QU'APPELLE RIVER SSARR MODEL
MODIFICATION STUDY

Prepared for: Prairie Provinces Water Board

HYD-5-66

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SYNOPSIS

The Qu'Appelle River SSARR Natural Flow Model was developed to be used to estimate the natural flow in the Qu'Appelle River at the Saskatchewan/Manitoba Boundary. The model has been used since it was developed in 1975, to simulate natural flow in the Qu'Appelle River, however, over this period numerous problems with the model have arisen.

In 1980, The Prairie Provinces Water Board's Committee on Hydrology formed the Qu'Appelle SSARR Model Sub-Committee to discuss and identify what problems in the model needed to be addressed. As a result of the recommendations made by the sub-committee, the Prairie Provinces Water Board acquired the services of Hydrology Service, Saskatchewan Water Corporation to complete the Qu'Appelle River SSARR Model Modification Study.

This report summarizes the modifications that were made to the Qu'Appelle River SSARR Natural Flow Model. Also summarized in this report are simulation results for the 1975 to 1988 period that were obtained using the modified model. The modified model was found to simulate lake elevations and streamflows under both existing and natural conditions that were much more realistic than those obtained using the original model.

Over the 1975 to 1988 period, the modified model simulated apportionment period natural flow volumes in the Qu'Appelle River at the Saskatchewan/Manitoba Boundary which average 19 percent or 38200 dam^3 higher than those simulated by the original model. Although all of the modifications made to the model affect the natural flow estimates, the majority of the increase in the natural flow estimates can be attributed to incorporation of groundwater inflow into Last Mountain Lake and the Fishing Lakes, and compensation for increased evaporation due to artificially high lake levels under existing regulated conditions.

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CHAPTER I

INTRODUCTION

1.1 Background

On October 30, 1969, Canada and the Provinces of Manitoba, Saskatchewan and Alberta entered into an agreement to share the flow and to consider the quality of eastward flowing interprovincial streams. This agreement, the Master Agreement on Apportionment, permits the Province of Saskatchewan to make a net depletion of one-half the natural flow of water arising in each stream flowing into Manitoba from Saskatchewan plus one-half of the water flowing into the province from Alberta. The Prairie Provinces Water Board, established under Schedule C of the Agreement, was given the responsibility to administer the Agreement.

In the early 1970s, the Prairie Provinces Water Board acquired the services of Water Survey of Canada, Environment Canada, to develop a natural flow model of the Saskatchewan portion of the Qu'Appelle River Basin. In December 1975, the Qu'Appelle River Natural Flow Model was completed. The Qu'Appelle River Natural Flow Model used the Streamflow Synthesis and Reservoir Regulation Model (SSARR) developed by the United States Army Corps of Engineers.

1.2 Purpose of Study

Since the model was completed in 1975, the Qu'Appelle River Natural Flow

Model has been used to estimate the flow in the Qu'Appelle River that would have occurred under natural conditions. However, soon after use of the model commenced, numerous problems with the model became evident.

In 1980, the Prairie Provinces Water Board's Committee on Hydrology formed a sub-committee to study what modifications needed to be made to the Qu'Appelle River Natural Flow Model. The Qu'Appelle SSARR Model Sub-Committee studied the model and identified the deficiencies that needed to be addressed.

In April 1989, the Saskatchewan Water Corporation and the Prairie Provinces Water Board entered into a Memorandum of Understanding. With the signing of this agreement, the Saskatchewan Water Corporation agreed to modify the Qu'Appelle River Natural Flow Model. The Memorandum of Understanding is included in Appendix A. This report summarizes the modifications which were made to the Qu'Appelle River SSARR Natural Flow Model.

1.3 Qu'Appelle River Basin

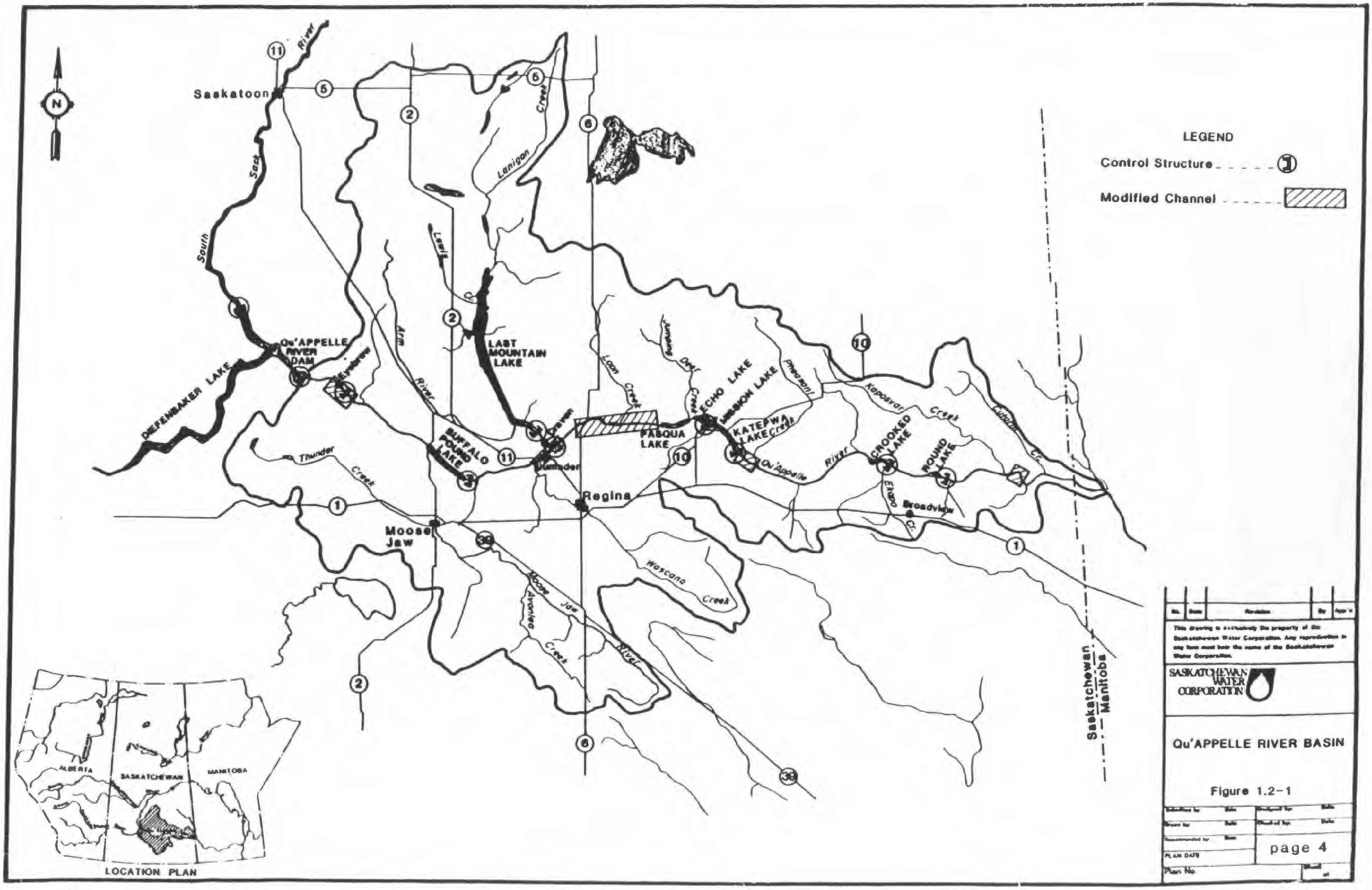
The Qu'Appelle River Basin is located in east central Saskatchewan, as shown in Figure 1.2-1. The basin extends approximately 400 km from its headwaters near the Qu'Appelle Dam on Lake Diefenbaker to its confluence with the Assiniboine River near the Saskatchewan/Manitoba Boundary. The basin encompasses an area of approximately 50000 km^2.

From below the Qu'Appelle Dam, the Qu'Appelle River flows through Buffalo Pound Lake, continues in an easterly direction and receives waters from two major tributaries, Moose Jaw River and Wascana Creek. The meandering Qu'Appelle River is joined by Last Mountain Creek, then passes through Pasqua, Echo, Mission and Katepwa Lakes and further downstream Crooked and Round Lakes before it crosses into Manitoba and joins the Assiniboine River near St. Lazare.

The most general physical characteristic of the basin is a flat to gently undulating and generally treeless plain. The elevation of this plain ranges from 580 m above sea level at the western end, to 480 m above sea level at the eastern end, with the local relief generally not exceeding 3 m.

In contrast, the most striking feature of the basin is the Qu'Appelle Valley itself. Through this valley, a former glacial spillway which traverses the entire length of the basin, flows the Qu'Appelle River, which meanders along the valley bottom. The valley is incised 30 to 100 m into the plain; it has steep side slopes and a relatively flat bottom which varies from 1.0 to 3.0 km in width.

The climate of the Qu'Appelle River Basin is characterized by hot summers, cold winters, and generally moderate precipitation. The average annual precipitation ranges from 350 mm in the western portion of the basin to 500 mm in the eastern portion. Snowfall makes up about 25 percent of the total annual precipitation (Hydrological Atlas of Canada, Environment Canada, 1978). The basin experiences a mean annual gross evaporation of approximately 900 mm (PFRA Hydrology Report #121, 1989).



N
Saskatoon
South Sask River
LEGEND
Control Structure
Modified Channel
DIEFENBAKER LAKE
Qu'APPELLE RIVER DAM
Eyebrow
Arm River
Thunder Creek
BUFFALO POUND LAKE
LAST MOUNTAIN LAKE
Lanigan Creek
Loon Creek
PASQUA LAKE
Lumsden
Regina
Moose Jaw
ECHO LAKE
MISSION LAKE
KATEPWA LAKE
Qu'Appelle River
Kaposvar Creek
CROOKED LAKE
ROUND LAKE
Broadview
Wascana Creek
Moose Jaw River
Avonlea Creek
Saskatchewan
Manitoba
SASKATCHEWAN WATER CORPORATION
Qu'APPELLE RIVER BASIN
Figure 1.2-1
page 4
LOCATION PLAN
ALBERTA
SASKATCHEWAN
MANITOBA

The drainage area contributing directly to the Qu'Appelle River alone is relatively small when compared to the combined drainage areas of all the tributaries; hence, the hydrology of the Qu'Appelle River is dominated by the runoff characteristics of the tributaries. Since most of the surface water in the basin originates from snowmelt, the main characteristics of the tributary streams is high volumes of flow during the spring runoff period with little or no flow during the remainder of the year.

Approximately 90 percent of the total volume of water contributed to the Qu'Appelle River by its tributaries occurs during the period of March to May. Flows in the Qu'Appelle River for the remainder of the year generally represent a draining of the system with only minor contributions from rainfall events. Also, there are significant known groundwater contributions to Last Mountain Lake and the Fishing Lakes in preserving water levels and maintaining base flows.

1.4 Man-Made Modifications to Qu'Appelle River Basin

The high seasonal and annual variation in water supply in the Qu'Appelle River Basin has prompted man to construct numerous water control structures in the basin. These structures are used to regulate flows and water levels, and therefore alter the natural flow. Table 1.4-1 lists the types of man-made structures in the Qu'Appelle River Basin which alter the natural flow of water in the basin.

TABLE 1.4-1 TYPES OF MAN-MADE MODIFICATIONS AND DEVELOPMENTS IN THE QU'APPELLE RIVER BASIN WHICH ALTER NATURAL FLOW	
(i)	Adjustable Lake Outlet Structures
(ii)	Variable Diversion of Water From South Saskatchewan River Basin
(iii)	Numerous Dams and Diversions Within the Basin*
(iv)	Municipal Demands and Return Flows
(v)	Conveyance Works on Main Channel
(vi)	Changes In Land Use and Vegetative Cover
(vii)	Agricultural Drainage
(viii)	Urban Development
* Note:	Licensed diversions in the Qu'Appelle River Basin as of December 31, 1988 totalled 79900 dam^3.

1.5 Qu'Appelle River Natural Flow Model

In the early 1970s, the Prairie Provinces Water Board acquired the services of Environment Canada to develop the Qu'Appelle River Natural Flow Model. The Qu'Appelle River Natural Flow Model makes use of the SSARR Model. The SSARR model, developed by the United States Army Corps of Engineers, was chosen because it is capable of simulating upstream releases and diversions and streamflow from upstream to downstream points considering channel and lake storage, overbank flow, and backwater effects at lake outlets. Details on the SSARR Model can be found in the User Manual - SSARR Model, Streamflow Synthesis and Reservoir Regulation, U.S. Army Corps of Engineers, August 1987.

A detailed description of the natural flow computational procedure used in the Qu'Appelle River Natural Flow Model can be found in the two-volume report "Natural Flow - Qu'Appelle River at Saskatchewan/Manitoba Boundary" published by the Prairie Provinces Water Board in December 1975.

Specific details on the model should be obtained from these reports. However, in brief, the Qu'Appelle River Natural Flow model has two segments: a fall and winter segment and a spring and summer segment. The fall and winter segment is used to simulate the natural drawdown of the lakes in the Qu'Appelle River Basin over the August 1 to March 1 period. The spring and summer segment of the model is used to simulate the natural spring runoff over the March 1 to July 31 period. The spring and summer segment of the model has two simulation limbs; a natural conditions limb and an existing conditions limb. In the natural conditions limb, natural streamflows and lake elevations are simulated. The existing conditions limb is used to estimate local inflow for input into the natural conditions limb. The configuration charts for the original model, taken from the original report "Natural Flow - Qu'Appelle River at Saskatchewan-Manitoba Boundary" 1975 are included in Appendix B.

1.6 Deficiencies of Original Model

Since the model was developed in 1975, the Qu'Appelle River Natural Flow Model has been used to estimate the flow which would have occurred in the Qu'Appelle River under natural conditions. However, soon after use of the model commenced, numerous problems with the model were evident.

In 1980, the Prairie Provinces Water Board's Committee on Hydrology formed a sub-committee to study what modifications needed to be made to the Qu'Appelle River Natural Flow Model. This Qu'Appelle SSARR Model Sub-Committee held numerous meetings over the period of 1980 to 1988. The sub-committee studied model characteristics and simulation capabilities and identified model deficiencies that needed to be addressed in order to make the natural flow and "existing conditions" simulations more realistic and, therefore, acceptable.

In 1987, the Water Resources Branch of Environment Canada prepared a project description and cost estimate for modifying the Qu'Appelle River Natural Flow Model. It was estimated that 30 person-months would be required to modify the Qu'Appelle River Natural Flow Model. At the following Qu'Appelle SSARR Model Sub-Committee meeting held on March 3, 1988, the sub-committee identified three options which were presented to the Committee on Hydrology. The three options identified are described in Table 1.6-1.

TABLE 1.6-1

THREE OPTIONS IDENTIFIED BY THE QU'APPELLE SSARR MODEL SUB-COMMITTEE

Option 1: Do nothing.

Option 2: Undertake detailed calibration work as proposed by Environment Canada.

Option 3: Modify the existing model with emphasis on the following work components:

(a) Extend the stage-area and stage-capacity curves of Last Mountain Lake further down to cover the entire range of lake levels and incorporate extended curves into the existing model;

(b) Revise the routing parameters for channel reaches under the post-conveyance condition;

(c) Implement the reservoir regulation cards and modify the evaporation (4P) cards of the existing model;

(d) Revise the procedure used for computing lateral inflow by utilizing an effective drainage area ratio concept; and

(e) Evaluate the effect of groundwater on Last Mountain Lake and the Fishing Lakes, and incorporate these effects into the existing model.

The SSARR Sub-Committee recommended that Option 3 be considered by the Committee on Hydrology.

At Committee on Hydrology Meeting #56 held in March 1988, the committee agreed that Hydrology Service, Saskatchewan Water Corporation should provide a study proposal, including a cost estimate to complete the five work items listed in Option 3 as suggested by the SSARR Sub-Committee (COH Minute 56-53).

1.7 Memorandum of Understanding

The Saskatchewan Water Corporation provided the Committee on Hydrology with a study proposal, and in April 1989, a Memorandum of Understanding was signed by the Prairie Provinces Water Board and the Saskatchewan Water Corporation. This Memorandum of Understanding can be found in Appendix A.

1.8 Units

At the December 14, 1987 Qu'Appelle SSARR Model Sub-Committee meeting, it was determined that it would not be cost-effective to convert the Qu'Appelle River Natural Flow Model to SI Units. As a result of this decision, the conversion of the model to metric units was not included in the list of work required for this report. It is for this reason that the discussions and results of this study are reported in Imperial Units. Metric equivalents are provided in parenthesis.

CHAPTER II

DISCUSSION OF MODEL MODIFICATIONS

Schedule A of the Memorandum of Understanding (found in Appendix A) lists the modifications to be made to the Qu'Appelle River Natural Flow Model. Sections 2.1 to 2.9 provide a discussion of the modifications made to the model. Configuration charts of the modified model are shown in Figures 2-1 to 2-10. The modifications made to the model are highlighted on these figures with enhanced lines. Sample input files of the modified model are found in Appendix D.

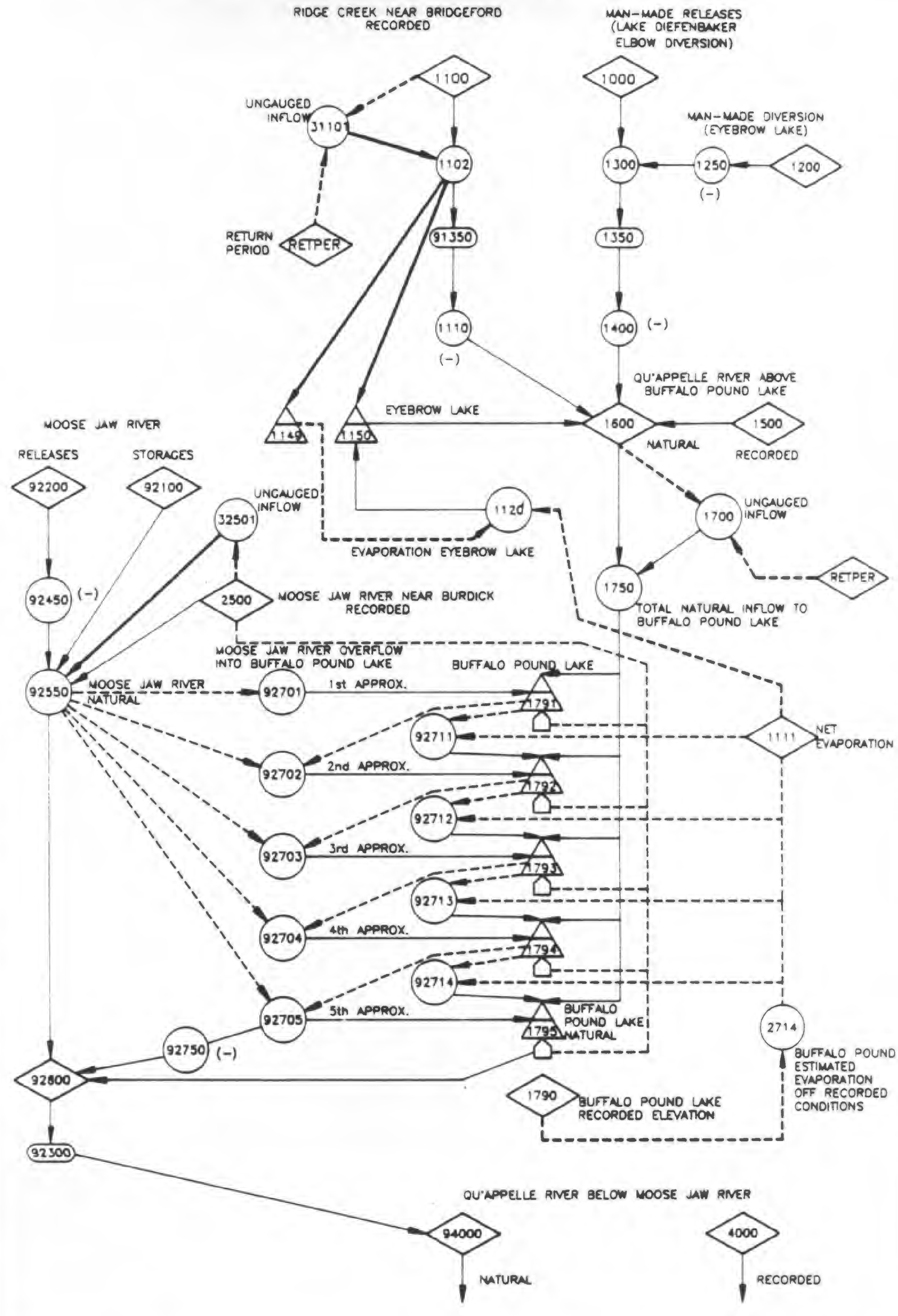
2.1 Implement the Existing Qu'Appelle River Natural Flow Model on a Microcomputer

2.1.1 Installation of SSARR Model on Microcomputer

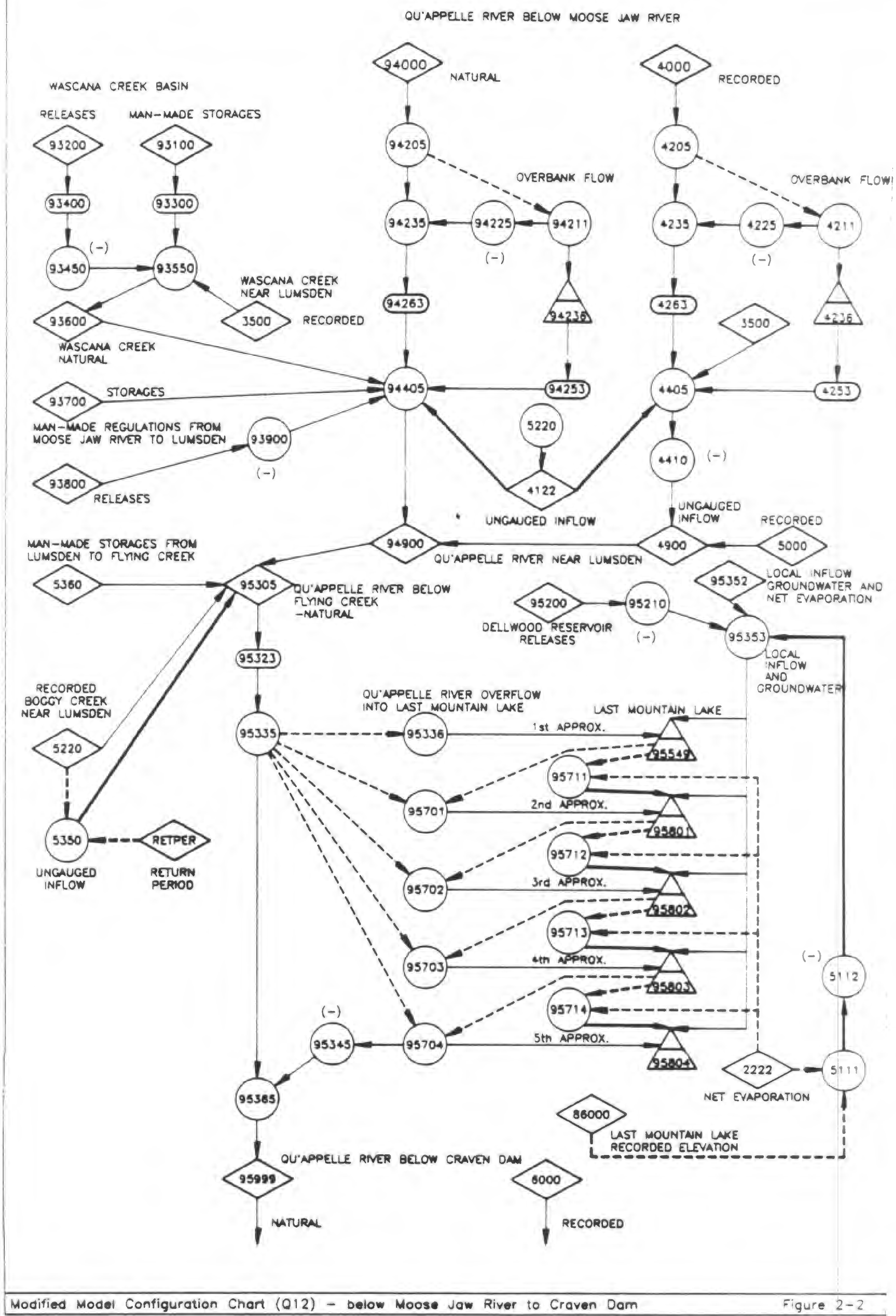
The microcomputer version of the Streamflow Synthesis and Reservoir Regulation (SSARR) model was obtained from the United States Corps of Engineers, North Pacific Division. The August 1987 version of the model was obtained at a cost of $60.00 (U.S. Funds).

Included with the SSARR Model, which was provided on seven 5-1/4" floppy disks, was a copy of the SSARR User Manual. Also included was a paper discussing the microcomputer version of SSARR and its installation. The SSARR microcomputer version was installed on an

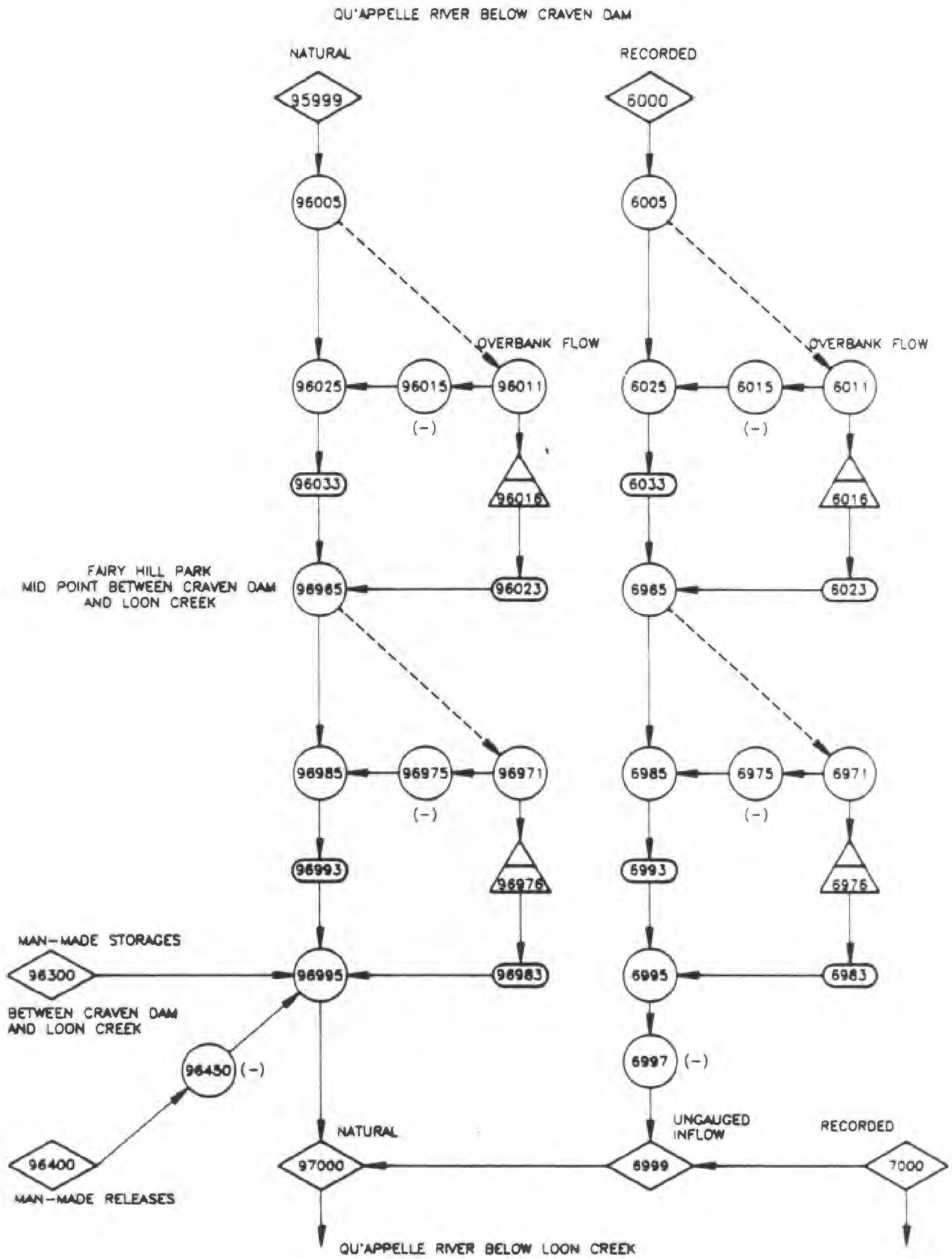
SPRING AND SUMMER MODEL



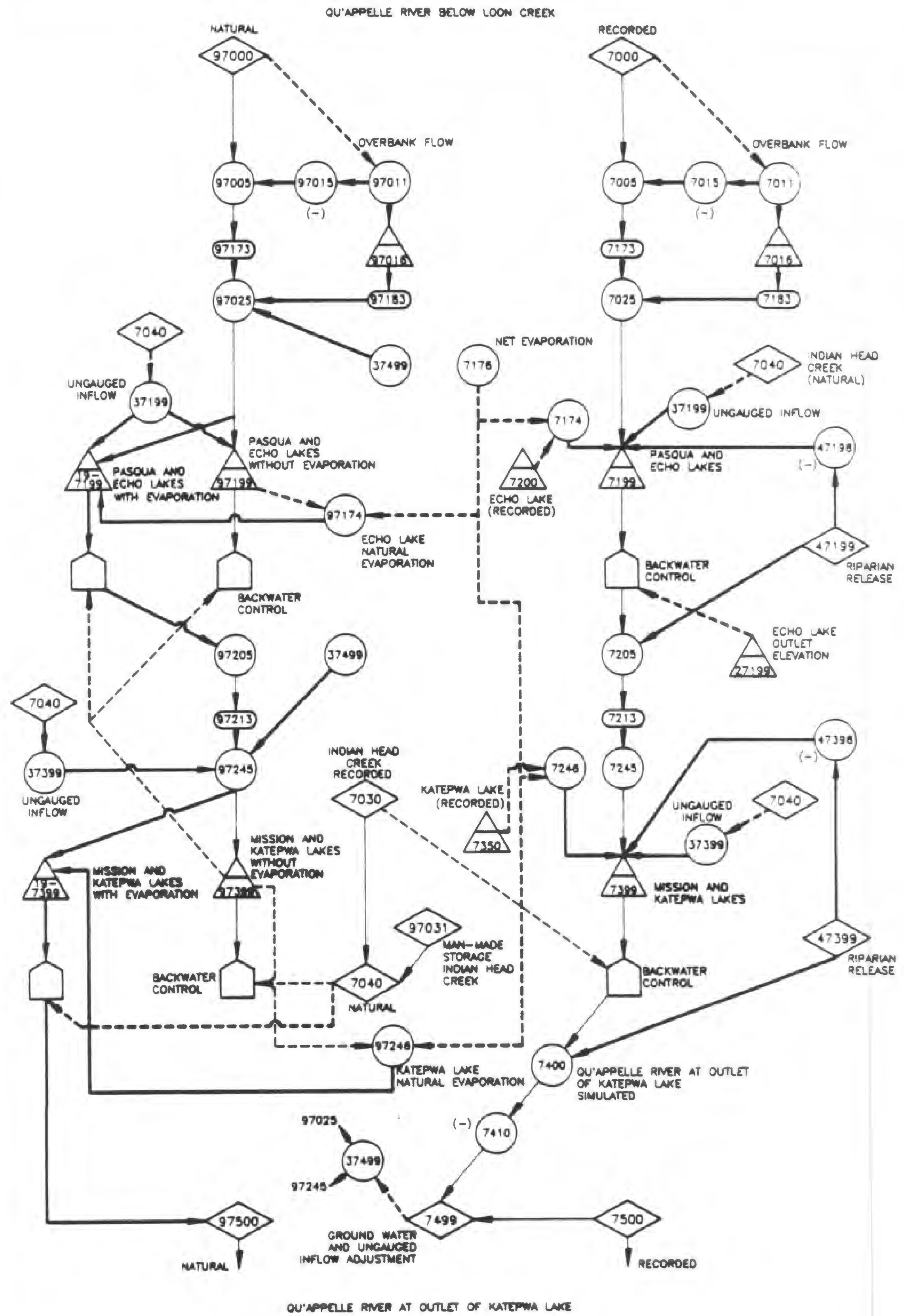
Modified Model Configuration Chart (Q12) -Lake Diefenbaker to below Moose Jaw River — Figure 2-1



