	0	-335	100			2,703
Dec.	3,015	4	4	4	0	-256	100			2,659
Jan.	2,732	8	8	8	0	-408	100			2,224
Feb.	2,797	12	12	12	0	250	100			2,947
Mar.	4,688	167	167	167	0	-1,008	160			3,720
Apr.	3,237	41	41	41	0	1,281	240	200	(615	3,463
May	7,496	27	27	27	0	-3,862	500	200	(1,847	1,087
June	19,679	25	25	25	0	-2,228	560	200	(3,077	13,614
July	10,168	43	43	43	0	3,579	620	200	(3,077	9,850
Aug.	3,795	40	40	40	0	444	520	200	(1,847	1,642
Sept.	5,055	16	16	16	0	-842	360	200	(1,230	2,423

	1	2	3	4	5	6	7	8	9	10
1945-46										
Oct.	5,955	17	17	17	0	-223	240	200	100%	4,677
Nov.	3,740	20	20	20	0	-1,701	100	200	(615	1,939
Dec.	4,070	11	11	11	0	-37	100			3,933
Jan.	3,929	15	15	15	0	-284	100			3,545
Feb.	3,442	24	24	24	0	-144	100			3,198
Mar.	7,292	237	237	237	0	-1,159	160			6,073
Apr.	6,717	298	298	298	0	275	240	200	(584	5,968
May	6,398	36	36	36	0	-2,760	500	200	(1,755	1,183
June	20,179	48	48	48	0	-2,402	560	200	(2,923	14,094
July	9,409	47	47	47	0	3,286	620	200	(2,923	8,952
Aug.	3,368	38	38	38	0	425	520	200	(1,755	1,318
Sept.	7,530	23	23	23	0	15	360	200	(1,168	5,817
1946-47									93%	
Oct.	5,568	25	25	25	0	-68	240	200	(584	4,476
Nov.	4,533	20	20	20	0	-549	100			3,684
Dec.	4,673	7	7	7	0	-744	100			3,629
Jan.	4,092	14	14	14	0	-517	100			3,475
Feb.	4,980	20	20	20	0	-1,744	100			3,136
Mar.	13,475	97	97	97	0	-1,537	160			11,778
Apr.	14,192	362	362	362	0	5,181	240	200	(615	18,318
May	17,790	74	74	74	0	-887	500	200	(1,847	14,356
June	17,506	47	47	47	0	250	560	200	(3,077	13,919
July	10,730	43	43	43	0	1,761	620	200	(3,077	8,594
Aug.	5,599	2	2	2	0	-92	520	200	(1,847	2,940
Sept.	7,357	31	31	31	0	-667	360	200	(1,230	4,900
1947-48									100%	
Oct.	9,937	20	20	20	0	-1,116	240	200	(615	7,766
Nov.	6,376	13	13	13	0	483	100			6,759
Dec.	4,200	4	4	4	0	401	100			4,501
Jan.	3,742	9	9	9	0	293	100			3,935
Feb.	3,323	13	13	13	0	-138	100			3,085
Mar.	5,602	62	62	62	0	-1,618	160			3,824
Apr.	26,536	158	158	158	0	-3,325	240	200	(615	22,156
May	48,569	41	41	41	0	-2,643	500	200	(1,847	43,379
June	49,178	59	59	59	0	1,655	560	200	(3,077	46,996
July	13,207	50	50	50	0	4,995	620	200	(3,077	14,905
Aug.	11,272	28	28	28	0	128	520	200	(1,847	8,633
Sept.	4,221	32	32	32	0	1,501	360	200	(1,230	3,932

TABLE B

FIRM COMMERCIAL, PUMPING & EVAPORATION CORRECTION DEMANDS
FOR VARIOUS MONTHS & RESERVOIR ELEVATIONS - in C.F.M.

Res. Elev.	I 1825 - 15				II 1815 - 95				III 1805 - 1795				IV 1795 - 85			
	Com. Power	Pumping	Corr. for Evap.	Total	Com. Power	Pumping	Corr. for Evap.	Total	Com. Power	Pumping	Corr. for Evap.	Total	Com. Power	Pumping	Corr. for Evap.	Total
Jan.	4,940	0	0	4,940	5,230	0	0	5,230	5,560	0	0	5,560	5,940	0	0	5,940
Feb.	3,410	0	0	3,410	3,610	0	0	3,610	3,850	0	0	3,850	4,100	0	0	4,100
Mar.	2,640	0	+40	2,680	2,800	0	0	2,800	2,980	0	-30	2,950	3,180	0	-50	3,130
Apr.	1,890	255	+50	2,195	2,005	283	0	2,288	2,130	325	-50	2,405	2,270	375	-90	2,555
May	1,890	762	+50	2,702	2,005	850	0	2,855	2,130	975	-50	3,055	2,270	1,125	-90	3,305
June	1,705	1,270	+50	3,025	1,810	1,417	0	3,227	1,920	1,625	-50	3,495	2,050	1,875	-90	3,835
July	1,705	1,270	+50	3,025	1,810	1,417	0	3,227	1,920	1,625	-50	3,495	2,050	1,875	-90	3,835
Aug.	2,640	762	+50	3,452	2,800	850	0	3,650	2,980	975	-50	3,905	3,180	1,125	-90	4,215
Sept.	3,020	509	+50	3,579	3,200	567	0	3,767	3,410	650	-50	4,010	3,640	750	-90	4,300
Oct.	4,160	255	+40	4,455	4,400	283	0	4,683	4,680	325	-50	4,955	5,000	375	-90	5,285
Nov.	4,540	0	0	4,540	4,820	0	0	4,820*	5,120	0	0	5,120	5,460	0	0	5,460
Dec.	5,300	0	0	5,300	5,620	0	0	5,620	5,980	0	0	5,980	6,380	0	0	6,380
Total	37,840	5,083	380	43,303	40,110	5,667	0	45,777	42,660	6,500	-380	48,780	45,520	7,500	-680	52,340

* 4,830 was used in the III study, should be 4,820

TABLE C

WATER SUPPLY STUDY FOR SOUTH SASKATCHEWAN RIVER PROJECT ASSUMING 1,700,000 ACRES IRRIGATED IN ALBERTA - in C.F.M.

