

PRAIRIE PROVINCES WATER BOARD

Report #3

PRELIMINARY REPORT ON EFFECTS OF
CERTAIN MAJOR PROJECTS IN THE
SASKATCHEWAN RIVER DRAINAGE BASIN

413 Post Office Building,
Regina, Saskatchewan,
March, 1951.

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PRELIMINARY REPORT ON
EFFECTS OF CERTAIN MAJOR PROJECTS
IN THE SASKATCHEWAN RIVER DRAINAGE BASIN

GENERAL

In November, 1950, the Water Board staff issued their Report #1 which set out tables of average monthly natural and recorded flows at certain points on the Saskatchewan River system.

In December, 1950, there was issued Report #2 which set out tables showing the average monthly flows at certain points on the South Saskatchewan and Saskatchewan Rivers which would pertain after full development of those projects contained in Alberta's 1949 'request'. To supplement this present report, three Tables (21, 22 & 23) have been reproduced from Report #2 and are attached hereto.

This report (#3) will indicate the effect of two different stages of development in Alberta on downstream interests, both separately and together with the effect of fairly full development in Saskatchewan. These three assumptions form the four separate conditions of development that have been investigated. These are:

Condition A - After Alberta's request - assumed full development of those projects contained in Alberta's request to the Water Board and recommended in 1949.

Condition B - same as above plus some additional projects (Red Deer Project with Clearwater Diversion, Carmangay, etc. Total = 1,700,000 acres).

Condition C - same as Condition A plus full development of South Saskatchewan River Project

plus other small Saskatchewan projects.

Condition D - same as Condition B plus full development of South Saskatchewan River Project plus other small Saskatchewan projects.

ALBERTA ASSUMPTIONS

Table 21 (Report #2) gave the flow of the South Saskatchewan River at the Alberta-Saskatchewan Boundary for condition A (after Alberta's request).

There was some question of what additional projects to assume for "fairly full development in Alberta" (Condition B). It was decided, however, to assume the following in full operation:

Alberta's approved request	=	1,256,000 acres
Extension of St. M.M.R.D. (1)	=	30,000
Red Deer Project (2)	=	350,000
Carmangay, Macleod, etc. (3)	=	<u>64,000</u>
Total	=	1,700,000 acres.

Water supply studies were then instituted for the Red Deer Project and it was found:

(a) that if 300 c.f.s. (the designated riparian flow) was used for primary power production throughout the year, then only 310,000 acres could be irrigated using Red Deer water alone.

(b) that if 300 c.f.s. in the six summer months, and 1,000 c.f.s. in the six winter months, were used for

 (1) Allowance was previously made for this in tables of flow after Alberta's request - see Report #2.

(2) A P.F.R.A. report by Mr. S. H. Hawkins, dated April 30, 1947, assumed this project had 500,000 irrigable acres. In 1948, Mr. B. Russell estimated 450,000 acres in this project. Latest soils information indicates that this area should be further cut down.

(3) Some of the possible small Alberta projects are:

Carmangay	-	12,000 acres
Macleod extension	-	20,000
Pincher Creek	-	16,000
'Oldman' projects	-	18,000
Private projects		
including sprinklers		<u> ?</u>

66,000 acres plus.

primary power production, then only 100,000 acres could be irrigated using Red Deer water alone.

(c) that if the Clearwater River were diverted into the Red Deer basin, it would be possible to irrigate 350,000 acres and use 300 c.f.s. in the summer, and 1,000 c.f.s. in the winter, for primary power production.

The logical plan of development of the Red Deer Project appears to be to build the dam, immediately use 300 c.f.s. in the summer and 1,000 c.f.s. in the winter to produce primary power, and start the irrigation development. As soon as 100,000 acres were developed, the Clearwater River would be diverted and the irrigation development continued until the 350,000 acres were irrigated. As the Clearwater diversion is a profitable one,⁽⁴⁾ it is unlikely Alberta would not do this.

The resulting flows due to Condition B will therefore include the effect of diverting the Clearwater River to assist in the development of the Red Deer Project. Table 26 sets forth the assumed diverted Clearwater flows, being 90% of the flows recorded at Rocky Mountain House.

The water required to irrigate the additional smaller projects (Carmangay, etc.) was assumed to be distributed over a five-month period in the summer.

(4) This statement is based on the fact that if the Clearwater River were not diverted, Alberta could only irrigate 310,000 acres and produce primary power from 300 c.f.s., instead of 1,000 c.f.s., in the six winter months. Thus the diversion should be credited with the extra production from 40,000 acres and the power revenues from the additional 700 c.f.s. in the six winter months, or -

H = 165'	Q = 700 c.f.s./6 months
KWH = 165 x 700 x 0.7456 x 4380 + 11 = 34,000,000 k.w.h.	
If firm winter energy is worth 5 mills	
Then the additional energy is worth = \$170,000.00 annually	
Annual costs of \$1,000,000.00	capital cost @ 8% = 80,000.00
Net power revenues due to diversion = \$ 90,000.00 annually.	

The resulting monthly average flows for Condition B at the Alberta-Saskatchewan Boundary will be found in Table 27.

Flow-duration curves for the Boundary showing natural, recorded, Condition A and Condition B flows will be found on Figure 3.

FLOWS FOR THE VARIOUS CONDITIONS

"Fairly full development in Saskatchewan" was defined as full development of those projects approved by the Water Board in 1950 (Swift Current Irrigation Project, etc.) plus the South Saskatchewan River Project.

Two complete South Saskatchewan reservoir studies were undertaken⁽⁵⁾ assuming the two conditions of inflow (A and B) from Alberta. It should be noted that the resulting flows downstream become Condition C with the Alberta inflow assumed as Condition A: similarly Condition D flows result from Condition B inflows.

Average monthly flows for the 1923-48 period have been calculated for all pertinent points on the river for the four conditions. The following tabulation sets out the table numbers where these flows may be found. Stream flow tables from the earlier reports are included.

Flow type	Alta-Sask. Bdry.	Saskatoon	Below	
			The Forks	Le Pas
Natural	Table 2	Table 4	Table 10	Table 12
Recorded	" 1	" 3	" 9	" 11
Condition A	" 21	" 22	" 25	" 23
Condition B	" 27	" 28	" 31	" 34
Condition C	-	" 29	" 32	" 35
Condition D	-	" 30	" 33	" 36

- (5) Basic assumptions used in these two studies were:
- Period of years investigated - 1923-48
 - Area irrigated in Swift Current Project = 21,000 acres
 - Area irrigated in this project = 455,000 acres including land in Qu'Appelle Valley
 - Water required for gravity & pump irrigation = 740,000 ac-ft
 - Qu'Appelle diversion = 84,000 acre-feet
 - Water required annually for irrigation pumping power = 305,000 - 450,000 acre-feet depending on reservoir elev.
 - Seepage loss @ 100 c.f.s. continuously = 72,000 acre-feet
 - Evaporation loss @ 24 inches from reservoir surface
 - Available reservoir storage = 4,000,000 acre-feet
 - Allowable reservoir drawdown = 1825 - 1785 = 40 feet
 - Turbine-generator efficiency = 80%
 - Distribution of commercial energy production by months:

January - 13.0%	May - 5.0%	September - 8.0%
February - 9.0	June - 4.5	October - 11.0
March - 7.0	July - 4.5	November - 12.0
April - 5.0	August - 7.0	December - 14.0

Flow-duration curves for the flow at the Alta-Sask. Boundary, Saskatoon, below The Forks and at Le Pas, for the various flow conditions, will be found in Figures 3, 4, 5 & 6 respectively.

The following tabulation summarizes the average annual flows in acre-feet for the period October 1923 to September 1948. These are taken from the equivalent tables set out above.

Average Annual Flows in Acre-feet: 1923-48

Flow type	Alta-Sask Bdry.	Saskatoon	Below The Forks	Le Pas
Natural	6,966,000	7,141,000	13,196,000	16,278,000
Recorded	6,305,000	6,477,000	12,531,000	15,620,000
Condition A	5,008,000	5,185,000	11,239,000	14,318,000
Condition B	4,869,000	5,047,000	10,568,000	13,644,000
Condition C	-	4,192,000	10,246,000	13,302,000
Condition D	-	4,055,000	9,571,000	12,632,000

The following sets out the average annual flows in acre-feet for the most critical seven-year periods of record.

Average Annual Flows in Acre-Feet

Flow type	Alta-Sask. Bdry. (1934-41)	Le Pas (1935-42)
Natural	5,300,000	13,058,000
Recorded	4,480,000	12,217,000
Condition A	3,442,000	11,169,000
Condition B	3,261,000	10,496,000
Condition C	-	10,338,000
Condition D	-	9,727,000

HYDROPOWER POSSIBILITIES

The changes in hydropower potentialities due to the changes in flow from the four conditions were roughly investigated. As the Water Board has already recommended the approval of Alberta's 1949 request, this condition (A) was used as the basis (datum) for showing these changes.

Alberta

Condition A allows for full development of Calgary Power Limited's plants in the Bow River Basin. Condition B brings into being the power plant associated with the Red Deer Project. This plant would produce firm energy from 300 c.f.s. during the six summer months and from 1,000 c.f.s. in the six winter months plus an undetermined amount of secondary power. The amount of firm energy produced annually by this project would be 65,000,000 k.w.h.

Saskatchewan

Figures 1 and 2 are profiles of the South Saskatchewan and Saskatchewan Rivers respectively showing locations of proposed hydroplants. Saskatchewan's potential hydrodevelopments are found in three different reaches of these rivers: on the South Saskatchewan River upstream from Saskatoon (containing South Saskatchewan River Project); on the South Saskatchewan River between Saskatoon and The Forks (containing two 75-foot plants); and on the Saskatchewan River below The Forks (containing two 120-foot and one 50-foot plants).

The reservoir studies for the South Saskatchewan River Project, referred to previously, gave the following as its potential power output.

S. Sask. River Project Output in K.W.H.

<u>Type of Energy</u>	<u>Condition C</u>	<u>Condition D</u>
Firm commercial	350,000,000	325,000,000
Firm pumping	50,000,000	50,000,000
Secondary commercial	100,000,000	100,000,000

The output of the potential hydroplants downstream from Saskatoon was calculated using the following procedure:

(a) A plant capacity was arbitrarily chosen.

(b) The firm energy was then calculated from curves of average monthly flows available 90% of the time, limited, of course, by the assumed capacity, see Figure 7 (this figure was obtained from 'monthly' flow-duration curves prepared for each station, see Figure 9 for an example).

(c) The secondary energy was calculated by obtaining the area under the flow-duration curves (Figures 3 to 6) and the equivalent capacity, converting this into gross energy production and subtracting the firm energy production.

The combined output of the two 75-foot hydroplants proposed on the reach of the river between Saskatoon and The Forks was found to be:

<u>Flow</u>	<u>Output in K.W.H.</u>		
	<u>Combined Capacity - K.W.</u>	<u>December Firm</u>	<u>Annual Firm</u>
Condition A	70,000	19,000,000	276,000,000
Condition B	70,000	24,500,000	232,000,000
Condition C	70,000	42,500,000	343,000,000
Condition D	70,000	40,000,000	323,000,000

Similarly, the combined output of the three proposed plants downstream from The Forks (Fort a la Corne - 120', Nipawin - 120' and Squaw - 50') was found to be:

<u>Combined Output in K.W.H.</u>			
<u>Flow</u>	<u>Combined Capacity-K.W.</u>	<u>December Firm</u>	<u>Annual Firm</u>
Condition A	225,000	53,500,000	1,240,000,000
Condition B	225,000	69,000,000	1,240,000,000
Condition C	270,000	97,000,000	1,470,000,000
Condition D	260,000	89,000,000	1,390,000,000

Manitoba

Manitoba has two major power projects dependent to some extent on the waters of the Saskatchewan River: the Dauphin River Power Project where these waters are diverted into the Dauphin River drainage basin, and the Nelson River power drops.

With the aid of data obtained from the Manitoba Water Resources Branch, a preliminary estimate has been made of the potential output of the Dauphin River Power Project⁽⁷⁾ with the following results (see Figure 8 for average monthly flows available 90% of the time at Le Pas, and Figure 10 for the mass curve used for Condition D):

(7) Basic assumptions used in this study were:

Dimensions of Mossey Portage channel; width = 600 ft.
bottom elevation = 815.0
Limits of controllable elevations in lakes;
Cedar Lake = 836.5 to 830.2
Lake Winnipegosis = 836.0 to 830.0
Lake Manitoba = 812.5 to 809.5
Power head = 90'

Output in K.W.H.

Flow	Regulated Outflow		Annual Firm
	Continuous c.f.s.	Ac.Ft. per yr.	
Condition A	16,150	11,692,000	863,000,000
Condition B	15,330	11,098,000	819,000,000
Condition C	15,750	11,403,000	842,000,000
Condition D	14,940	10,816,000	798,000,000

It is difficult to arrive at conclusions regarding the power potential of the Nelson River. It is, however, relatively simple to assess the effect of upstream diversions on this potential. As it is likely the Dauphin River Power Project would be in operation before the Nelson River hydro-plants are fully developed, it is only necessary to calculate the loss in energy production from the decreases in the regulated outflows from the Dauphin River powerplant due to the different conditions. This has been done assuming (a) a combined drop of 500 feet on the Nelson River and (b) Condition A is the datum from which the energy losses are calculated for the other conditions of flow.