Modified Model Configuration Chart (Q12) – below Moose Jaw River to Craven Dam   Figure 2-2

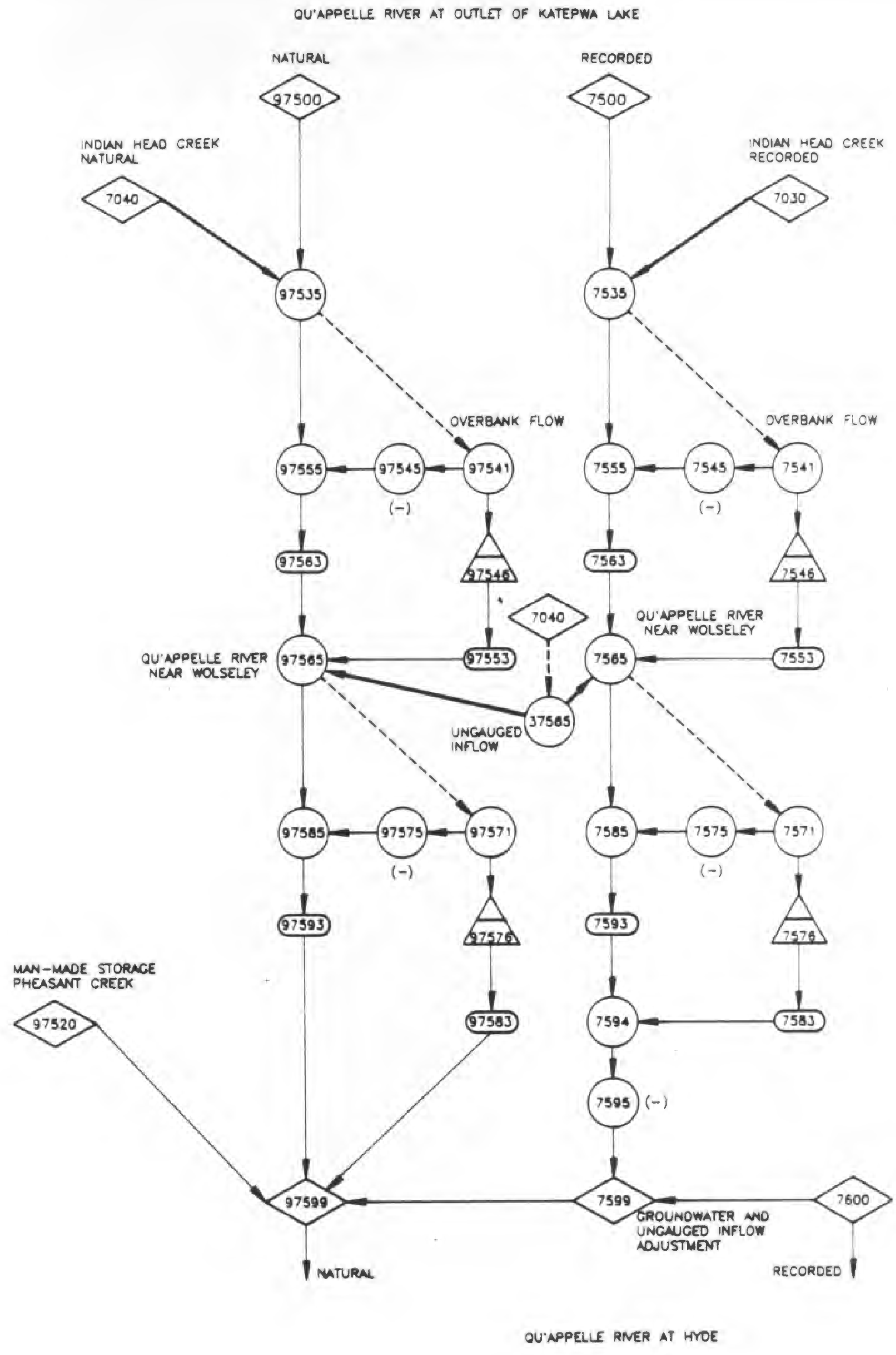


Modified Model Configuration Chart (Q12) – below Craven Dam to below Loon Creek Figure 2–3

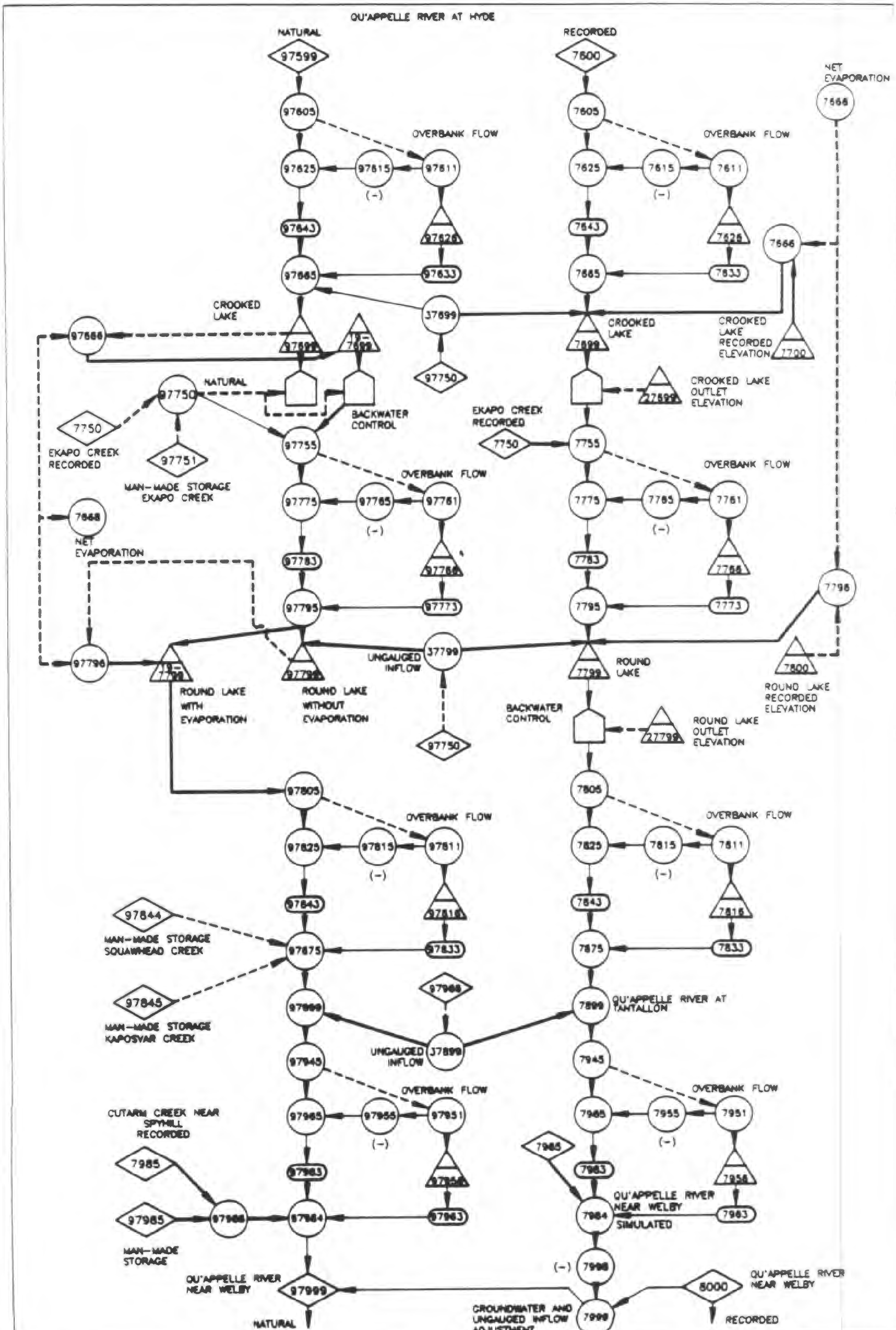


Modified Model Configuration Chart(Q12)—below Loon Creek to below Katepwa Lake

Figure 2-4

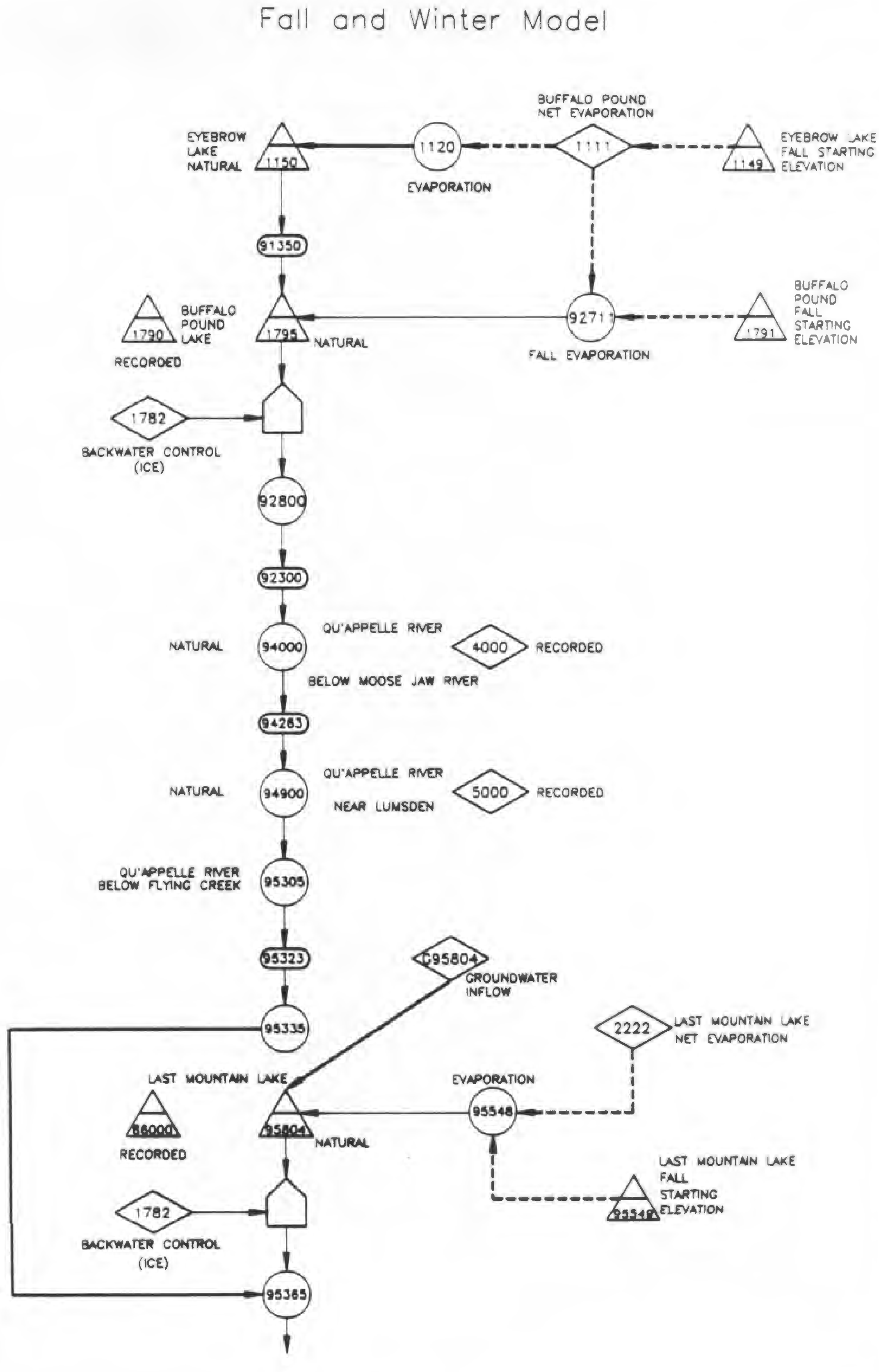


Modified Model Configuration Chart (Q12) – below Katepwa Lake to Qu'Appelle River at Hude Figure 2–5

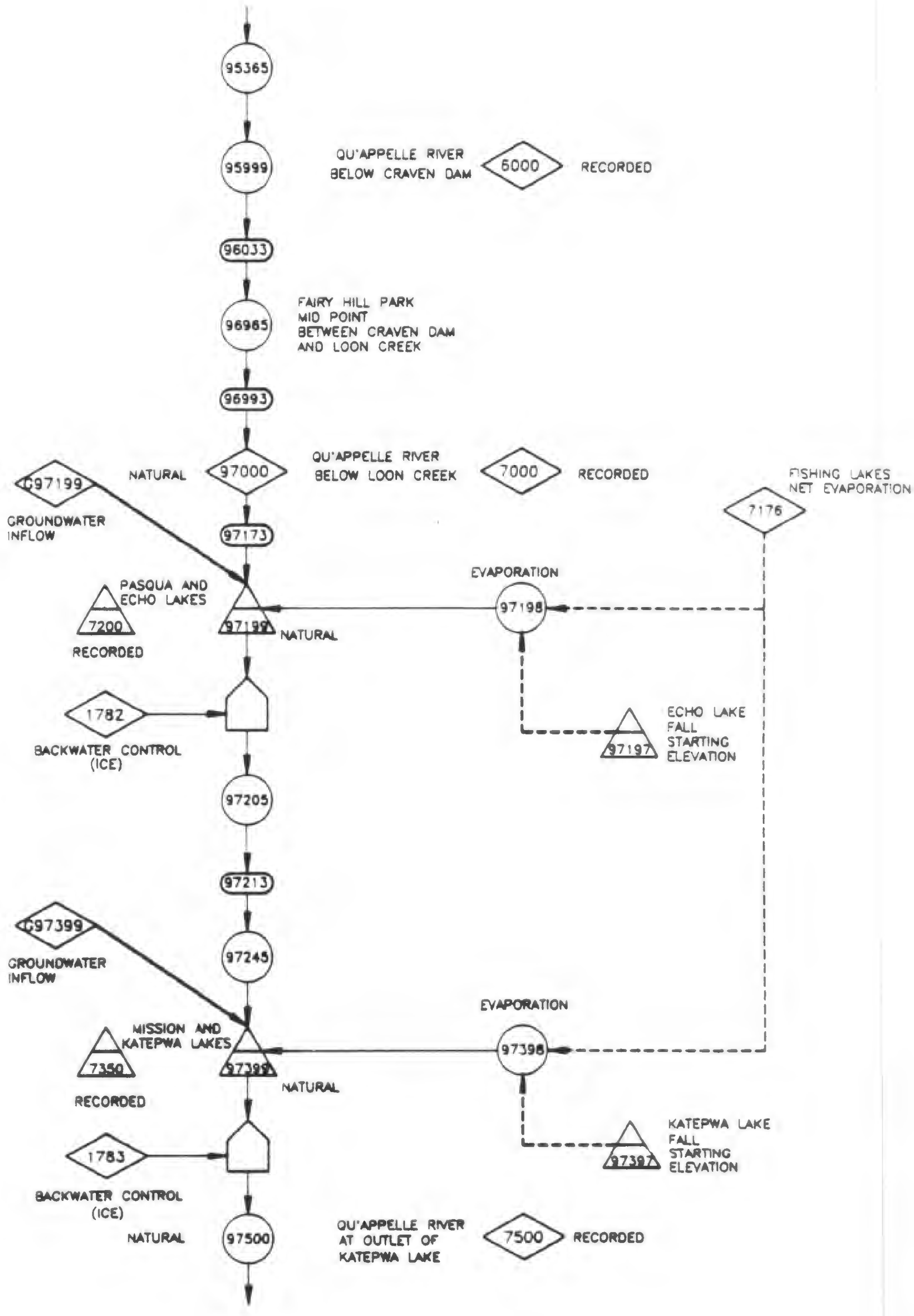


Modified Model Configuration Chart (Q12) – Hyde to Welby

Figure 2-6

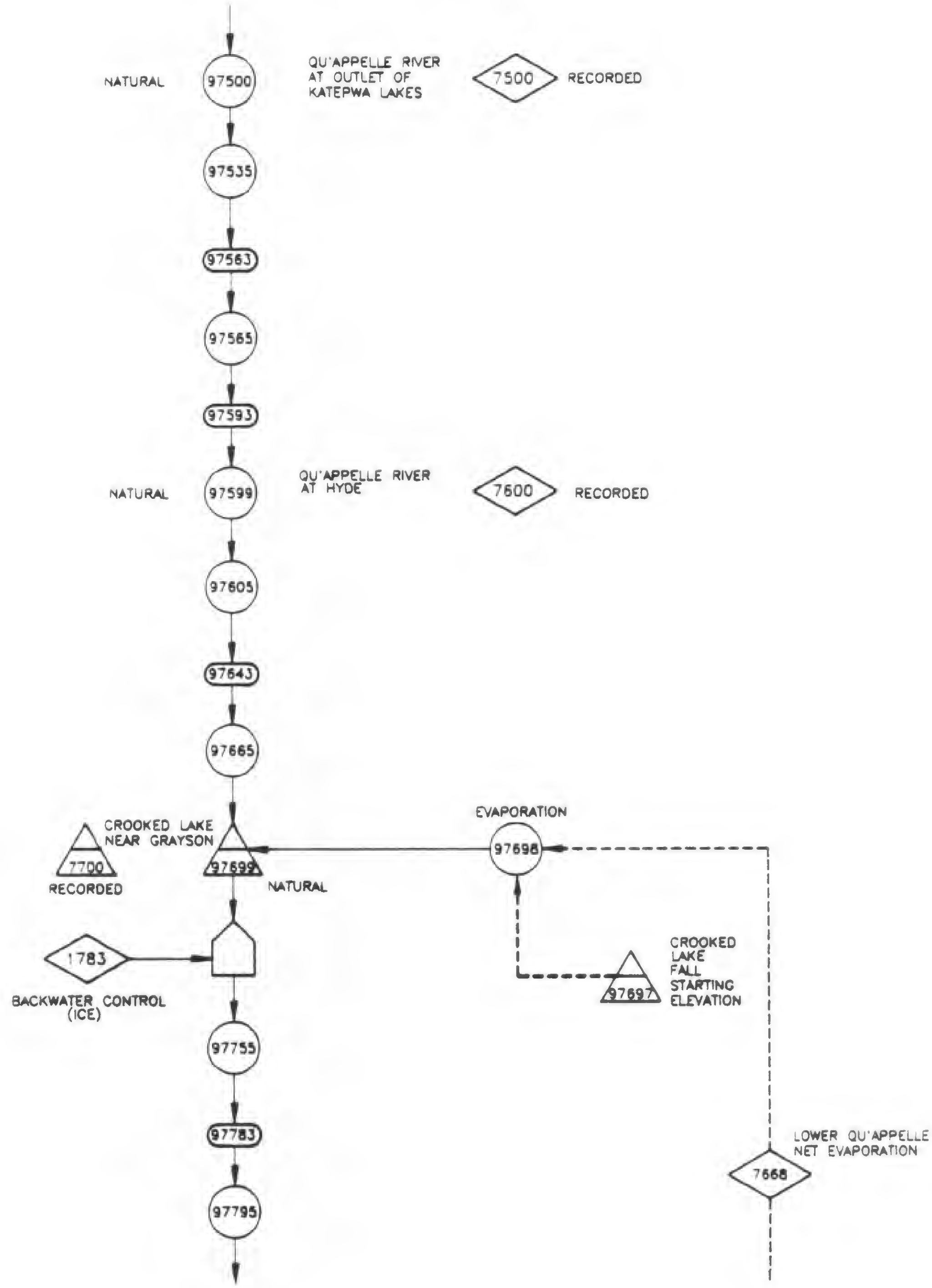


Modified Model Configuration Chart (Q3) – Eyebrow Lake to below Craven Dam Figure 2–7

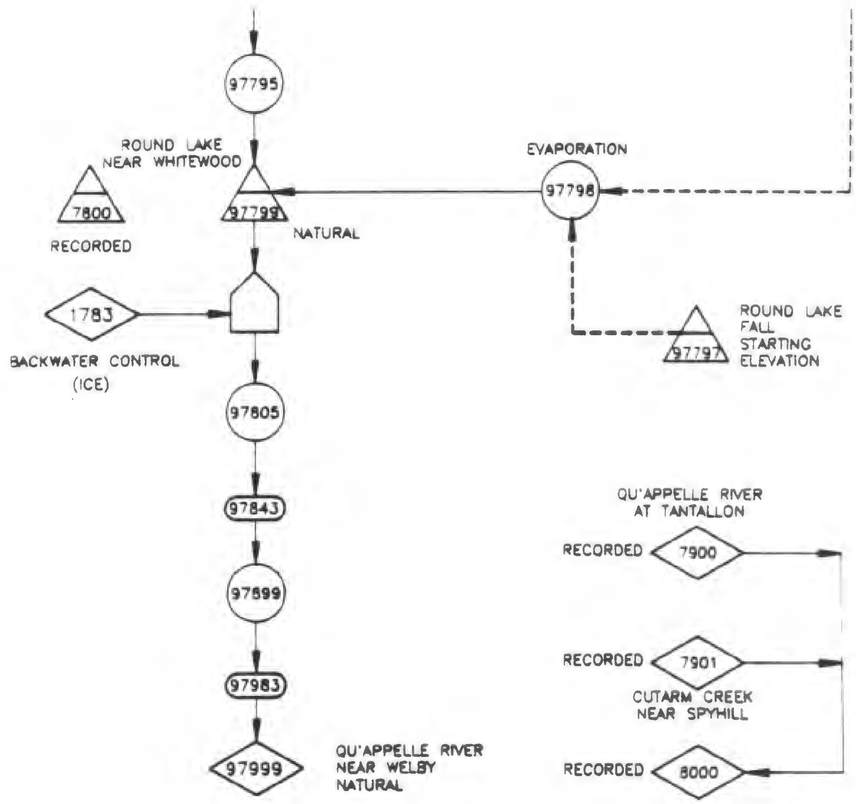


Modified Model Configuration Chart (Q3) – below Craven Dam to below Katepwa Lake

Figure 2–8



Modified Model Configuration Chart (Q3) – below Katepwa Lake at above Round Lake Figure 2–9



Modified Model Configuration Chart (Q3) – above Round Lake to Qu'Appelle River near Welby Figure 2–10

IBM Model 50 (AT286, 20 meg hard disk, 1 meg RAM) as per the instructions in this paper.

The microcomputer version of the SSARR model was then tested using original Qu'Appelle River Natural Flow Model Input Files set up by the Water Resources Branch of Environment Canada for 1987 natural flow calculations for the Prairie Provinces Water Board.

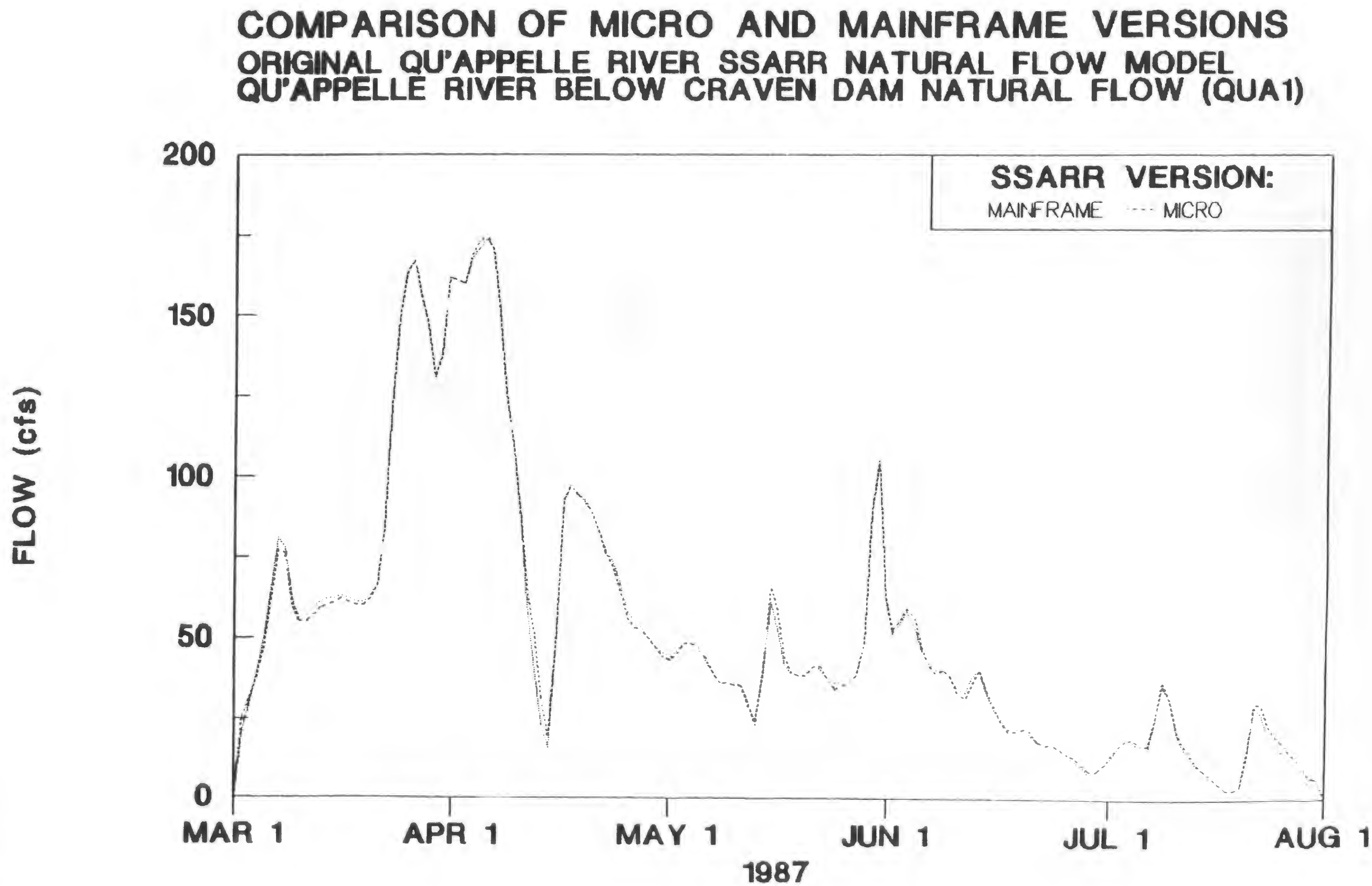
Output results, obtained using the microcomputer version of SSARR, were compared with results obtained using the mainframe computer version at Westbridge Computers Ltd. (formerly SaskComp). Output results obtained with the microcomputer version and with the mainframe version are plotted in Figures 2.1.2-1,-2 and -3. These figures show the output from the micro and mainframe versions of SSARR to be very similar, however, not identical. The discrepancy is attributed to the difference in versions. The 1975 mainframe version of SSARR is installed at Westbridge. Numerous changes have been made to the SSARR program since 1975, all of which have been incorporated into the 1987 microcomputer version. The microcomputer output results were then compared with results obtained using the micro-vax version of SSARR on a Micro-Vax II mini-computer. It was found that the output results obtained using the microcomputer version and the Vax version were identical.

2.1.2 Converting Original Qu'Appelle River Natural Flow Model to Microcomputer Version Format

The original Qu'Appelle River Natural Flow Model consisted of three separate input files identified as QUA1, QUA2 and QUA3. QUA1 and QUA2 were used to simulate the upper and lower portions of the Qu'Appelle River Basin over the spring and summer period (March 1 to July 31). QUA3 was used to simulate the entire Qu'Appelle River Basin over the fall and winter period (August 1 to February 28).

The spring and summer segment of the original model was split into two portions to reduce computational costs which were a major concern at the time of original model development in 1975. QUA1 simulated the upper portion of the Qu'Appelle River Basin (from below the Qu'Appelle Dam to below the Craven Dam). QUA2 simulated the lower portion of the Qu'Appelle River Basin (from below the Craven Dam to the Saskatchewan/Manitoba Boundary near Welby). With the conversion of the Qu'Appelle River Natural Flow Model to the microcomputer, the need to minimize computer time is no longer a major concern. QUA1 and QUA2 were therefore combined into one input file.

The combined spring and summer input file, referred to in this report as Q12, runs in approximately 20 minutes. The fall and winter portion input file, referred to as Q3 in this report, runs in approximately 5 minutes. (Note: Run times were obtained using an IBM AT286 with math co-processor).