Months	10	11	12	13	14	15	16	17	18	19	20	21	22
	Reservoir Balances	Effect Red Deer River Irr. D.	Future Small Irr. District	Net Inflow after Red Deer effect & Small Irr. D.	Outflow (Power, pumping & Evap. Corr.)	Spillwater	Below (Spill, power, and pumping)	Change in Storage	Storage	Natural Inflow between Dam & Saskatoon	Municipal Small Irr. and Return Flow	Seepage through Dam	Balance at Saskatoon
1923									116,271				
Jan.	2,607	858		3,465	4,940		4,940	-1,475	116,796	-10	-10	25	4,945
Feb.	2,239	867		3,106	3,430		3,430	-304	114,492	-11	-10	25	3,414
Mar.	2,878	841		3,519	2,680		2,680	839	115,331	-80	-10	25	2,615
Apr.	4,144	-714		3,430	2,195		2,195	1,235	116,566	98	-10	25	2,308
May	855	-1,228	-270	-643	2,702		2,702	-3,345	113,221	-342	300	25	2,685
June	38,835	-1,261	-270	37,304	3,025		3,025	34,279	147,500	-949	270	25	2,321
July	19,506	20	-270	19,256	3,025	16,231	19,206	0	147,500	564	250	25	20,045
Aug.	8,223	330	-270	8,283	3,452	4,831	8,233	0	147,500	-19	250	25	8,489
Sept.	6,087	163	-270	5,980	3,579	2,401	5,930	0	147,500	152	270	25	6,377
1923-24													
Oct.	3,880	122	-270	4,002	4,455		4,415	-453	147,047	-11	-30	25	4,399
Nov.	3,820	469	-270	4,289	4,540		4,540	-251	146,796	-31	-10	25	4,524
Dec.	3,567	605	-270	4,172	5,300		5,300	-1,128	145,668	51	-10	25	5,356
Jan.	2,830	694	-270	3,524	4,940		4,940	-1,416	144,252	-2	-10	25	4,953
Feb.	3,031	634	-270	3,665	3,410		3,410	255	144,507	-34	-10	25	3,391
Mar.	3,264	399	-270	3,663	2,880		2,880	983	145,490	-15	-10	25	2,640
Apr.	4,445	-1,203	-270	3,242	2,195		2,145	1,047	146,537	338	-10	25	2,498
May	2,766	115	-270	2,611	2,702		2,652	-91	146,446	-260	300	25	2,717
June	8,147	-125	-270	7,752	3,025	3,671	6,646	1,054	147,500	-213	270	25	6,728
July	7,422	-405	-270	6,747	3,025	3,722	6,697	0	147,500	340	250	25	7,312
Aug.	7,047	112	-270	6,889	3,452	3,437	6,839	0	147,500	-8	250	25	7,106
Sept.	4,969	-323	-270	4,376	3,579	797	4,326	0	147,500	179	270	25	4,800

	10	11	12	13	14	15	16	17	18	19	20	21	22
<u>1924-25</u>													
Oct.	3,032	261		3,293	4,455		4,415	-1,162	146,338	89	-30	25	4,493
Nov.	3,270	514		3,784	4,540		4,540	-756	145,582	-53	-10	25	4,502
Dec.	3,275	678		3,953	5,300		5,300	-1,347	144,235	-5	-10	25	5,310
Jan.	2,784	702		3,486	4,940		4,940	-1,454	142,781	-36	-10	25	4,919
Feb.	3,225	714		3,939	3,410		3,410	529	143,210	-23	-10	25	3,402
Mar.	3,905	622		4,527	2,680		2,640	1,847	145,157	-418	-10	25	2,237
Apr.	19,808	-2,085		17,723	2,195	13,185	15,330	2,343	147,500	582	-10	25	15,927
May	7,616	-768	-270	6,578	2,702	3,876	6,528	0	147,500	-290	300	25	6,563
June	11,749	-30	-270	11,449	3,025	8,424	11,399	0	147,500	66	270	25	11,760
July	7,872	-661	-270	6,941	3,025	3,916	6,891	0	147,500	444	250	25	7,610
Aug.	4,107	372	-270	4,209	3,452	757	4,159	0	147,500	-67	250	25	4,367
Sept.	6,140	782	-270	6,652	3,579	3,073	6,602	0	147,500	74	270	25	6,971
<u>1925-26</u>													
Oct.	6,245	772		7,017	4,455	2,562	6,977	0	147,500	-132	-30	25	6,840
Nov.	5,597	675		6,272	4,540	1,732	6,272	0	147,500	41	-10	25	6,328
Dec.	4,199	365		4,564	5,300		5,300	-736	146,764	-1	-10	25	5,314
Jan.	3,556	515		4,071	4,940		4,940	-869	145,895	12	-10	25	4,967
Feb.	3,574	497		4,071	3,410		3,410	661	146,556	16	-10	25	3,441
Mar.	9,022	41		9,063	2,680	5,439	8,079	944	147,500	-6	-10	25	8,088
Apr.	8,003	25		8,028	2,195	5,833	7,978		147,500	200	-10	25	8,193
May	2,444	-912	-270	1,262	2,752		2,552	-1,440	146,060	190	300	25	3,167
June	-1,884	-1,055	-270	-3,209	3,025		2,975	-6,234	139,826	-479	270	25	2,791
July	6,744	-720	-270	5,754	3,025		2,975	2,729	142,555	442	250	25	3,992
Aug.	3,112	-770	-270	2,072	3,452		3,402	-1,380	141,175	96	250	25	3,773
Sept.	14,023	750	-270	14,503	3,579	4,599	8,128	6,325	147,500	-421	270	25	8,002
<u>1926-27</u>													
Oct.	13,286	999		14,385	4,455	9,930	14,345	0	147,500	172	-30	25	14,512
Nov.	8,491	857		9,348	4,540	4,808	9,348	0	147,500	184	-10	25	9,547
Dec.	4,544	396		4,940	5,300		5,300	-360	147,140	-35	-10	25	5,280
Jan.	3,767	602		4,369	4,940		4,940	-571	146,569	-17	-10	25	4,938
Feb.	3,674	558		4,232	3,410		3,410	822	147,391	-16	-10	25	3,409
Mar.	5,599	427		6,026	2,680	3,237	5,877	109	147,500	-20	-10	25	5,872
Apr.	20,454	-356	-270	20,098	2,195	17,903	20,048	0	147,500	803	-10	25	20,866
May	12,528	-478	-270	12,080	2,702	9,378	12,030	0	147,500	-287	300	25	12,068
June	35,060	380	-270	35,170	3,025	32,145	35,120	0	147,500	-34	270	25	35,381
July	23,046	370	-270	23,146	3,025	20,121	23,096	0	147,500	589	250	25	23,960
Aug.	13,765	284	-270	13,779	3,452	10,327	13,729	0	147,500	87	250	25	14,091
Sept.	16,636	436	-270	16,802	3,579	13,223	16,752	0	147,500	80	270	25	17,127