Flow	Decrease in flow-c.f.s.	Loss in Firm Annual Energy-k.w.h.
Condition A	0	0
Condition B	820	243,000,000
Condition C	400	118,000,000
Condition D	1,210	360,000,000

Summary

The following table summarizes the preceding data on the effect of the different conditions of flow on firm annual power potentialities, always using Condition A as the datum (i.e. the effect of Condition A flows = 0).

Flow type	Effect in '000,000 k.w.h.			Total Effect in K.W.H.
	Alta.	Sask.	Man.	
Condition A	0	0	0	0
Condition B	+65	-44	-283	-262,000,000
Condition C	0	+647	-139	+573,000,000
Condition D	+65	+522	-425	+162,000,000

CONCLUSIONS

This preliminary study presents the effect, each upon the other, of all the existing and most of the proposed projects in the Saskatchewan River drainage basin. The major projects included were: existing projects in Alberta, the Red Deer irrigation and power project, the South Saskatchewan irrigation and power project, five additional power projects in Saskatchewan and the Dauphin River and Nelson River power projects in Manitoba.

The following table summarizes the total effect on the irrigation and power potentialities in this drainage basin.

<u>Flow type</u>	<u>Effect on firm Annual energy-k.w.h.</u>	<u>Effect on irrigable area - acres</u>
Condition A	0	0
Condition B	-262,000,000	+414,000
Condition C	+508,000,000	+480,000
Condition D	+162,000,000	+894,000

This study is preliminary inasmuch as certain phases of the problem have only been studied in a rough fashion or have been neglected completely. Some of these factors are:

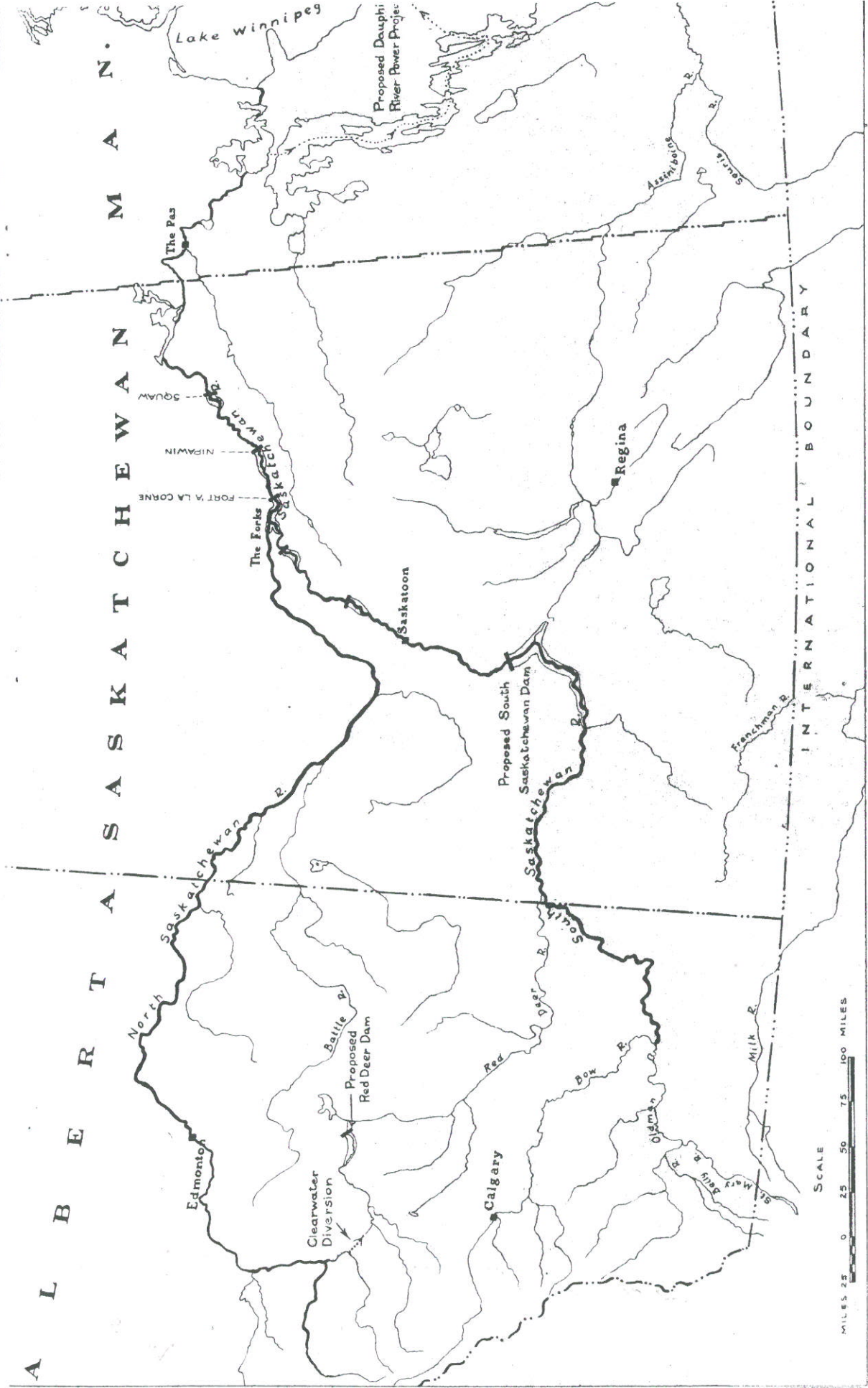
1. The Red Deer Project has had only a rough month-by-month study, a more intensive study should be made.
2. The feasibility of winter diversion from the Clearwater River was not investigated although winter diversions were assumed herein.
3. Possible diversions from the North Saskatchewan River were not considered.
4. Headwater storage possibilities on the Clear-

water and North Saskatchewan River were not considered.

5. Headwater storage possibilities on the South Saskatchewan tributaries were not considered.

6. Effects in Manitoba, other than power production, were neglected (lake levels, river levels, etc.).

7. Flood-control, navigation, fish and wildlife, social and economic effects have been ignored.



A
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Lake Winnipeg

Proposed Dauphin
River Power Project

The Pas

SQUAM

NIPAWIN

FORT 'A. LA CORNE

The Forks

Saskatoon

Regina

Proposed South
Saskatchewan Dam

Frenchman R.

Edmonton

Clearwater
Diversion

Battle R.
Proposed
Red Deer Dam

Calgary

Red R.

Bow R.

Oldman R.

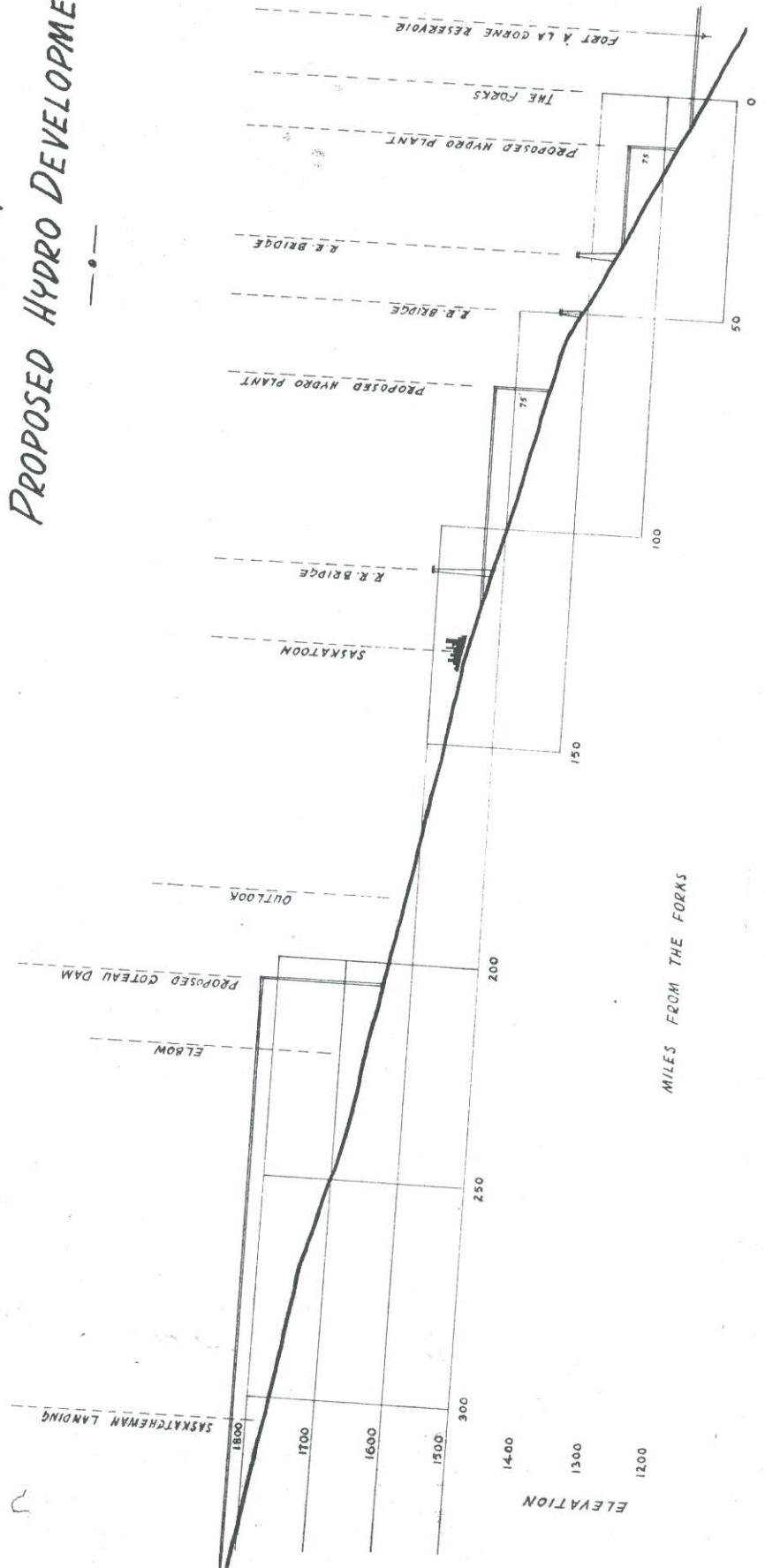
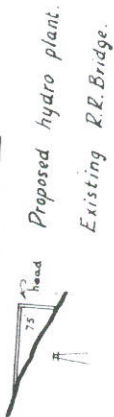
Milk R.

INTERNATIONAL BOUNDARY

SCALE
MILES 25 0 25 50 75 100 MILES

PROFILE OF
 SOUTH SASKATCHEWAN RIVER
 SHOWING
 PROPOSED HYDRO DEVELOPMENT

LEGEND



MILES FROM THE FORKS

ELEVATION

PROFILE OF
LOW WATER PLANE
OF

NORTH MAIN SASKATCHEWAN RIVER

FROM

VOLIGNY'S REPORT

-0-

LEGEND



Hydro plant proposed by Dom. Dept. of Interior - 1919.

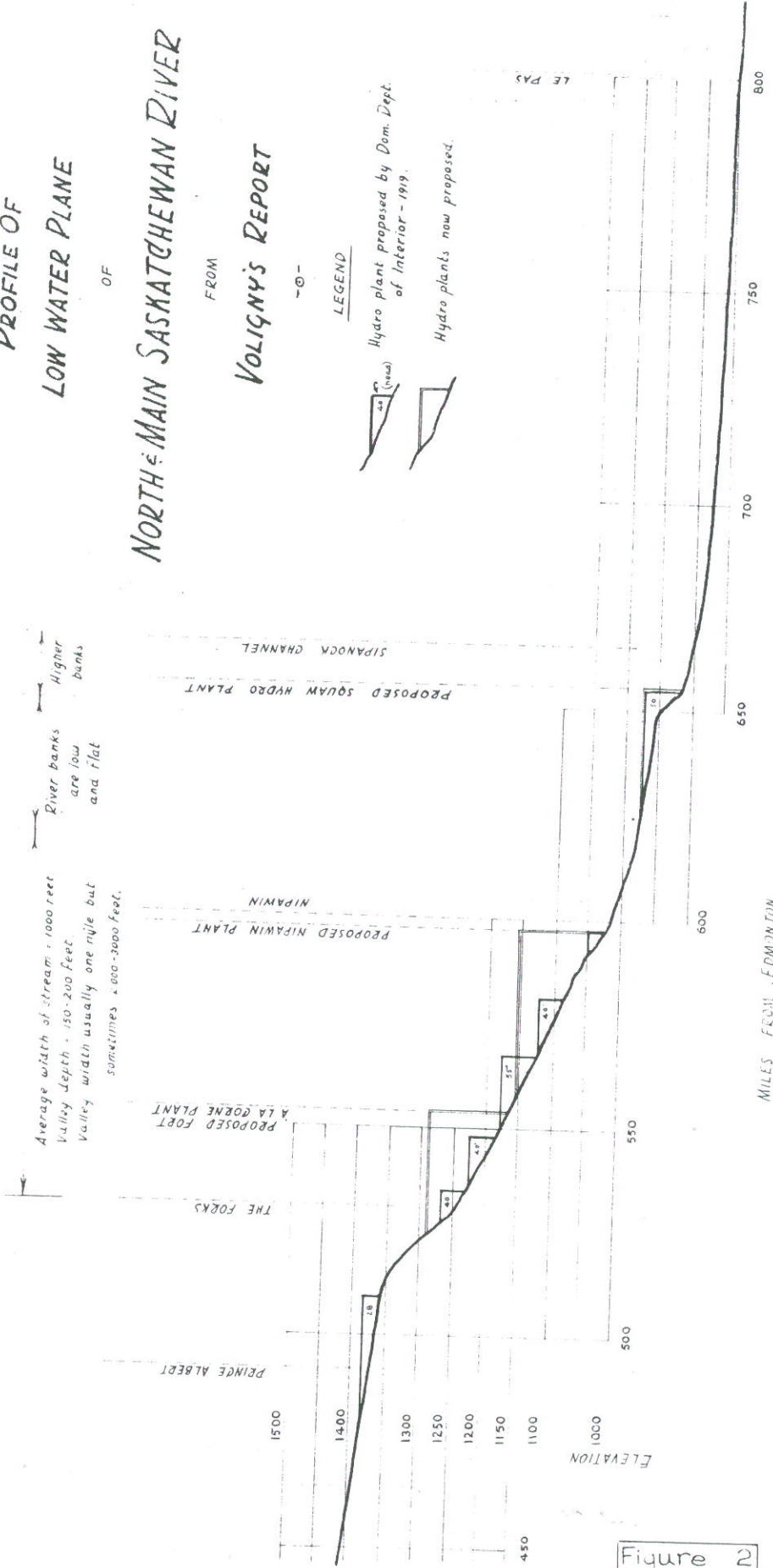


Hydro plants now proposed.