COMPARISON OF MICRO AND MAINFRAME VERSIONS
ORIGINAL QU'APPELLE RIVER SSARR NATURAL FLOW MODEL
QU'APPELLE RIVER BELOW CRAVEN DAM NATURAL FLOW (QUA1)
SSARR VERSION:
MAINFRAME
MICRO
FLOW (cfs)
200
150
100
50
0
MAR 1
APR 1
MAY 1
JUN 1
JUL 1
AUG 1
1987

Figure 2.1.2-1

COMPARISON OF MICRO AND MAINFRAME VERSIONS
ORIGINAL QU'APPELLE RIVER SSARR NATURAL FLOW MODEL
QU'APPELLE RIVER NEAR WELBY SIMULATED NATURAL FLOW (QUA2)

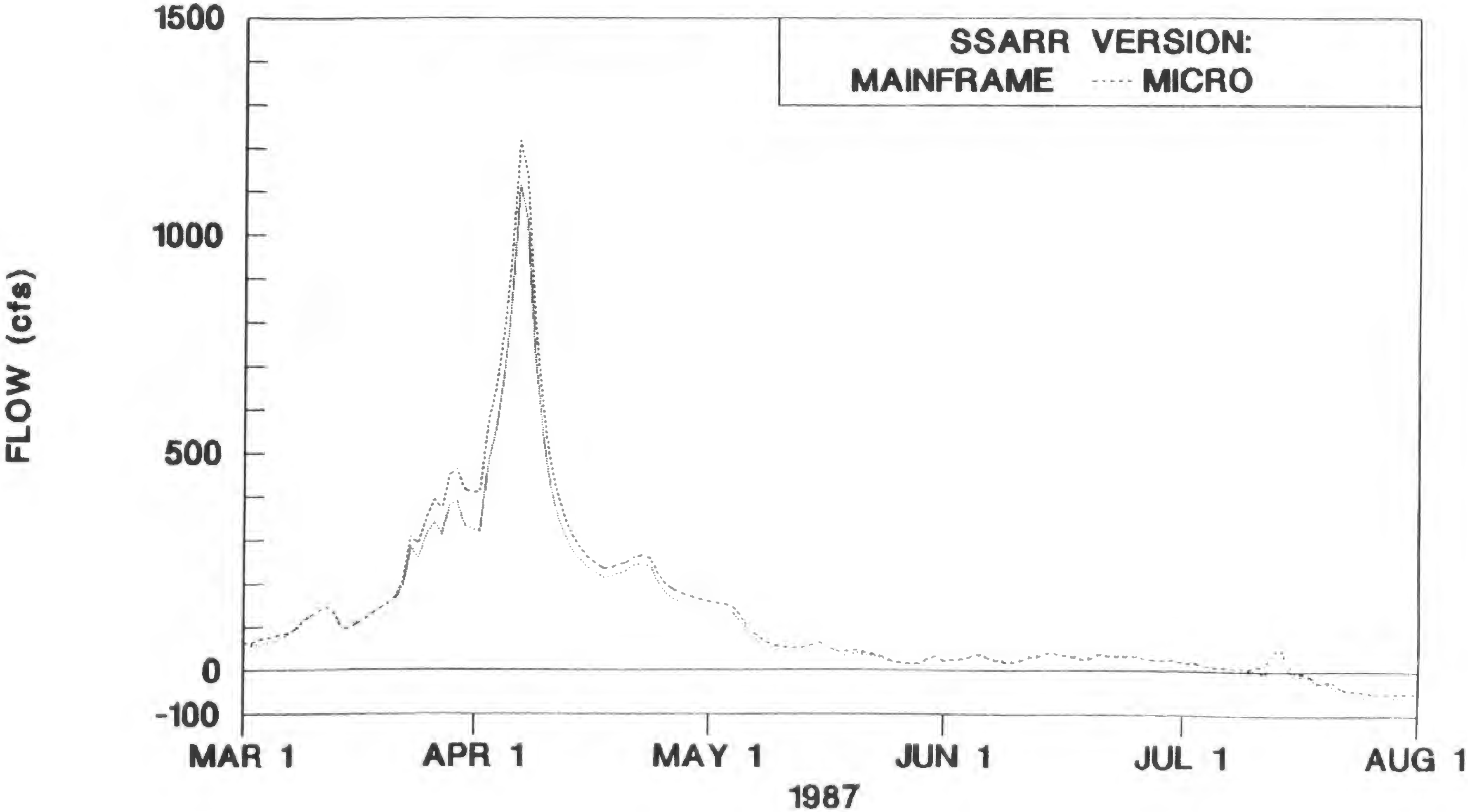


Figure 2.1.2-2

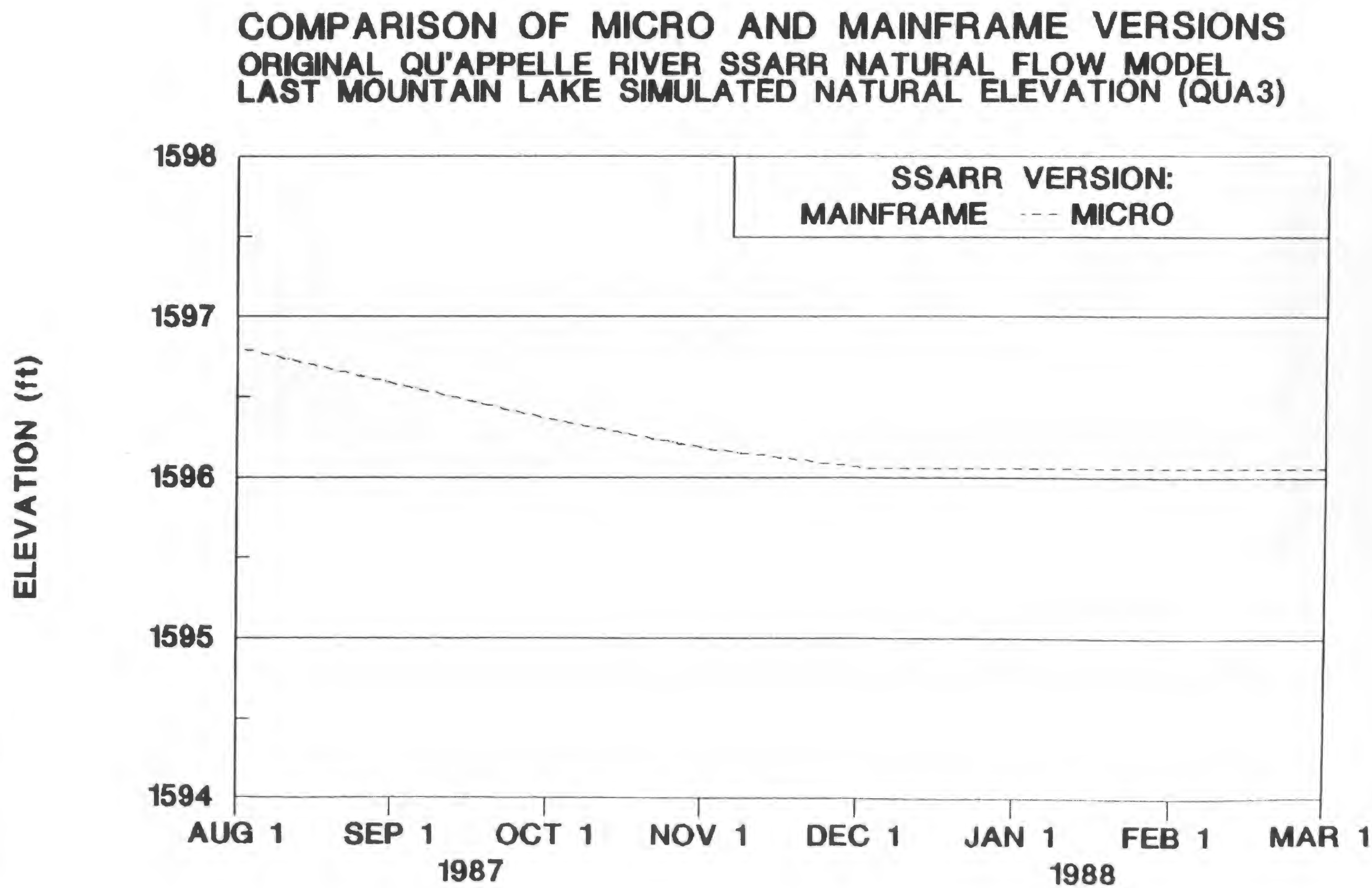

COMPARISON OF MICRO AND MAINFRAME VERSIONS
ORIGINAL QU'APPELLE RIVER SSARR NATURAL FLOW MODEL
LAST MOUNTAIN LAKE SIMULATED NATURAL ELEVATION (QUA3)
SSARR VERSION:
MAINFRAME
MICRO
ELEVATION (ft)
1598
1597
1596
1595
1594
AUG 1
SEP 1
OCT 1
NOV 1
DEC 1
JAN 1
FEB 1
MAR 1
1987
1988

Figure 2.1.2-3

2.2 Extend Last Mountain Lake Elevation-Storage Tables

The original Qu'Appelle River Natural Flow Model was developed in the early to mid 1970s. During this period, the Qu'Appelle River Basin was experiencing high runoff events. It is therefore not surprising that the original model was set up with emphasis on high flows and high water levels. As the Qu'Appelle River Basin began experiencing low runoff years during the 1980s, the need to modify the model for low flows and low water levels became evident.

In the original model, the lowest specified data point in the elevation-storage table (C1 card) was for an elevation of 1,601 feet (487.985 m). The source of this original table was not documented in the manual of the original model. The original table was replaced with elevation-storage table shown in Figure 2.2-1.

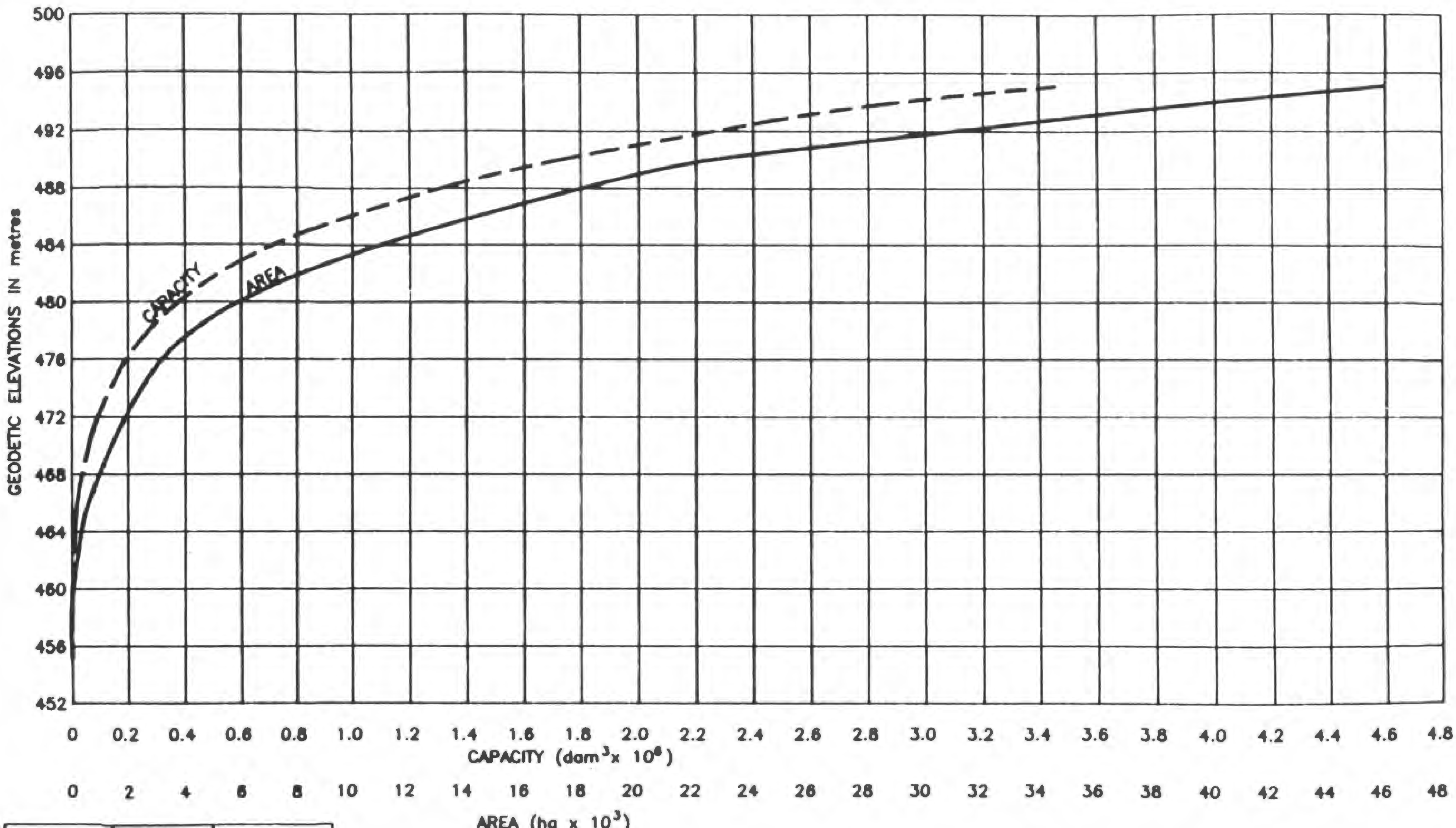
The original three-dimensional table used in the natural flow limb to determine the fraction of flow in the Qu'Appelle River which flows into (or out of) Last Mountain Lake was also set up with emphasis on high flows and high water levels. The original three-dimensional table is plotted in Figure 2.2-1. This figure shows the original table did not go below an elevation of 1,597 feet (486.766 m). Figure 2.2-2 shows that the amount of simulated inflow (or outflow) from Last Mountain Lake during low flows on the Qu'Appelle River must be interpolated between simulated Qu'Appelle River flows of -10 and 500 cfs. Figure 2.2-2 also shows that, at low Qu'Appelle River flows, the original 3D table simulated outflow from Last Mountain Lake starting at lake elevations above 1,597 feet.

In order to develop a three-dimensional table which better simulates the natural flow of water in and out of Last Mountain Lake, a number of old plans of the Valeport Control and Craven Control, filed in the water rights files of Sask Water, area were analyzed. Plan 1175-2-A-7 shows the natural outlet elevation of Last Mountain Lake to be 1,605 feet (489.204 m). Thus, under natural conditions, flow out of Last Mountain Lake would not occur at lake elevations below 1,605 feet. Plan 801-P3-1087 shows the natural elevation of the streambed at the confluence of the Qu'Appelle River and Last Mountain Creek to be 1,604 feet (488.899 m). Using manning's equation, cross sections and streambed slopes obtained from the plans, and Manning's n of 0.07 (minor stream on plains with sluggish reaches and weedy pools), it was determined that under natural conditions, when the elevation of Last Mountain Lake is below 1,605 feet (489.204 m), flows below 25 cfs (0.708 m^3/s) in the Qu'Appelle River would not back up Last Mountain Creek high enough to flow into Last Mountain Lake.

The modified three-dimensional table, which was incorporated into the Qu'Appelle River Natural Flow Model, is shown graphically in Figure 2.2-3. The modified three-dimensional table can be found in the example input file located in Appendix D.

2.3 Revise Channel Routing Parameters

Since the Qu'Appelle River Natural Flow Model was developed, extensive channel improvement work has been carried out on the main stem of the Qu'Appelle River. Although channel modification work has been completed at numerous locations along the length of the Qu'Appelle River as shown in



ELEV. (metres)	AREA (ha)	CAPACITY (dam^3)
455.12	0	0
460.12	25	417
465.12	437	11967
470.12	1433	58717
475.12	2859	166017
480.12	6035	388367
485.12	12787	858917
490.12	22885	1750717
492.72	34000	2461780
495.12	46000	3461780

SOURCE OF DATA:
1951 BATHYMETRIC MAP
PLANIMETERED SEPT 27, 1990

Designed Drawn D.E.S. Recm'd Approved	SASKATCHEWAN WATER CORPORATION	LAST MOUNTAIN LAKE AREA/CAPACITY CURVE	Date 90.10.09 Sheet of PLAN No. FIGURE 2.2-1

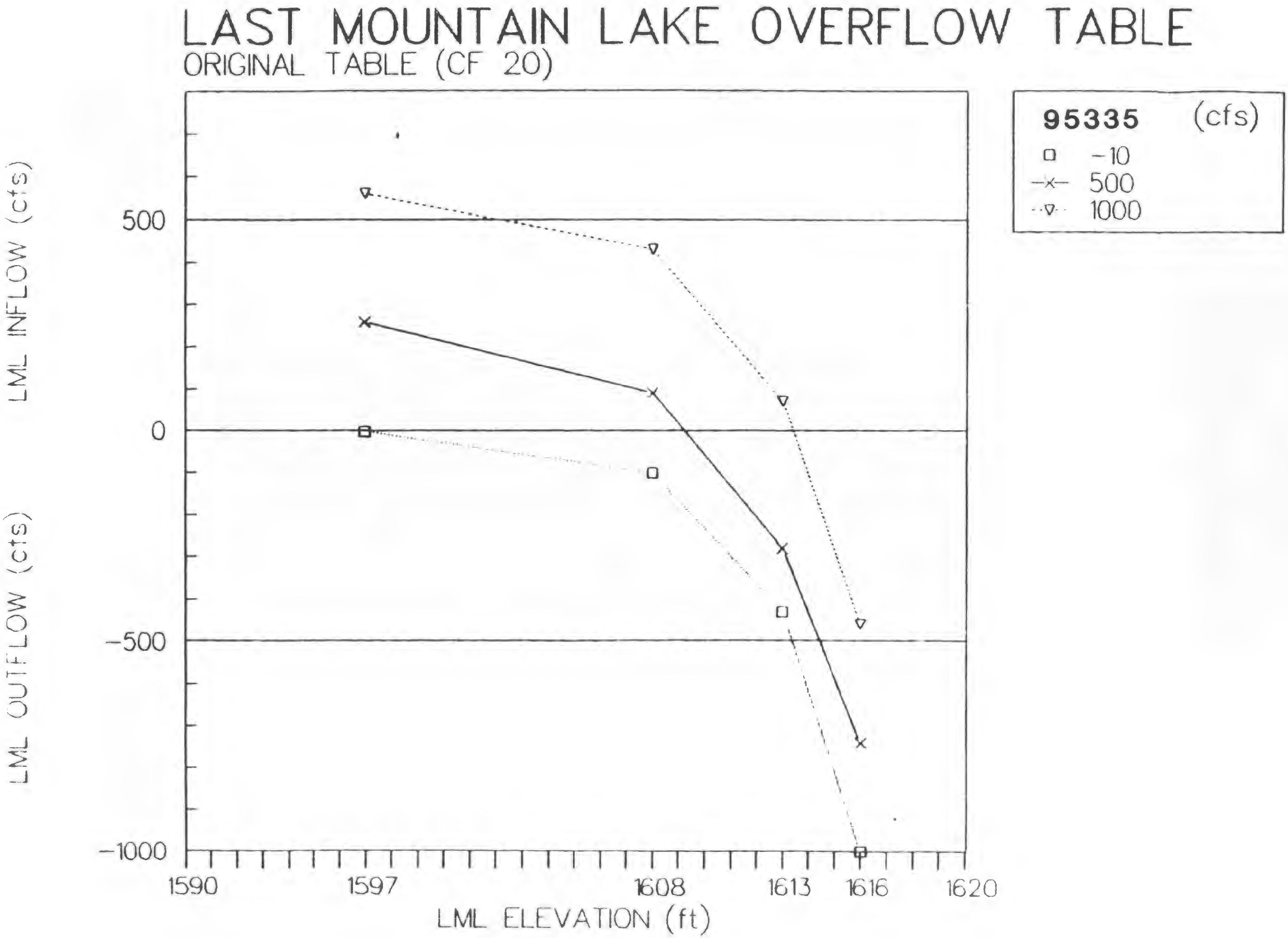

LAST MOUNTAIN LAKE OVERFLOW TABLE
ORIGINAL TABLE (CF 20)
95335 (cfs)
−10
500
1000
LML INFLOW (cfs)
LML OUTFLOW (cfs)
500
0
−500
−1000
1590
1597
1608
1613
1616
1620
LML ELEVATION (ft)

Figure 2.2-2

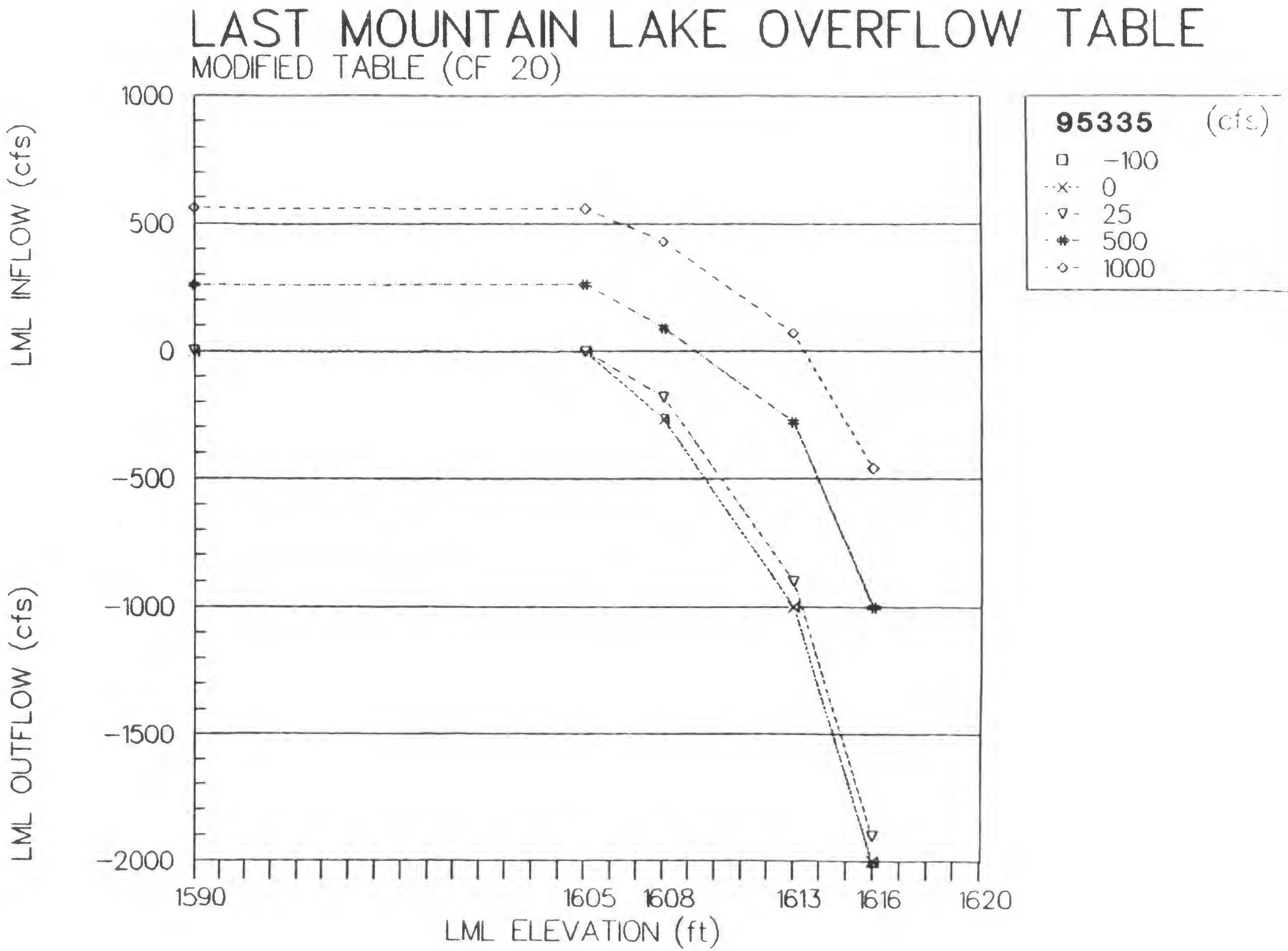

LAST MOUNTAIN LAKE OVERFLOW TABLE
MODIFIED TABLE (CF 20)
LML INFLOW (cfs)
LML OUTFLOW (cfs)
1000
500
0
-500
-1000
-1500
-2000
1590
1605
1608
1613
1616
1620
LML ELEVATION (ft)
95335 (cfs)
-100
0
25
500
1000

Figure 2.2-3

Figure 1.2-1, the only locations where works are considered to be significant enough to be incorporated into the natural flow model are in the reaches from No. 6 Highway to Pasqua Lake and immediately below Katepwa Lake. In these reaches, conveyance works completed over the period of 1980 to 1988 have significantly altered both the time of travel and overbank flow characteristics of the Qu'Appelle River.

2.3.1 Streamflow Routing

The SSARR model accounts for streamflow routing by first dividing the reach into a series of increments as specified in the CR02 record. Outflow from each increment is used as inflow to the next downstream increment. The step-by-step procedure is thus completed for each increment for each time period. The relation between time of storage and flow rate is expressed in equation (1):

$$TS = KTS/Q^n \qquad (1)$$

where TS = the time of storage per increment (hrs)

TKS = constant for the reach

Q = flow rate (cfs)

n = a coefficient between -1 and 1

The values for KTS and n are specified in the input file in CR02 records. In estimating the effect of constructing loop cutoffs and streamflow time of travel, it was assumed the time of travel was reduced by the same proportion as the resulting reduction of stream length. This assumption does not account for any increase in velocity due to the increase in channel slope; however, because time of travel is not a crucial factor in determining the natural flow volume, it was determined to be sufficient.

Using travel times obtained from the Report on Stream Time of Travel, Upper Qu'Appelle River (Water Survey of Canada, 1973) new routing parameters for the reaches between Highway No. 6 and Pasqua Lake and below Katepwa Lake were estimated. These new parameters are shown in Table 2.3.1-1.

TABLE 2.3.1-1

ROUTING PARAMETERS FOR
PRE- AND POST-CONVEYANCE CONDITIONS

Channel Characteristic	Hwy #6 to Loon Creek		Loon Creek to Pasqua Lake		Below Katepwa Lake	
	Pre-1988	Post-1988	Pre-1987	Post-1987	Pre-1980	Post-1980
Channel Length *(km)	27.1	20.8	29.5	19.3	29.5	27.0
Channel Capacity**(cfs)	150	500	300	500	150	500
No.SSARR Routing Segments (n)	5	5	2	2	8	8
KTS	204	157	255	167	64.6	59
n	0.491	0.491	0.553	0.553	0.350	0.350
Overbank Flow CT Table	34	37	32	37	34	37

* Source: Qu'Appelle River Conveyance Project, Post Construction Plans, February 1988

** Source: Qu'Appelle River System and Operation, Technical Document, Qu'Appelle Valley Management Board, 1977

2.3.2 Overbank Flow

In analyzing and checking the new routing parameters, it was discovered that the original method of handling overbank flow does not work as originally intended. The streamflow is split into channel flow and overbank flow as specified in the CT records. However, because no outflow is specified in the elevation/storage/outflow relationship (Cl records) for the overbank reservoirs, the entire overbank flow is passed directly through the overbank reservoir and added back to the channel flow. Thus, the original overbank flow mechanism had no net effect on simulated flows.

The elevation/storage/outflow relationship (Cl records) table for each existing overbank reservoir, and for the new overbank reservoir which was incorporated into the model for the reach from below Loon Creek to Pasqua Lake, were modified in the following manner. Total simulated flow is split into channel and overbank flow as specified in the CT records. The overbank flow would flow into the overbank reservoir, increasing its storage. The elevation of the overbank reservoir would thus increase and outflow from the overbank reservoir would occur as specified in the elevation/outflow table. As the total streamflow recedes to the point where the main channel is capable of handling the entire flow, inflow into the overbank reservoir ceases, however, outflow from the overbank reservoir continues, dropping the storage to the point where flow out of the reservoir began. The volume of water remaining in the overbank reservoir was set equal to the amount of overbank flow lost to infiltration which was estimated to be the area of the reach valley bottom multiplied by a depth of infiltration. When estimating water use of backflood operations, the depth of infiltration used by the Saskatchewan Water Corporation ranges from four inches to eight inches. The depth of overbank flow assumed to be lost to infiltration in the Qu'Appelle River Valley due to overbank flow was six inches. The area of valley bottom of each reach was obtained using 1:50000 Energy, Mines and Resources topographic maps. Table 2.3.2-1 summarizes the overbank reservoir characteristics.

TABLE 2.3.2-1

OVERBANK FLOW RESERVOIR CHARACTERISTICS

Overbank Reservoir SSARR No.	Reach Valley Bottom Area (acre)	Volume of Infiltration* (acre-feet)
4236	8600	4300
6016	6500	3250
6976	5000	2500
7016	5000	2500
7546	7000	3500
7576	6000	3000
7626	3000	1500
7816	5200	2600
7951	6000	3000

* Based on a 6-inch infiltration depth.

2.4 Reservoir Regulation

In the existing conditions limb of the original spring and summer portion of the Qu'Appelle River Natural Flow Model, all lakes are simulated with the lake outlet structures wide open for the entire period. This is not a reasonable simulation of the existing conditions as in all but extremely high runoff years, the outlet structures are operated so as to maintain optimum lake elevations and meet downstream demands.

The SSARR model has the ability to simulate reservoir operations. This internal method of reservoir operation simulation forces reservoir elevations to equal specified elevations on specified dates using 6S records. This method of simulating the reservoir regulation was tested to determine if it is suitable for incorporation into the Qu'Appelle River Natural Flow Model.

When using this method of simulating reservoir regulation, the model calculates a lake outflow by completing a water balance on the lake. Using the net lake inflow and the change in lake storage, which is calculated using the change in recorded elevation, the lake outflow is calculated. Unfortunately, due to the size of the lakes in the Qu'Appelle River Valley, even small changes in the recorded elevation indicate relatively large changes in lake storage, resulting in a large simulated lake outflow or inflow.

Thus, even minor anomalies in the recorded lake elevation data caused by wind set-up or any other factor which affects the accuracy and precision of recorded elevation data, have a major effect on the accuracy of the simulated lake outflows. Figure 2.4-1 shows the outflow of Echo Lake simulated using 6D reservoir regulation records. This figure shows the exaggerated oscillation in the simulated lake outflow which results when this method of reservoir regulation is used. Lake outflows simulated using this method are obviously not a reasonable simulation of actual conditions. Thus, specifying lake elevations using 6D regulation records was not found o be a suitable method of simulating reservoir regulation.