	10	11	12	13	14	15	16	17	18	19	20	21	22
1927-28													
Oct.	14,009	428		14,437	4,455	9,982	14,397	0	147,500	514	-30	25	14,906
Nov.	6,372	376		6,748	4,540	2,208	6,748	0	147,500	28	-10	25	6,791
Dec.	5,455	500		5,955	5,300	655	5,955	0	147,500	70	-10	25	6,040
Jan.	8,963	459		9,422	4,940	4,482	9,422	0	147,500	112	-10	25	9,549
Feb.	5,068	426		5,494	3,410	2,084	5,494	0	147,500	-24	-10	25	5,485
Mar.	9,676	-230		9,446	2680	6,766	9,406	0	147,500	-439	-10	25	8,982
Apr.	14,135	116		14,251	2,195	12,056	14,201	0	147,500	621	-10	25	14,837
May	9,491	-977		8,514	2,702	5,812	8,194	0	147,500	-216	300	25	8,303
June	29,149	30	-270	28,909	3,025	25,884	28,859	0	147,500	-118	270	25	28,736
July	31,855	20	-270	31,605	3,025	28,580	31,555	0	147,500	-609	250	25	32,439
Aug.	8,260	-563	-270	7,697	3,452	3,975	7,377	0	147,500	303	250	25	7,955
Sept.	4,931	-501	-270	4,430	3,579	881	4,110	0	147,500	82	270	25	4,487
1928-29													
Oct.	4,128	144		4,272	4,455	1,147	4,415	-183	147,317	-68	-30	25	4,342
Nov.	3,372	498		3,870	4,540	5,687	5,687	183	147,500	39	-10	25	5,741
Dec.	3,616	592		4,208	5,300	5,300	5,300	-1,092	146,408	28	-10	25	5,343
Jan.	3,866	705		4,571	4,940	4,940	4,940	-369	146,039	6	-10	25	4,961
Feb.	3,361	742		4,103	3,410	3,410	3,410	693	146,732	-23	-10	25	3,402
Mar.	5,932	507		6,439	2,680	2,680	5,631	768	147,500	-12	-10	25	5,634
Apr.	5,010	-768		4,242	2,195	2,047	4,192	0	147,500	251	-10	25	4,458
May	5,152	-2394	-270	2,848	2,702	2,047	2,652	-214	147,286	-129	300	25	2,548
June	23,896	30	-270	23,656	3,025	20,417	23,392	214	147,500	382	270	25	24,069
July	2,687	-950	-270	1,737	3,025	2,975	2,975	-1,558	145,942	389	250	25	3,639
Aug.	908	-650	-270	236	3,452	3,402	3,402	-3,464	142,478	104	250	25	3,781
Sept.	1,647	-458	-270	919	3,579	3,529	3,529	-2,660	139,818	98	270	25	3,922
1929-30													
Oct.	2,505	550		3,055	4,455	4,415	4,415	-1,400	136,418	43	-30	25	4,453
Nov.	3,193	629		3,822	4,540	4,540	4,540	-718	137,700	-11	-10	25	4,544
Dec.	2,600	748		3,348	5,300	5,300	5,300	-1,952	135,748	-97	-10	25	5,218
Jan.	2,971	775		3,746	4,940	4,940	4,940	-1,194	134,554	-4	-10	25	4,991
Feb.	3,570	462		4,032	3,410	3,410	3,410	622	135,176	-256	-10	25	3,169
Mar.	6,527	379		6,906	2,680	2,680	2,680	4,226	139,402	117	-10	25	3,772
Apr.	7,259	-1,776	-270	5,483	2,195	2,195	2,145	3,288	142,690	76	-10	25	2,236
May	5,069	-1,406	-270	3,663	2,702	2,652	2,652	691	143,381	-112	300	25	2,865
June	6,987	-2,731	-270	3,986	3,025	2,975	2,975	961	144,342	-1	270	25	3,269
July	4,659	-765	-270	3,624	3,025	3,025	2,975	599	144,941	160	250	25	3,410
Aug.	2,303	-757	-270	1,276	3,452	3,402	3,402	-2,176	142,765	207	250	25	3,884
Sept.	2,793	-586	-270	1,937	3,579	3,529	3,529	-1,642	141,123	160	270	25	3,984

	10	11	12	13	14	15	16	17	18	19	20	21	22
<u>1930-31</u>													
Oct.	2,581	476		3,057	4,455		4,415	-1,398	139,725	-18	-30	25	4,392
Nov.	4,294	598		4,872	4,540		4,540	332	140,057	76	-10	25	4,631
Dec.	3,829	751		4,580	5,300		5,300	-720	139,337	22	-10	25	5,337
Jan.	2,944	825		3,769	4,940		4,940	-1,171	138,166	-20	-10	25	4,935
Feb.	3,369	792		4,161	3,410		3,410	751	138,917	50	-10	25	3,475
Mar.	3,295	732		4,027	2,680		2,680	1,347	140,264	40	-10	25	2,695
Apr.	2,447	-362		2,085	2,195		2,145	-110	140,154	124	-10	25	2,284
May	-1,692	-755	-270	-2,717	2,702		2,652	-5,419	134,735	-185	300	25	2,792
June	-1,309	-2,144	-270	-3,723	3,025		2,975	-6,748	127,987	-367	270	25	2,903
July	2,527	-2,580	-270	-323	3,025		3,025	-3,348	124,639	159	250	25	3,459
Aug.	934	-900	-270	-236	3,650		3,650	-3,886	120,753	144	250	25	4,069
Sept.	1,733	-500	-270	963	3,767		3,767	-2,804	117,949	77	270	25	4,139
<u>1931-32</u>													
Oct.	3,012	500		3,512	4,683		4,683	-1,171	116,778	-4	-30	25	4,674
Nov.	2,659	600		3,259	4,830		4,830	-1,571	115,207	-30	-10	25	4,815
Dec.	2,419	500		2,919	5,620		5,620	-2,701	112,506	-34	-10	25	5,601
Jan.	2,348	645		2,993	5,230		5,230	-2,237	110,269	-39	-10	25	5,206
Feb.	2,115	740		2,855	3,610		3,610	-755	109,514	-59	-10	25	3,566
Mar.	3,450	780		4,210	2,800		2,800	1,410	110,924	-35	-10	25	2,780
Apr.	5,897	-744		5,153	2,288		2,288	2,865	113,789	124	-10	25	2,427
May	8,376	-2,848	-270	5,258	2,855		2,855	2,403	116,192	-55	300	25	3,125
June	25,348	80	-270	25,158	3,227		3,177	21,931	136,123	-34	270	25	3,438
July	8,399	-796	-270	7,333	3,025		2,975	4,308	142,431	418	250	25	3,668
Aug.	1,283	-539	-270	474	3,452		3,402	-2,978	139,453	82	250	25	3,759
Sept.	4,811	-372	-270	4,169	3,579		3,529	590	140,043	155	270	25	3,979
<u>1932-33</u>													
Oct.	3,316	251		3,567	4,455		4,415	-888	139,155	66	-30	25	4,476
Nov.	3,887	394		4,281	4,540		4,540	-259	138,896	-16	-10	25	4,539
Dec.	3,568	623		4,191	5,300		5,300	-1,109	137,787	1	-10	25	5,316
Jan.	3,036	635		3,671	4,940		4,940	-1,269	136,518	-16	-10	25	4,939
Feb.	2,811	777		3,583	3,410		3,370	178	136,696	-34	-10	25	3,351
Mar.	3,120	687		3,807	2,680		2,630	1,127	137,823	-95	-10	25	2,550
Apr.	8,978	-1,904	-270	7,074	2,195	1,032	2,145	4,879	142,702	429	-10	25	2,589
May	9,220	-518	-270	8,532	2,702	8,829	3,684	4,798	147,500	-830	300	25	3,179
June	12,330	-206	-270	11,654	3,025	2,699	11,804	0	147,500	-48	270	25	12,051
July	6,759	-765	-270	5,724	3,025		5,674	0	147,500	439	250	25	6,388
Aug.	1,662	-734	-270	678	3,452		3,402	-2,774	144,726	238	250	25	3,915
Sept.	2,812	-395	-270	2,147	3,579		3,529	-1,432	143,294	237	270	25	4,051