Average width of stream - 1000 feet
Valley depth - 150-200 feet
Valley width usually one mile but
sometimes 1000-2000 feet.

River banks
are low
and flat

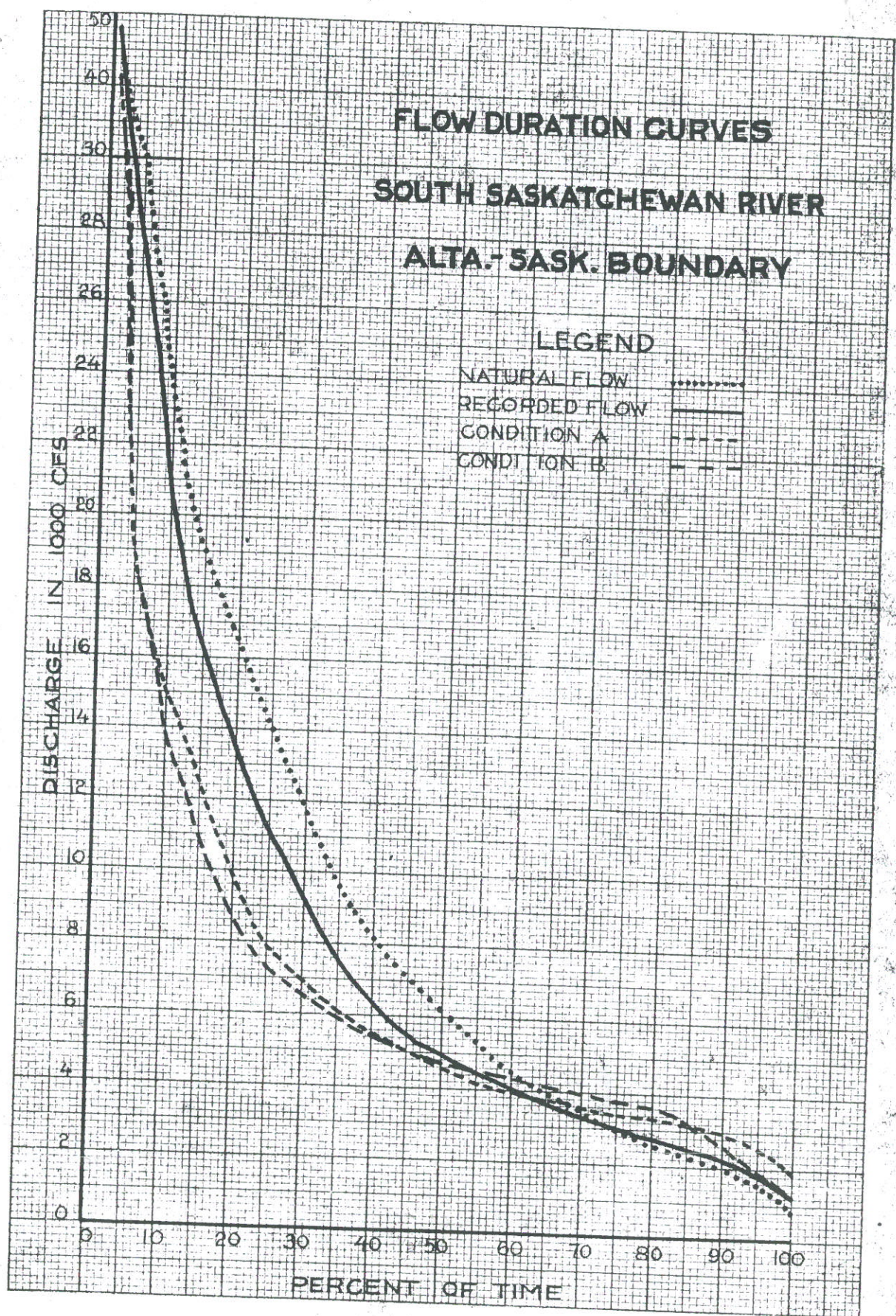
Higher
banks



MILES FROM EDMONTON

Figure 2

FLOW DURATION CURVES SOUTH SASKATCHEWAN RIVER ALTA.-SASK. BOUNDARY



MADE IN U.S.A.