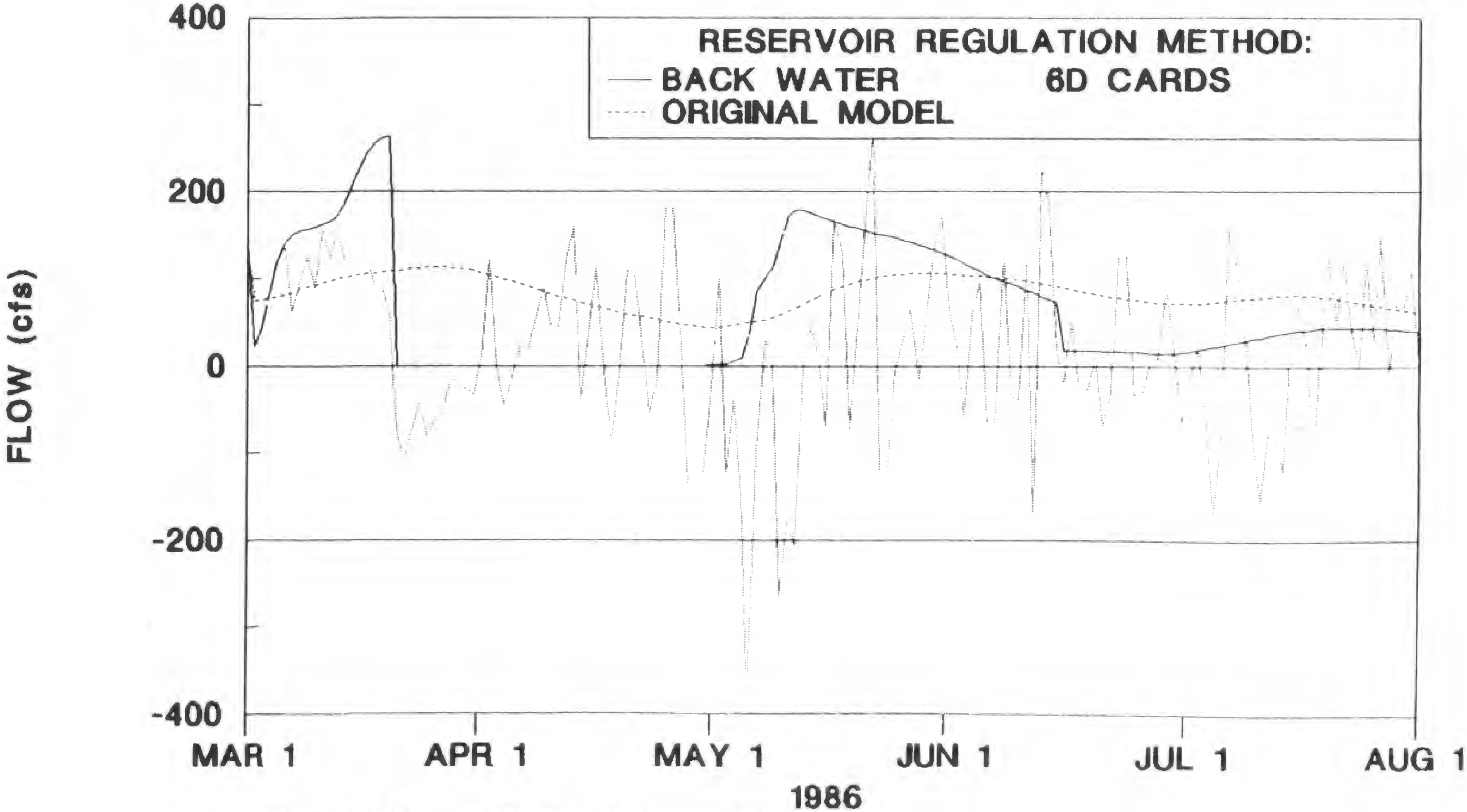
Lake outlet structures operations have the effect of changing the lake elevation/outflow curve. The SSARR model has the ability to alter the elevation/outflow relationship with the use of backwater control records. This method utilizes a three-variable relationship between the lake elevation, the downstream control (either a flow or an elevation) and outflow from the lake.

This backwater control option is used in both the natural and existing conditions limbs to simulate the backwater effect caused by high tributary flows entering immediately below a lake outlet. In the existing conditions limb of the modified model, a backwater effect was used to simulate reservoir regulation. The downstream controlling factor was changed from tributary inflow to the elevation of a dummy reservoir. The elevation of the dummy reservoir was then set equal to the elevation of the outlet structure to simulate outlet structure operations. When the logs in the various bays in an outlet structure are set at differing elevations, the dummy reservoir is set to the elevation of the lowest bay.

The SSARR model allows only one backwater control station so in the case of Echo Lake and Crooked Lake, the backwater effects of Katepwa Lake and Ekapo Creek, respectively, must be simulated using the outlet elevation of the dummy reservoirs.

ECHO LAKE OUTFLOW

COMPARISON OF OUTFLOWS SIMULATED BY EXISTING CONDITIONS LIMB OF MODEL



1. March 20, 1986 - Stoplogs raised to elevation 1571.23 ft
2. June 15, 1986 - Stoplogs raised to elevation 1571.52 ft

Figure 2.4-1

Releases made through the gates at the Echo and Katepwa Lake outlets are simulated by adding a flow equal to the actual release to the lake outflow and subtracting it from the respective lake storage. The riparian release, including flow over the fish ladder, must be specified with 6D records.

Figure 2.4-1 shows Echo Lake outflow simulated by the existing conditions limb of the model using the different methods of reservoir regulation. This figure shows the backwater method best simulates the affect of structure operations on reservoir outflow.

The modified model configuration charts in Figures 2-4 and 2-6 (Pages 15 and 17) show how reservoir regulation has been incorporated into the existing conditions limb of the Qu'Appelle River Natural Flow Model.

2.5 Lake Evaporation

The original spring and summer portion of the Qu'Appelle River Natural Flow Model compensated for lake evaporation with a net inflow residual factor on all lakes within the Qu'Appelle River basin (with the exception of Eyebrow Lake and Buffalo Pound Lake). The net inflow residual factor was calculated using the change in lake storage which was calculated using recorded month-end lake elevations. The problem with this method of handling evaporation is that there is no compensation for the increased evaporation due to the present lake surfaces being larger than natural due to higher lake levels caused by the man-made outlet structures.

In the modified natural flow model, lake evaporation is based on the net evaporation estimated for the geographical location of the lake and the lake surface area. The recorded lake elevation is used to estimate the lake surface area on the existing conditions limb of the model. An iterative process is used to determine natural lake elevations used to estimate lake surface area on the natural conditions limb of the model.

Net evaporation for each lake was estimated by subtracting monthly precipitation data recorded at precipitation stations in the vicinity of the lake, from monthly gross evaporation data estimated for the geographic location of the lake. Mean monthly gross evaporation data was estimated by transferring gross evaporation data from Regina to the various lake locations. Gross evaporation data estimated by PFRA using the Meyer Equation was used (PFRA Hydrology Report #121).

Table 2.5-1 lists the precipitation stations, gross evaporation stations and transfer ratios used to estimate the net evaporation at each respective lake in the Qu'Appelle Valley.

TABLE 2.5-1

ESTIMATION OF NET EVAPORATION IN QU'APPELLE RIVER BASIN

Lake	Gross Evaporation Station	Transfer Factor	Precipitation* Stations	SSARR
Eyebrow Lake & Buffalo Pound Lake	Regina	1.0	Buffalo Pound, Marquis, Moose Jaw	1111
Last Mountain Lake	Regina	1.0	Rowan's Ravine, L.M.L. Wildlife, Lumsden, Regina	2222
Fishing Lakes	Regina	0.93	Fort Qu'Appelle, Lebret, Indian Head	7176
Crooked Lake & Round Lake	Regina	0.93	Crooked Lake, Whitehead, Broadview	7668

* Precipitation stations are listed in order of preference.

The configuration charts shown in Figures 2-1, 2-2, 2-4 and 2-6 (Pages 12, 13, 15 and 17) show how evaporation was incorporated into the spring and summer portion of the model.

In the case of Last Mountain Lake, because the net inflow residual contains existing condition evaporation, it is necessary to add back the estimated existing condition evaporation, then subtract the natural conditions evaporation from the natural lake storage.

The method in which evaporation is accounted for in the fall and winter portion of the Qu'Appelle River Natural Flow Model was also modified such that lake evaporation is based on the net evaporation estimated for the geographic location of the lake and the simulated natural lake area of each respective lake. The model configuration charts shown in Figures 2-7, 2-8, 2-9 and 2-10 (Pages 18 to 21) show how lake evaporation was incorporated into the fall and winter portion of the model.

2.6 Local Inflow

The method used by the original Qu'Appelle River Natural Flow Model to compensate for local inflow is described in detail in the report on the original natural flow model. Briefly, the original model estimated ungauged inflow by routing a recorded inflow through a reach. The routed outflow was then subtracted from the recorded outflow. The difference between the routed and recorded outflow was considered to be the net ungauged inflow. The problem with this method is that there was no way to check the accuracy of the simulation. Elevations and flows simulated with the existing conditions limb could not be meaningfully compared to recorded data because they were simulated without local inflow.

The Qu'Appelle River Natural Flow Model was modified to estimate local ungauged inflow by transferring flows recorded at representative hydrometric streamflow stations using drainage area ratios. This estimated local inflow was included at key locations throughout the model so that simulation results could be compared with actual recorded data. Table 2.6-1 lists the reaches for which local inflow was incorporated. Also shown in this table are the ungauged areas and the recording station which was used to estimate the local inflow and the respective effective and gross drainage area ratios.

The configuration charts shown in Figures 2-1 to Figure 2-6 (Pages 12 to 17) show where ungauged local inflows are incorporated into the natural flow model.

TABLE 2.6-1

ESTIMATION OF UNGAUGED LOCAL INFLOW

Ungauged Location	GDA (km^2)	EDA (km^2)	Transfer Station	GDA Ratio	EDA Ratio	SSARR Station
Above Eyebrow L.	1086	176	Ridge Cr. Nr. Bridgeford 05JG013	2.36	1.07	31101
Above Buffalo Pound	688	340	Q.R. Ab. Buffalo Pound (Natural 1600)	0.26	0.39	31700
MJR Nr. Burdick to BP	215	136	MJR Nr. Burdick 05JE006	0.02	0.04	32501
Q.R. below Moose Jaw R. to Q.R. Nr. Lumsden	880	403	Boggy Cr. Nr. Lumsden 05JF006	2.19	1.29	34122
Q.R. Nr. Lumsden to Q.R. below Flying Cr.	746	605	Boggy Cr. Nr. Lumsden 05JF006	0.86	0.95	35350
Q.R. below Loon Cr. to Echo Lake Outlet	3047	940	Indianhead Cr. Nr. Indian Head 05JL002	9.32	5.00	37199
Q.R. below Echo L. to Katepwa L. Outlet	982	435	Indianhead Cr. Nr. Indian Head 05JL002	3.00	2.31	37399
Q.R. below Katepwa L. to Q.R. at Hyde	3239	1496	Indianhead Cr. Nr. Indian Head 05JL002	9.91	7.96	37565
Q.R. at Hyde to Crooked L. Outlet	1002	420	Ekapo Cr. Nr. Marieval 05JM010	0.91	0.95	37699
Q.R. below Katepwa L. to Round L. Outlet	1452	724	Ekapo Cr. Nr. Marieval 05JM010	0.32	0.64	37799
Q.R. below Round L. to Q.R. near Welby	4224	1814	Cutarm Cr. Nr. Spyhill 05JM015	4.49	3.56	37899

Note: GDA - gross drainage area
EDA - effective drainage area

Source of Drainage Areas - PFRA Hydrology Report #104, January 1988

The estimated return period of the year being simulated is specified using 6S records. The model calculates the ungauged local inflow using the recorded flow of the specified control station, the specified return period and the calculated transfer ratio specified in three-dimensional tables (6F records).

The model uses the effective drainage area ratio to transfer flows in runoff events less than or equal to a 1:2 runoff event. The gross drainage area ratio is used to transfer flows in runoff events larger than or equal to a 1:500 runoff event. The model linearly interpolates between the EDA ratio and the GDA ratio for events between the 1:2 and the 1:500 runoff events. The above relationships are incorporated into the model using three-dimensional tables (CF records).

With these local inflows included, the flows and elevations simulated by the existing conditions limb of the model can now be better compared with the recorded data. In this way, the accuracy of the model simulation can be determined.

Reach outflows simulated in the existing conditions limb of the model are subtracted from the respective recorded flows. The difference in flow is a combination of groundwater inflow or outflow and a correction of the estimated ungauged inflow. This groundwater and ungauged inflow adjustment is then added to the natural flow limb. In all reaches, with the exception of the Loon Creek to below Katepwa Lake reach, the groundwater inflow and ungauged inflow adjustment is added to the outflow simulated in the corresponding natural flow limb. In the Loon Creek to below Katepwa Lake reach, the groundwater inflow and ungauged inflow adjustment is added to the natural flow limb, half above Echo Lake and half above Katepwa Lake. In this way, the adjustment is added directly to the actual location where the groundwater inflow and ungauged inflow most likely occur.

2.7 Groundwater Inflow

Groundwater is an important component of the Qu'Appelle River hydrologic regime. The report prepared by the Qu'Appelle Basin Study Board estimated the Qu'Appelle River system receives an estimated 40000 acre-feet (49340 dam^3) of water annually from groundwater (Report of the Qu'Appelle Basin Study Board, Canada - Saskatchewan - Manitoba, 1972). The major source of groundwater discharge into the Qu'Appelle River Valley is the Hatfield Valley Aquifer (Fort Qu'Appelle Geology, Saskatchewan Research Council, 1977).

In the spring runoff portion of the original Qu'Appelle River Natural Flow Model (Q12), the effect of groundwater is accounted for in the net inflow factor calculated for Last Mountain Lake and in the groundwater and ungauged inflow adjustment factor in the Fishing Lakes. There is not, however, any compensation for groundwater inflow into either Last Mountain Lake or the Fishing Lakes in the fall and winter portion of the original natural flow model. The original fall and winter model simply started the lakes at the August 1 elevation, simulated by the spring and summer model, and routed them through the fall and winter months. The original model assumed no tributary inflow and no groundwater inflow in the fall and winter period.

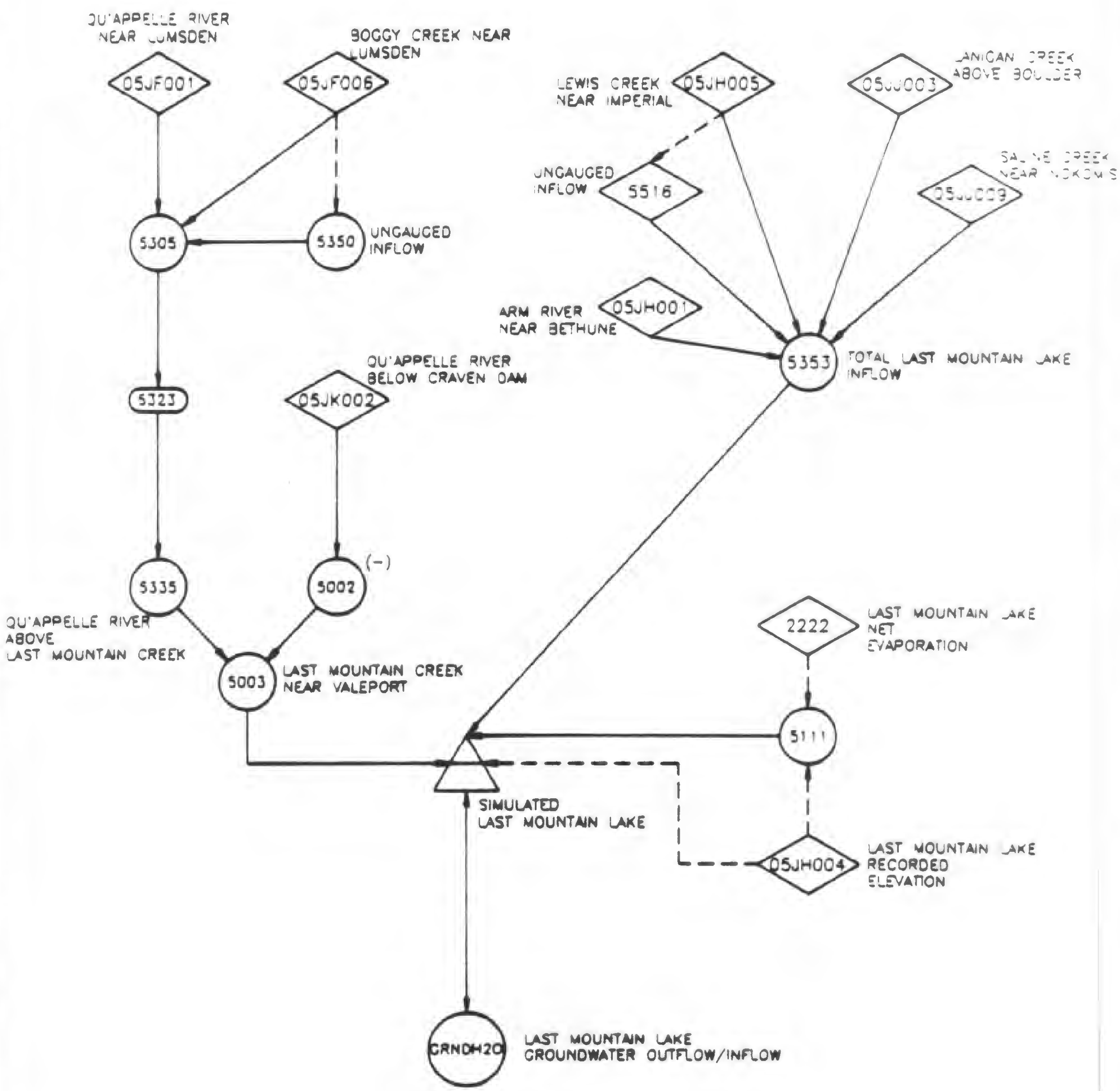
Water balances were carried out on Last Mountain Lake and the Fishing Lakes to determine the amount of groundwater inflow into these lakes during the fall and winter period.

2.7.1 Last Mountain Lake

Two separate water balances were carried out on Last Mountain Lake to determine the amount of groundwater inflow into Last Mountain Lake. The first method consisted of completing a daily water balance on Last Mountain Lake for the Period of 1975 to 1986. The second method of analysis consisted of completing a monthly water balance for the months of December and January over the period of 1975 to 1988. The following two sections discuss each water balance method in detail.

2.7.1.1 Method I - Daily Water Balance

The SSARR model was used to simulate groundwater inflow into Last Mountain Lake on a daily basis for the period of 1975 to 1986. The configuration chart for the model which was developed for this purpose is shown in Figure 2.7.1.1-1. As shown in this figure, recorded tributary flows were input into Last Mountain Lake; ungauged inflow was estimated using Lewis Creek near Imperial. Evaporation from Last



LAST MOUNTAIN LAKE GROUND WATER SSARR MODEL CONFIGURATION CHART

Figure 2.7.1.1-1

Mountain Lake was estimated using the recorded lake elevation and mean monthly net evaporation estimated for the Last Mountain Lake area; the net flow in Last Mountain Creek was estimated by subtracting the recorded flow below Craven Dam from the estimated flow in the Qu'Appelle River above Last Mountain Creek. The simulated elevation of Last Mountain Lake was forced to equal the actual recorded elevation. The SSARR model then calculated the daily lake outflow required to satisfy the water balance. This calculated daily outflow is attributed to groundwater flow.

The daily groundwater inflow rates calculated with this model were very erratic. Last Mountain Lake has a large surface area, thus even small changes in the recorded daily lake elevation indicate a relatively large change in the volume of water stored in the lake. As a result, even small inaccuracies in the recorded lake elevation data due to wind set up, recording gauge anomalies, and even rounding errors, have a significant effect on the water balance results.

Although the daily groundwater flow rates were erratic, the annual volumes of groundwater inflow into Last Mountain Lake, over the period of 1975 to 1986, that were simulated using this method were fairly consistent as shown in Figure 2.7.1.1-2. The mean annual volume of groundwater inflow into Last Mountain Lake was 41800 acre-feet/year (51560 dam^3).

LAST MOUNTAIN LAKE

SIMULATED ANNUAL GROUNDWATER INFLOW VOLUME
1975–1986

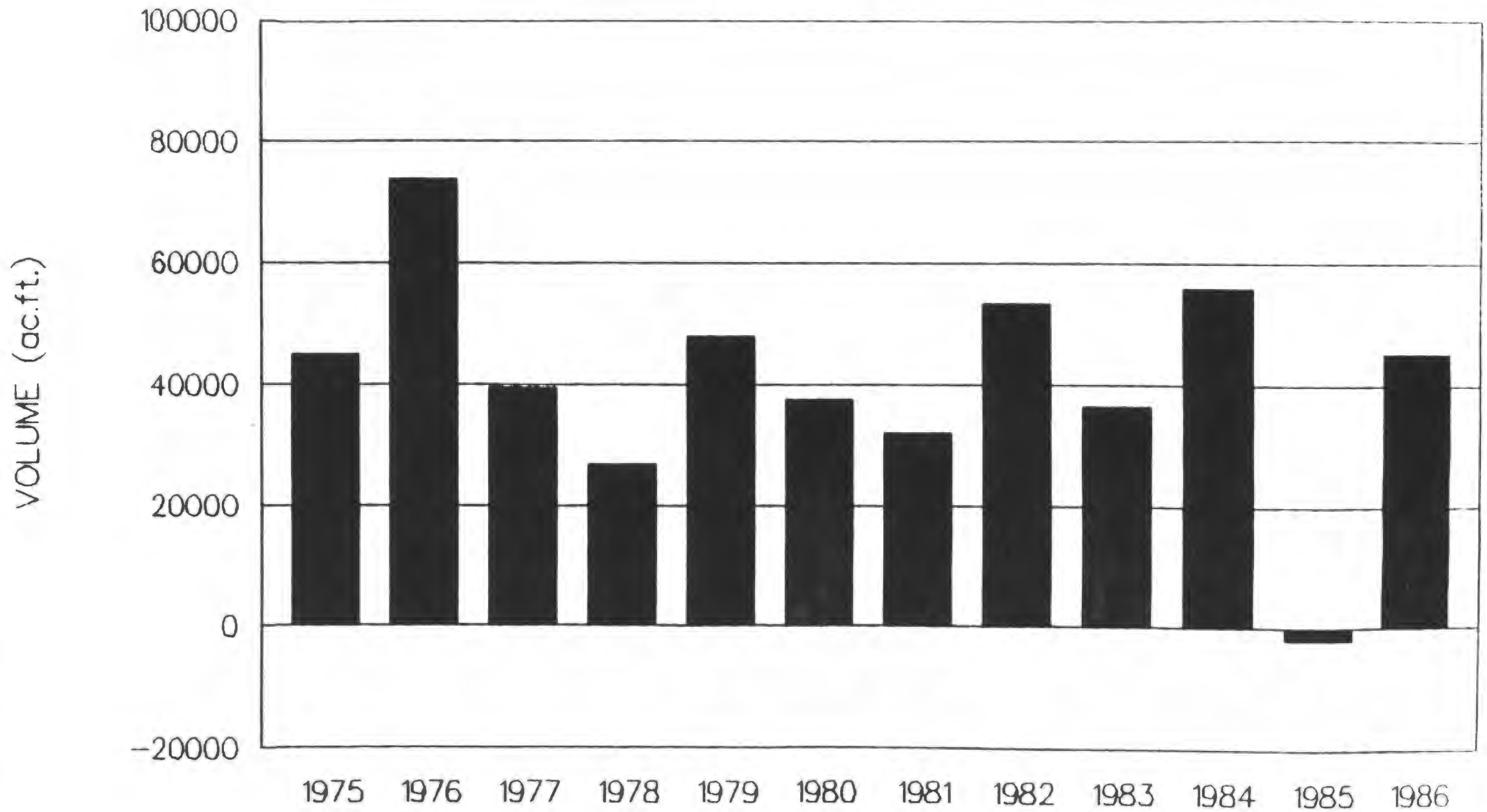


Figure 2.7.1.1-2

LAST MOUNTAIN LAKE

AVERAGE DAILY GROUNDWATER FLOW (1975 TO 1986)
30 DAY MOVING MEAN

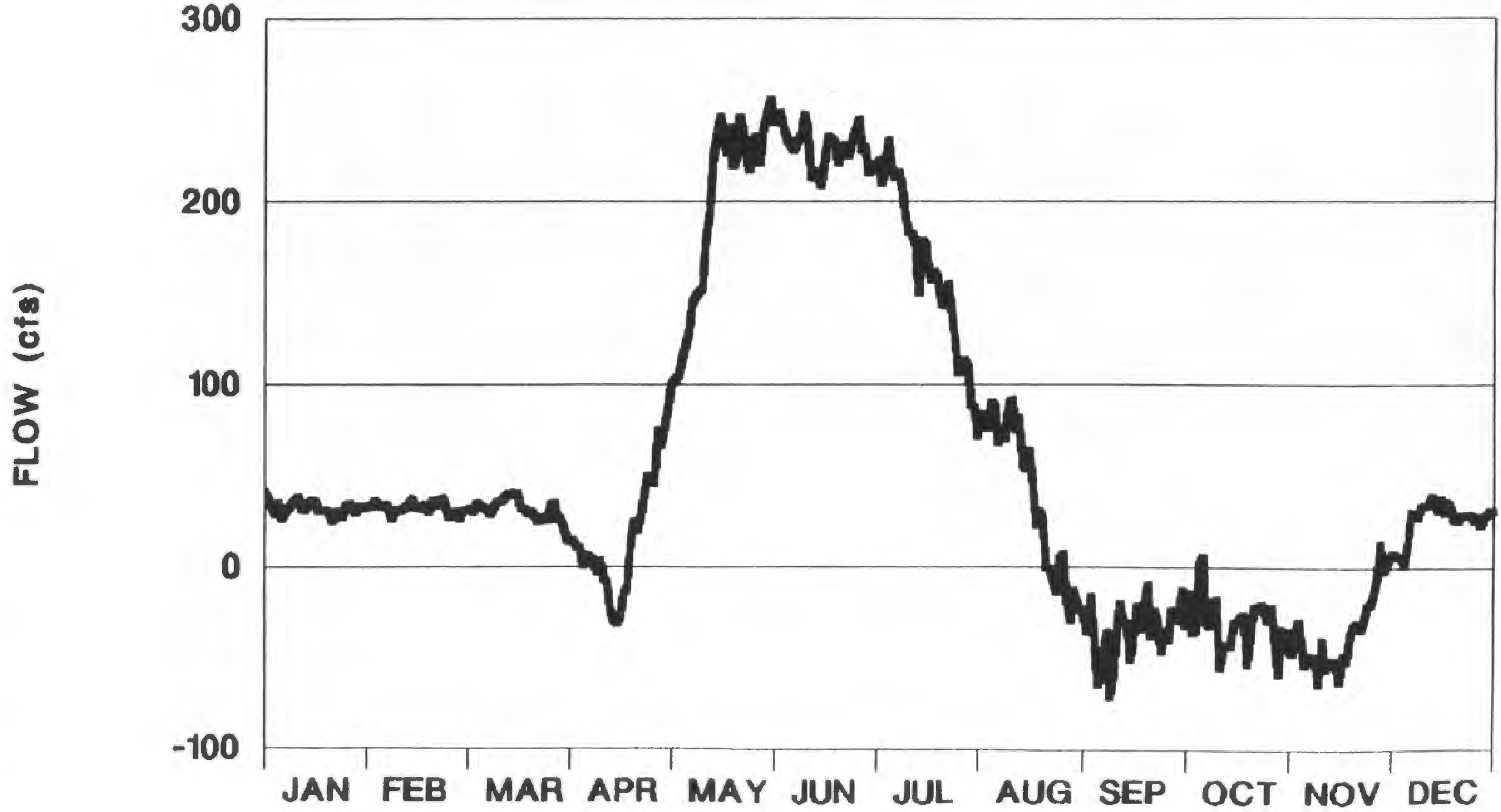


Figure 2.7.1.1-3

The average daily groundwater inflow rate for the 1975 to 1986 period is plotted in Figure 2.7.1.1-3. This figure shows that the 41800 acre-feet of groundwater inflow is not distributed evenly throughout the year. However, this figure does show the groundwater flow rate staying relatively constant over the winter period. The mean daily groundwater inflow rate into Last Mountain Lake for the months of December and January was 31.1 cfs (0.88 m^3/s). Figure 27.1.1-3 shows a dramatic increase in groundwater inflow during the summer months. It is suggested that this dramatic increase could be due inpart to an under-estimation of local inflow and/or an over-estimation of evaporation losses. However, this anomaly in the water balance during the summer months is not a concern as we are interested in obtaining a groundwater inflow estimate in the winter months only.

2.7.1.2 <u>Method II - Monthly Water Balance</u>

The second method of estimating groundwater inflow into Last Mountain Lake consisted of completing water balances on Last Mountain Lake on a monthly basis. Since groundwater inflow is accounted for in the net inflow factor in the spring and summer portion of the model, only the winter months of December and January were considered in this analysis.

LAST MOUNTAIN LAKE

MEAN DECEMBER AND JANUARY GROUNDWATER INFLOW
(DECEMBER 1975 TO JANUARY 1988)

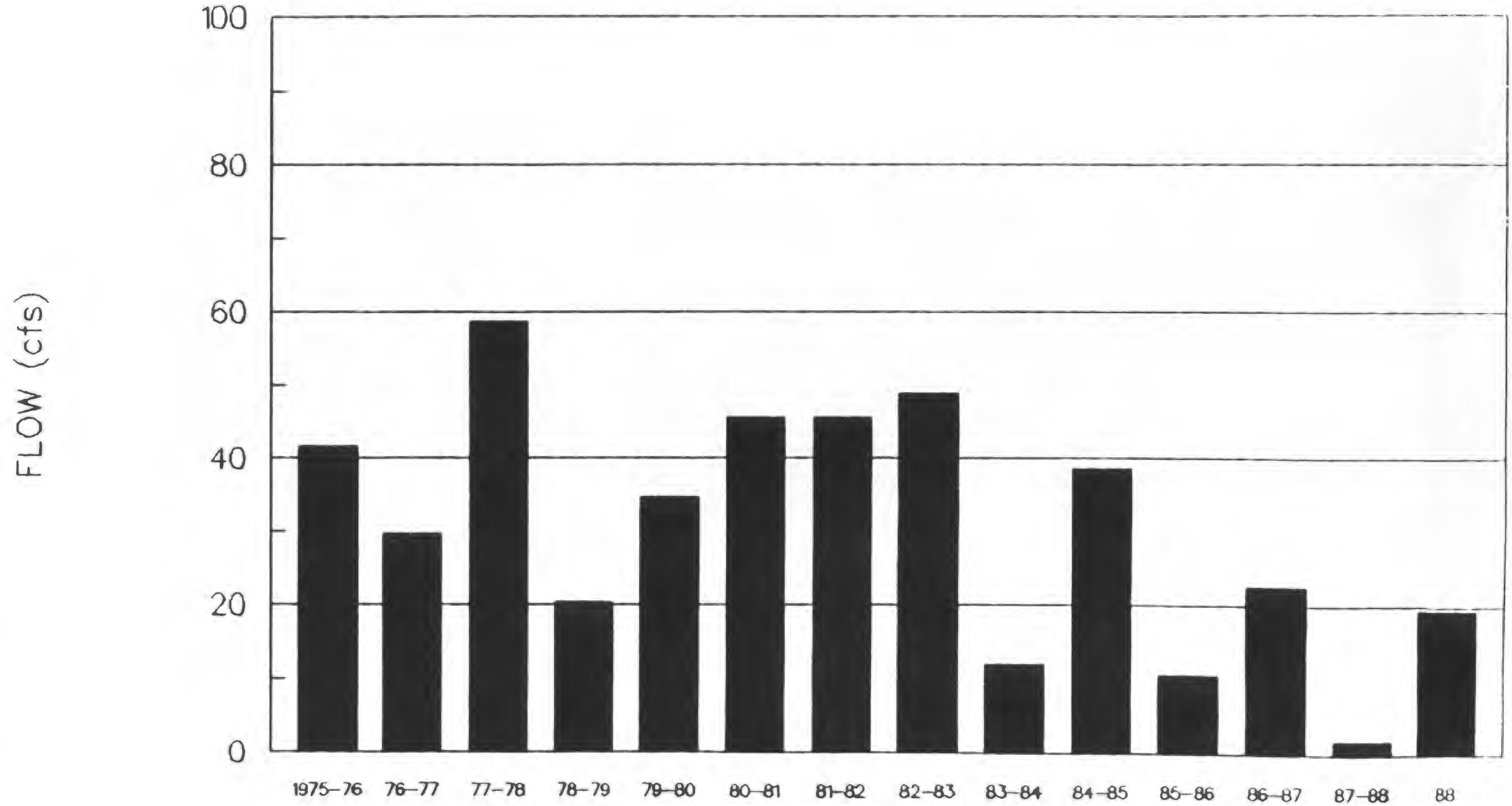


Figure 2.7.1.2-1

Using these two winter months simplified the water balance calculation because in these months both net evaporation and local inflow could be assumed to be zero. The simplified water balance, equation (2), could easily be solved to determine the monthly volume of groundwater inflow.