	10	11	12	13	14	15	16	17	18	19	20	21	22
1933-34													
Oct.	1,870	600		2,470	4,455		4,415	-1,985	141,309	78	-30	25	4,488
Nov.	5,516	650		6,166	4,540		4,540	1,626	142,935	4	-10	25	4,559
Dec.	3,578	770		4,348	5,300		5,300	-952	141,983	-46	-10	25	5,269
Jan.	3,330	660		3,990	4,940		4,940	-950	141,033	-95	-10	25	4,860
Feb.	4,733	690		5,423	3,410		3,410	2,013	143,046	22	-10	25	3,447
Mar.	5,350	-320		5,070	2,680		2,680	2,390	145,436	59	-10	25	2,714
Apr.	5,551	-3,002		3,549	2,195		2,145	1,354	146,790	-210	-10	25	1,950
May	11,024	-497	-270	10,257	2,702	6,845	9,497	710	147,500	-222	300	25	9,660
June	11,397	-485	-270	10,642	3,025	7,617	10,592	0	147,500	-214	270	25	10,673
July	1,869	-1,100	-270	599	3,025		2,975	-2,426	145,074	178	250	25	3,428
Aug.	-254	-800	-270	-1,324	3,452		3,402	-4,776	140,298	49	250	25	3,726
Sept.	1,122	-400	-270	452	3,579		3,529	-3,127	137,171	71	270	25	3,895
1934-35													
Oct.	3,120	500		3,620	4,455		4,415	-835	136,336	20	-30	25	4,430
Nov.	4,038	600		4,638	4,540		4,540	98	136,434	-151	-10	25	4,404
Dec.	2,985	670		3,655	5,300		5,300	-1,645	134,789	-48	-10	25	5,267
Jan.	2,291	820		3,111	4,940		4,940	-1,829	132,960	-127	-10	25	4,828
Feb.	3,330	800		4,130	3,410		3,410	720	133,680	-117	-10	25	3,308
Mar.	3,917	790		4,707	2,680		2,680	2,027	135,707	8	-10	25	2,663
Apr.	7,393	-638		6,755	2,195		2,145	4,560	140,267	273	-10	25	2,433
May	1,981	-1,112	-270	599	2,702		2,652	-2,103	138,164	-152	300	25	2,625
June	7,453	-2,686	-270	4,537	3,025		2,975	1,512	139,676	-139	270	25	3,331
July	6,399	20	-270	6,149	3,025		2,975	3,124	142,800	201	250	25	3,451
Aug.	4,669	-1,860	-270	6,279	3,452		3,402	2,827	145,627	229	250	25	2,306
Sept.	2,199	-548	-270	1,381	3,579		3,529	-2,198	143,429	73	270	25	3,897
1935-36													
Oct.	1,901	452		2,353	4,455		4,415	-2,102	141,327	-31	-30	25	4,379
Nov.	2,895	635		3,530	4,540		4,540	-1,010	140,317	-33	-10	25	4,522
Dec.	2,849	774		3,623	5,300		5,300	-1,677	138,640	19	-10	25	5,334
Jan.	2,677	751		2,848	4,940		4,940	-2,092	136,548	-63	-10	25	4,892
Feb.	1,969	813		2,782	3,410		3,410	-628	135,920	-68	-10	25	3,357
Mar.	4,548	766		5,314	2,680		2,640	2,634	138,554	-11	-10	25	2,644
Apr.	11,999	-2,828		9,171	2,195		2,145	6,976	145,530	-52	-10	25	2,108
May	5,310	-398	-270	4,642	2,702	1,632	2,652	1,940	147,470	148	300	25	3,125
June	5,082	-125	-270	4,687	3,025		4,607	30	147,500	137	270	25	5,039
July	-720	-840	-270	-1,830	3,025		2,975	-4,855	142,645	115	250	25	3,365
Aug.	-562	-620	-270	-1,452	3,452		3,402	-4,904	137,741	11	250	25	3,688
Sept.	1,009	-320	-270	419	3,579		3,529	-3,160	134,581	99	270	25	3,923