Figure 3

FLOW DURATION CURVES OF SOUTH SASKATCHEWAN RIVER AT SASKATOON

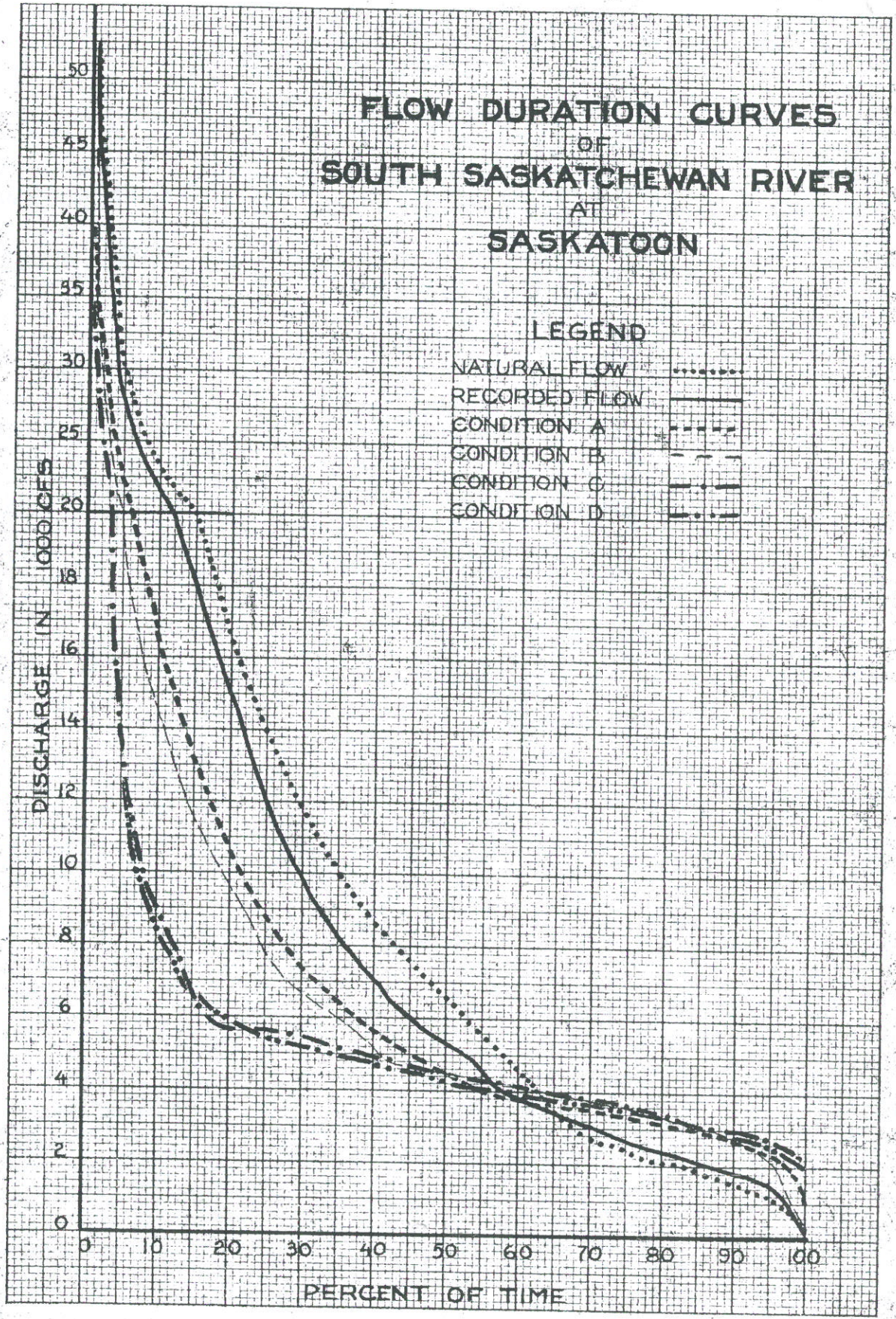


Figure 4

FLOW DURATION CURVES OF SASKATCHEWAN RIVER AT THE FORKS

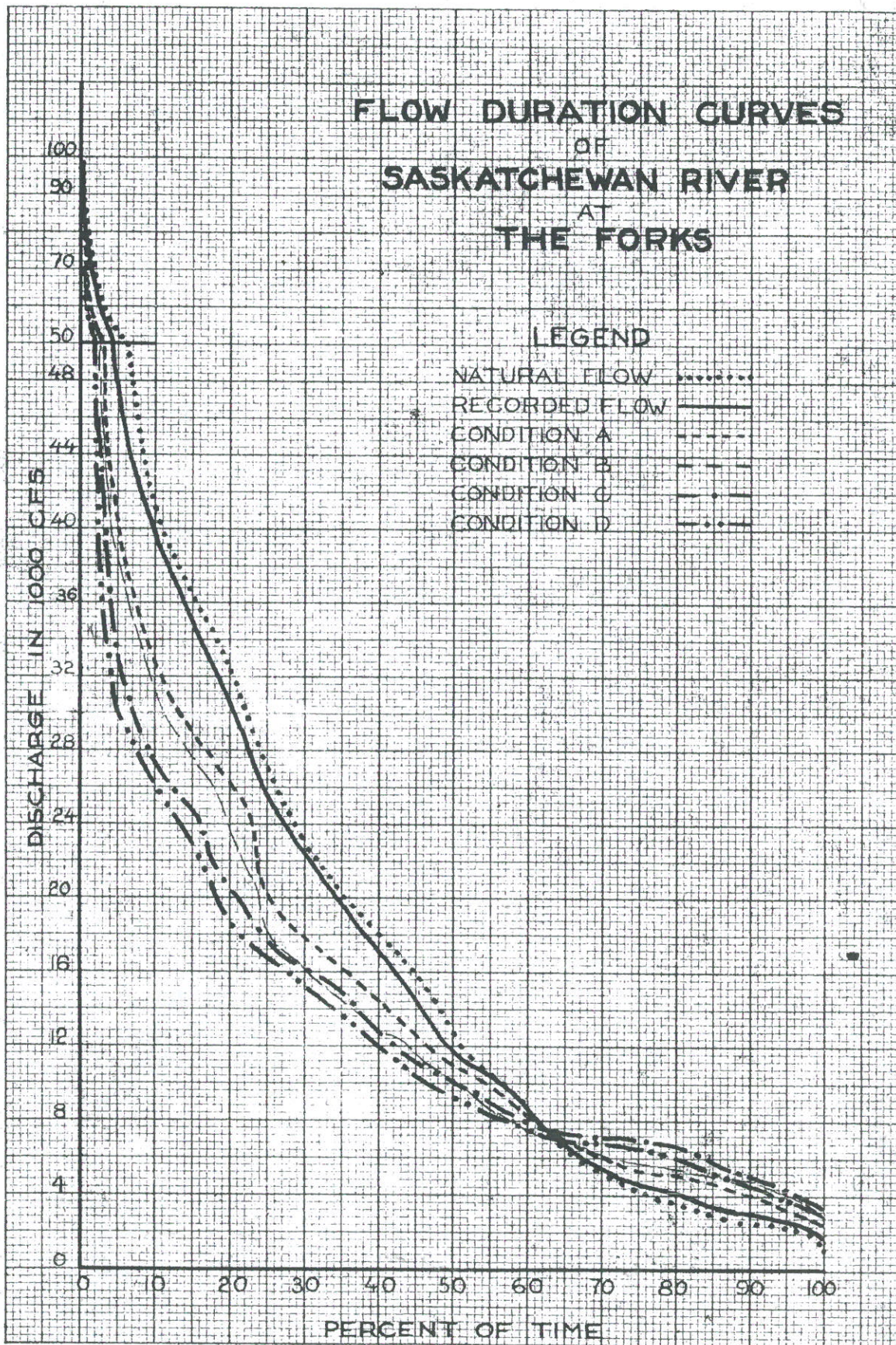
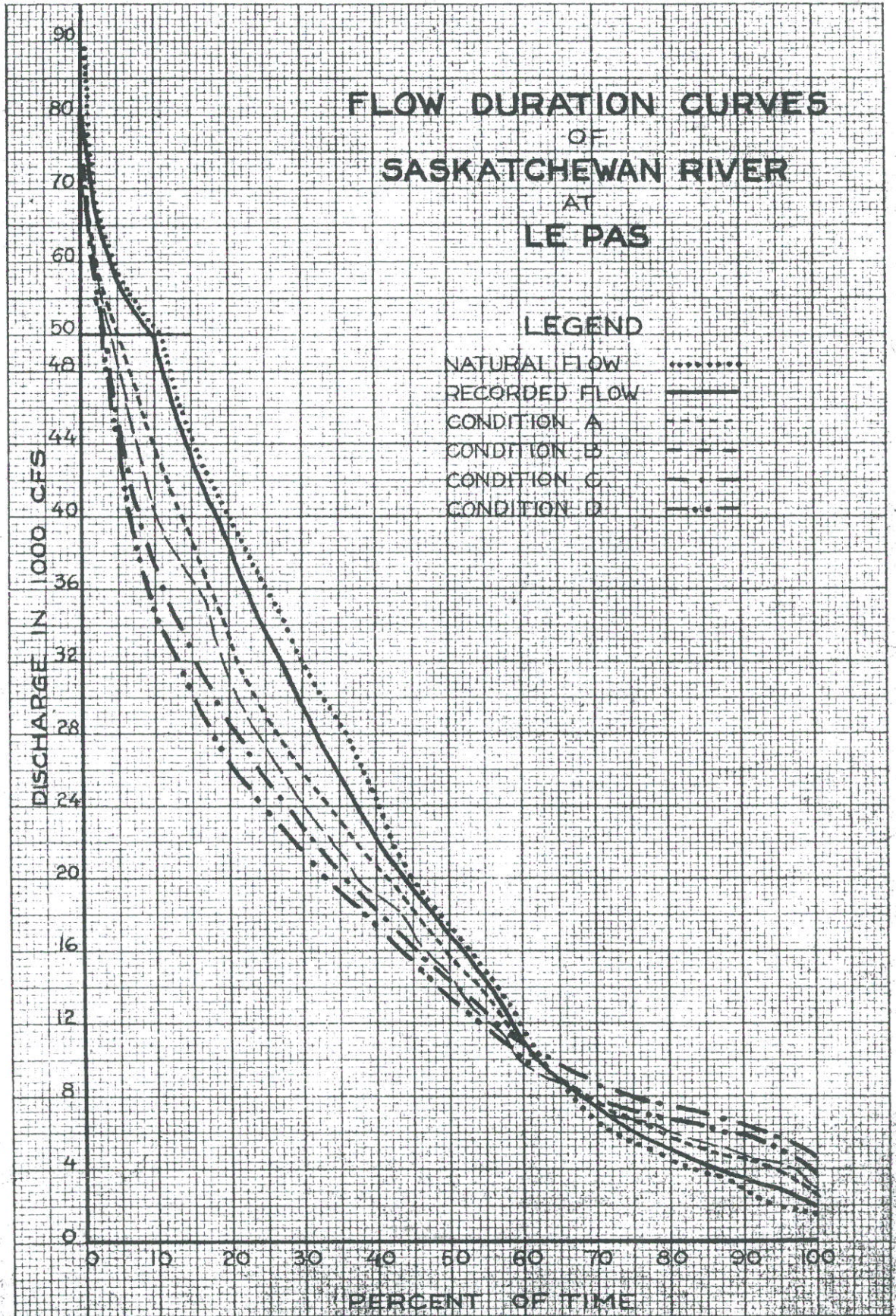


Figure 5

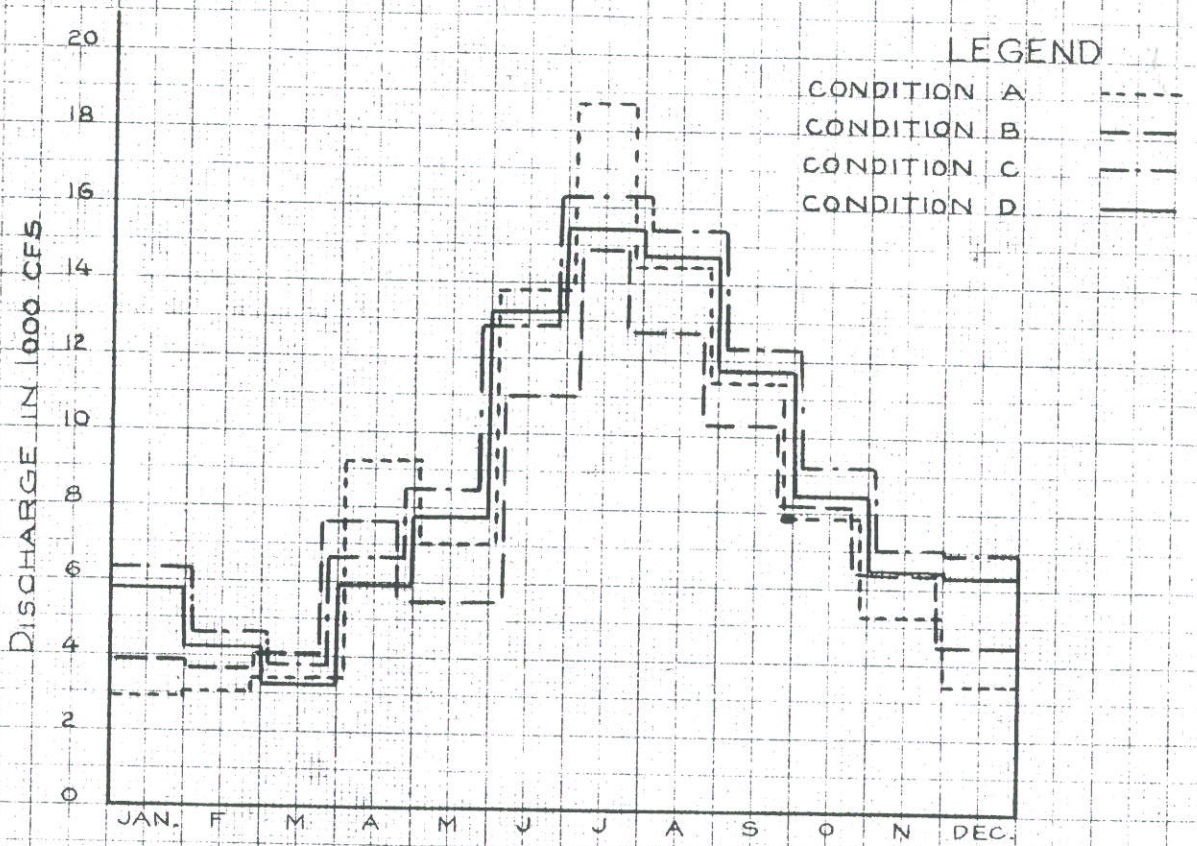
10 X 10 TO 60 X 60 MILLIMETER GRID PAPER
 ENGINEERING GRAPHIC COMPANY
 MADE IN U.S.A.

FLOW DURATION CURVES OF SASKATCHEWAN RIVER AT LE PAS

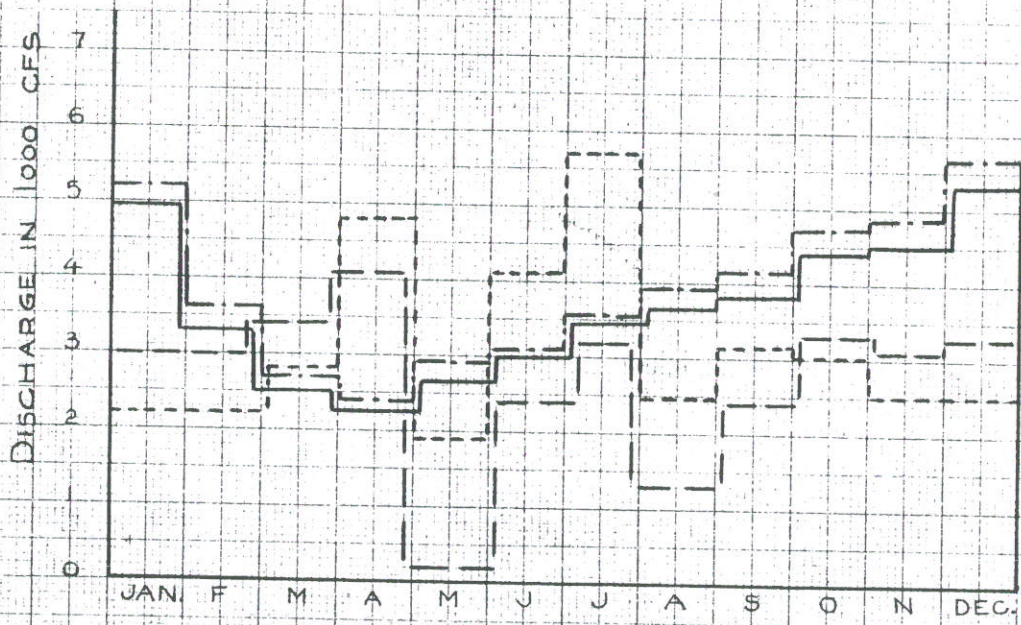


REPRODUCED FROM THE
 10 X 10 TO THE 1/2 INCH, 5th EDITION, 1960.
 ENGINEERING, 6-11-60.
 MADE IN U. S. A.

Figure 6



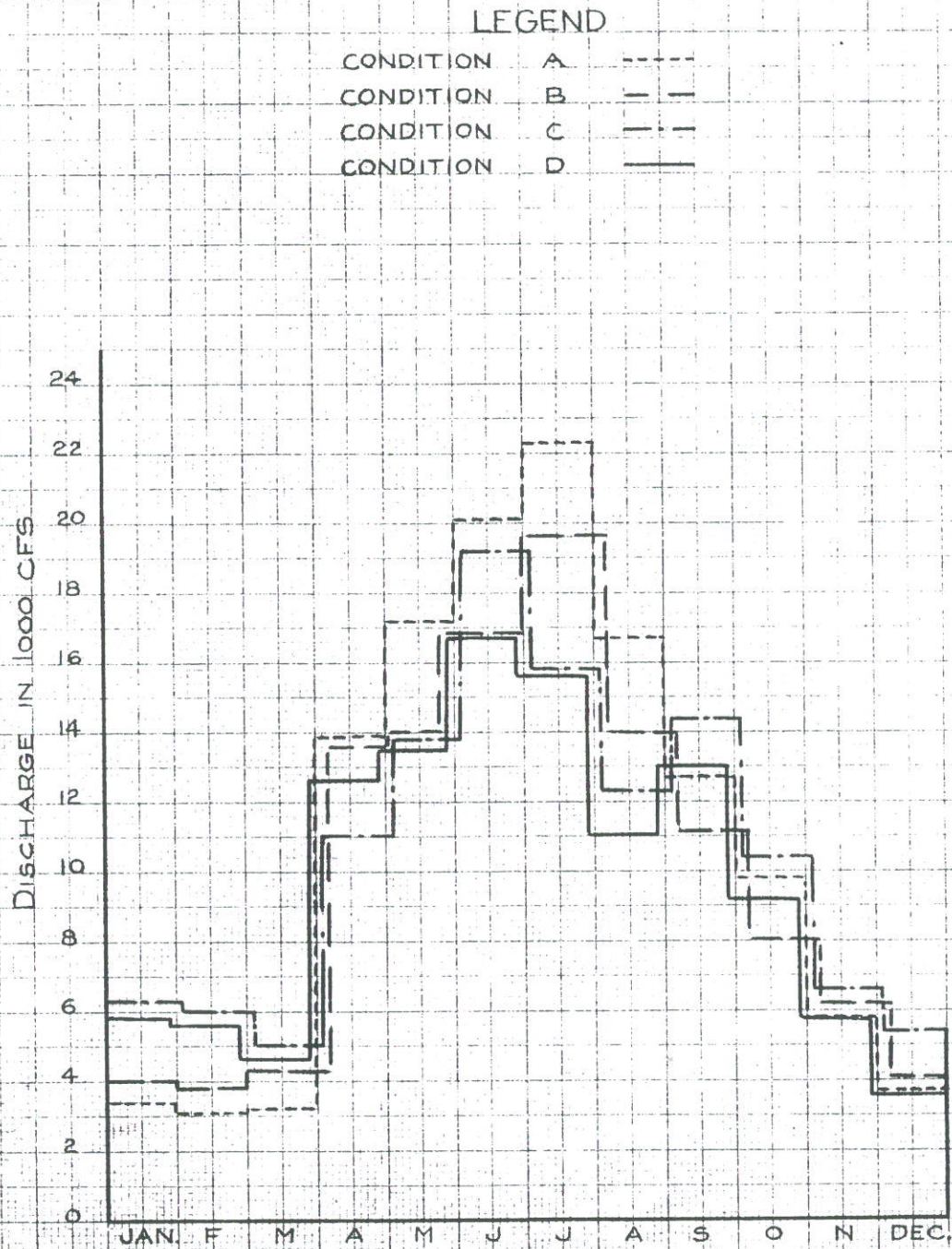
AVERAGE MONTHLY FLOW
AVAILABLE 90% OF THE TIME
SASKATCHEWAN RIVER BELOW THE FORKS