Groundwater Inflow = (Q.R. below Flying Creek - Q. R. below Craven) + Change in Last Mountain Storage. (2)

The mean daily rate of groundwater inflow, calculated for the months of December and January for the period of 1975 to 1988 are plotted in Figure 2.7.1.2-1. The mean daily groundwater inflow rate for the months of December and January calculated using this method was 30.8 cfs (0.87 m^3/s).

The average mean daily winter groundwater inflow into Last Mountain estimated using the two methods was 31 cfs (0.88 m^3/s). The configuration chart shown in Figure 2-7 (Page 18) shows how the 31 cfs groundwater inflow into Last Mountain Lake was incorporated into the winter portion of the modified natural flow model.

2.7.2 Fishing Lakes

In order to determine the effect of groundwater on the Fishing Lakes, a monthly water balance was completed. Since groundwater inflow into the Fishing Lakes is already accounted for in the spring and summer period, only winter months were considered in this analysis.

Using only the months of December and January simplified the water balance equation as both net evaporation and tributary inflow could be assumed to be negligible. Thus, the simplified water balance, equation (3), could easily be solved.

Groundwater Inflow = Change in Lake Storage - (Q.R. below Loon Creek - Q.R. below Katepwa Lake) (3)

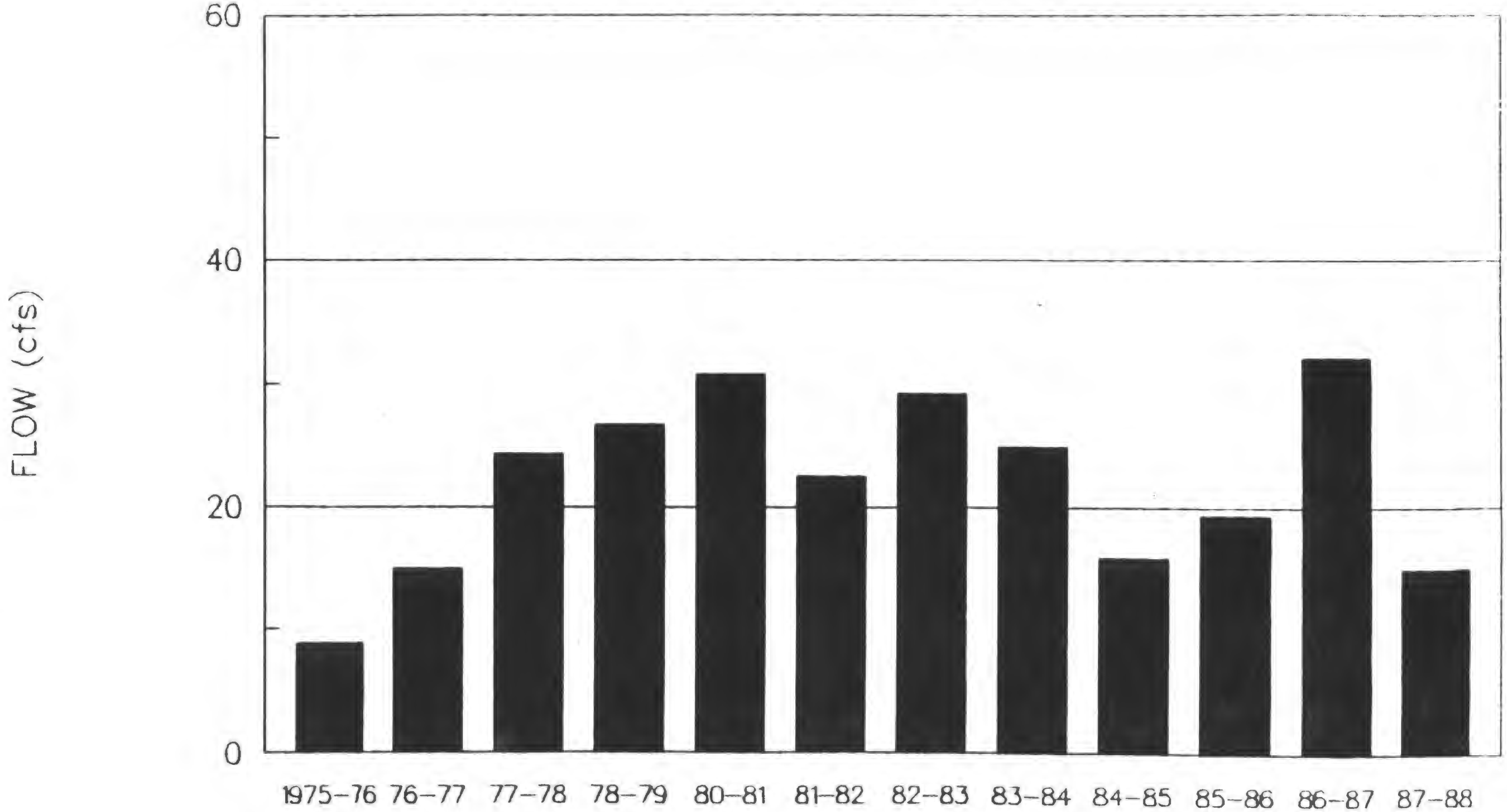
Results of the water balance for the period of 1975 to 1988 are shown in Figure 2.7.2-1. This figure shows the calculated December and January groundwater inflow relatively constant for the 1975 to 1988 period. The mean groundwater inflow rate calculated was 22 cfs (0.62 m^3/s). The model configuration chart shown in Figure 2-8 shows how the groundwater inflow into the Fishing Lakes was incorporated into the winter portion of the model. The 22 cfs groundwater inflow was split equally between Echo Lake and Katepwa Lake.

2.8 Other Modifications

During the process of completing the modifications outlined in the Memorandum of Understanding, a number of additional modifications were made to the Qu'Appelle River Natural Flow Model. These additional modifications are discussed below.

FISHING LAKES

MEAN DECEMBER AND JANUARY GROUNDWATER INFLOW
(DECEMBER 1975 TO JANUARY 1988)



NOTE : DECEMBER 1979 DATA NOT AVAILABLE

Figure 2.7.2-1

2.8.1 Summation Reservoirs

In order to make the model easier to use by reducing the number of manual calculations required, summation reservoirs were placed at a number of locations where the total volume of flow is required. Table 2.8-1 lists the locations where summation reservoirs were incorporated into the model. To avoid confusion by further complicating the model configuration charts, these summation reservoirs were not shown in Figures 2-1 to 2-10 (Pages 12 to 20).

These summation reservoirs were initialized at the beginning of each run to have zero storage. The elevation/outflow relationship for these reservoirs were set such that there is no outflow at all reservoir elevations. Thus, the volume of water stored in these reservoirs at the end of a period is equal to the total volume of flow simulated for the respective flow station. Monthly volumes of flow can be determined by merely subtracting month-end storage in the reservoir.

These summation reservoirs revealed two apparent anomalies in the SSARR program. First, flows decrease to a value of -1, not zero as would be expected. Secondly, the increase in the volume of storage in the summation reservoirs does not correspond to the inflow unless 1cfs is added to the flow.

TABLE 2.8-1

SUMMATION RESERVOIRS

Summation Reservoir Location	SSARR Station No.
Elbow Diversion	S1000
Qu'Appelle River Below Moose Jaw River - Recorded	S4000
Qu'Appelle River Below Moose Jaw River - Natural	S94000
Qu'Appelle River Near Lumsden - Recorded	S5000
- Natural	S94900
Qu'Appelle River Below Craven Dam - Recorded	S6000
Qu'Appelle River Below Craven Dam - Natural	S95999
Cumulative Evaporation - Natural Lakes	SEVPN
Cumulative Evaporation - Recorded Lakes	SEVPS
Qu'Appelle River Below Katepwa Lake - Recorded	S7500
- Simulated	S7499
- Natural	S97500
Qu'Appelle River Near Welby - Recorded	S8000
- Simulated	S7984
- Natural	S97999

2.8.2 Data Records

In analyzing the original model input files used to estimate the natural flow in the Qu'Appelle River for the years 1975 to 1988, numerous errors in the input data records were found. It is suspected that the major cause of these errors was due to a misunderstanding of the configuration of these data input records.

Man-made releases and storages and other data were often entered with 6D data records with only one data point per record, with the understanding that the model would interpolate between the specified points. The SSARR model does interpolate between specified values, however, if the number of data points on the record is not specified as was often the case, the model defaults to assume the record contains the full number data points (8 points). Thus, instead of interpolating between two intended data points, the model reads seven data points of zero flow after the first specified flow. The model then interpolates between the last zero read and the next specified data point.

When re-running the model over the 1975 to 1988 period, much of the data which must be entered manually (man-made releases, storages, LML net inflow) was taken from the original files, however, care was taken to ensure the data records were in the correct format.

2.9 Re-Running the Modified Model

2.9.1 Starting Year

In order to determine the effect of the modifications made to the Qu'Appelle River Natural Flow Model, natural flows and elevations simulated with the modified model for 1986 could not simply be compared with those simulated with the original model. Because final simulated natural lake elevations carry over as the starting simulated natural lake elevations for the following simulation run, the effects of the modifications are cumulative. Thus, it was necessary to re-run the model for a number of years, starting with the year with the last known natural lake elevation.

In 1974, a combination of precipitation accumulation and snowmelt runoff produced the flood of record in the upper Qu'Appelle River Basin. At most flow gauging stations throughout the basin, the highest annual volumes on record were recorded in 1974. Throughout the flood of 1974, control structures were left wide open in an attempt to minimize the amount of damage caused by flooding. With all control structures completely open, the effects of man-made changes to the basin were minimal, and the runoff proceeded under what can be considered as near natural conditions. With the exception of the Buffalo Pound Outlet control, all control structures remained wide open until the spring of 1975. Thus, it could be assumed that on March 1, 1975 the elevations of the lakes throughout the Qu'Appelle River Basin under natural conditions would approximately be equal to the recorded lake elevations on that date.

Buffalo Pound Lake's natural elevation was assumed to be at the natural outlet elevation on March 1, 1975.

1976 was also a high runoff year in the Qu'Appelle River Basin, and similar to 1974, all control structures were left completely open for the entire year. However, it was decided to re-run the model starting in the spring of 1975 so that the performance of the modified model in a high runoff year (1976) would be tested.

2.9.2 Modified Model Input Data Requirements

As a result of the numerous modifications made to the configuration of the original Qu'Appelle River Natural Flow Model, the data set-up requirements of the modified model are slightly different from those of the original model. Tables 2.9.2-1 and 2.9.2-2 itemize the changes in the input data requirements for the spring and summer, and fall and winter portions of the model respectively. Table 2.9.2-1 also lists the source of the additional data. The format in which these data are to be entered into the modified model are shown in the example input files found in Appendix D. When re-running the model over the 1975 to 1988 period, gross evaporation estimated by PFRA was used (Hydrology Report #121) for the entire period. When running the model for apportionment purposes in the future, average gross evaporation, published by the PFRA hydrology division should be used for the April to June apportionment report. Monthly Gross evaporation Data, estimated using Meyer's equation, should be used for the annual apportionment report.

TABLE 2.9.2-1

CHANGES IN INPUT DATA REQUIREMENTS
SPRING AND SUMMER MODEL (Q12)

SSARR Station No.	Description	Change	Source
7035	Man-Made Storage - Fishing Lakes	No Longer Required	----
97756	Man-Made Storage - Crooked Lake	No Longer Required	----
97806	Man-Made Storage - Round Lake	No Longer Required	----
27199	Outlet Structure Elevation - Echo Lake	Must be Specified with 6S Cards	PFRA, Operations Reports
27699	Outlet Structure Elevation - Crooked Lake	Must be Specified with 6S Cards	PFRA, Operations Reports
27799	Outlet Structure Elevation - Round Lake	Must be Specified with 6S Cards	PFRA, Operations Reports
47199	Riparian Release - Echo Lake	Must be Specified with 6S Cards	Sask Water
47399	Riparian Release - Katepwa Lake	Must be Specified with 6S Cards	Sask Water
7985	Cutarm Creek near Spy Hill - 05JM015 Recorded Daily Streamflow	Streamflow Data Required in 6D Form	Environment Canada, Water Resources Branch
RETPER	Estimated Return Period of Year Being Simulated	Must be Specified with 6S Cards	Sask Water
1111	Net Evaporation - Buffalo Pound	Must be Specified with 6S Cards	Environment Canada, Atmospheric Environment Service
2222	Net Evaporation - Last Mountain Lake	Must be Specified with 6S Cards	Environment Canada, Atmospheric Environment Service
7176	Net Evaporation - Fishing Lakes	Must be Specified with 6S Cards	Environment Canada, Atmospheric Environment Service
7668	Net Evaporation - Crooked and Round Lakes	Must be Specified with 6S Cards	Environment Canada, Atmospheric Environment Service
1790	Recorded Daily Elevation - Buffalo Pound	Must be Specified with 6D Cards	Environment Canada, Water Resources Branch
86000	Recorded Daily Elevation - Last Mountain	Must be Specified with 6D Cards	Environment Canada, Water Resources Branch
7200	Recorded Daily Elevation - Echo Lake	Must be Specified with 6D Cards	Environment Canada, Water Resources Branch
7350	Recorded Daily Elevation - Katepwa Lake	Must be Specified with 6D Cards	Environment Canada, Water Resources Branch
7600	Recorded Daily Elevation - Crooked Lake	Must be Specified with 6D Cards	Environment Canada, Water Resources Branch
7700	Recorded Daily Elevation - Round Lake	Must be Specified with 6D Cards	Environment Canada, Water Resources Branch

TABLE 2.9.2-2

CHANGES IN INPUT DATA REQUIREMENTS
FALL AND WINTER MODEL (Q3)

SSARR Station No.	Description	Change
1791	Buffalo Pound Aug. 1 Natural Lake Elevation	Specify Aug.1 Natural Lake Elevation with 2L Card
95549	Last Mountain Lake Aug. 1 Natural Lake Elevation	Specify Aug.1 Natural Lake Elevation with 2L Card
97197	Echo Lake Aug. 1 Natural Lake Elevation	Specify Aug.1 Natural Lake Elevation with 2L Card
97397	Katepwa Lake Aug. 1 Natural Lake Elevation	Specify Aug.1 Natural Lake Elevation with 2L Card
97697	Crooked Lake Aug. 1 Natural Lake Elevation	Specify Aug.1 Natural Lake Elevation with 2L Card
97797	Round Lake Aug. 1 Natural Lake Elevation	Specify Aug.1 Natural Lake Elevation with 2L Card
1111	Buffalo Pound Net Evaporation	Must be Specified with 6S Cards
2222	Last Mountain Lake Net Evaporation	Must be Specified with 6S Cards
7176	Fishing Lakes Net Evaporation	Must be Specified with 6S Cards
7668	Crooked & Round Lakes Net Evaporation	Must be Specified with 6S Cards

2.9.3 Procedure for Running Modified Model

Switching the model from the mainframe computer to the microcomputer version has altered the procedure for running the model. The new procedure, shown in Appendix C, was obtained by capturing messages to the microcomputer screen on a printer during a typical model running session.

Sample input files for the spring and summer, and for the fall and winter portion of the modified model are shown in Appendix D. Also found in Appendix D are sample input files which were used to specify which stations were to be included in the model outputs. Example output files obtained using the modified spring and summer and fall and winter models can be found in Appendix E.

CHAPTER III

DISCUSSION OF RESULTS

3.1 General Performance of Modified Model

When re-running the model over the 1975 to 1988 period, the simulated results for each year, for a number of key locations throughout the Qu'Appelle River Basin, were plotted to ensure the modified model was working properly. Figures 3.1-1 to 3.1-10 show the simulation results produced by the spring and summer portion of the modified model for a median runoff year (1986). These figures show simulated natural, simulated existing conditions and recorded elevations and flows for 10 key locations throughout the Qu'Appelle River Valley. These figures show the modified model simulating reasonable lake levels and streamflows for both existing and natural conditions. Similar results were obtained for all 14 years (1975 to 1988) which were simulated.

Lake elevations simulated by the existing conditions limb of the modified model are shown in Figures 3.1-5, 3.1-6, 3.1-8 and 3.1-9. These figures show the modified model simulated lake elevations which are close to actual recorded elevations. However, the simulated August 1 elevations are not exactly equal to the recorded August 1 lake elevations. The difference between the August 1 volume of water in lake storage under recorded conditions and the volume of water in lake storage under simulated conditions must be accounted for as this is water which should have been routed through the system. The volume of water in lake storage on August 1

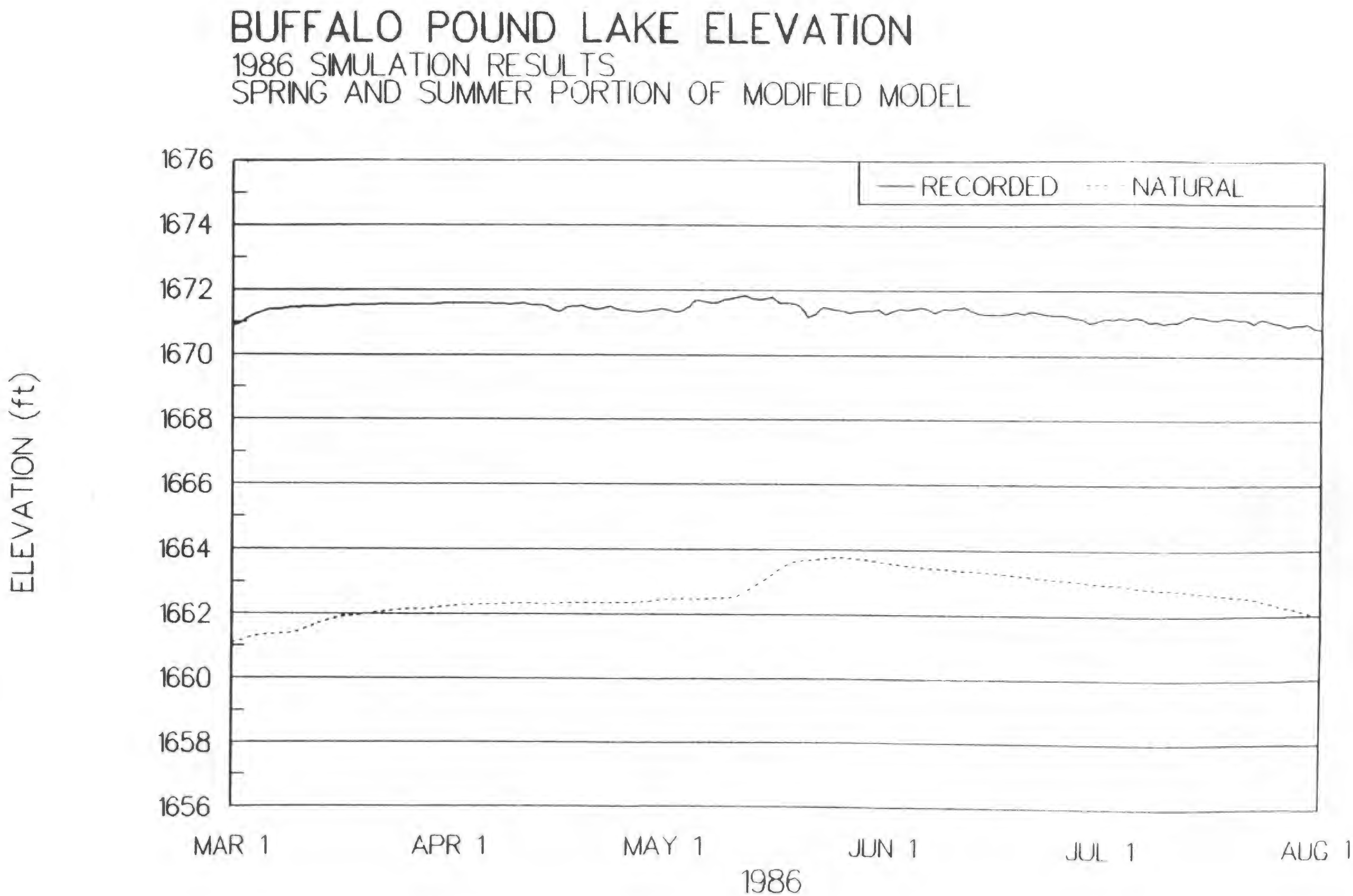

BUFFALO POUND LAKE ELEVATION
1986 SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODIFIED MODEL
RECORDED
NATURAL
ELEVATION (ft)
1676
1674
1672
1670
1668
1666
1664
1662
1660
1658
1656
MAR 1
APR 1
MAY 1
JUN 1
JUL 1
AUG 1
1986

Figure 3.1-1

QU'APPELLE RIVER BELOW MOOSE JAW RIVER

1986 SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODIFIED MODEL

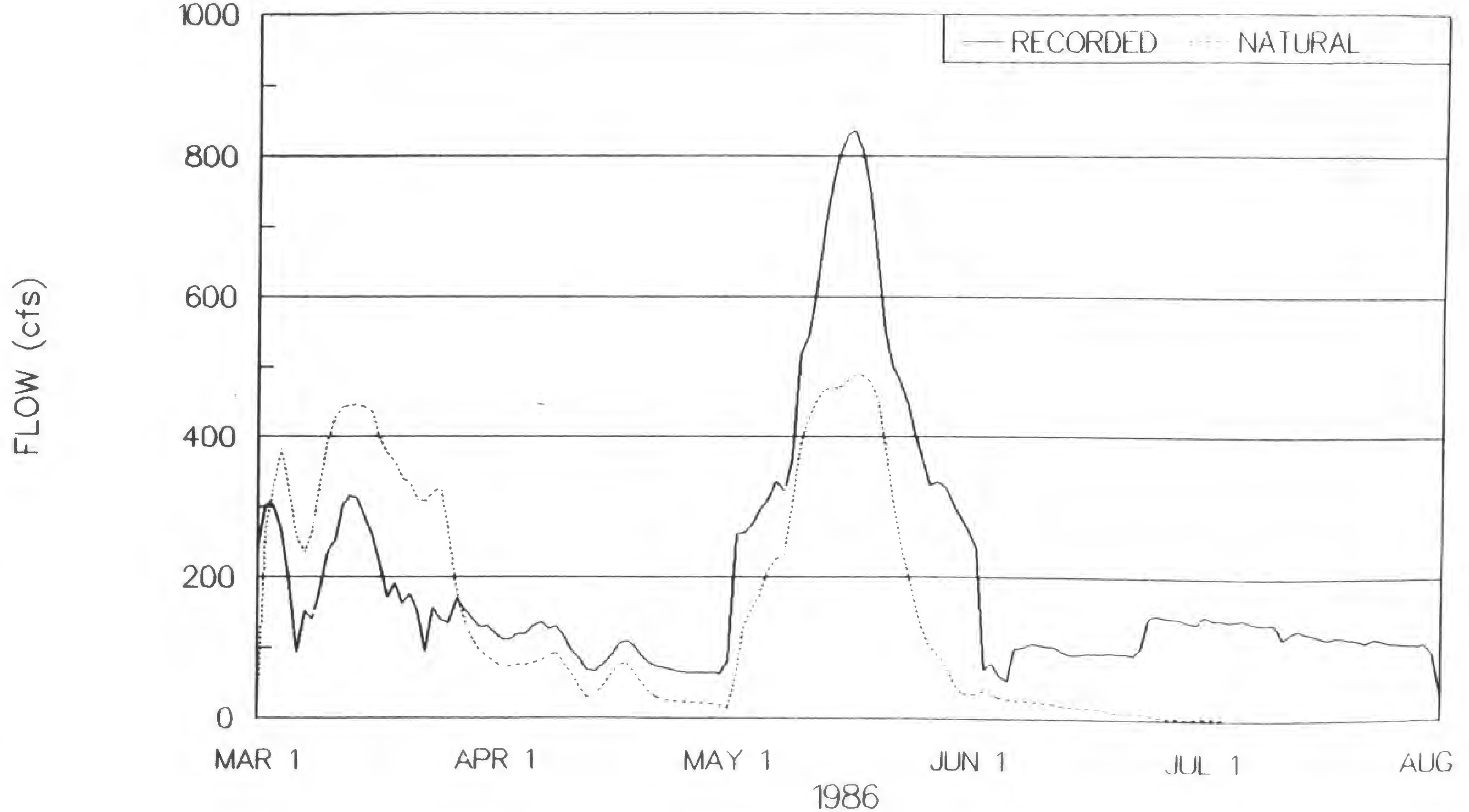


Figure 3.1-2

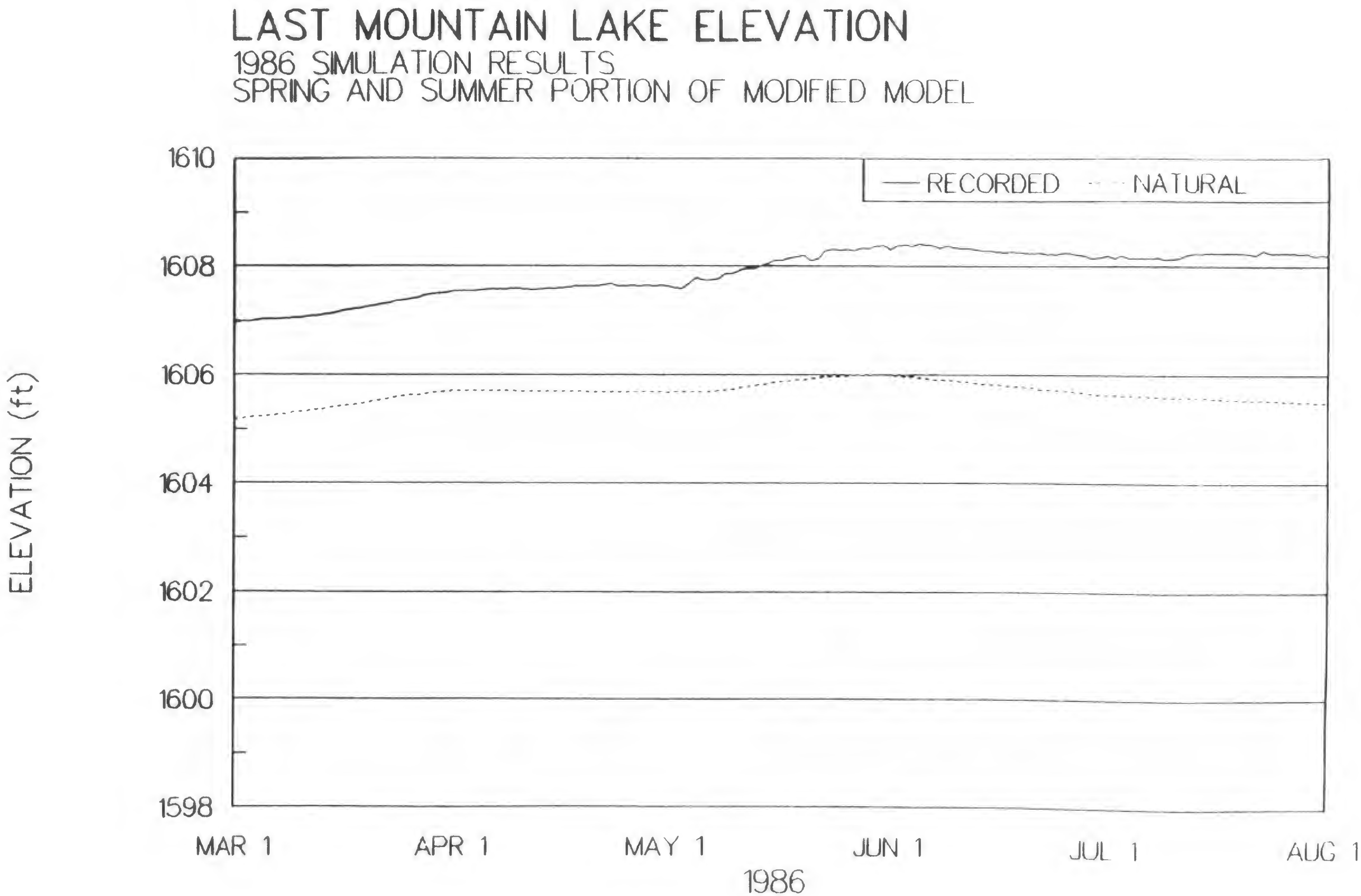

LAST MOUNTAIN LAKE ELEVATION
1986 SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODIFIED MODEL
RECORDED
NATURAL
ELEVATION (ft)
1610
1608
1606
1604
1602
1600
1598
MAR 1
APR 1
MAY 1
JUN 1
JUL 1
AUG 1
1986