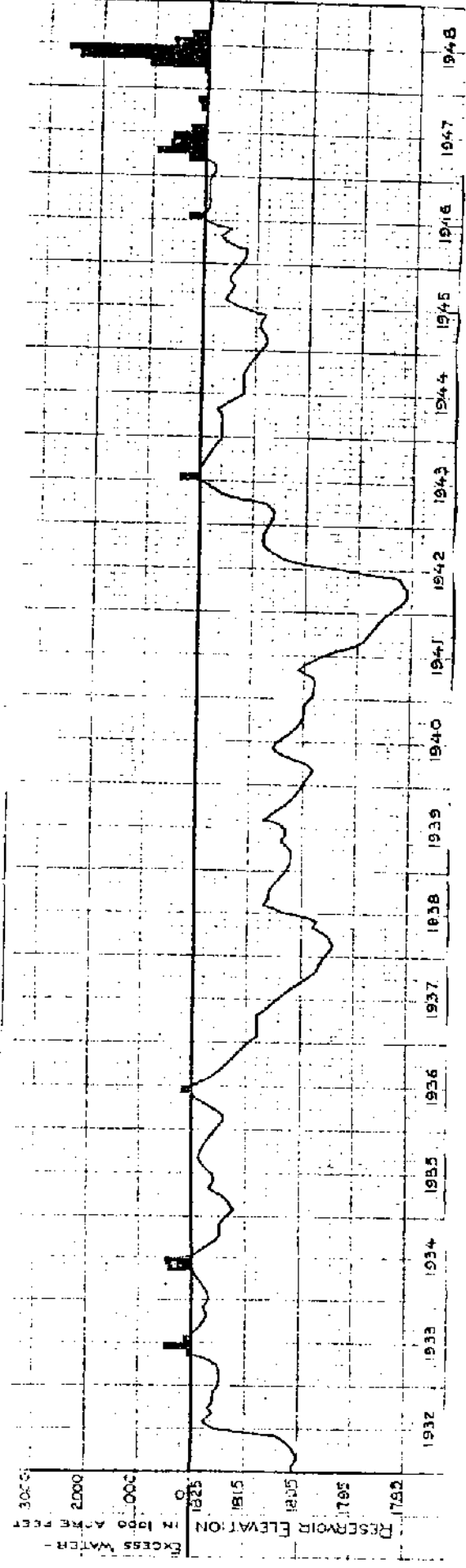
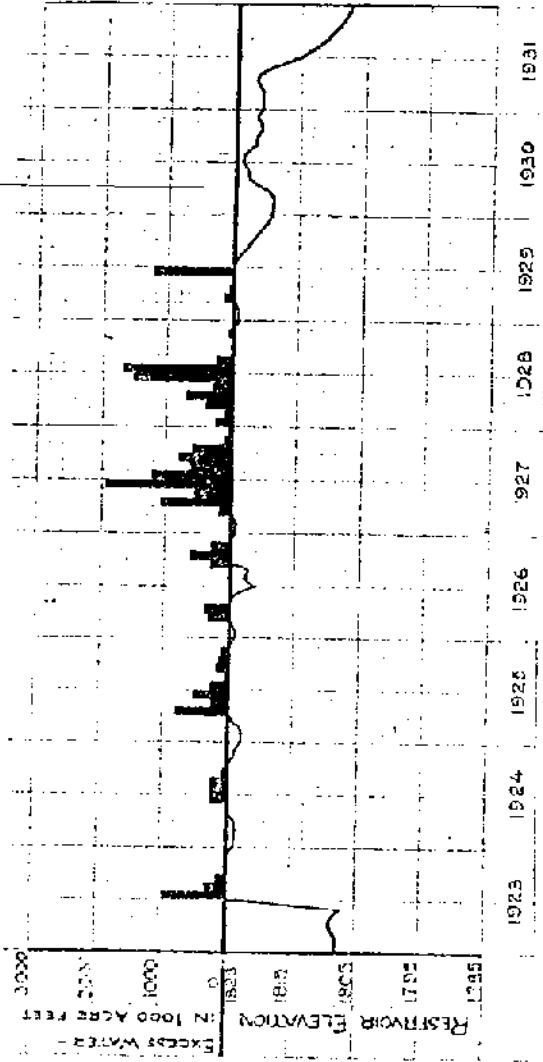
	10	11	12	13	14	15	16	17	18	19	20	21	22
1930-37													
Oct.	1,245	631		1,876	4,455		4,415	-2,579	132,002	52	-30	25	4,462
Nov.	1,922	616		2,538	4,540		4,540	-2,002	130,000	-62	-10	25	4,493
Dec.	1,505	904		2,409	5,300		5,300	-2,891	127,109	-5	-10	25	5,310
Jan.	1,641	894		2,535	5,230		5,230	-2,695	124,414	-11	-10	25	5,234
Feb.	1,980	897		2,977	3,610		3,610	-733	123,681	-15	-10	25	3,610
Mar.	1,950	758		2,708	2,800		2,800	-92	123,589	-124	-10	25	2,691
Apr.	4,048	-590		3,458	2,288		2,288	1,170	124,759	109	-10	25	2,412
May	-1,314	-592	-270	-2,276	2,855		2,855	-5,131	119,628	-158	300	25	3,022
June	4,508	-2,216	-270	2,022	3,227		3,227	-1,205	118,423	-368	270	25	3,154
July	1,871	-1,320	-270	281	3,227		3,227	-2,946	115,477	304	250	25	3,806
Aug.	161	-940	-270	-1,049	3,650		3,650	-4,699	110,778	57	250	25	3,982
Sept.	1,249	-660	-270	319	3,767		3,817	-3,448	107,330	28	270	25	4,140
1927-28													
Oct.	2,333	112		2,445	4,955		5,005	-2,510	104,820	7	-30	25	5,007
Nov.	3,563	499		4,062	5,120		5,120	-1,058	103,762	-47	-10	25	5,088
Dec.	3,456	719		4,175	5,980		5,980	-1,805	101,957	-20	-10	25	5,975
Jan.	2,780	816		3,476	5,560		5,560	-2,084	99,873	-69	-10	25	5,506
Feb.	2,527	824		3,351	3,850		3,850	-499	99,374	-21	-10	25	3,844
Mar.	2,810	575		3,385	2,950		2,980	435	99,809	-243	-10	25	2,752
Apr.	9,550	-754		8,796	2,405		2,455	6,391	106,200	329	-10	25	2,799
May	3,571	-1,805	-270	1,496	3,055		3,105	-1,559	104,641	-595	300	25	2,835
June	7,896	-3,452	-270	14,174	3,495		3,495	10,679	115,320	548	270	25	4,338
July	11,331	-1,426	-270	9,635	3,227		3,227	6,408	121,728	479	250	25	3,981
Aug.	2,713	-572	-270	1,671	3,650		3,650	-1,779	119,949	109	250	25	4,034
Sept.	2,617	181	-270	2,528	3,767		3,767	-1,239	118,710	-23	270	25	4,039
1928-29													
Oct.	2,993	392		3,385	4,683		4,683	-1,298	117,412	-27	-30	25	4,651
Nov.	3,449	675		4,124	4,830		4,830	-706	116,706	-33	-10	25	4,812
Dec.	3,002	790		3,792	5,620		5,620	-1,828	114,878	-25	-10	25	5,610
Jan.	2,631	785		3,416	5,230		5,230	-1,814	113,064	-15	-10	25	5,230
Feb.	2,409	813		3,222	3,610		3,610	-388	112,676	-7	-10	25	3,618
Mar.	2,749	459		3,208	2,800		2,800	408	113,084	-242	-10	25	2,573
Apr.	7,531	-656		7,195	2,288		2,288	4,907	117,991	492	-10	25	2,795
May	162	-648	-270	-756	2,855		2,855	-3,611	114,380	-124	300	25	3,056
June	6,516	-2,555	-270	3,691	3,227		3,227	464	114,844	-497	270	25	3,025
July	11,385	-693	-270	10,422	3,227		3,227	7,195	122,039	870	250	25	4,372
Aug.	653	-806	-270	-423	3,650		3,650	-4,073	117,966	68	250	25	3,993
Sept.	1,682	-476	-270	936	3,767		3,767	-2,831	115,135	40	270	25	4,102

	10	11	12	13	14	15	16	17	18	19	20	21	22
1939-40													
Oct.	2,322	390		2,712	4,683		4,683	-1,971	113,164	26	-30	25	4,704
Nov.	2,930	390		3,320	4,830		4,830	-1,510	111,654	-101	-10	25	4,744
Dec.	2,517	847		3,164	5,620		5,620	-2,456	109,198	-35	-10	25	5,600
Jan.	2,551	817		3,368	5,230		5,230	-1,862	107,336	-12	-10	25	5,233
Feb.	2,439	814		3,253	3,610		3,610	-357	106,979	-21	-10	25	3,604
Mar.	2,625	690		3,315	2,800		2,830	515	107,494	-223	-10	25	2,622
Apr.	13,075	-2,550		10,525	2,288		2,288	8,237	115,731	222	-10	25	2,525
May	7,369	-473	-270	6,626	2,855		2,855	3,771	119,502	108	300	25	3,288
June	3,687	-912	-270	2,505	3,227		3,227	-722	118,780	272	270	25	3,794
July	18	-940	-270	-1,192	3,227		3,227	-4,419	114,361	28	250	25	3,530
Aug.	1,425	-690	-270	465	3,650		3,650	-3,185	111,176	98	250	25	4,023
Sept.	1,821	-720	-270	831	3,767		3,767	-2,936	108,240	-129	270	25	3,933
1940-41													
Oct.	4,894	460		5,354	4,683		4,683	671	108,911	101	-30	25	4,779
Nov.	3,771	624		4,395	4,830		4,830	-435	108,476	-53	-10	25	4,792
Dec.	3,598	699		4,297	5,620		5,620	-1,323	107,153	31	-10	25	5,666
Jan.	3,126	773		3,899	5,560		5,560	-1,661	105,492	42	-10	25	5,617
Feb.	3,083	751		3,834	3,850		3,850	-16	105,476	14	-10	25	3,879
Mar.	3,070	429		3,499	2,950		2,980	549	106,025	-259	-10	25	2,736
Apr.	8,278	-496		7,782	2,405		2,405	5,377	111,402	553	-10	25	2,973
May	-356	-138	-270	-784	2,855		2,905	-3,639	107,783	18	300	25	3,248
June	-704	-939	-270	-1,913	3,495		3,545	-5,408	102,355	-58	270	25	3,782
July	-135	-1,060	-270	-1,445	3,495		3,545	-4,940	97,115	47	280	25	3,867
Aug.	-64	-1,330	-270	-1,684	3,905		3,955	-5,589	91,826	-51	250	25	4,179
Sept.	2,727	-900	-270	1,557	4,500		4,590	-2,743	89,083	16	270	25	4,701
1941-42													
Oct.	3,746	205		3,951	5,285		5,375	-1,334	87,749	-3	-30	25	5,367
Nov.	3,832	559		4,391	5,460		5,460	-1,069	86,680	9	-10	25	5,484
Dec.	2,547	737		3,284	6,380		6,380	-3,096	83,584	-24	-10	25	6,371
Jan.	2,344	801		3,145	5,940		5,940	-2,795	80,789	-39	-10	25	5,916
Feb.	2,030	835		2,865	4,100		4,100	-1,235	79,554	-29	-10	25	4,086
Mar.	2,377	837		3,214	3,190		3,190	84	79,638	-57	-10	25	3,138
Apr.	3,320	-224	-270	3,096	2,555		2,645	541	80,179	43	-10	25	2,703
May	7,273	-1,648	-270	5,355	3,805		3,395	2,050	82,229	-841	300	25	2,879
June	23,282	-3,421	-270	19,591	3,835		3,885	15,756	97,985	-8	270	25	4,172
July	18,892	64	-270	18,558	3,495		3,495	15,063	113,048	236	250	25	4,006
Aug.	10,901	-330	-270	10,301	3,650		3,650	0,651	119,699	96	250	25	4,021
Sept.	7,978	-574	-270	7,134	3,767		3,767	3,367	123,066	-29	270	25	4,033