AVERAGE MONTHLY FLOW
AVAILABLE 90% OF THE TIME
SOUTH SASKATCHEWAN RIVER AT SASKATOON

Figure 7

No. 359-14. Millineters, 5 centimeters, 1 inch, 2 centimeters



AVERAGE MONTHLY FLOW
AVAILABLE 90% OF THE TIME
SASKATCHEWAN RIVER AT LE PAS

Figure 8

MONTHLY FLOW DURATION CURVES
OF
SASK. RIVER AT THE FORKS
FOR CONDITION C

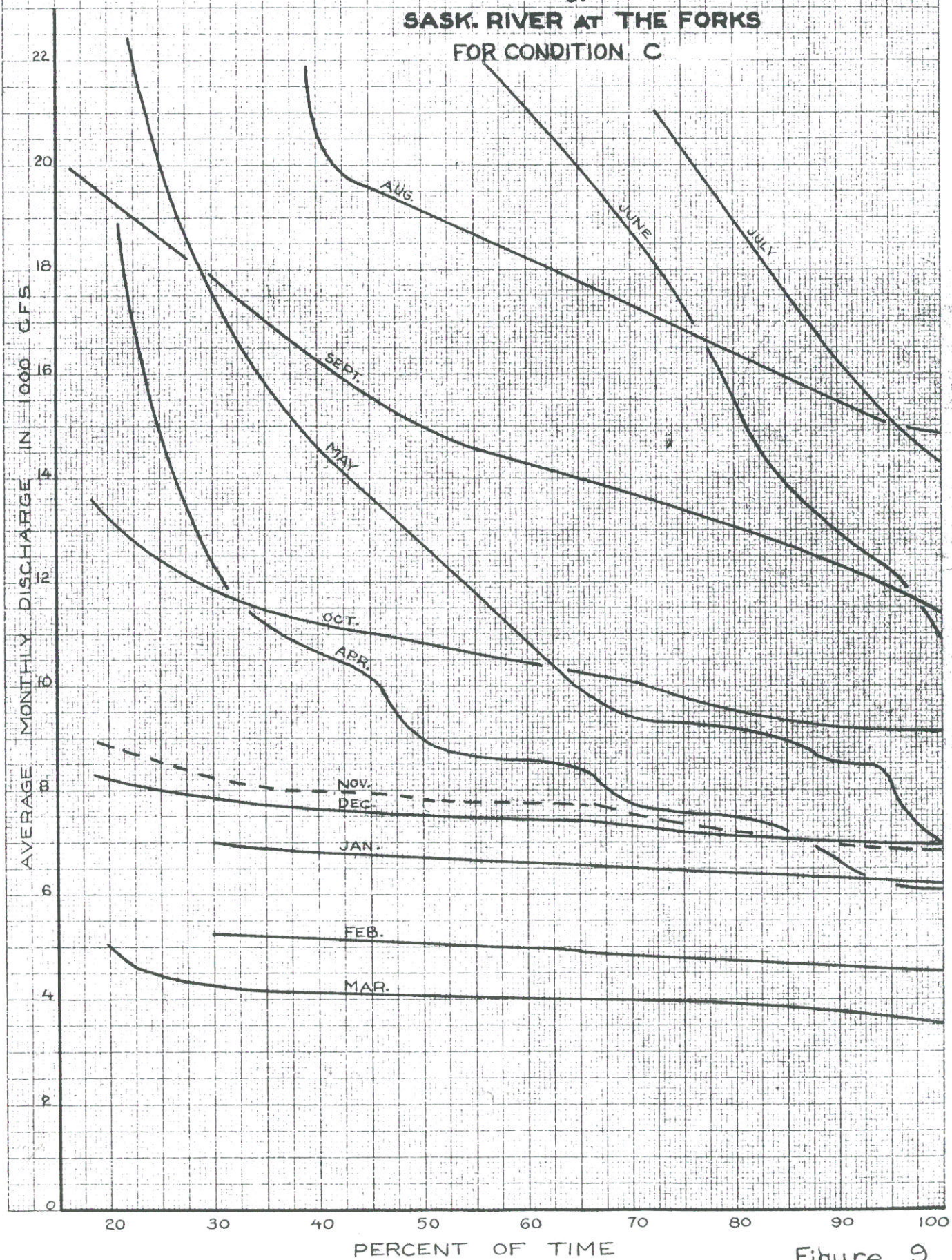


Figure 9

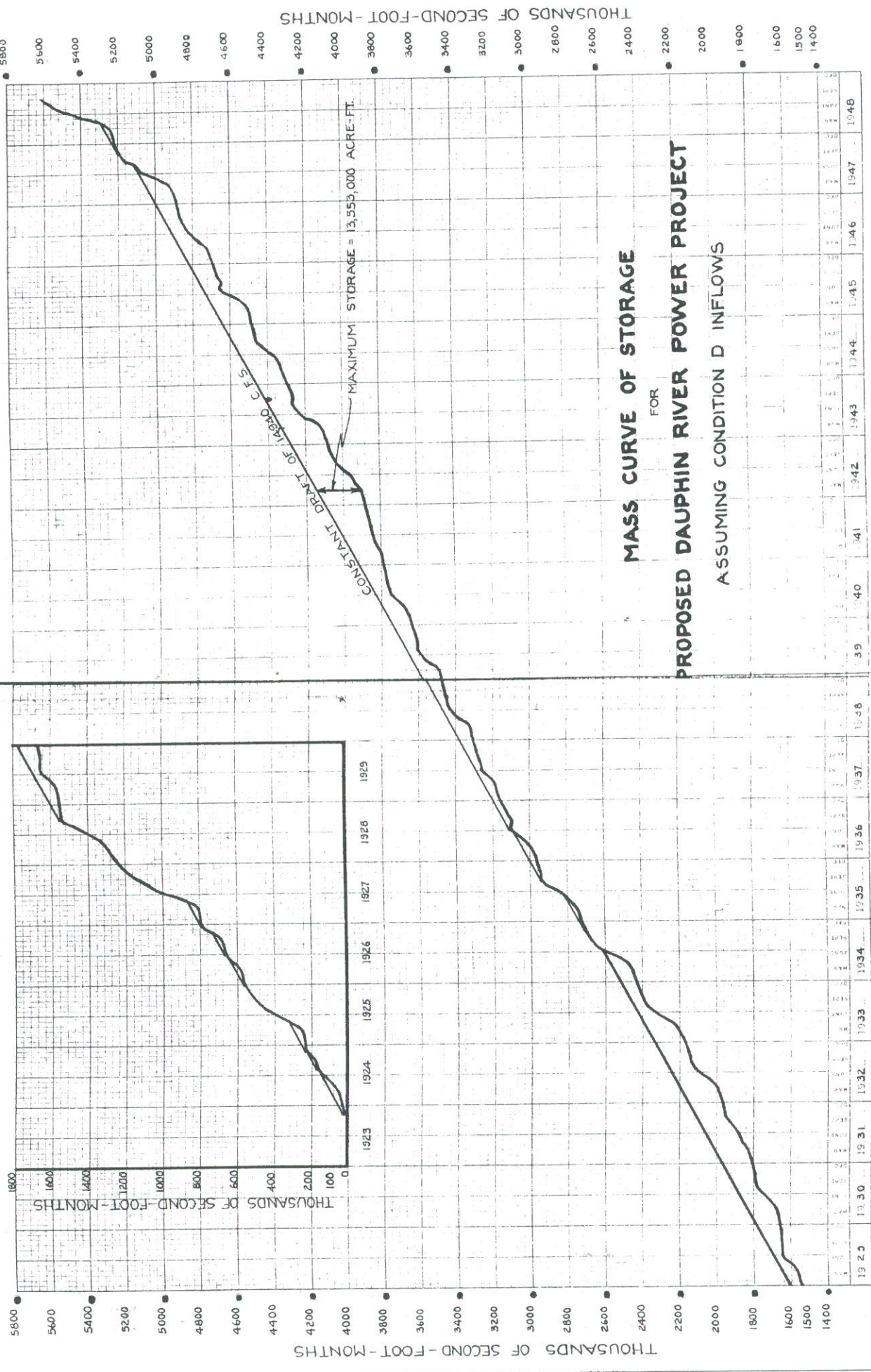


FIGURE 10

SOUTH SASKATCHEWAN RIVER AT THE ALBERTA-SASKATCHEWAN BOUNDARY AFTER ALBERTA'S 1949 REQUEST (Sec. Ft.)
Condition A

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Total Ar. Ft.
1923	-	-	-	2,792	2,438	3,560	4,282	6,392	51,060	18,171	10,874	6,446	6,381,000
1923-24	5,000	4,202	3,212	2,952	3,438	3,563	2,462	7,652	13,901	8,261	9,689	5,151	4,208,000
1924-25	3,342	3,849	3,417	3,206	3,536	7,823	15,612	12,730	14,914	7,698	7,228	7,238	5,467,000
1925-26	8,470	5,330	4,311	3,549	3,529	9,239	7,260	3,282	6,264	6,663	4,811	19,600	4,964,000
1926-27	12,895	6,936	4,956	4,020	3,915	5,938	14,192	17,626	38,898	21,317	15,367	17,581	9,885,000
1927-28	10,372	6,218	4,925	7,970	5,312	13,433	9,516	13,986	36,752	30,273	8,097	5,982	9,260,000
1928-29	5,798	5,122	3,468	3,909	3,668	6,205	3,809	11,558	24,293	3,079	2,541	2,559	4,581,000
1929-30	3,173	3,396	3,577	3,104	5,976	5,635	7,626	8,622	10,831	7,115	3,009	3,144	3,924,000
1930-31	3,802	3,710	3,731	3,223	3,019	3,999	2,385	2,520	5,830	4,994	3,209	2,834	2,496,000
1931-32	4,101	3,030	2,829	2,798	2,746	3,906	5,838	11,421	29,487	8,538	3,113	5,202	5,007,000
1932-33	3,774	4,131	3,654	3,278	3,216	4,132	6,169	19,340	16,596	6,702	2,109	2,469	4,569,000
1933-34	2,220	5,578	4,096	4,281	4,631	5,019	8,498	15,567	17,161	4,266	1,868	2,271	4,546,000
1934-35	3,991	5,502	3,515	3,536	4,488	4,004	5,976	5,845	12,509	8,405	5,143	3,304	3,991,000
1935-36	3,216	3,297	2,773	2,363	2,678	5,744	13,524	6,521	7,685	2,143	1,906	1,903	3,242,000
1936-37	1,834	2,577	1,648	1,844	2,212	3,224	4,123	2,659	11,654	3,029	2,215	2,787	2,392,000
1937-38	3,325	4,088	3,733	3,485	2,821	5,159	7,645	11,469	16,798	10,917	4,303	4,616	4,736,000
1938-39	4,287	3,850	3,325	2,862	2,576	5,090	4,458	3,824	14,826	7,448	2,605	3,113	3,515,000
1939-40	3,143	3,936	2,931	2,757	2,725	4,793	12,132	8,946	5,076	3,666	3,108	4,773	3,503,000
1940-41	5,035	4,353	3,421	2,846	3,058	5,558	4,358	2,028	3,650	3,341	2,864	4,376	2,715,000
1941-42	4,833	3,856	2,965	2,793	2,386	3,055	3,896	17,111	26,732	20,200	12,328	9,848	6,656,000
1942-43	7,022	4,630	3,471	3,097	3,848	6,457	21,877	6,407	15,079	12,907	4,830	2,636	5,562,000
1943-44	2,977	3,045	3,072	2,962	2,849	3,114	3,313	2,032	9,063	5,607	7,392	3,553	2,963,000
1944-45	2,628	3,138	3,015	2,732	2,797	4,888	3,237	7,496	19,679	10,168	3,795	5,055	4,141,000
1945-46	5,955	3,740	4,070	3,929	3,442	7,392	6,717	6,398	20,179	9,409	3,368	7,530	4,354,000
1946-47	5,568	4,533	4,573	4,092	4,980	13,475	14,192	17,790	17,506	10,730	5,599	7,357	6,672,000
1947-48	9,937	6,376	4,200	3,742	3,323	5,602	26,536	48,569	49,178	13,207	11,272	4,221	11,262,000
TOTAL	126,698	108,423	88,788	85,330	87,169	145,547	215,351	271,399	444,547	230,083	130,869	139,103	125,209,000
AVERAGE	5,068	4,337	3,552	3,413	3,487	5,822	8,614	10,856	17,792	9,203	5,235	5,564	5,008,000
													→ 5,008,000

SOUTH SASKATCHEWAN RIVER AT SASKATOON - After Alberta's 1949 Request (Sec. Ft.)
Condition A