Figure 3.1-3

QU'APPELLE RIVER BELOW CRAVEN DAM

1986 SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODIFIED MODEL

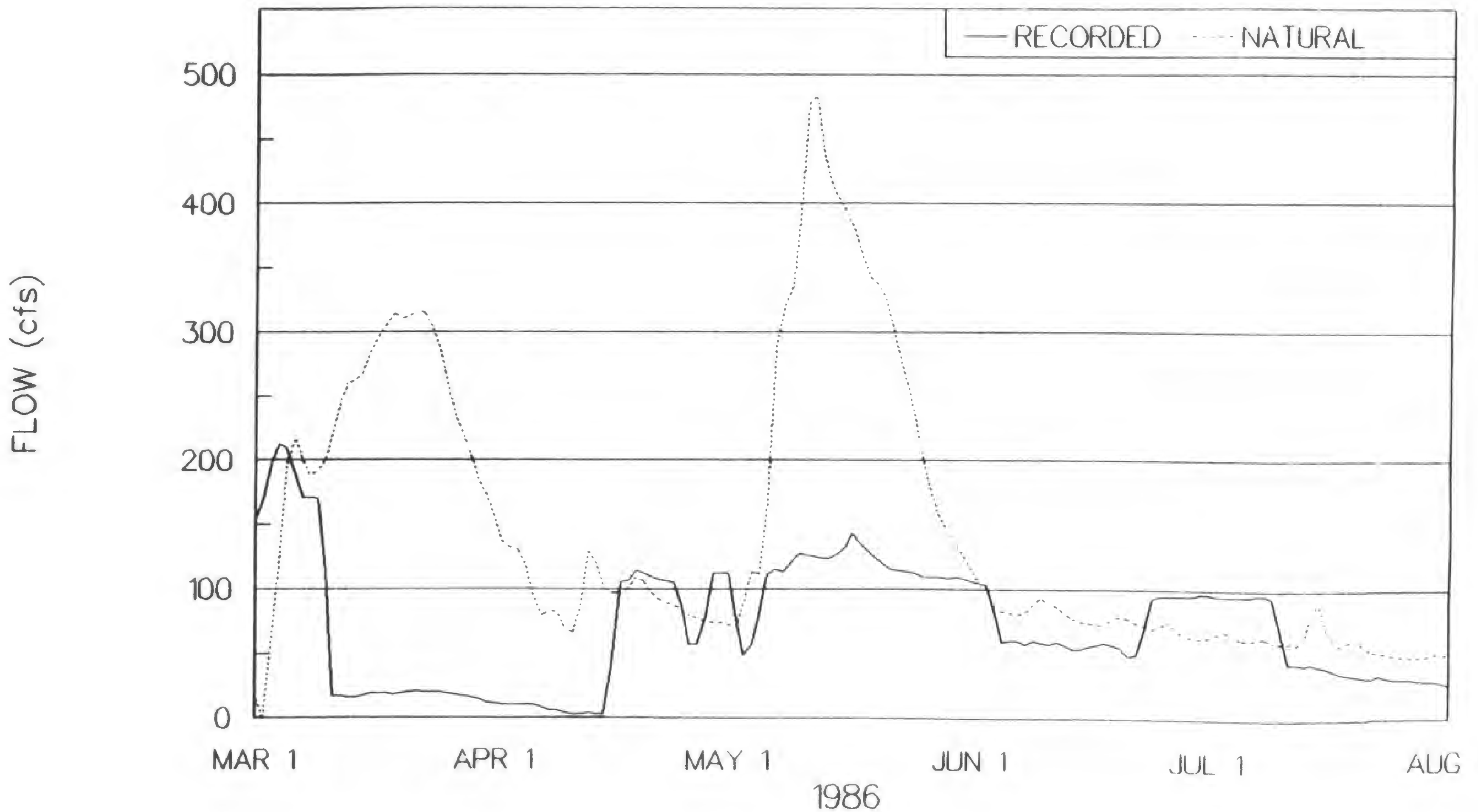


Figure 3.1-4

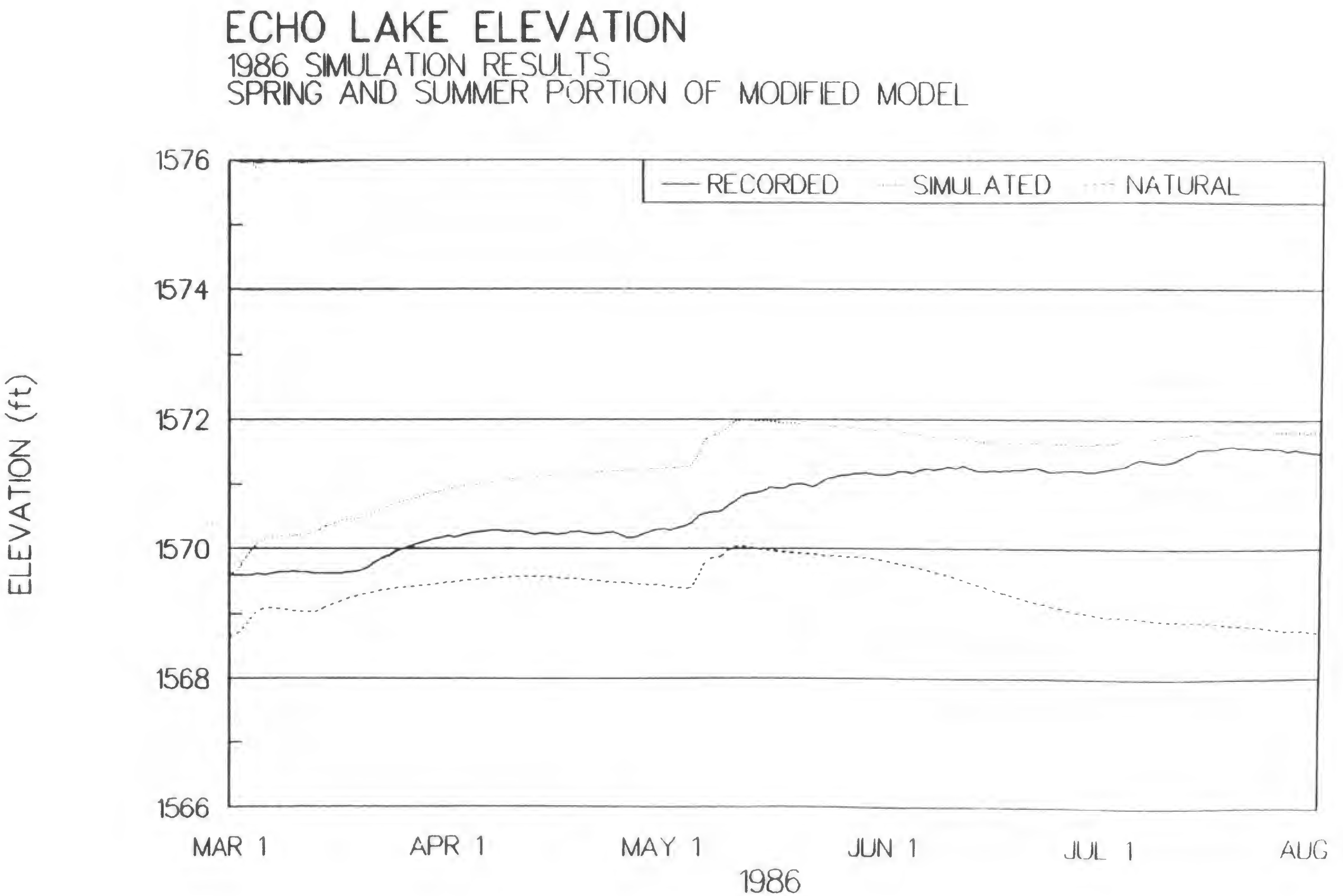

ECHO LAKE ELEVATION
1986 SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODIFIED MODEL
RECORDED
SIMULATED
NATURAL
ELEVATION (ft)
1576
1574
1572
1570
1568
1566
MAR 1
APR 1
MAY 1
JUN 1
JUL 1
AUG 1
1986

Figure 3.1-5

KATEPWA LAKE ELEVATION
1986 SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODIFIED MODEL

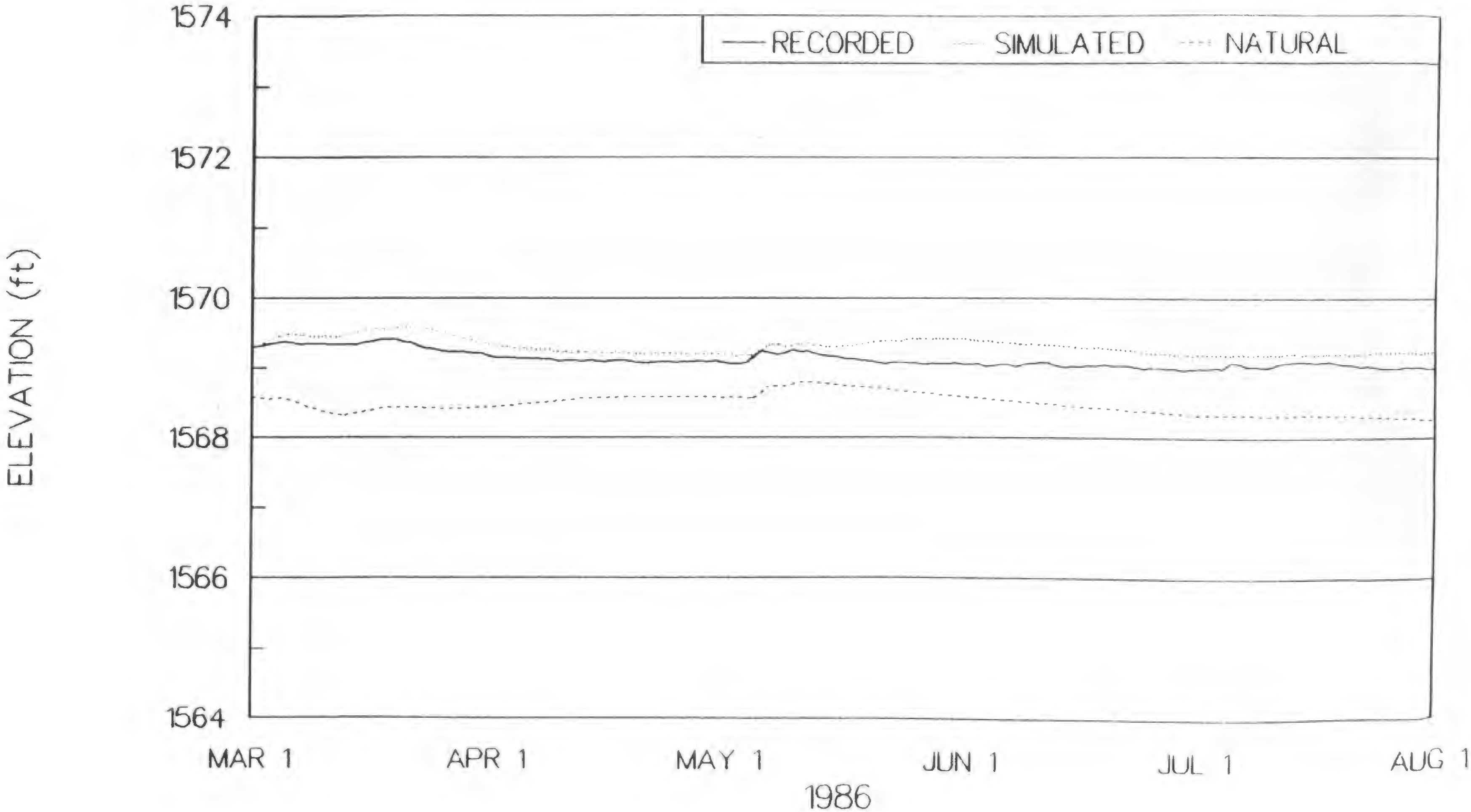


Figure 3.1-6

QU'APPELLE RIVER BELOW KATEPWA LAKE

1986 SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODIFIED MODEL

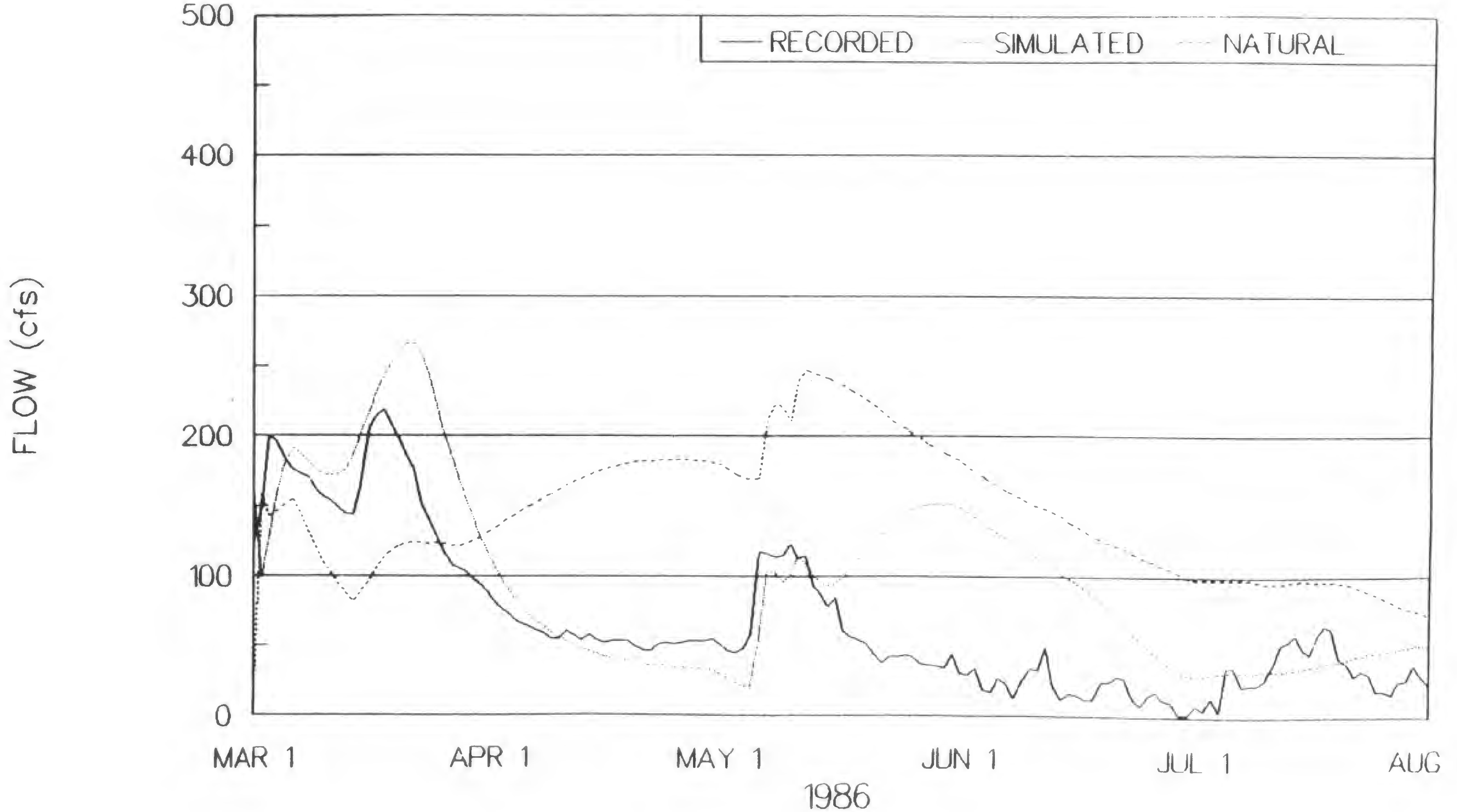


Figure 3.1-7

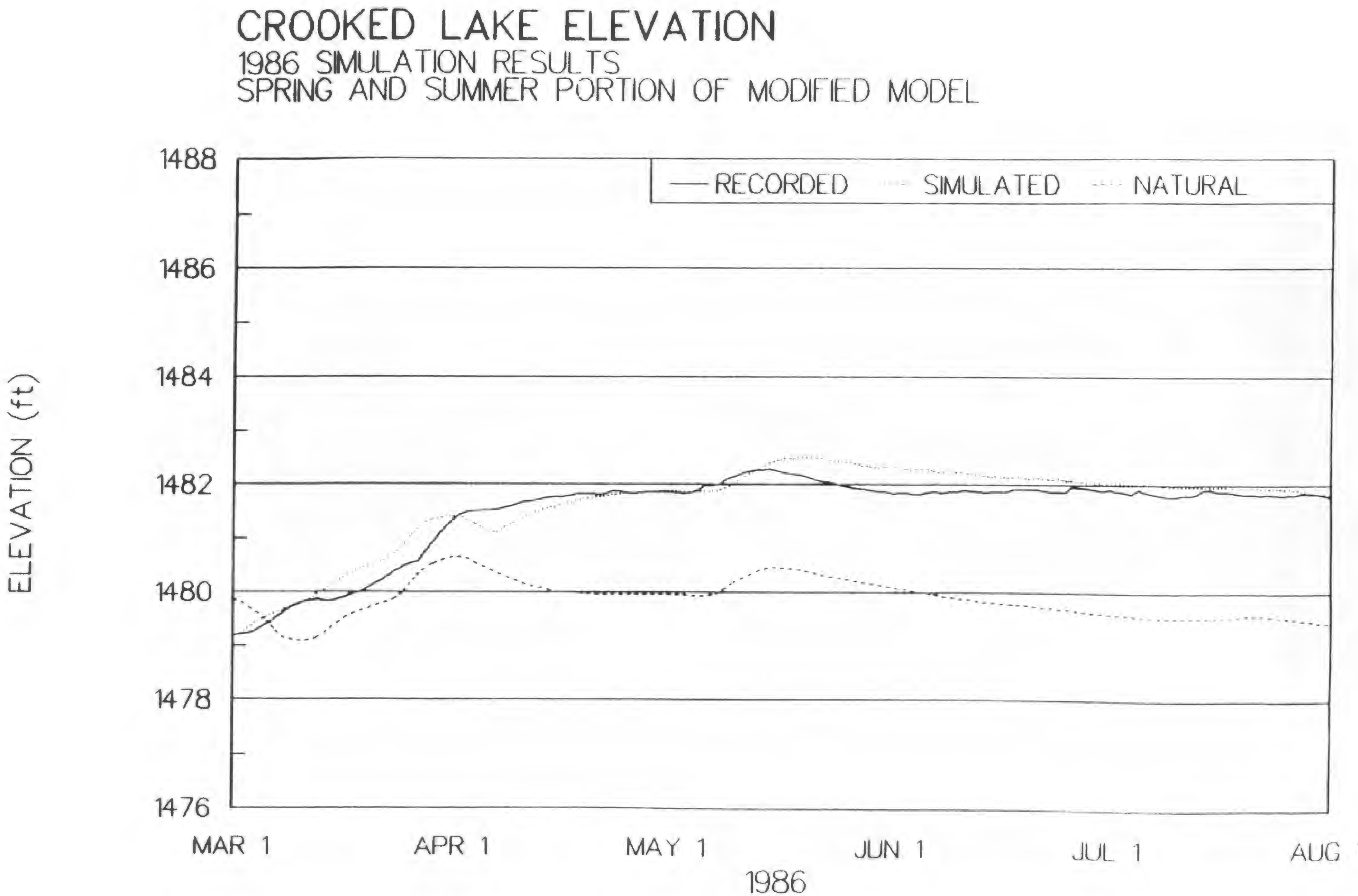

CROOKED LAKE ELEVATION
1986 SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODIFIED MODEL
RECORDED
SIMULATED
NATURAL
ELEVATION (ft)
1488
1486
1484
1482
1480
1478
1476
MAR 1
APR 1
MAY 1
JUN 1
JUL 1
AUG 1
1986

Figure 3.1-8

ROUND LAKE ELEVATION

1986 SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODIFIED MODEL

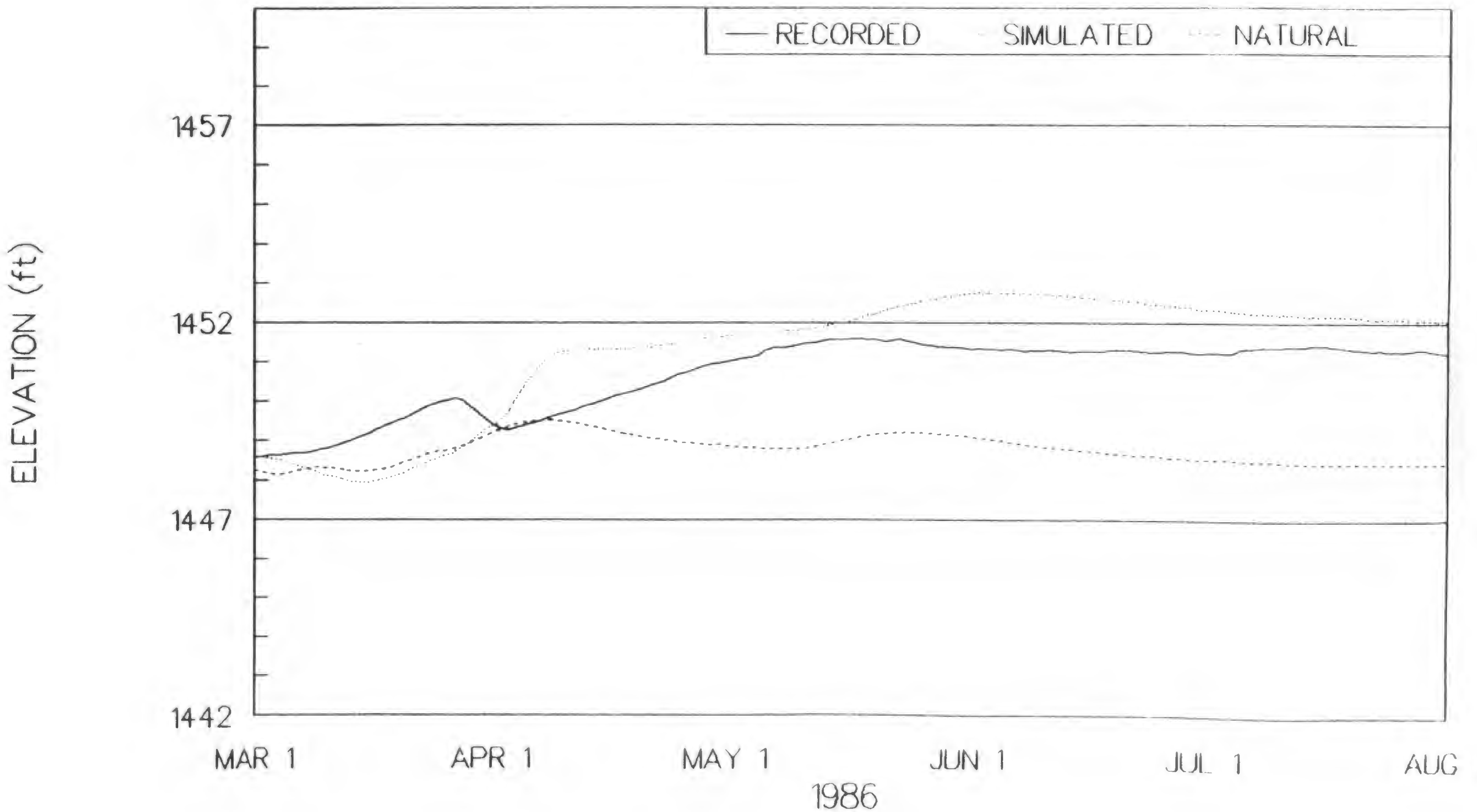


Figure 3.1-9

QU'APPELLE RIVER NEAR WELBY

1986 SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODIFIED MODEL

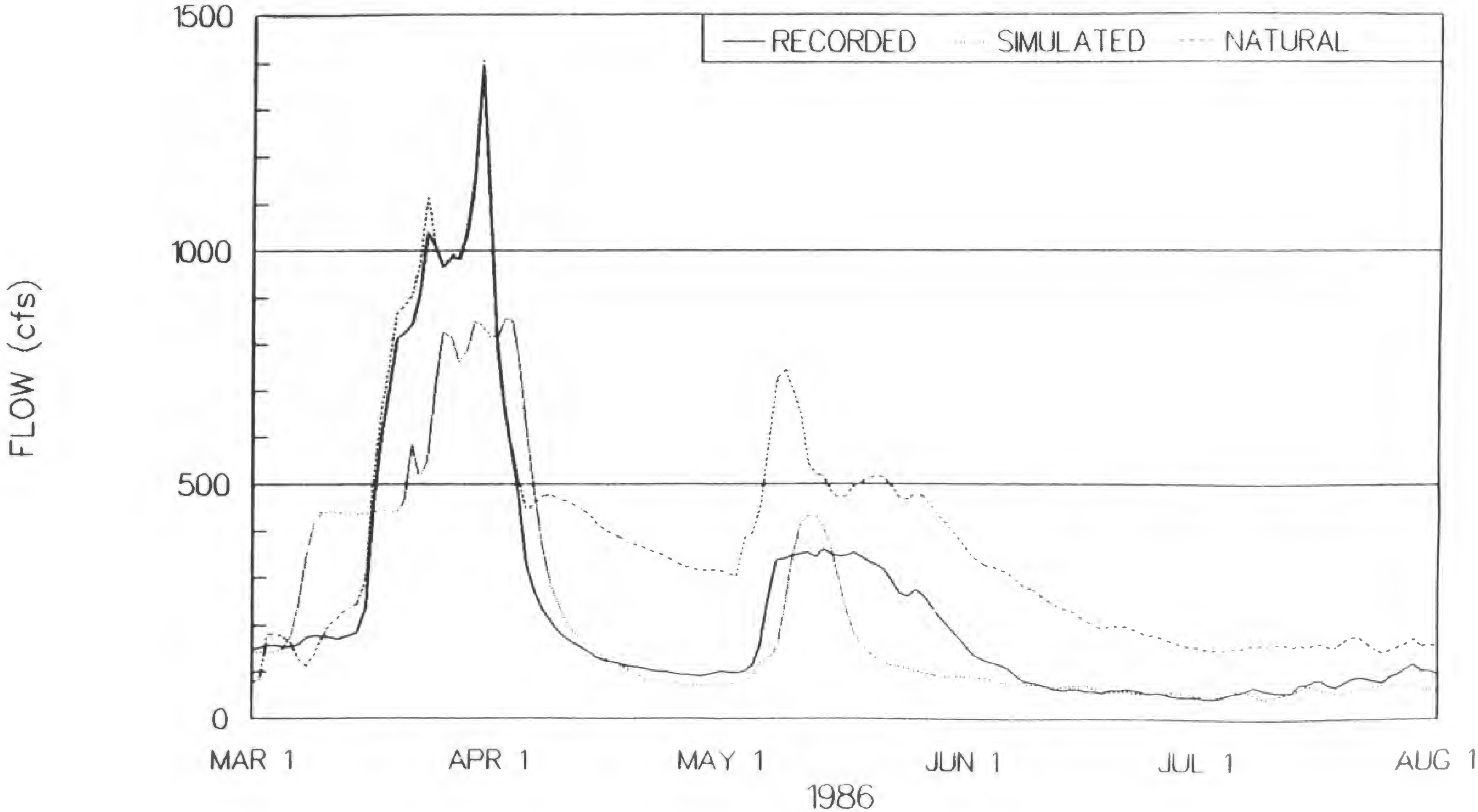


Figure 3.1-10

under both recorded and simulated conditions is included in the output of the spring and summer portion of the modified model as shown in Appendix E. The sum of the differences must be manually calculated and added to the natural flow volume of the Qu'Appelle River near Welby. An example of the required calculation is shown in Appendix E.

3.2 Comparison of Original Model and Modified Model Simulation Results

3.2.1 Existing Conditions Limb

Simulation results produced by the existing conditions limb of the spring and summer portions of both the original and the modified models for the year 1986 are plotted in Figures 3.2.1-1 to 3.2.1-6. These figures show the effect of the modifications made to the Qu'Appelle River Natural Flow Model on simulated elevations and streamflows for a number of locations along the Qu'Appelle River Valley. These figures show that lake elevations and streamflows simulated with the modified model are much closer to actual recorded data than those simulated by the original model.