	10	11	12	13	14	15	16	17	18	19	20	21	22
1942-43													
Oct.	6,917	6,607		4,683	4,683		4,683	1,924	124,990	95	-30	25	4,773
Nov.	3,922	4,211		4,830	4,830		4,830	-619	124,371	-67	-10	25	4,778
Dec.	2,879	3,364		5,620	5,620		5,620	-2,256	122,115	-55	-10	25	5,580
Jan.	2,742	3,460		5,230	5,230		5,230	-1,770	120,345	-28	-10	25	5,217
Feb.	3,162	3,862		3,610	3,610		3,610	252	120,597	-65	-10	25	3,560
Mar.	3,548	3,846		2,800	2,800		2,800	1,046	121,643	-305	-10	25	2,510
Apr.	21,452	20,625		2,288	2,288		2,238	18,337	139,980	70	-10	25	2,233
May	4,764	2,565	-270	2,702	2,702		2,652	863	140,843	101	300	25	3,078
June	9,835	9,395	-270	3,025	3,025		2,975	6,370	147,213	-156	270	25	3,114
July	10,588	9,823	-270	3,025	3,025	6,511	9,486	287	147,500	175	250	25	9,936
Aug.	4,403	3,426	-270	3,452	3,452		3,402	-26	117,474	238	255	25	3,915
Sept.	1,842	988	-270	3,579	3,579		3,529	-2,591	144,883	111	270	25	3,935
1943-44													
Oct.	2,022	2,304		4,455	4,455		4,415	-2,151	142,732	11	-30	25	4,421
Nov.	3,126	3,728		4,540	4,540		4,540	-812	141,920	20	-10	25	4,575
Dec.	2,636	3,370		5,300	5,300		5,300	-1,930	139,990	-37	-10	25	5,278
Jan.	2,542	3,320		4,940	4,940		4,940	-1,620	138,370	-36	-10	25	4,919
Feb.	2,858	3,645		3,410	3,410		3,410	235	138,605	12	-10	25	3,437
Mar.	2,882	3,353		2,680	2,680		2,640	673	139,278	-8	-10	25	2,647
Apr.	4,012	3,048		2,195	2,195		2,145	853	140,131	195	-10	25	2,155
May	-991	-2,772	-270	2,702	2,702		2,652	-5,474	134,657	-53	300	25	2,924
June	2,396	497	-270	3,025	3,025		2,975	-2,1528	132,129	-314	270	25	2,956
July	3,718	3,277	-270	3,025	3,025		2,975	252	132,381	223	250	25	3,473
Aug.	3,881	3,941	-270	3,452	3,452		3,402	489	132,870	-105	250	25	3,572
Sept.	3,103	2,717	-270	3,579	3,579		3,529	-862	132,008	149	270	25	3,973
1944-45													
Oct.	2,150	2,335		4,455	4,455		4,415	-2,120	129,888	64	-30	25	4,474
Nov.	2,703	3,088		4,540	4,540		4,540	-1,452	128,436	-37	-10	25	4,518
Dec.	2,659	3,303		5,300	5,300		5,300	-1,997	126,439	-28	-10	25	5,287
Jan.	2,224	2,923		4,940	4,940		4,940	-2,017	124,422	-45	-10	25	4,910
Feb.	2,947	3,636		3,610	3,610		3,610	26	124,448	28	-10	25	3,653
Mar.	3,720	4,299		2,800	2,800		2,800	1,499	125,947	-112	-10	25	2,703
Apr.	3,463	2,591		2,195	2,195		2,195	396	126,343	142	-10	25	2,352
May	1,087	-217	-270	2,702	2,702		2,702	-2,919	123,424	-429	300	25	2,598
June	13,644	13,336	-270	3,237	3,237		3,187	10,099	133,523	-248	270	25	3,234
July	9,850	8,103	-270	3,025	3,025		2,975	5,078	138,601	398	250	25	3,648
Aug.	1,642	1,007	-270	3,452	3,452		3,402	-2,445	136,157	46	250	25	3,723
Sept.	2,423	1,992	-270	3,579	3,579		3,529	-1,587	134,570	-94	270	25	3,730

	10	11	12	13	14	15	16	17	18	19	20	21	22
1945-46													
Oct.	4,677	396		5,073	4,455		4,415	618	135,188	-25	-30	25	4,385
Nov.	1,939	452		2,391	4,540		4,540	-2,149	133,039	-190	-10	25	4,365
Dec.	3,933	450		4,383	5,300		5,300	-917	132,122	-4	-10	25	5,311
Jan.	3,545	514		4,059	4,940		4,940	-881	131,241	-31	-10	25	4,924
Feb.	3,198	582		3,780	3,410		3,410	370	131,611	-16	-10	25	3,409
Mar.	6,073	-360		5,713	2,680		2,640	3,033	134,644	-129	-10	25	2,526
Apr.	5,968	-47		5,921	2,195		2,145	3,726	138,370	31	-10	25	2,191
May	1,183	-739		174	2,702		2,652	3,726	135,842	-307	300	25	2,670
June	14,094	80		13,904	3,025		2,975	-2,528	146,721	-267	270	25	3,003
July	8,952	-391		8,291	3,025	4,487	7,462	779	147,500	355	250	25	8,102
Aug.	1,318	-683		365	3,452		3,402	-3,087	144,413	47	250	25	3,724
Sept.	5,817	-351		5,196	3,579		3,529	1,617	146,030	2	270	25	3,826
1946-47													
Oct.	4,476	20		4,496	4,455		4,415	41	146,071	-8	-30	25	4,402
Nov.	3,884	516		4,400	4,540		4,540	-140	145,931	-61	-10	25	4,494
Dec.	3,829	582		4,411	5,300		5,300	-889	145,042	-83	-10	25	5,232
Jan.	3,475	557		4,032	4,940		4,940	-908	144,134	-57	-10	25	4,898
Feb.	3,136	659		3,795	3,410		3,410	365	144,519	-194	-10	25	3,231
Mar.	11,778	-90		11,688	2,680		8,667	2,981	147,500	-171	-10	25	8,511
Apr.	18,318	-422		17,896	2,195		17,846	0	147,500	576	-10	25	18,437
May	14,356	-497		13,589	2,702		13,539	0	147,500	-99	300	25	13,765
June	13,919	-8		13,641	3,025		13,591	0	147,500	28	270	25	13,914
July	8,594	-450		7,874	3,025		7,824	0	147,500	196	250	25	8,295
Aug.	2,940	-653		2,017	3,452		3,402	-1,435	146,065	-10	250	25	3,667
Sept.	4,900	-381		4,249	3,579		3,529	670	146,735	-74	270	25	3,750
1947-48													
Oct.	7,766	68		7,834	4,455		7,029	765	147,500	-12	-30	25	7,012
Nov.	6,759	601		7,360	4,540		7,360	0	147,500	54	-10	25	7,429
Dec.	4,501	330		4,831	5,300		5,300	-469	147,031	45	-10	25	5,360
Jan.	3,935	555		4,450	4,940		4,940	-450	146,581	33	-10	25	4,968
Feb.	3,085	660		3,745	3,410		3,410	335	146,916	-15	-10	25	3,410
Mar.	3,824	659		4,483	2,680		3,659	584	147,500	-180	-10	25	3,694
Apr.	22,156	-1,198		20,958	2,195		20,908	0	147,500	-370	-10	25	20,553
May	43,379	354		43,463	2,702		43,413	0	147,500	-294	300	25	43,444
June	46,596	30		45,755	3,025		46,706	0	147,500	184	270	25	47,185
July	14,305	-441		13,594	3,025		13,544	0	147,500	56	250	25	13,575
Aug.	8,833	-266		8,297	3,452		8,247	0	147,500	14	250	25	8,536
Sept.	3,932	-481		3,181	3,579		3,529	-398	147,102	167	270	25	3,991