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sent.	Total ac.Ft.
1923				2,705	2,332	2,827	5,265	3,025	41,805	23,871	10,699	7,577	6,075,000
1923-24	4,912	3,908	3,732	2,931	3,112	3,421	5,949	5,094	11,811	11,674	9,636	6,945	4,427,000
1924-25	4,195	3,335	3,385	2,852	3,316	4,330	21,861	9,850	15,625	12,148	6,567	7,987	5,755,000
1925-26	7,185	5,760	4,304	3,673	3,698	9,746	9,338	5,223	1,499	11,093	5,780	15,407	5,000,000
1926-27	14,633	8,786	4,613	3,853	3,758	5,798	22,931	15,092	38,718	27,363	16,263	18,406	10,832,000
1927-28	15,533	6,518	5,634	9,289	5,143	9,397	15,854	11,878	32,642	36,420	11,148	6,816	10,082,000
1928-29	2,140	2,532	3,756	3,980	3,441	6,206	6,432	7,340	28,163	6,988	3,581	3,538	5,067,000
1929-30	3,618	3,297	2,608	3,069	3,645	6,955	8,634	7,558	10,857	8,735	5,079	4,762	4,155,000
1930-31	3,651	4,506	3,973	3,040	3,541	3,527	3,676	6,98	2,180	6,594	3,649	3,604	2,573,000
1931-32	4,076	2,743	2,489	2,418	2,170	3,686	7,241	10,912	29,183	12,731	3,937	6,765	5,333,000
1932-33	4,455	3,981	3,674	3,127	2,889	3,302	10,562	11,021	16,142	11,125	4,493	4,862	4,813,000
1933-34	3,021	5,628	3,636	3,341	4,865	5,699	6,301	13,378	15,056	6,049	2,362	2,984	4,370,000
1934-35	4,212	4,002	3,045	2,276	3,332	4,264	8,941	4,390	11,147	10,453	7,443	4,034	3,426,000
1935-36	2,916	2,988	2,977	2,151	2,027	4,650	13,514	8,073	9,073	3,293	2,016	2,898	2,295,000
1936-37	2,356	1,967	1,602	1,734	2,072	2,013	5,359	1,104	7,988	6,074	2,785	3,067	3,046,000
1937-38	3,395	3,628	3,543	2,805	2,628	3,074	11,189	5,601	22,309	15,717	5,392	4,336	3,877,000
1938-39	4,027	3,540	3,085	2,732	2,526	3,087	9,457	2,643	10,058	16,188	3,295	3,518	3,701,000
1939-40	3,408	2,956	2,591	2,657	2,545	2,707	15,004	10,079	7,827	3,946	4,093	3,483	2,988,000
1940-41	6,066	3,833	3,736	3,279	3,215	3,147	10,105	2,268	3,117	3,834	2,461	4,544	2,988,000
1941-42	4,810	3,952	2,628	2,413	3,228	2,607	4,485	8,744	26,679	22,581	13,292	9,563	6,285,000
1942-43	8,005	3,981	2,937	2,834	3,114	3,705	4,485	7,514	13,587	14,704	7,223	3,762	5,700,000
1943-44	3,117	3,256	2,702	2,612	2,979	3,116	5,325	1,531	5,942	7,857	6,382	5,063	3,016,000
1944-45	3,298	2,778	2,735	2,287	3,087	3,935	4,701	3,232	17,228	14,188	4,295	4,135	3,976,000
1945-46	5,725	1,870	4,040	3,629	3,306	6,341	7,321	3,367	17,558	13,107	3,878	7,570	4,691,000
1946-47	5,518	3,943	3,853	3,532	3,062	11,864	20,311	16,878	17,831	12,730	5,499	6,647	6,751,000
1947-48	8,717	6,926	4,650	4,077	3,183	3,866	22,999	45,673	51,076	18,807	11,442	5,921	11,334,000
TOTAL	136,007	103,614	85,928	80,591	78,882	120,643	280,696	219,251	423,296	314,405	151,991	150,667	129,621,000
AVERAGE	5,440	4,145	3,437	3,224	3,155	4,826	11,228	8,770	16,932	12,576	6,080	6,027	5,185,000
													5,185,000

Table 22

SASKATCHEWAN HIVER AT LE PAS AFTER ALBERTA'S 1949 REQUEST (Sec. Ft.)

Year	Condition A												Total Ac.Ft.
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	
1923	-	-	-	5,391	5,205	5,062	13,577	30,345	41,435	65,905	56,471	40,499	16,006,000Z
1923-24	21,467	8,562	6,118	4,492	4,601	5,002	7,121	31,409	27,994	34,811	26,374	25,836	12,374,000
1924-25	16,175	6,725	6,675	5,725	4,752	5,406	25,480	40,761	40,190	44,125	33,748	39,787	16,323,000
1925-26	29,867	14,875	9,030	6,754	6,563	8,078	20,316	34,138	40,583	29,769	21,693	34,080	14,278,000
1926-27	40,807	27,233	7,646	8,103	6,553	6,898	18,188	61,131	56,892	63,318	61,363	47,763	24,740,000
1927-28	45,206	25,351	13,438	11,194	9,809	9,983	26,297	49,654	38,278	69,242	56,126	27,948	23,248,000
1928-29	13,126	5,940	4,382	3,736	4,270	4,841	13,046	27,352	38,140	25,563	13,688	13,041	10,111,000
1929-30	8,268	5,488	3,437	3,268	3,369	3,865	23,285	24,134	28,258	30,357	21,435	16,119	10,367,000
1930-31	11,342	8,651	5,616	5,023	4,780	5,241	17,707	14,616	14,048	28,780	23,994	21,049	9,740,000
1931-32	18,304	11,996	4,023	4,779	3,798	5,440	22,496	39,011	47,912	48,883	32,431	25,707	16,051,000
1932-33	17,395	12,425	7,141	7,104	6,707	6,529	19,062	48,562	47,391	42,542	24,925	22,253	15,871,000
1933-34	13,732	10,691	8,448	6,886	7,761	9,005	24,709	51,301	43,578	47,356	31,249	21,482	16,737,000
1934-35	16,264	15,392	10,822	7,675	6,186	8,322	19,824	35,841	33,220	40,047	37,553	19,443	15,197,000
1935-36	11,784	5,766	5,698	4,577	4,201	4,117	16,650	55,314	37,873	21,873	16,623	16,066	12,163,000
1936-37	9,188	6,346	3,877	2,725	2,744	3,222	18,373	21,169	18,444	23,088	19,724	10,575	8,453,000
1937-38	10,467	8,555	3,878	4,753	3,575	4,398	43,434	21,789	29,401	36,809	24,917	20,312	12,830,000
1938-39	14,446	8,807	4,070	4,135	3,652	3,756	45,997	22,757	20,073	41,458	22,588	14,425	12,478,000
1939-40	10,678	10,058	4,476	4,121	3,617	3,725	26,657	43,234	26,849	17,747	18,156	13,253	11,059,000
1940-41	13,563	6,566	5,173	4,606	3,799	3,905	22,657	12,805	10,208	13,787	14,594	13,281	7,555,000
1941-42	9,204	9,090	3,262	2,338	2,953	2,994	15,607	17,325	35,754	48,569	46,181	31,882	13,644,000
1942-43	21,093	10,745	6,911	5,917	5,224	5,948	37,195	45,056	30,314	42,187	31,604	20,323	15,915,000
1943-44	11,632	10,087	4,746	4,482	4,342	4,439	21,796	15,685	29,331	45,642	36,317	25,512	12,970,000
1944-45	14,883	7,418	5,068	4,025	4,677	5,407	18,725	27,831	38,282	38,738	24,498	19,235	12,644,000
1945-46	18,425	10,465	6,780	6,630	6,499	7,216	36,231	23,211	28,607	39,218	24,877	18,518	13,713,000
1946-47	15,600	8,698	4,623	6,083	5,942	6,462	29,244	48,381	39,068	37,301	26,970	23,069	15,227,000
1947-48	21,807	15,407	9,776	9,590	7,627	6,773	12,236	77,129	92,433	69,856	47,157	30,312	24,273,000
TOTAL	434,723	271,337	155,114	138,721	128,001	140,972	582,333	889,596	873,121	981,066	738,785	573,271	357,960,000
AVERAGE	17,389	10,853	6,204	5,549	5,120	5,639	23,293	35,584	34,924	39,242	29,551	22,271	14,318,000
													14,318,000

SASKATCHEWAN RIVER AT THE FORKS
AFTER ALBERTA'S REQUEST

Condition A

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Total Ac.
1923				3,714	3,308	3,770	9,170	10,386	65,788	54,413	33,256	22,929	12,498,00
1923-24	12,536	7,455	6,467	4,005	4,609	5,157	9,444	17,644	25,050	28,265	25,515	19,123	10,023,00
1924-25	9,838	5,718	5,392	4,437	4,712	5,578	38,599	21,775	32,720	30,748	29,743	26,999	13,063,00
1925-26	18,251	10,143	7,023	5,513	5,026	11,325	19,257	13,665	11,956	28,362	17,892	40,473	11,422,00
1926-27	27,679	15,237	7,312	5,555	5,339	7,897	32,249	38,595	59,385	57,271	39,902	33,695	19,987,00
1927-28	25,543	11,338	8,177	11,944	7,104	11,617	26,070	22,849	57,670	70,424	31,226	17,034	18,257,00
1928-29	10,015	7,806	5,347	5,135	4,396	7,380	10,703	15,838	45,755	17,530	14,454	10,815	9,366,00
1929-30	7,953	5,288	3,907	4,212	4,800	8,165	14,718	14,788	25,182	27,049	19,444	13,879	9,040,00
1930-31	8,253	6,496	5,361	4,085	4,485	4,668	8,155	6,537	13,794	29,757	19,856	14,698	7,644,00
1931-32	9,796	5,806	4,288	3,980	3,383	4,770	17,311	25,949	56,487	31,741	19,207	18,698	12,176,00
1932-33	10,117	6,455	5,446	4,918	4,456	4,539	15,626	29,966	34,146	29,848	17,861	15,767	10,846,00
1933-34	7,384	7,731	4,985	4,824	6,470	7,789	14,781	24,511	31,960	20,103	14,408	11,372	9,467,00
1934-35	9,269	7,016	4,985	3,325	4,286	5,538	13,792	17,893	28,693	39,167	29,194	14,121	10,749,00
1935-36	8,405	5,890	5,087	3,488	3,171	5,704	26,096	30,028	28,199	16,828	14,621	11,814	9,641,00
1936-37	6,712	4,233	3,066	2,456	2,763	2,873	10,117	7,316	18,366	22,522	15,626	10,353	6,441,00
1937-38	8,932	7,051	4,691	3,843	3,473	4,434	18,741	11,215	38,280	42,533	20,791	17,869	10,998,00
1938-39	11,515	6,544	4,321	3,592	3,327	3,787	15,282	8,936	21,207	36,688	16,805	12,239	8,740,00
1939-40	8,826	6,415	4,328	3,762	3,502	3,660	23,656	25,047	19,729	16,939	15,307	12,636	8,705,00
1940-41	11,332	6,373	5,139	4,267	4,233	3,996	14,908	5,588	10,015	16,851	13,486	12,795	6,588,00
1941-42	9,678	6,833	3,355	3,121	2,940	3,473	9,193	3,338	43,758	48,352	33,231	23,050	12,135,00
1942-43	15,058	7,190	5,225	4,840	4,795	5,304	39,333	19,064	27,587	38,355	23,146	13,129	12,282,00
1943-44	8,716	6,293	3,901	3,536	4,051	4,291	11,896	7,784	41,975	33,953	29,385	17,615	10,491,00
1944-45	10,415	5,899	2,935	3,398	4,410	5,306	8,482	10,335	31,446	29,616	16,932	13,730	8,704,00
1945-46	13,102	4,806	6,235	5,423	4,958	8,155	15,712	9,689	38,795	33,629	15,990	16,293	10,445,00
1946-47	10,301	6,556	5,264	4,963	4,397	12,635	29,933	29,353	34,194	31,253	19,142	16,892	12,398,00
1947-48	15,841	10,729	7,355	6,120	4,844	5,372	28,584	97,295	84,970	41,292	32,480	17,687	21,378,00
TOTAL	295,467	181,301	130,992	114,742	109,930	153,413	472,638	524,998	861,319	819,076	545,644	432,776	280,985,00
AVERAGE	11,819	7,252	5,240	4,590	4,397	6,136	18,906	21,000	34,453	32,763	21,826	17,311	11,239,00
													11,239,00

WATER DIVERSION FROM THE CLEARWATER RIVER

TO THE RED DEER RIVER (second feet monthly)