Although a number of the modifications which were made to the model contribute to the improved simulation of existing conditions, the incorporation of ungauged local inflow and reservoir outlet control operation into the model were the main contributing factors. The original model simulated existing conditions without ungauged inflow and with the reservoir outlet structures permanently and completely open. The incorporation of these two factors into the natural flow

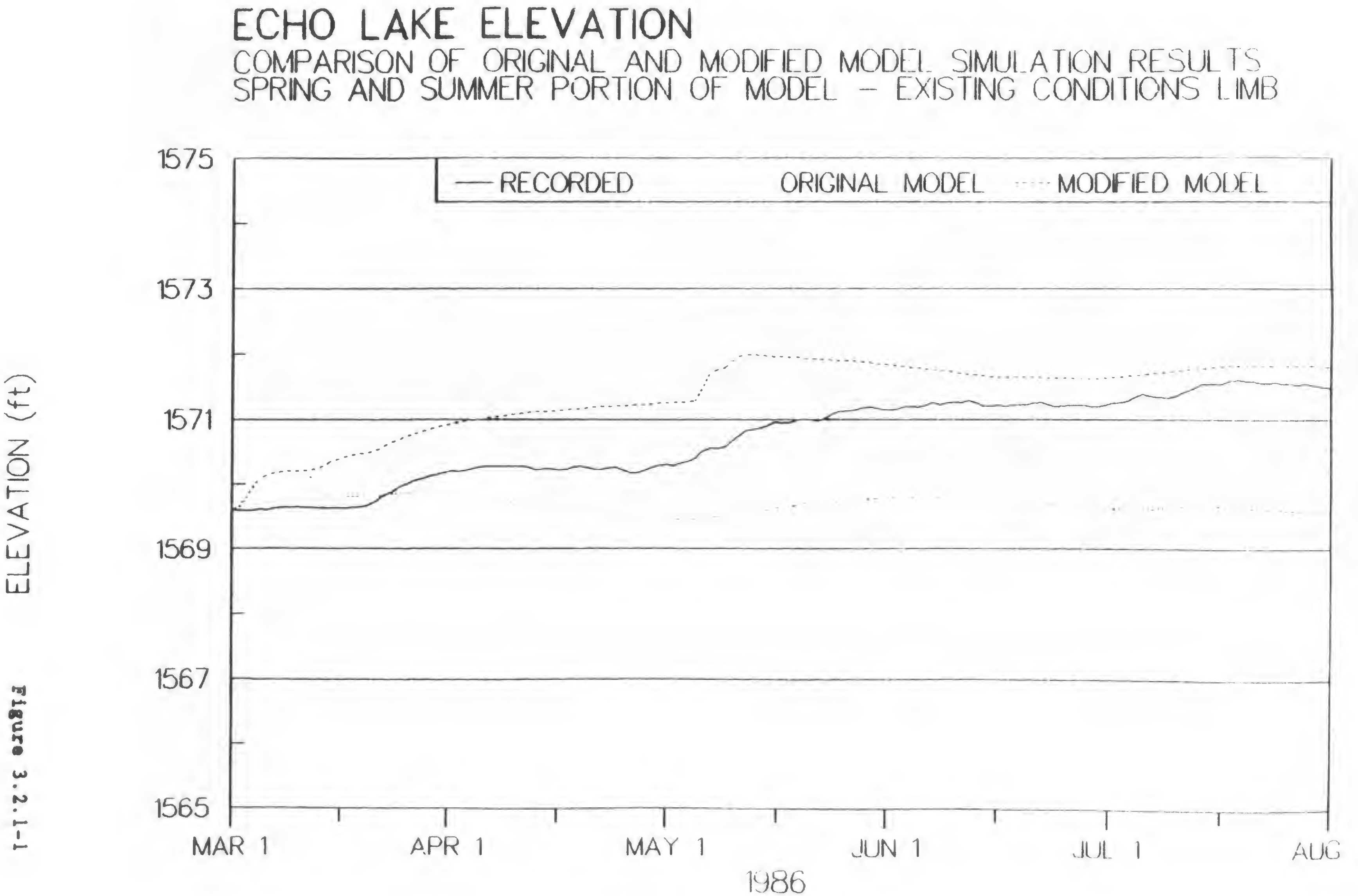

ECHO LAKE ELEVATION
COMPARISON OF ORIGINAL AND MODIFIED MODEL SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODEL - EXISTING CONDITIONS LIMB
RECORDED
ORIGINAL MODEL
MODIFIED MODEL
ELEVATION (ft)
1575
1573
1571
1569
1567
1565
MAR 1
APR 1
MAY 1
JUN 1
JUL 1
AUG 1
1986

Figure 3.2.1-1

QU'APPELLE RIVER BELOW KATEPWA LAKE

COMPARISON OF ORIGINAL AND MODIFIED MODEL SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODEL - EXISTING CONDITIONS LIMB

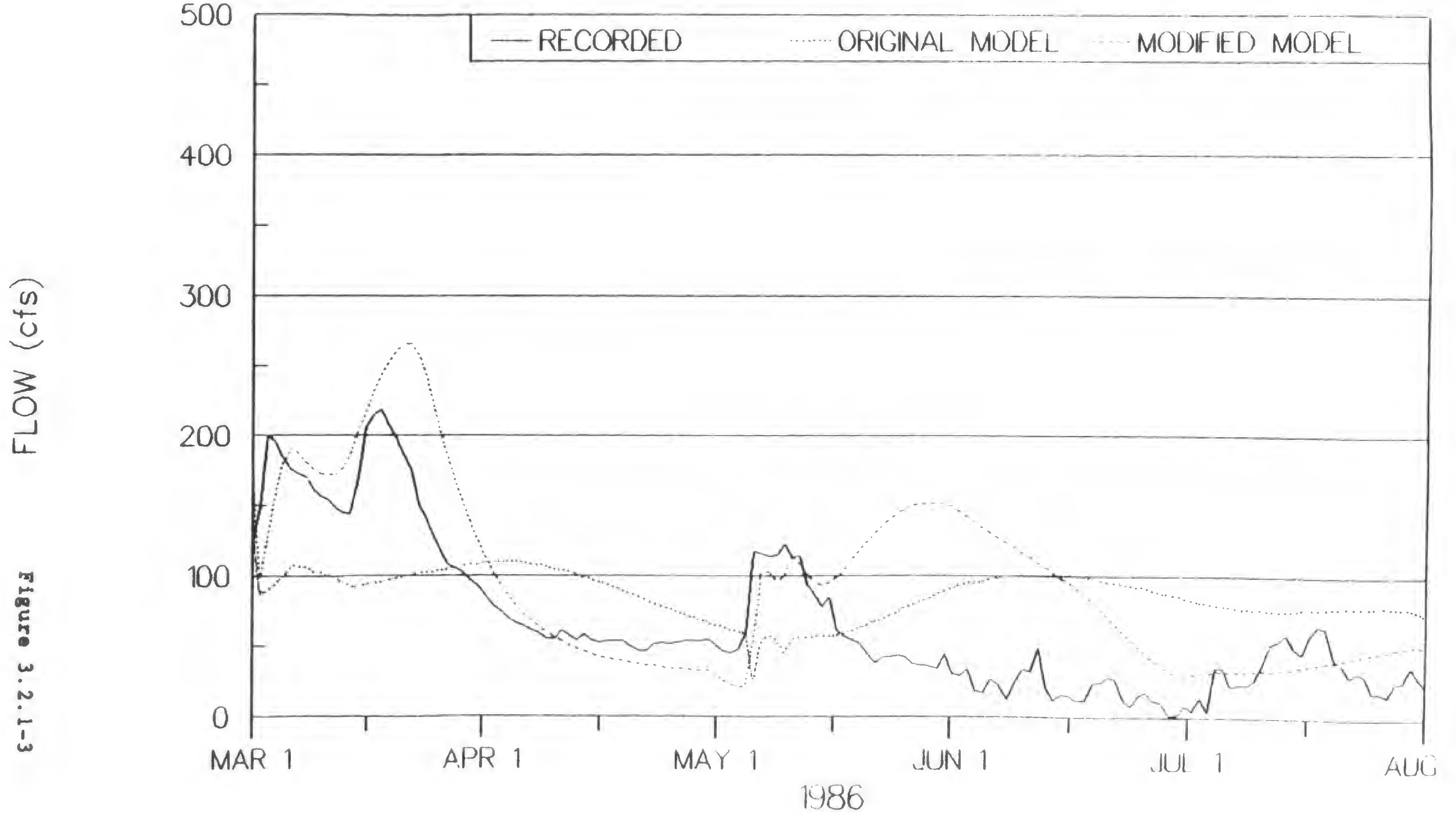


Figure 3.2.1-3

KATEPWA LAKE ELEVATION

COMPARISON OF ORIGINAL AND MODIFIED MODEL SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODEL - EXISTING CONDITIONS LIMB

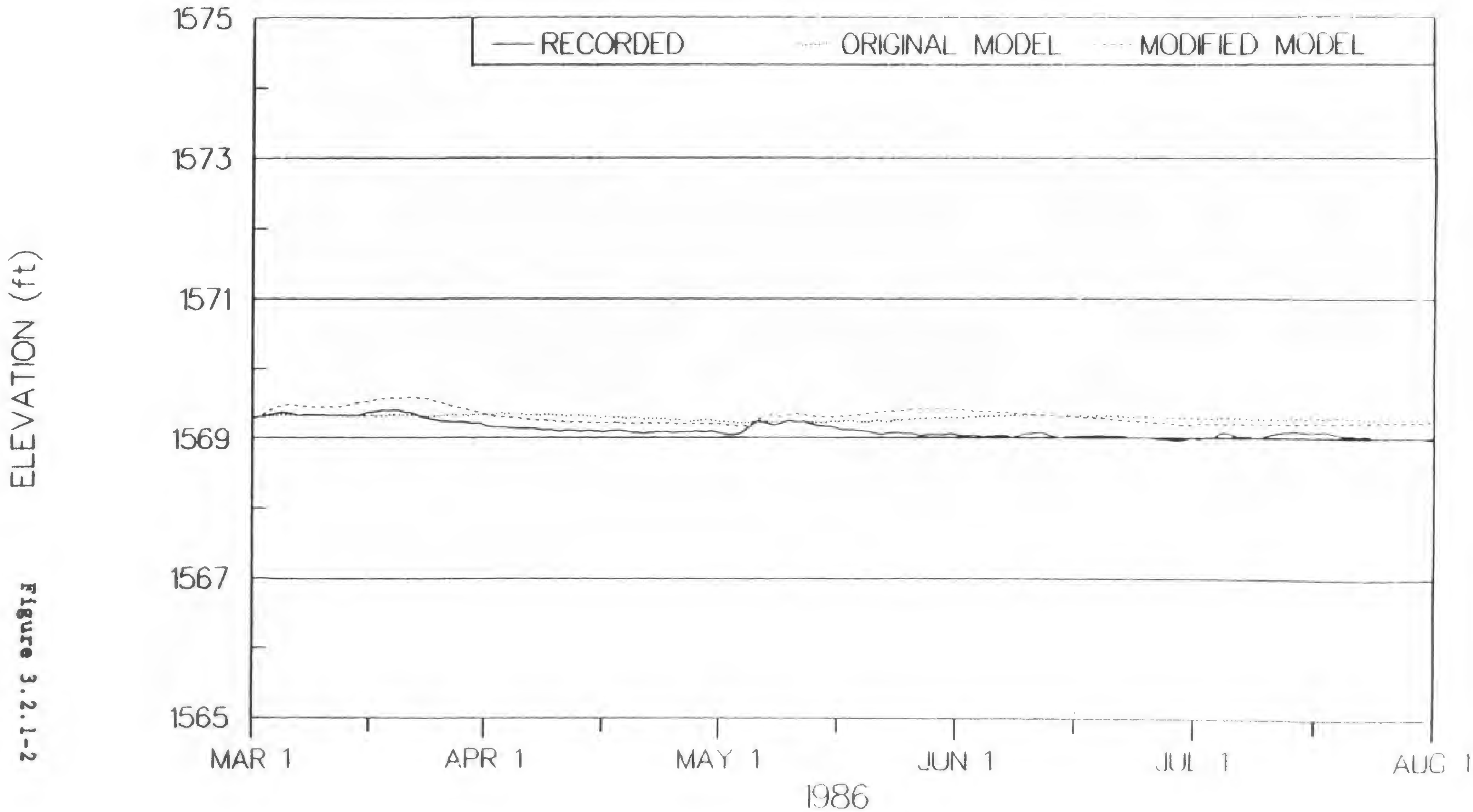


Figure 3.2.1-2

CROOKED LAKE ELEVATION

COMPARISON OF ORIGINAL AND MODIFIED MODEL SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODEL - EXISTING CONDITIONS LIMB

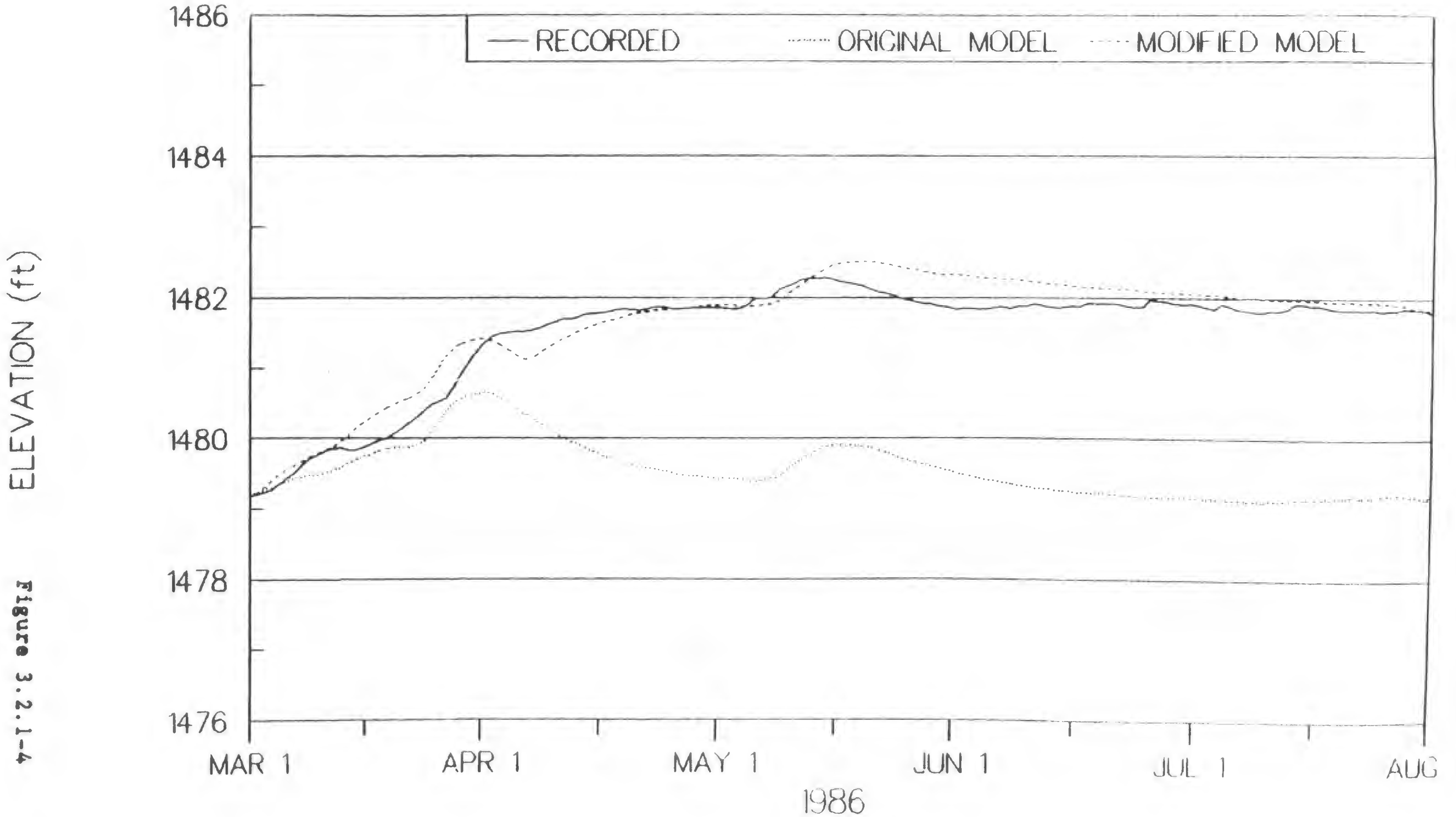


Figure 3.2.1-4

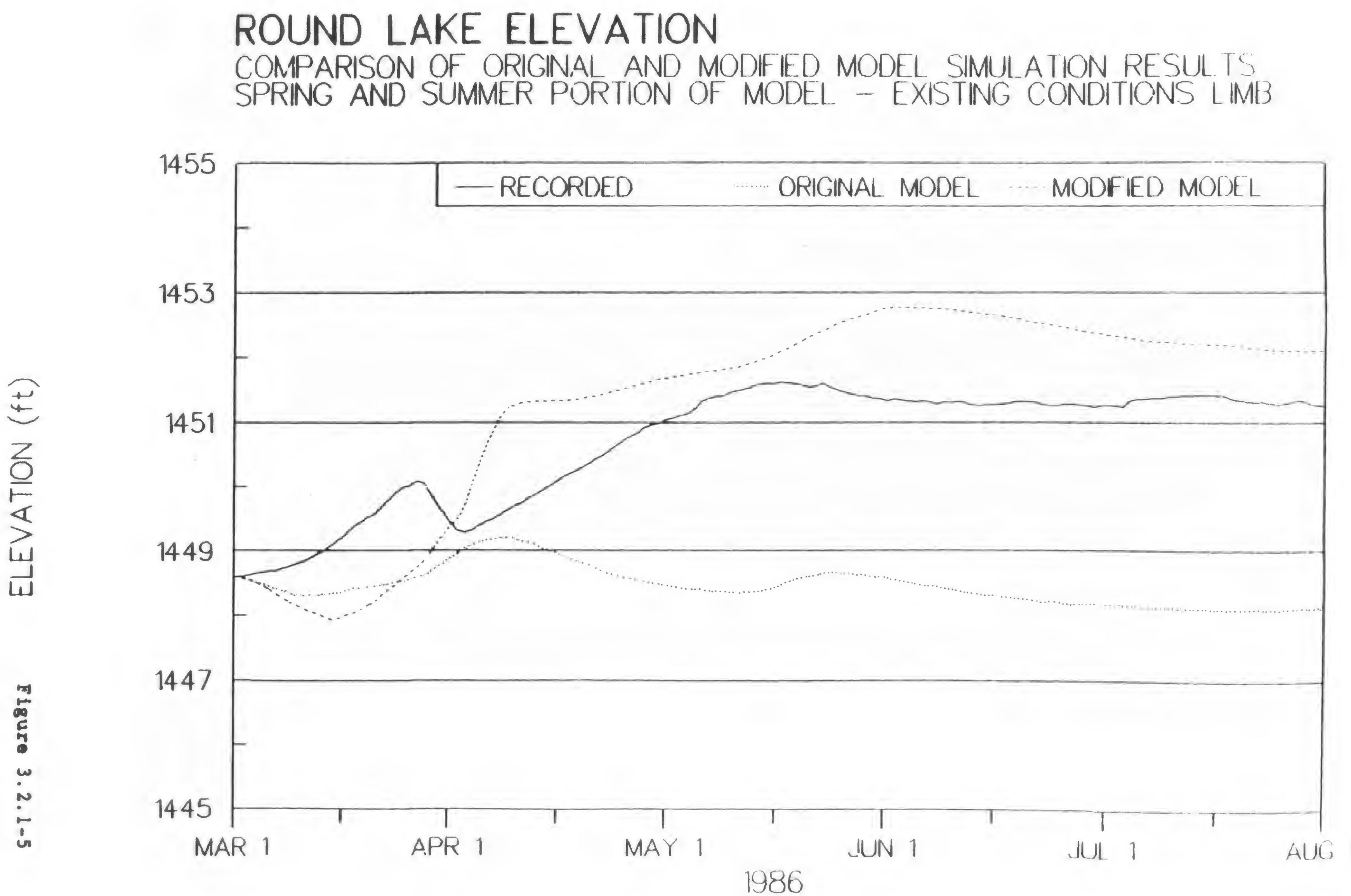

ROUND LAKE ELEVATION
COMPARISON OF ORIGINAL AND MODIFIED MODEL SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODEL - EXISTING CONDITIONS LIMB
RECORDED
ORIGINAL MODEL
MODIFIED MODEL
ELEVATION (ft)
1455
1453
1451
1449
1447
1445
MAR 1
APR 1
MAY 1
JUN 1
JUL 1
AUG 1
1986

Figure 3.2.1-5

QU'APPELLE RIVER NEAR WELBY

COMPARISON OF ORIGINAL AND MODIFIED MODEL SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODEL - EXISTING CONDITIONS LIMB

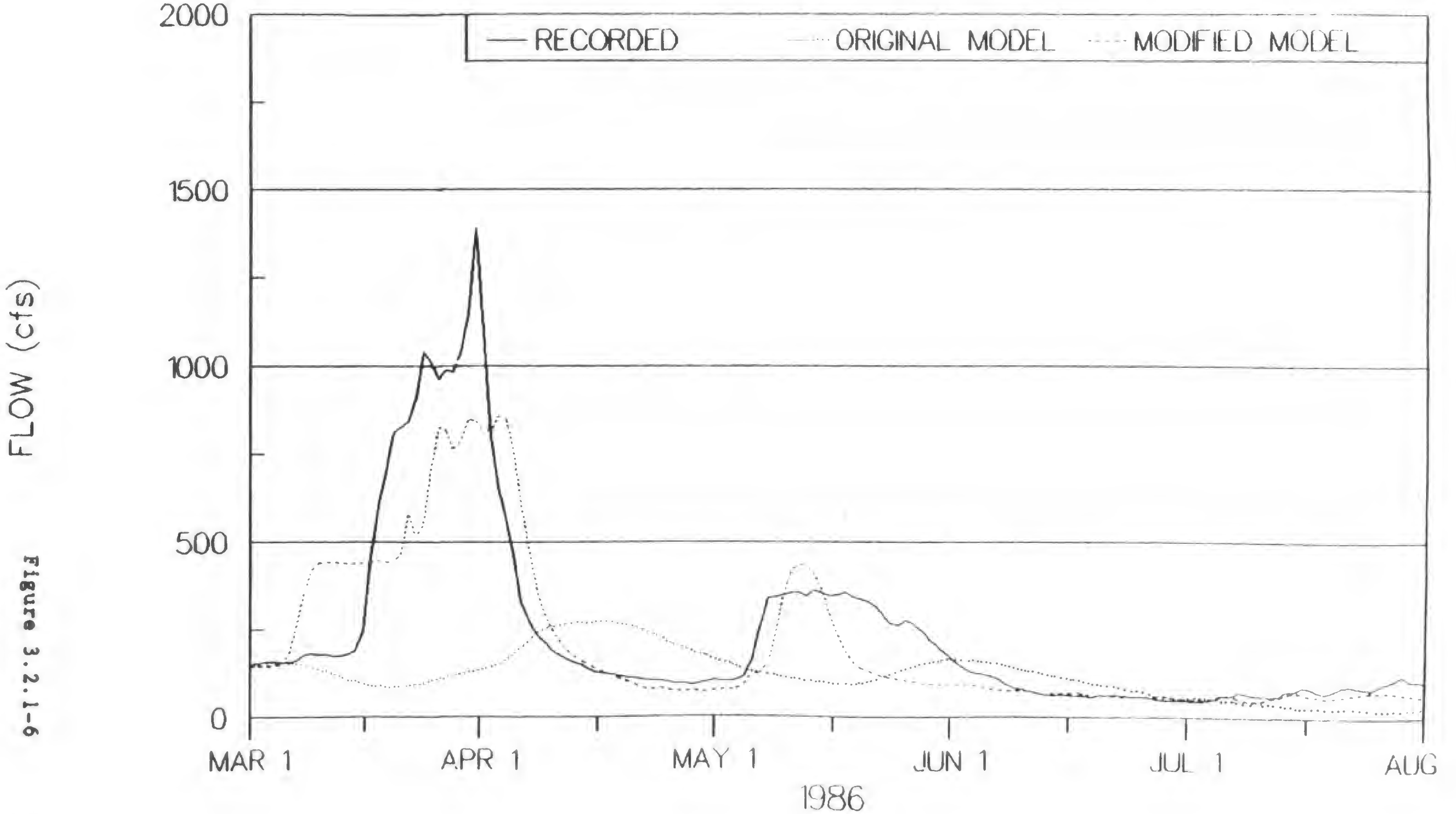


Figure 3.2.1-6

model greatly improved the accuracy of the existing conditions flow limb, enabling one to meaningfully compare the results of the existing conditions limb to recorded data and evaluate the accuracy of the simulation.

3.2.2 Natural Conditions Limb

Simulation results produced by the natural flow limb of the spring and summer portions of both the original and the modified models for the year 1986 are plotted in Figures 3.2.2-1 to 3.2.2-10.

These figures show the cumulative effect of the modifications made to the Qu'Appelle River Natural Flow Model on the simulated natural lake elevations and streamflows. These figures show the modified model simulating natural lake elevations which are, in general, higher than those simulated with the original model.

BUFFALO POUND ELEVATION

COMPARISON OF ORIGINAL AND MODIFIED MODEL SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODEL – NATURAL CONDITIONS LIMB

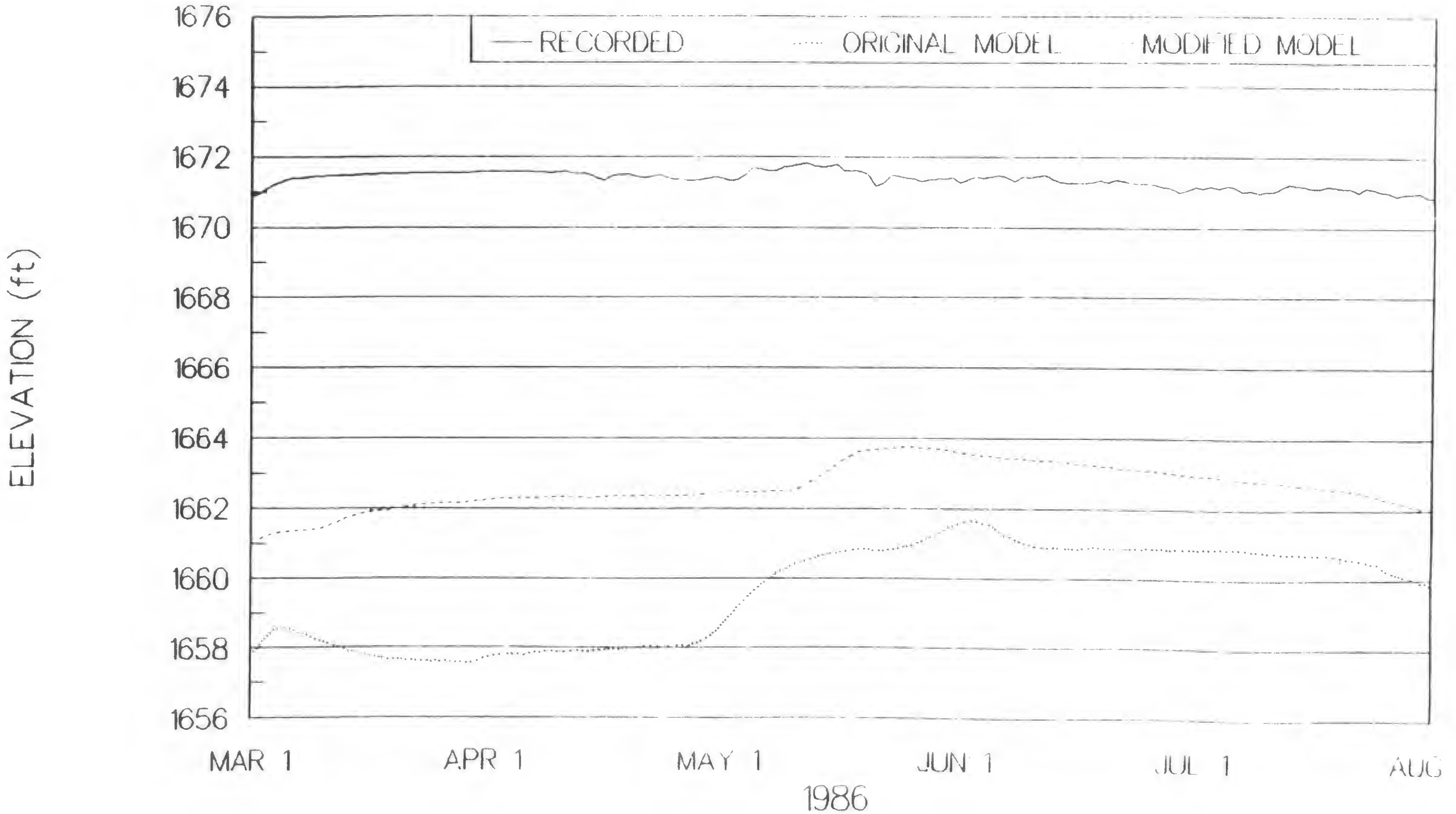


Figure 3.2.2-1

QU'APPELLE RIVER BELOW MOOSE JAW RIVER

COMPARISON OF ORIGINAL AND MODIFIED MODEL SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODEL - NATURAL CONDITIONS LIMB

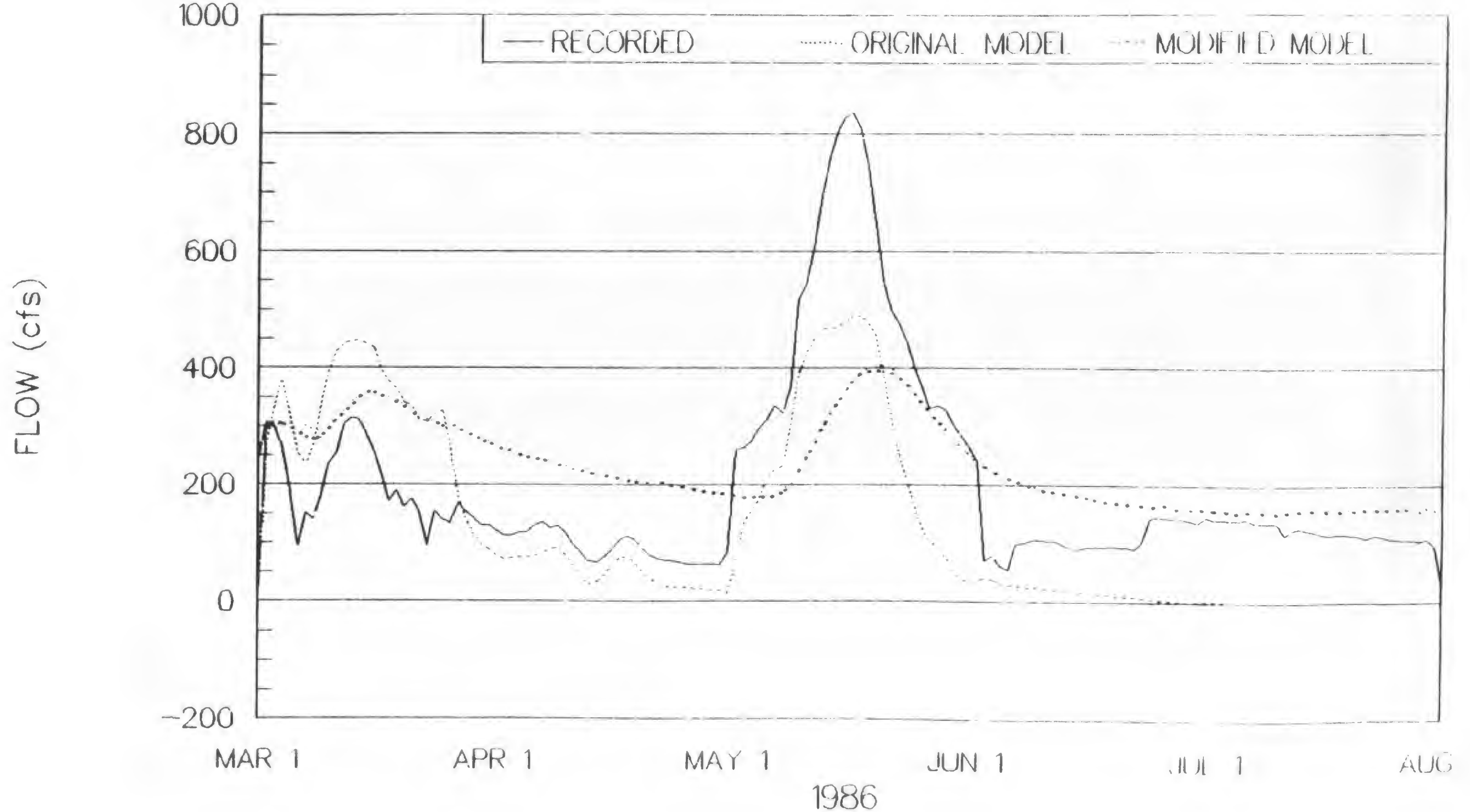


Figure 3.2.2-2

LAST MOUNTAIN LAKE ELEVATION

COMPARISON OF ORIGINAL AND MODIFIED MODEL SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODEL - NATURAL CONDITIONS LIMB