SOUTH SASKATCHEWAN RIVER PROJECT
RESERVOIR ELEVATION & EXCESS WATER AVAILABLE
AT THE
RESERVOIR
AFTER
ALBERTA'S REQUEST & RED DEER PROJECT, ETC.



**PROPOSAL #1
PROPOSED NORTH SASKATCHEWAN IRRIGATION PROJECT**

Legend
 irrigated area dam or weir
 canal powerhouse

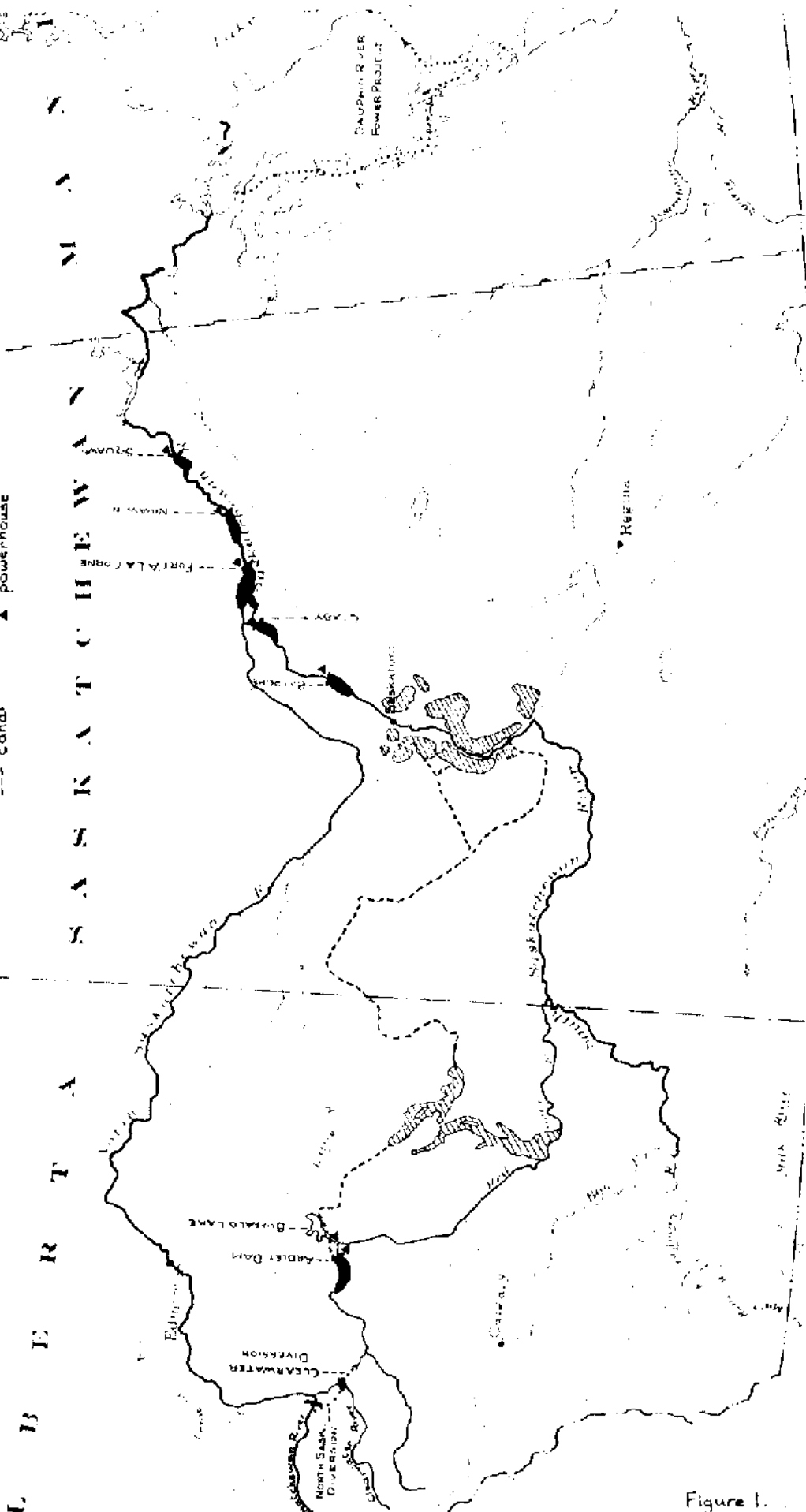







Figure 1.

PROPOSAL # 212A
PROPOSED RED DEER PROJECT AND
SOUTH SASKATCHEWAN RIVER PROJECT

Legend
 irrigated area in P.D.P. 
 irrigated area in S.S.R.P. 
 dam or weir 
 canal 
 powerhouse 