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Total Ac.Ft.
1923				136	128	189	452	718	2,000	2,000	2,000	1,413	547,000z
1923-24	752	489	274	249	227	231	508	1,755	1,845	1,575	1,782	1,927	644,000
1924-25	625	388	212	248	215	189	824	1,890	1,890	1,269	2,000	2,000	646,000
1925-26	1,386	695	345	370	371	372	645	518	1,125	1,260	2,000	2,000	603,000
1926-27	1,829	877	406	285	288	311	892	864	2,000	2,000	1,656	1,458	767,000
1927-28	936	396	167	314	305	409	733	663	2,000	2,000	1,107	749	592,000
1928-29	536	382	220	187	178	209	328	936	2,000	744	751	560	425,000
1929-30	348	264	201	172	212	202	610	898	1,530	1,215	813	655	430,000
1930-31	464	295	202	170	189	227	326	132	1,197	1,278	981	765	377,000
1931-32	576	342	288	288	207	171	603	1,107	2,000	1,134	1,089	846	524,000
1932-33	540	333	261	351	243	216	567	1,368	1,764	1,215	936	855	523,000
1933-34	405	261	180	279	252	369	612	1,143	1,485	801	711	603	429,000
1934-35	450	316	261	162	171	189	603	1,125	1,872	2,000	1,530	702	569,000
1935-36	504	549	216	216	216	180	792	1,242	1,845	855	873	639	491,000
1936-37	432	324	144	126	117	180	387	963	1,107	1,359	792	684	401,000
1937-38	522	558	243	234	153	189	450	819	1,198	1,782	1,098	1,431	466,000
1938-39	693	405	261	234	198	297	459	855	1,593	1,287	864	630	471,000
1939-40	540	522	270	198	162	180	765	1,125	1,008	990	711	873	445,000
1940-41	594	288	252	198	189	207	414	351	1,972	909	864	594	353,000
1941-42	513	279	207	198	207	180	414	873	1,854	2,376	1,512	1,278	599,000
1942-43	684	513	297	360	243	234	900	711	1,800	1,485	963	603	532,000
1943-44	446	198	117	162	171	207	369	963	2,000	1,809	2,000	1,134	581,000
1944-45	815	405	144	198	216	312	425	1,710	1,962	1,503	1,305	1,089	611,000
1945-46	1,026	392	270	270	324	299	621	859	2,000	1,539	945	867	569,000
1946-47	608	162	310	292	378	474	892	1,143	1,962	1,530	1,017	869	583,000
1947-48	698	621	302	288	328	188	560	2,000	2,000	1,539	1,404	769	649,000
TOTAL	16,722	10,254	6,050	6,049	5,760	6,222	14,699	24,953	41,009	35,456	28,604	23,580	13,279,000
AVERAGE	669	410	242	242	230	249	588	998	1,640	1,418	1,144	943	531,000
													531,000

SOUTH SASKATCHEWAN RIVER AT THE BOUNDARY
AFTER ALBERTA'S REQUEST, RED DEER AND SMALL IRRIGATION (With Clearwater R. Diversion)

Condition B

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Total Ac.
1923				3,650	3,305	4,401	3,568	4,894	49,529	17,921	10,934	6,339	6,290
1923-24	5,122	4,671	3,817	3,646	4,072	3,962	1,259	7,497	13,506	7,586	9,531	4,558	4,193
1924-25	3,603	4,363	4,095	3,908	4,250	8,445	13,527	11,692	14,614	6,767	7,330	7,750	5,450
1925-26	9,242	6,005	4,676	4,064	4,026	9,280	7,285	2,100	4,939	5,673	3,771	20,080	4,889
1926-27	13,894	7,793	5,352	4,622	4,473	6,365	13,836	16,878	39,008	21,417	15,381	17,747	10,072
1927-28	10,800	6,594	5,425	8,429	5,738	13,203	9,632	12,739	36,512	30,023	7,264	5,211	9,120
1928-29	5,942	5,620	4,060	4,614	4,410	6,712	3,041	8,894	24,053	1,859	1,621	1,831	4,373
1929-30	3,723	4,085	4,325	3,879	6,438	6,014	5,850	6,946	7,830	6,080	1,982	2,288	3,573
1930-31	4,278	4,288	4,482	4,048	3,811	3,831	2,023	1,495	3,416	2,144	1,039	2,064	2,224
1931-32	4,601	3,163	3,329	3,443	3,486	4,686	5,094	8,303	29,297	7,472	2,304	4,560	4,833
1932-33	4,025	4,525	4,277	3,913	3,993	4,819	4,265	18,552	16,120	5,667	1,105	1,804	4,416
1933-34	2,820	6,228	4,866	4,941	5,321	4,699	6,496	14,800	16,406	2,896	1,798	1,601	4,327
1934-35	4,491	6,102	4,185	4,356	5,288	4,794	5,338	4,463	9,553	8,155	6,733	2,486	3,977
1935-36	3,668	3,932	3,547	3,114	3,491	6,510	10,696	5,853	7,290	1,033	1,016	1,313	3,104
1936-37	2,465	3,193	2,552	2,738	3,109	3,982	3,533	1,697	9,168	1,439	1,005	1,857	2,205
1937-38	3,437	4,587	4,452	4,201	3,645	5,734	6,891	9,394	13,076	9,221	3,461	4,527	4,386
1938-39	4,609	4,525	4,115	3,574	3,389	5,549	3,822	2,906	12,001	6,485	1,529	2,367	3,217
1939-40	3,533	4,326	3,578	3,647	3,539	5,483	9,582	8,203	3,894	2,456	2,148	3,783	3,277
1940-41	5,038	4,977	4,120	3,619	3,809	5,987	3,862	1,600	2,447	2,031	1,344	3,206	2,562
1941-42	6,712	4,415	3,702	3,594	3,221	3,892	3,672	15,193	23,041	19,866	11,728	9,004	6,441
1942-43	3,259	4,919	3,956	3,815	4,548	6,755	21,050	5,208	14,639	12,142	3,853	1,782	5,388
1943-44	3,647	3,647	3,806	3,740	3,636	5,585	2,349	6,251	7,164	5,166	7,452	3,167	2,857
1944-45	2,813	3,523	3,659	4,431	3,486	5,467	2,365	6,192	19,401	8,421	3,160	4,624	4,011
1945-46	6,351	4,192	4,520	4,443	4,024	7,032	6,670	5,389	19,989	8,748	2,415	6,909	4,862
1946-47	5,588	5,049	5,155	4,649	5,639	13,385	13,770	17,023	17,228	10,010	4,676	6,706	6,576
1947-48	10,005	6,977	4,530	4,297	3,983	6,261	25,338	48,653	48,938	12,496	10,736	3,470	11,233
TOTAL	135,584	122,106	104,581	102,725	104,825	156,432	191,246	241,921	413,530	205,253	113,382	124,695	121,729
AVERAGE	5,423	4,884	4,183	4,109	4,193	6,257	7,650	9,677	16,541	8,210	4,535	4,988	4,869

SASKATCHEWAN RIVER AT THE FORKS
AFTER ALBERTA'S REQUEST, RED DEER RIVER IRRIGATION DISTRICT & CLEARWATER DIVERSION

Condition B

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Total
1923				4,436	4,047	4,422	8,004	8,170	62,257	52,163	31,316	21,409	11,859
1923-24	11,906	7,435	6,798	4,450	5,016	5,325	7,733	15,734	22,810	26,015	23,575	17,603	9,264
1924-25	9,474	5,844	5,858	4,891	5,211	6,011	35,690	19,907	30,530	28,548	27,845	25,511	12,400
1925-26	17,637	10,123	7,043	5,658	5,152	10,994	18,637	11,965	9,506	26,112	15,952	38,953	10,744
1926-27	27,049	15,217	7,302	5,872	5,609	8,013	31,001	36,883	57,495	55,371	38,260	32,403	19,408
1927-28	25,035	11,318	8,510	12,089	7,225	10,978	25,453	20,939	55,430	68,174	29,286	15,514	17,586
1928-29	9,623	7,922	5,719	5,653	4,960	7,678	9,607	12,238	43,515	15,566	12,783	9,527	8,733
1929-30	8,155	5,653	4,454	4,815	5,050	8,342	12,332	12,214	20,651	24,799	17,604	12,368	8,258
1930-31	8,265	6,779	5,910	4,740	5,088	5,173	7,467	5,380	10,183	25,629	17,705	13,163	6,996
1931-32	9,720	6,064	4,500	4,337	3,916	5,379	15,964	21,724	54,297	29,541	17,309	17,210	11,479
1932-33	9,828	6,516	5,808	5,202	4,990	5,010	13,155	27,810	31,906	27,598	15,921	14,247	10,169
1933-34	7,579	8,120	5,975	5,205	6,908	7,100	12,167	22,601	29,720	17,932	12,627	10,099	8,819
1934-35	9,319	7,300	5,394	3,983	4,915	6,139	12,551	15,386	23,865	36,917	29,254	12,601	10,166
1935-36	8,353	5,976	5,645	4,023	3,768	6,290	22,476	28,118	25,959	14,863	12,858	10,585	9,012
1936-37	6,911	4,525	3,826	3,224	3,543	3,451	9,140	5,391	14,773	19,573	13,624	8,739	5,852
1937-38	8,522	6,992	5,167	4,325	4,144	4,820	17,537	8,321	34,360	39,055	18,851	16,349	10,183
1938-39	11,214	6,814	4,705	4,143	3,942	3,949	14,187	7,163	16,789	34,438	14,865	10,863	8,071
1939-40	8,676	6,283	4,850	4,381	4,154	4,170	20,341	23,179	17,539	14,739	13,636	10,773	8,026
1940-41	11,198	6,709	5,586	4,842	4,795	4,218	13,998	4,809	7,834	14,632	11,002	11,031	6,082
1941-42	9,370	7,113	3,885	3,724	3,568	4,130	8,555	10,547	38,213	45,642	31,119	20,928	11,316
1942-43	14,064	6,966	5,413	5,198	5,252	5,368	37,606	17,154	25,347	36,105	21,206	11,672	11,573
1943-44	8,552	6,697	4,518	4,152	4,667	4,555	10,563	5,040	38,076	31,703	27,445	16,095	9,805
1944-45	9,785	5,879	4,435	3,899	4,883	5,573	7,185	7,321	29,206	26,366	14,992	12,210	7,963
1945-46	12,472	4,866	6,415	5,667	4,216	7,496	15,044	7,821	36,605	31,429	14,092	14,805	9,784
1946-47	9,713	6,910	5,536	5,228	4,678	12,071	28,619	27,443	31,954	29,003	17,202	15,372	11,720
1947-48	15,211	10,709	7,383	6,387	5,176	5,843	26,826	95,379	82,730	39,042	30,540	16,167	20,700
TOTAL	287,631	184,730	140,635	126,088	121,826	158,076	433,834	470,567	789,293	758,792	499,553	394,788	264,209
AVERAGE	11,502	7,389	5,625	5,044	4,873	6,323	17,353	18,823	31,572	30,352	19,982	15,792	10,568

SASKATCHEWAN RIVER AT THE FORKS - AFTER ALTA. & SASK. REQUEST & PWD DEER DIVERSION

Condition D

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Total Ac.
1923													
1923-24	11,291	7,582	7,837	5,818	4,262	3,369	5,451	9,298	24,284	48,587	29,066	19,936	9,104,00
1924-25	9,531	6,497	7,105	5,778	4,661	4,145	5,475	13,482	18,102	22,328	21,223	16,071	8,372,00
1925-26	16,540	10,016	7,688	6,256	4,583	3,296	31,831	17,588	26,945	24,941	25,563	24,003	11,364,00
1926-27	23,949	15,121	7,573	6,437	4,398	9,295	17,457	11,061	12,103	19,701	15,005	31,088	9,720,00
1927-28	23,982	11,215	8,416	6,355	4,702	7,660	29,282	30,677	54,028	51,868	36,094	30,978	18,179,00
1928-29	8,701	7,633	6,714	11,890	7,141	10,193	24,310	19,581	51,744	64,437	26,946	13,976	16,645,00
1929-30	8,460	6,271	6,316	5,929	4,179	6,599	8,341	10,080	39,641	13,437	13,923	10,659	8,196,00
1930-31	8,550	6,326	6,523	5,922	4,112	3,780	7,700	8,167	16,044	20,509	17,456	12,466	7,158,00
1931-32	9,840	7,536	7,106	6,480	4,230	3,609	6,427	8,469	13,300	25,344	19,315	14,488	7,420,00
1932-33	9,618	6,680	6,827	6,379	4,572	3,693	11,884	17,025	28,715	21,544	17,367	15,086	9,168,00
1933-34	8,466	6,401	6,838	6,379	4,675	3,571	7,076	20,656	28,271	23,896	16,367	14,131	8,970,00
1934-35	9,057	7,102	6,946	6,064	4,800	4,335	9,608	19,560	26,072	16,681	15,081	11,700	8,209,00
1935-36	9,384	6,875	7,228	5,715	4,091	3,748	6,671	15,173	18,785	30,165	24,147	13,302	8,794,00
1936-37	8,406	6,435	6,630	6,013	4,285	3,318	13,888	23,808	22,300	16,045	15,440	12,220	8,531,00
1937-38	10,042	7,953	6,880	6,310	4,184	3,371	6,773	8,241	12,405	18,895	16,031	10,762	6,543,00
1938-39	11,466	7,411	6,585	5,856	4,221	2,976	8,143	8,464	12,561	23,585	16,559	12,213	7,282,00
1939-40	9,602	7,681	7,067	6,140	4,399	3,595	10,402	17,101	14,668	15,533	14,546	12,233	7,442,00
1940-41	9,471	7,044	6,817	6,407	4,708	3,378	7,352	6,187	9,688	15,975	14,360	12,378	6,280,00
1941-42	9,742	8,086	6,891	6,426	4,705	3,824	6,987	6,570	19,377	27,401	22,468	16,262	8,402,00
1942-43	11,162	7,474	7,571	6,863	4,884	3,875	17,790	13,887	15,294	32,102	18,895	12,719	9,243,00
1943-44	9,594	7,414	6,360	5,881	4,338	3,615	8,547	8,184	36,969	27,760	24,595	15,411	9,591,00
1944-45	10,796	7,234	6,343	5,823	4,760	3,762	5,698	7,961	15,470	17,573	15,075	12,256	6,824,00
1945-46	10,756	6,909	7,236	6,448	4,737	4,041	9,951	8,103	22,220	27,085	14,911	11,702	8,117,00
1946-47	8,597	6,945	6,333	6,037	4,188	8,808	27,157	25,067	28,225	25,288	16,313	13,146	10,658,00
1947-48	13,458	10,611	7,763	6,743	4,743	5,012	25,568	93,036	79,059	34,821	28,190	15,008	19,645,00
TOTAL	282,461	196,452	175,593	159,592	114,832	117,922	324,209	426,728	642,147	645,929	484,938	380,369	239,271,00
AVERAGE	11,298	7,858	7,024	6,383	4,593	4,717	12,968	17,069	25,686	25,837	19,398	15,215	9,571,00