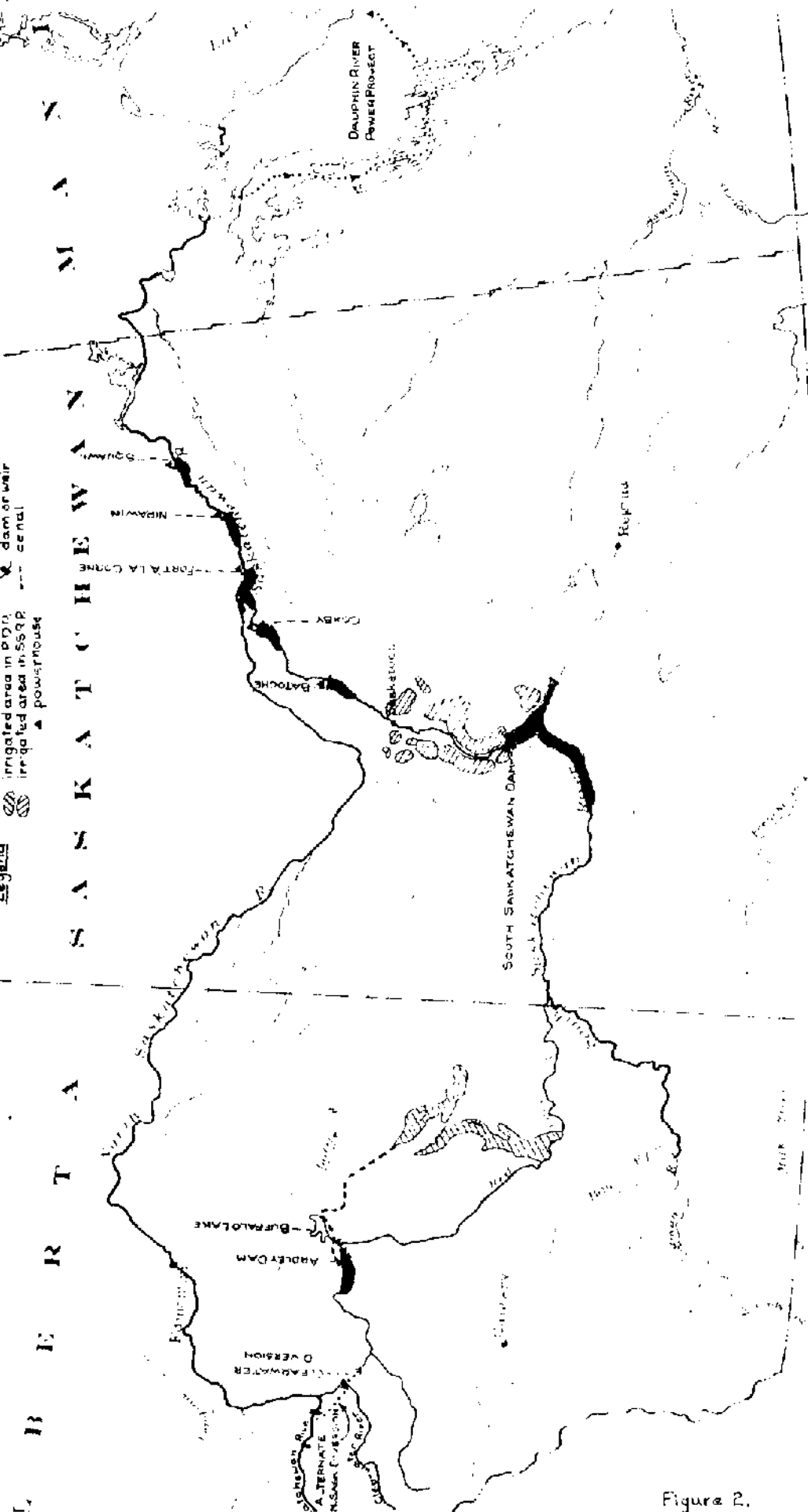


Figure 2.

PROPOSAL # 2B
PROPOSED RED DEER PROJECT AND
SOUTH SASKATCHEWAN RIVER PROJECT

Legend
 [Hatched area] irrigated area in R.D.P.
 [Dotted area] irrigated area in S.S.R.P.
 [X symbol] dam or weir
 [--- line] canal
 [▲ symbol] powerhouse

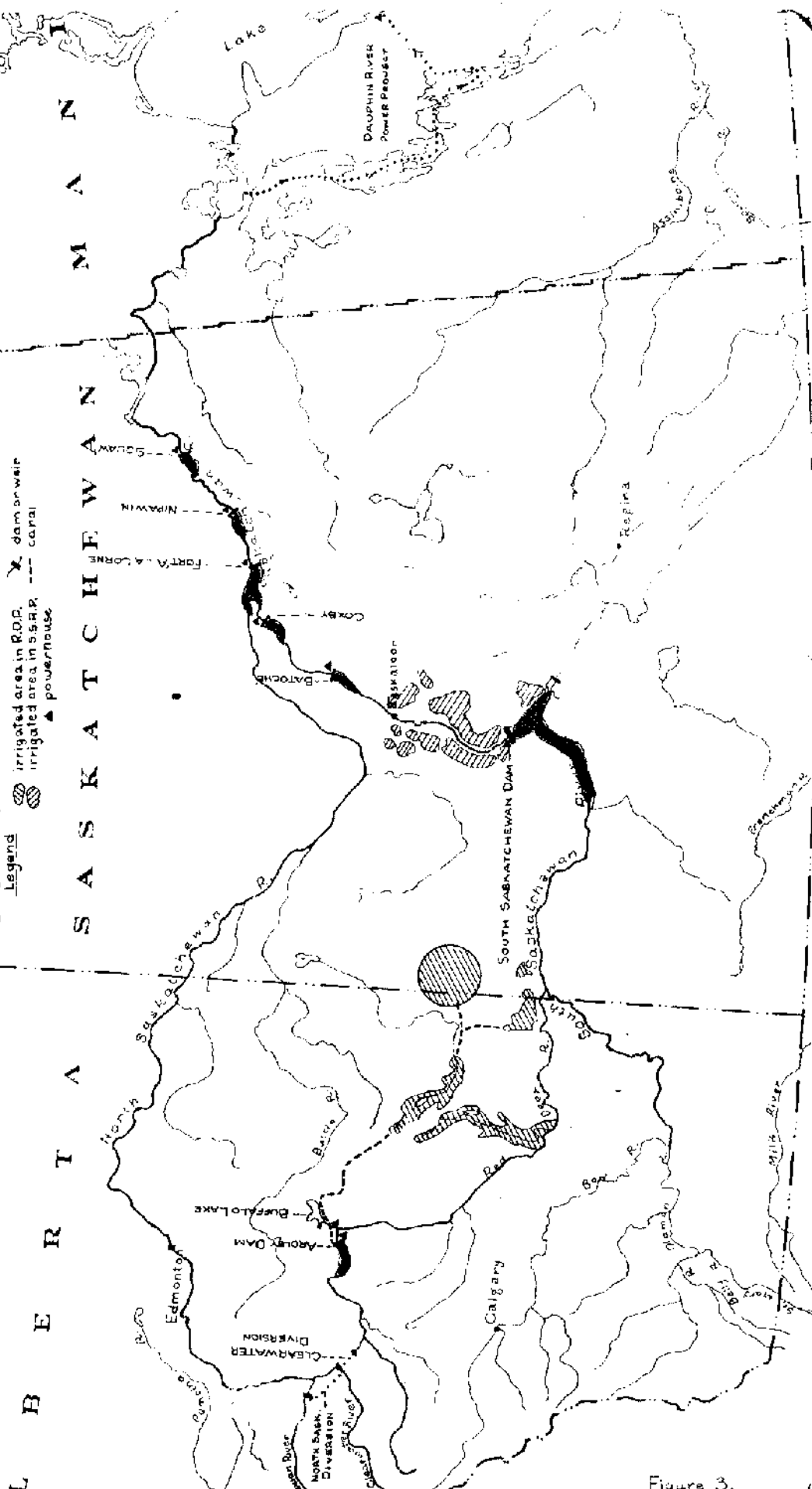


Figure 3.