SASKATCHEWAN RIVER AT LE PAS

AFTER ALBERTA'S REQUEST, RED DEER RIVER IRRIGATION DISTRICT & CLEARWATER RIVER DIVERSION

Condition B

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Total a.c.ft.
1923				5,975	5,927	5,801	14,229	29,179	39,219	62,374	54,221	38,559	15,491,000
1923-24	19,947	7,932	6,098	4,823	5,046	5,409	7,289	29,698	26,084	32,571	24,124	23,896	11,713,000
1924-25	14,655	6,361	6,801	6,191	5,206	5,905	25,913	37,852	38,322	41,935	31,548	37,889	15,653,000
1925-26	28,379	14,261	9,010	6,774	6,708	8,204	19,985	33,518	18,883	27,319	19,443	32,140	13,603,000
1926-27	39,287	26,603	7,626	8,093	6,870	7,168	18,304	59,883	55,280	61,428	59,463	48,121	24,145,000
1927-28	43,914	24,843	13,418	11,527	9,954	10,104	26,658	49,037	36,368	67,002	53,876	26,008	22,592,000
1928-29	11,606	4,498	4,108	4,108	4,788	5,405	13,344	26,256	34,540	23,323	11,724	11,370	9,466,000
1929-30	6,980	5,690	3,802	3,815	3,972	4,115	23,462	21,748	25,684	25,826	19,185	14,279	9,589,000
1930-31	9,831	8,663	5,899	5,572	5,435	5,844	18,212	13,928	12,891	25,169	19,866	18,898	9,087,000
1931-32	16,769	11,920	4,281	4,991	4,155	5,973	23,105	37,664	43,687	46,693	30,231	23,809	15,354,000
1932-33	15,907	12,136	7,202	7,466	6,991	7,063	19,533	46,091	45,235	40,302	22,675	20,313	15,194,000
1933-34	12,212	10,886	8,837	7,476	8,142	9,443	24,020	48,687	41,668	45,116	29,178	19,701	16,071,000
1934-35	14,991	15,442	11,106	8,084	6,844	8,951	20,425	34,600	30,713	35,219	35,303	19,503	14,618,000
1935-36	10,264	5,714	5,784	5,135	4,736	4,714	17,236	51,694	35,963	19,633	14,658	14,303	11,508,000
1936-37	7,959	6,545	4,169	3,485	3,512	4,002	18,951	20,192	16,519	19,495	16,775	2,573	7,883,000
1937-38	8,853	8,145	3,819	5,229	4,057	5,069	43,820	20,585	26,507	32,889	21,439	18,372	12,006,000
1938-39	12,926	8,506	4,340	4,664	4,203	4,371	46,159	21,662	18,300	37,040	20,338	12,485	11,795,000
1939-40	9,302	9,908	4,344	4,498	4,236	4,377	27,167	39,919	24,981	15,557	15,956	11,582	10,402,000
1940-41	11,700	6,432	5,509	5,053	4,374	4,467	22,879	11,895	9,429	11,606	12,375	10,797	7,040,000
1941-42	7,440	8,782	3,542	2,868	3,556	3,622	16,264	16,687	32,963	43,024	43,471	29,770	12,339,000
1942-43	18,971	9,751	6,687	6,105	5,582	6,405	37,259	43,329	28,404	39,947	29,354	18,383	15,164,000
1943-44	10,175	9,923	5,150	5,099	4,958	5,055	22,060	14,352	26,587	41,743	34,067	23,572	12,283,000
1944-45	13,363	6,788	5,048	4,525	5,178	5,880	18,992	26,534	35,268	36,498	21,248	17,295	11,903,000
1945-46	16,905	9,835	6,840	6,810	6,743	7,474	35,572	22,543	26,739	37,028	22,677	16,620	13,052,000
1946-47	14,112	8,110	4,977	6,355	6,207	6,743	28,680	47,067	37,158	35,061	24,720	21,129	14,551,000
1947-48	20,287	14,777	9,756	9,618	7,894	7,105	12,707	75,371	90,517	67,616	44,907	28,372	23,593,000
TOTAL	396,735	263,501	158,543	148,364	139,347	152,868	586,996	850,792	818,690	909,040	678,501	527,180	341,104,000
AVERAGE	15,869	10,540	6,342	5,935	5,574	6,115	23,480	34,032	32,748	36,361	27,140	21,087	13,644,000
													13,644,000

SASK. RIVER AT LE PAS - AFTER ALBERTA & SASK. REQUESTS
Condition on C

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Total Ac.
1923			7,064	8,800	8,085	6,594	13,695	27,326	41,393	26,536	52,895	38,229	13,512,000
1924-25	19,974	8,359	8,172	6,486	6,963	5,531	6,540	28,098	25,757	26,490	22,687	23,464	11,369,000
1925-26	14,623	7,333	8,923	8,010	7,159	5,742	23,587	31,631	37,901	40,560	30,141	37,485	15,262,000
1926-27	28,339	13,758	7,550	8,124	8,197	8,071	16,290	32,968	18,667	31,176	14,407	32,273	13,391,000
1927-28	36,889	26,113	13,335	9,130	7,978	6,799	15,329	59,422	54,616	59,871	57,860	47,577	23,595,000
1928-29	43,761	24,278	5,452	11,305	9,405	9,899	26,112	48,521	35,950	65,576	52,389	25,588	22,253,000
1929-30	11,568	5,452	3,774	5,683	5,591	5,052	9,683	25,256	35,798	21,923	10,454	13,441	9,288,000
1930-31	8,872	6,633	5,014	6,238	5,591	3,639	19,302	17,876	23,705	22,884	17,644	15,124	9,216,000
1931-32	10,784	9,702	6,071	6,747	7,015	5,425	17,075	13,364	16,282	29,618	20,924	21,421	9,941,000
1932-33	19,069	12,934	6,415	8,271	6,936	7,086	21,800	34,342	40,270	23,338	23,483	25,729	13,895,000
1933-34	14,829	12,756	8,029	9,106	8,859	7,281	18,520	40,729	42,780	38,927	21,223	21,875	14,816,000
1934-35	13,151	12,468	7,709	8,879	9,620	7,837	21,924	46,890	38,838	43,728	28,743	23,046	15,913,000
1935-36	17,395	15,920	11,554	10,257	9,078	8,548	18,423	29,473	31,795	32,146	30,666	16,106	14,009,000
1936-37	11,867	7,539	7,562	7,294	7,282	5,697	14,644	44,048	33,065	16,322	16,810	17,938	11,513,000
1937-38	10,433	8,762	6,733	6,793	6,594	5,010	19,261	18,367	20,507	18,404	17,606	11,982	9,092,000
1938-39	11,720	10,527	5,708	7,595	6,666	5,894	43,332	13,549	26,785	19,028	13,331	19,164	11,033,000
1939-40	14,329	9,771	5,662	7,040	6,500	5,098	45,693	16,240	20,631	34,575	10,922	15,333	11,573,000
1940-41	11,492	11,694	6,584	7,510	6,543	5,304	26,942	31,072	20,203	13,864	17,890	13,393	10,437,000
1941-42	14,243	5,619	6,452	6,916	6,157	4,849	22,942	5,873	11,488	14,592	14,767	15,219	7,764,000
1942-43	9,281	9,637	4,824	6,551	6,866	5,266	16,378	15,713	30,059	26,252	27,796	22,821	10,959,000
1943-44	15,793	7,555	7,748	8,600	7,957	6,530	36,210	24,568	26,018	36,577	27,888	17,966	13,516,000
1944-45	12,025	11,701	6,395	7,418	6,989	5,147	21,527	12,855	30,864	42,771	32,048	22,902	12,874,000
1945-46	14,013	8,904	7,138	7,277	7,940	6,223	17,703	25,720	37,946	24,934	14,073	18,863	11,515,000
1946-47	18,240	9,435	9,605	8,261	8,134	7,769	32,786	18,221	28,050	24,778	15,500	18,564	12,032,000
1947-48	12,076	7,892	5,504	7,822	7,648	6,881	23,072	46,929	36,722	33,662	23,255	21,437	14,098,000
	19,519	14,399	9,678	10,660	8,878	7,250	11,045	73,746	90,120	66,205	42,936	27,942	23,192,000
TOTAL	414,285	279,141	183,203	197,973	186,546	157,803	545,644	755,471	814,817	808,201	605,443	546,654	332,545,000
AVERAGE	16,571	11,166	7,328	7,919	7,462	6,312	21,826	30,219	32,593	32,328	24,218	21,866	13,302,000

SASKATCHEWAN RIVER AT LE PAS
AFTER ALBERTA-SASKATCHEWAN & RED DEER DIVERSION

Condition D

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Total Ac.Ft
1923				8,082	7,309	6,016	13,176	26,636	40,377	24,421	50,645	36,289	12,872,000
1923-24	18,454	7,297	6,245	5,852	6,374	5,054	6,109	27,450	23,862	27,883	20,437	21,524	10,713,000
1924-25	13,103	6,398	7,454	7,438	6,571	5,277	23,198	34,003	36,033	38,370	27,941	35,587	14,602,000
1925-26	26,851	13,144	8,903	7,419	7,487	7,450	18,286	32,348	18,009	29,936	13,032	31,173	12,956,000
1926-27	31,402	25,483	7,530	8,364	7,353	6,261	17,951	58,174	53,004	57,981	55,960	45,935	22,756,000
1927-28	42,469	23,770	13,315	11,433	9,755	10,020	25,473	47,904	34,040	63,336	50,139	23,648	21,596,000
1928-29	10,048	4,606	4,209	5,103	5,064	4,624	12,265	25,000	22,412	19,469	9,595	12,490	8,756,000
1929-30	8,092	5,975	4,420	5,677	5,079	3,177	18,900	17,126	22,667	21,239	14,895	14,111	8,539,000
1930-31	9,909	8,928	5,446	6,185	6,505	4,986	16,648	12,898	16,010	28,301	19,581	20,488	9,423,000
1931-32	18,074	12,018	5,753	7,603	6,298	6,629	21,419	33,594	39,018	21,138	22,234	24,440	13,200,000
1932-33	13,763	11,906	7,366	8,485	8,168	6,748	18,094	40,022	38,111	36,687	18,973	20,739	13,860,000
1933-34	12,076	11,753	7,118	8,339	9,001	7,317	21,355	46,138	38,657	41,488	27,827	22,135	15,329,000
1934-35	16,572	15,160	10,908	9,636	8,576	8,127	18,034	28,730	30,530	30,159	28,551	14,376	13,282,000
1935-36	10,945	6,725	6,683	6,718	6,726	5,231	14,264	43,116	31,683	15,994	15,840	16,865	10,952,000
1936-37	9,574	8,020	6,079	6,289	6,118	4,643	18,871	17,835	19,399	17,147	16,097	10,980	8,523,000
1937-38	10,856	9,645	4,780	6,942	6,042	5,461	42,923	12,949	25,816	18,640	11,399	17,856	10,429,000
1938-39	12,668	8,738	4,937	6,399	5,916	4,650	45,186	15,636	19,631	32,832	9,485	14,259	10,879,000
1939-40	10,632	10,814	5,742	6,860	5,995	4,622	26,392	29,990	18,933	12,706	16,750	12,472	9,796,000
1940-41	13,140	4,685	5,844	6,284	5,939	4,380	22,039	5,259	10,837	13,480	13,718	14,135	7,225,000
1941-42	8,767	9,134	4,515	5,874	6,258	4,759	15,958	15,129	29,016	24,208	25,606	21,099	10,285,000
1942-43	14,285	6,829	7,195	8,263	7,247	6,037	35,766	23,523	25,167	29,914	25,351	16,052	12,434,000
1943-44	11,202	10,945	5,867	6,941	6,487	4,726	21,120	12,346	29,761	40,656	30,124	20,702	12,162,000
1944-45	12,659	7,779	6,403	6,433	7,102	5,757	17,181	25,057	35,938	22,782	12,455	17,358	10,680,000
1945-46	16,931	8,099	8,883	7,631	7,524	6,995	32,117	17,460	27,051	22,663	18,333	17,419	11,538,000
1946-47	10,989	6,974	5,012	7,152	7,016	6,253	25,417	45,615	34,812	31,422	21,005	20,230	13,428,000
1947-48	18,041	13,004	9,658	9,998	8,250	6,672	11,876	74,123	88,204	63,965	40,686	26,002	22,471,000
TOTAL	381,502	257,829	170,265	183,318	172,851	145,856	546,842	741,425	778,601	762,396	566,014	512,065	315,815,000
AVERAGE	15,260	10,313	6,811	7,333	6,914	5,834	21,874	29,657	31,144	30,496	22,640	20,483	12,632,500
													12,632,500