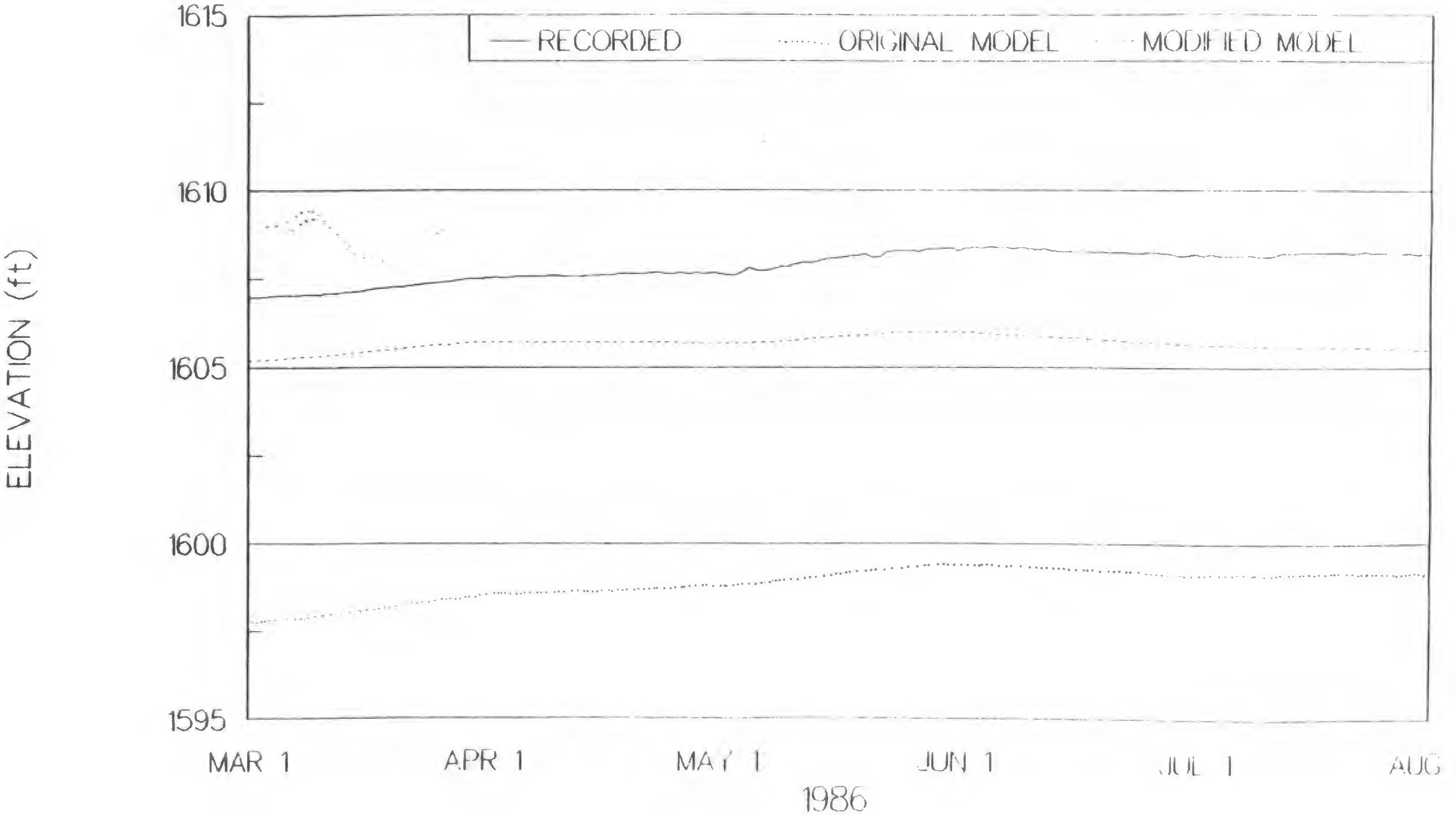


Figure 3.2.2-3

QU'APPELLE RIVER BELOW CRAVEN DAM

COMPARISON OF ORIGINAL AND MODIFIED MODEL SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODEL - NATURAL CONDITIONS LIMB

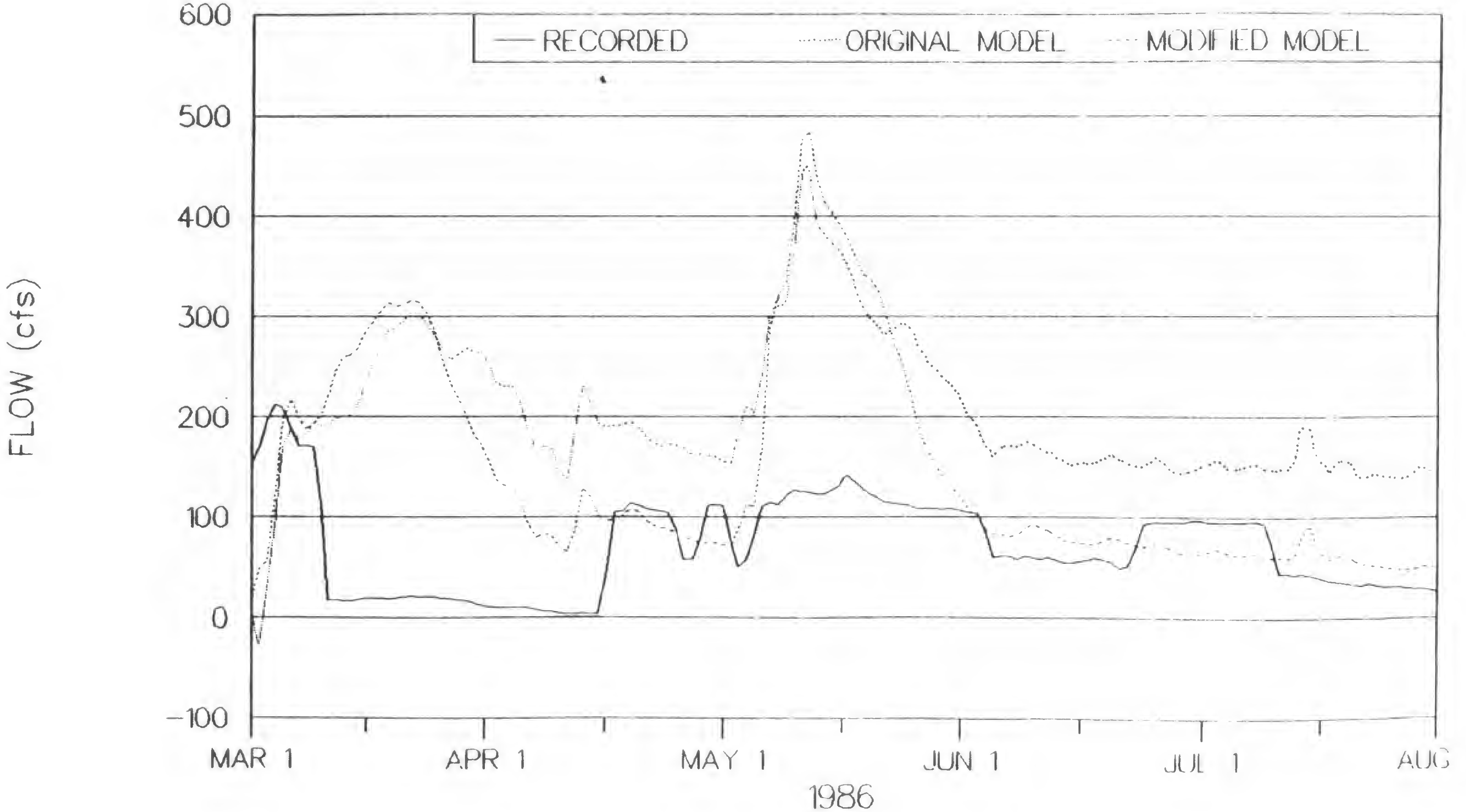


Figure 3.2.2-4

ECHO LAKE ELEVATION

COMPARISON OF ORIGINAL AND MODIFIED MODEL SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODEL - NATURAL CONDITIONS LIMB

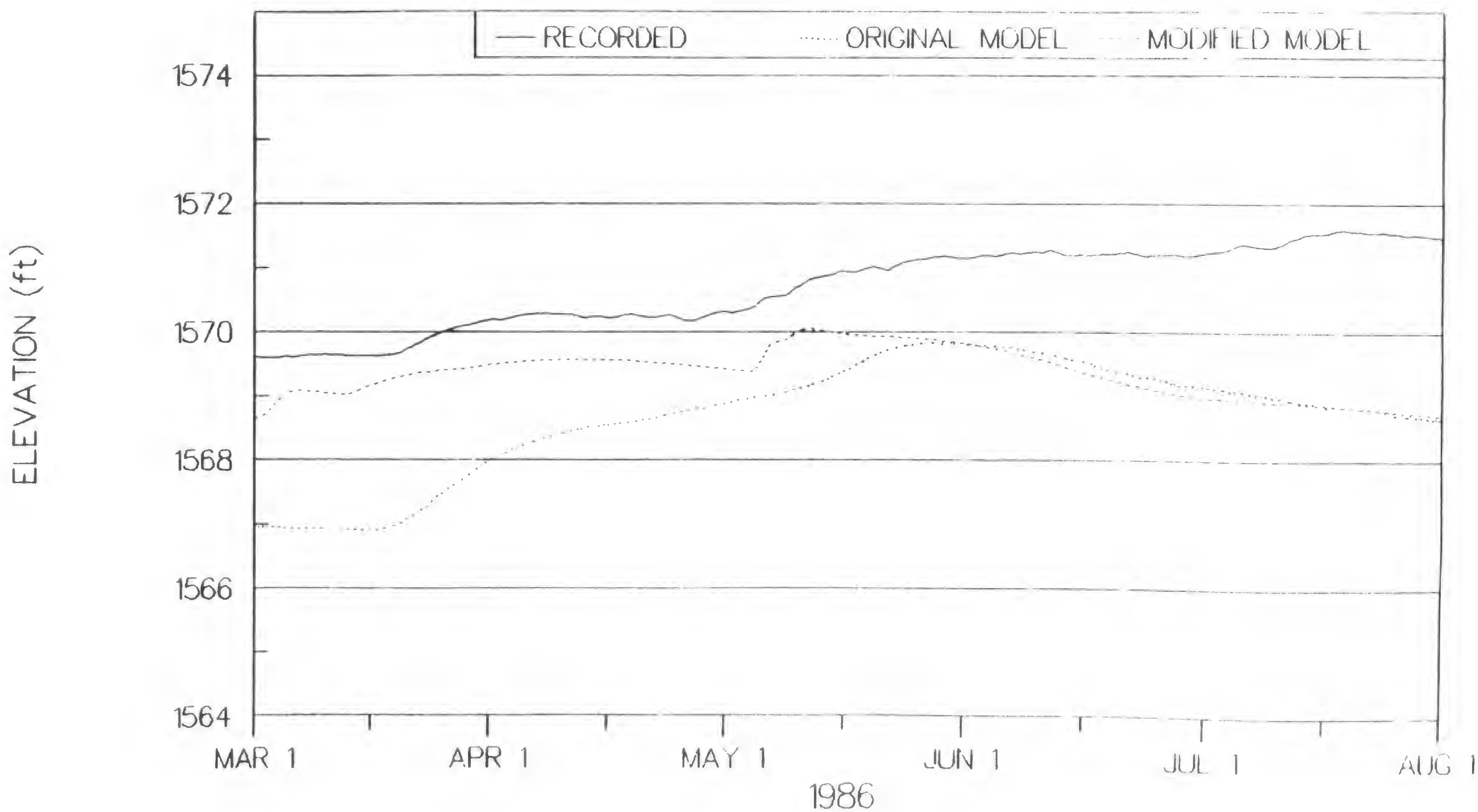


Figure 3.2.2-5

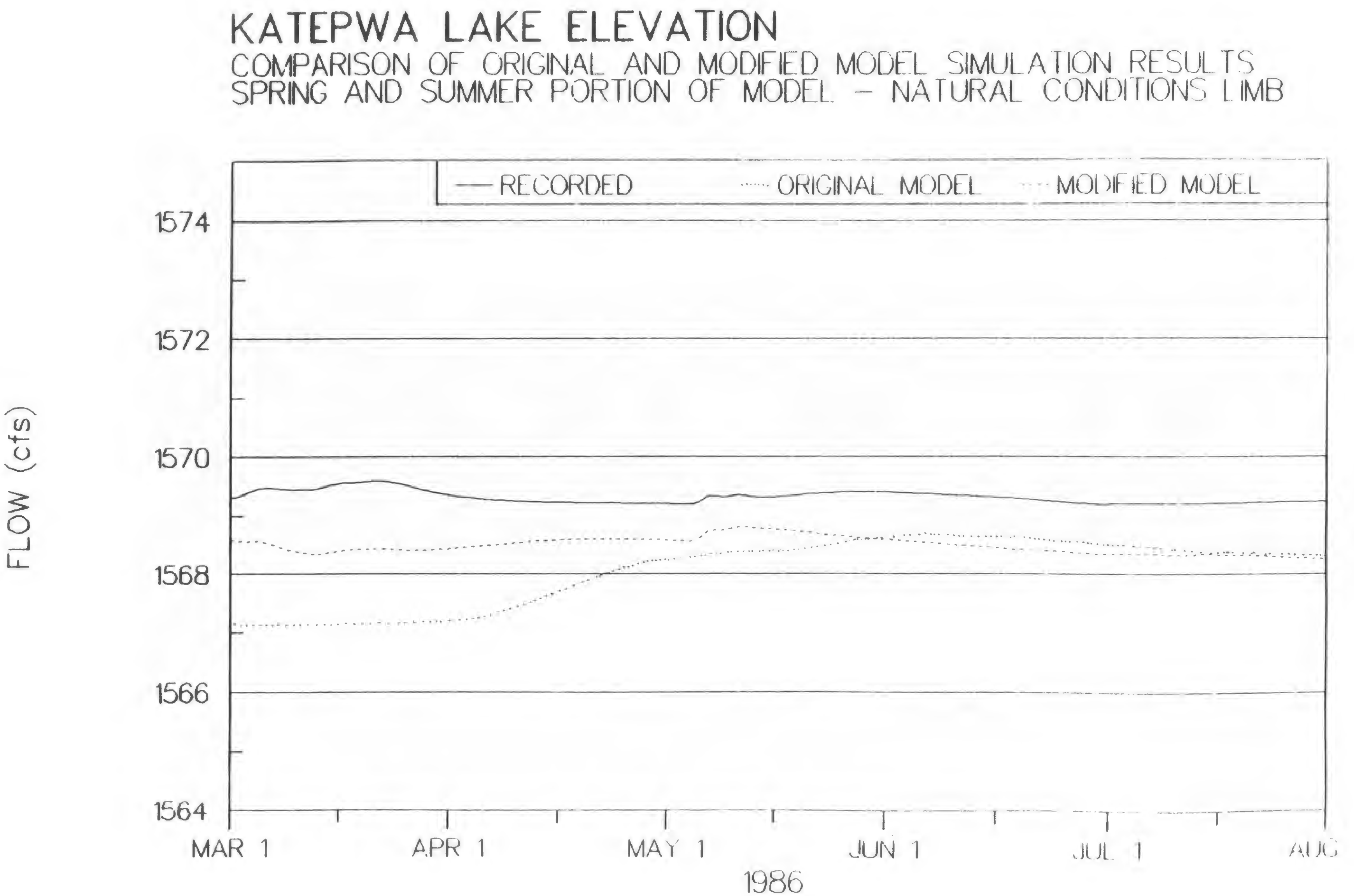

KATEPWA LAKE ELEVATION
COMPARISON OF ORIGINAL AND MODIFIED MODEL SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODEL - NATURAL CONDITIONS LIMB
RECORDED
ORIGINAL MODEL
MODIFIED MODEL
FLOW (cfs)
1574
1572
1570
1568
1566
1564
MAR 1
APR 1
MAY 1
JUN 1
JUL 1
1986

Figure 3.2.2-6

QU'APPELLE RIVER BELOW KATEPWA LAKE

COMPARISON OF ORIGINAL AND MODIFIED MODEL SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODEL - NATURAL CONDITIONS LIMB

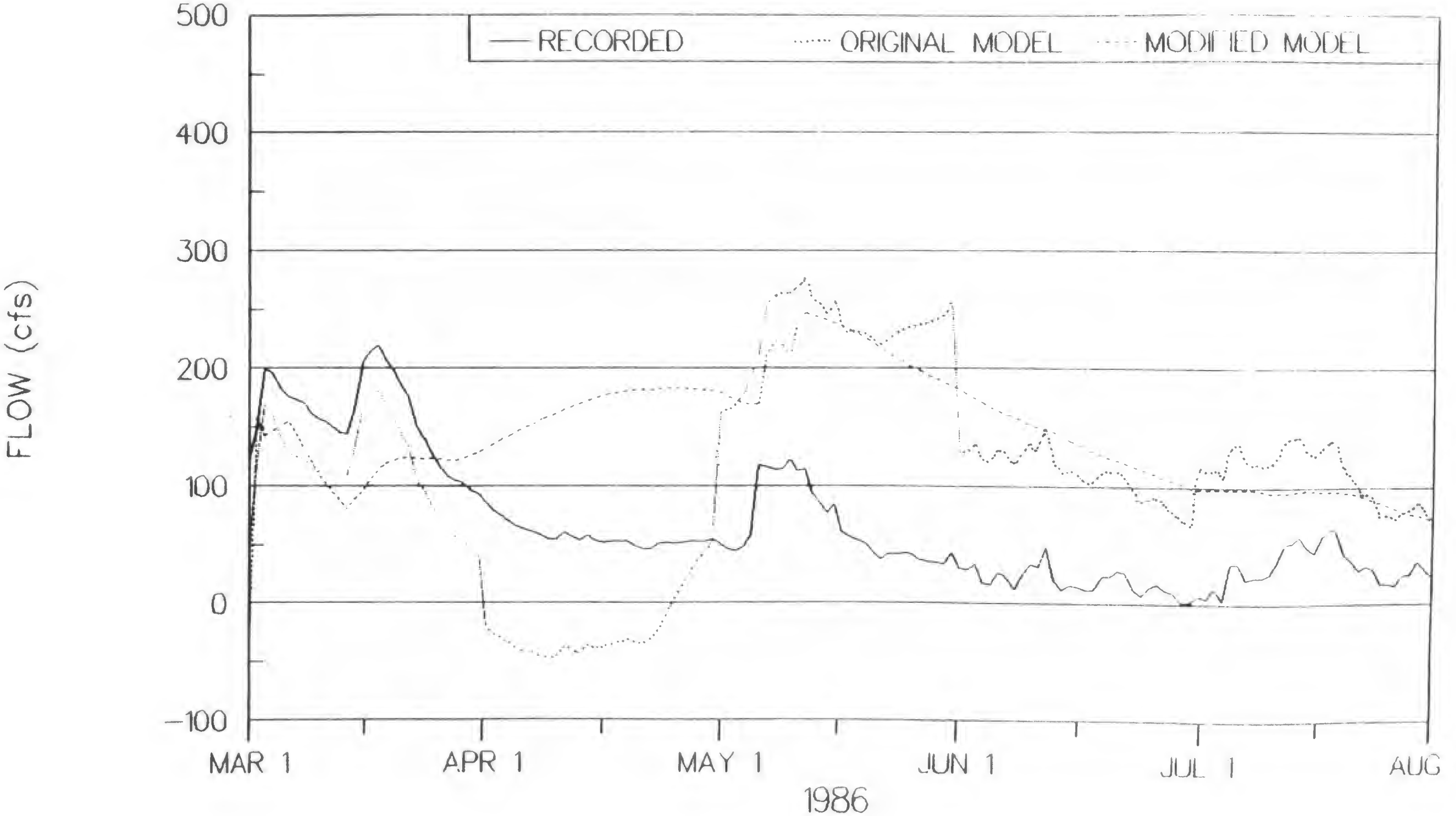


Figure 3.2.2-7

CROOKED LAKE ELEVATION

COMPARISON OF ORIGINAL AND MODIFIED MODEL SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODEL – NATURAL CONDITIONS LIMB

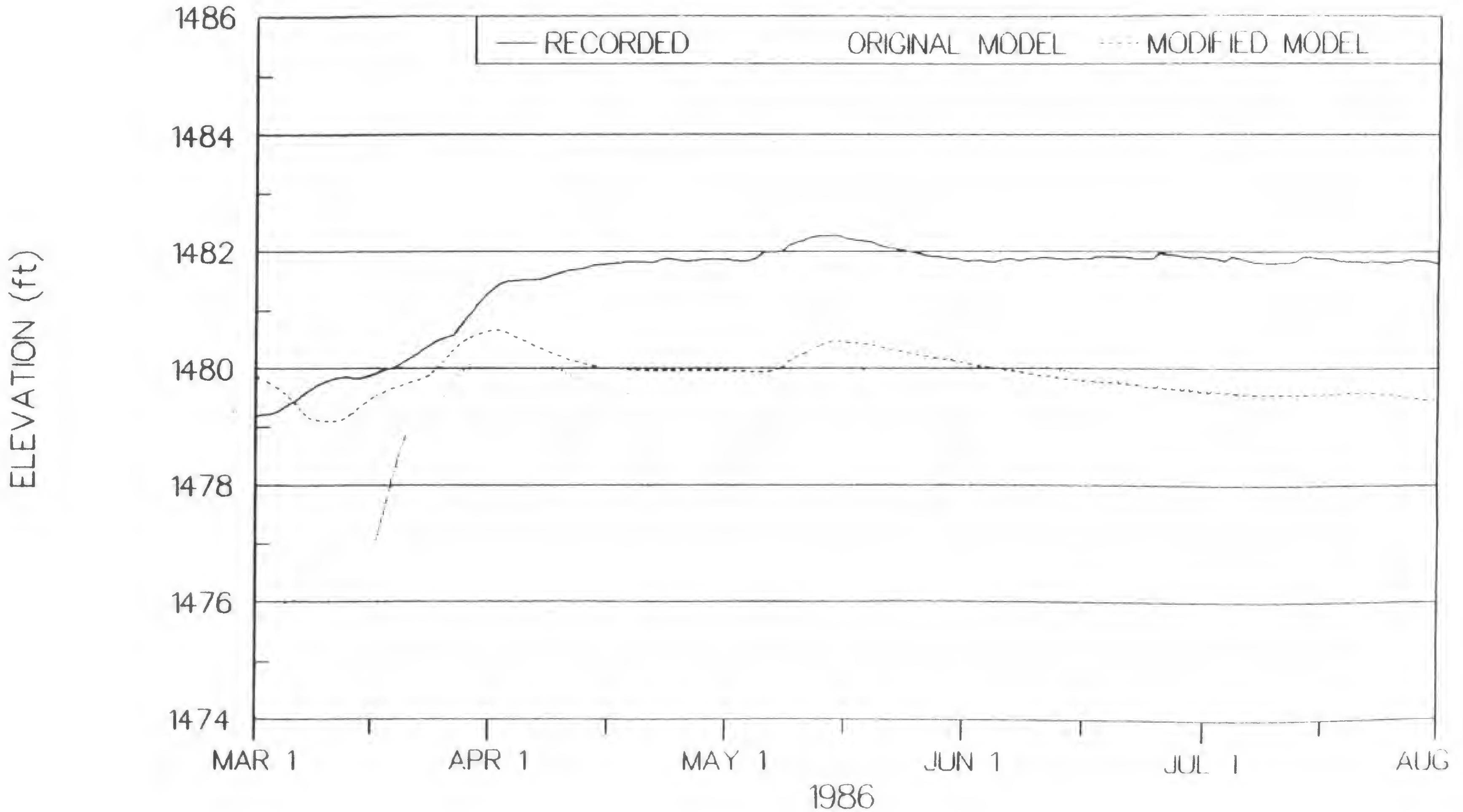


Figure 3.2.2-8

ROUND LAKE ELEVATION

COMPARISON OF ORIGINAL AND MODIFIED MODEL SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODEL -- NATURAL CONDITIONS LIMB

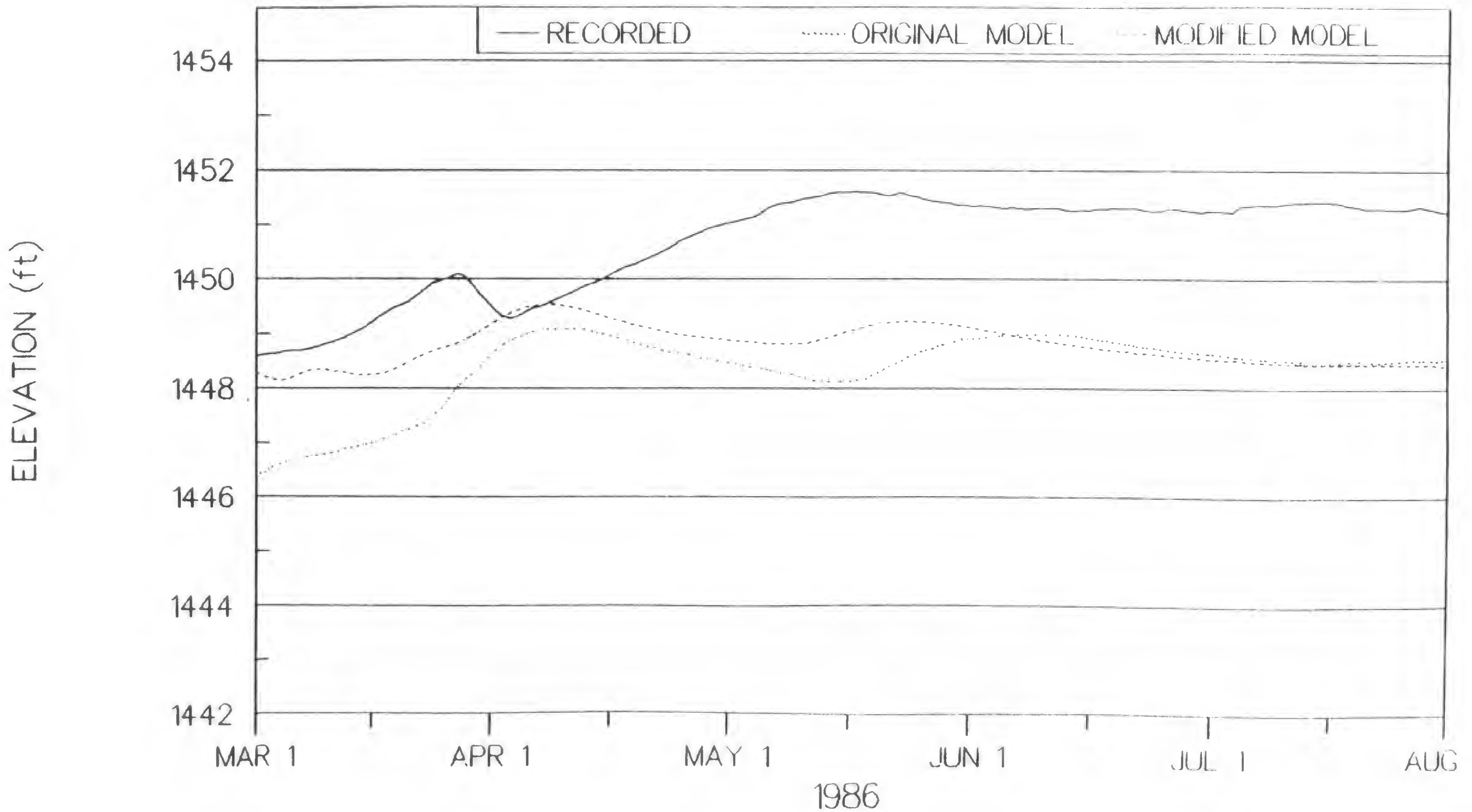


Figure 3.2.2-9

QU'APPELLE RIVER NEAR WELBY

COMPARISON OF ORIGINAL AND MODIFIED MODEL SIMULATION RESULTS
SPRING AND SUMMER PORTION OF MODEL - NATURAL CONDITIONS LIMB

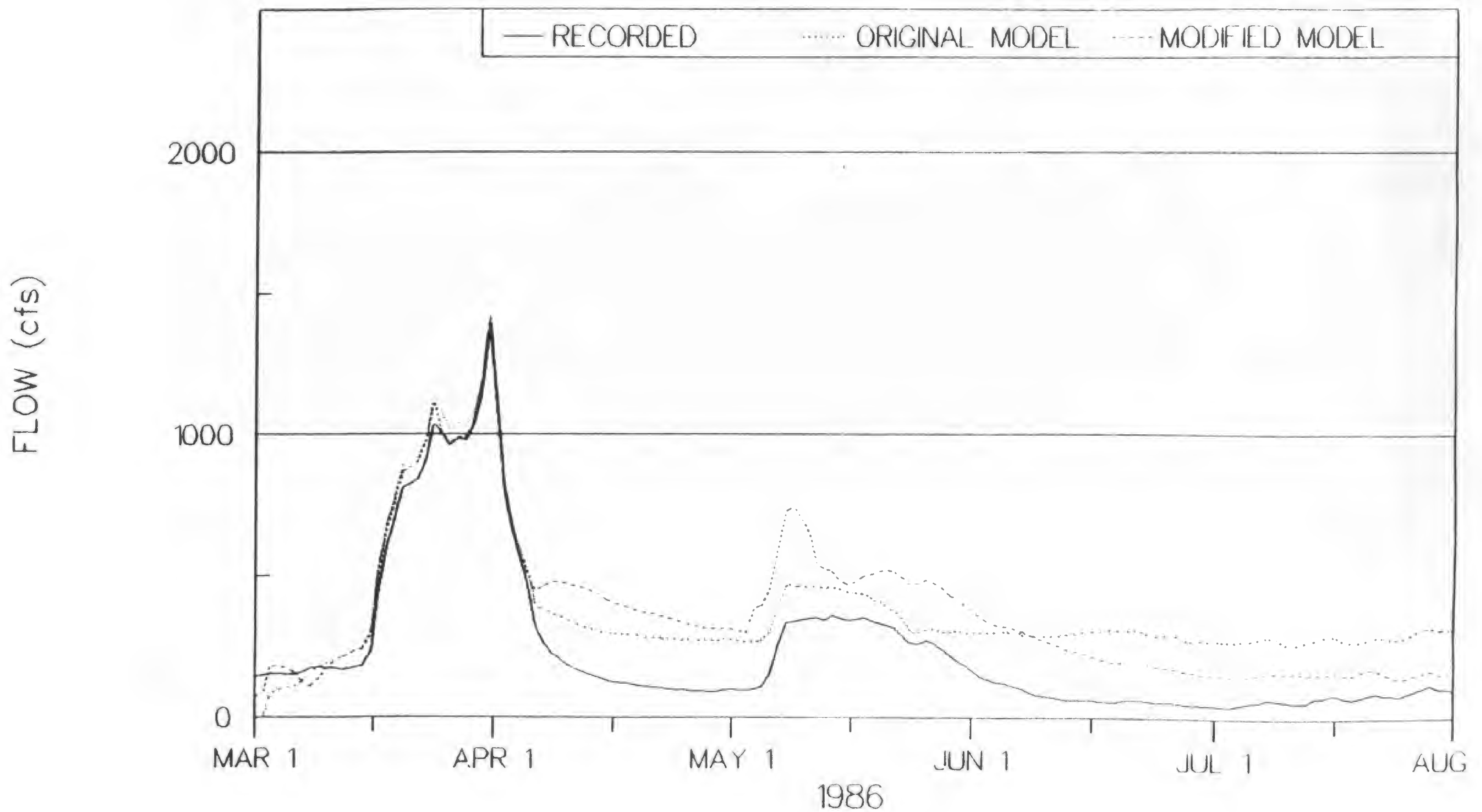


Figure 3.2.2-10

LAST MOUNTAIN LAKE

COMPARISON OF NATURAL ELEVATIONS SIMULATED WITH ORIGINAL AND MODIFIED NATURAL FLOW MODELS

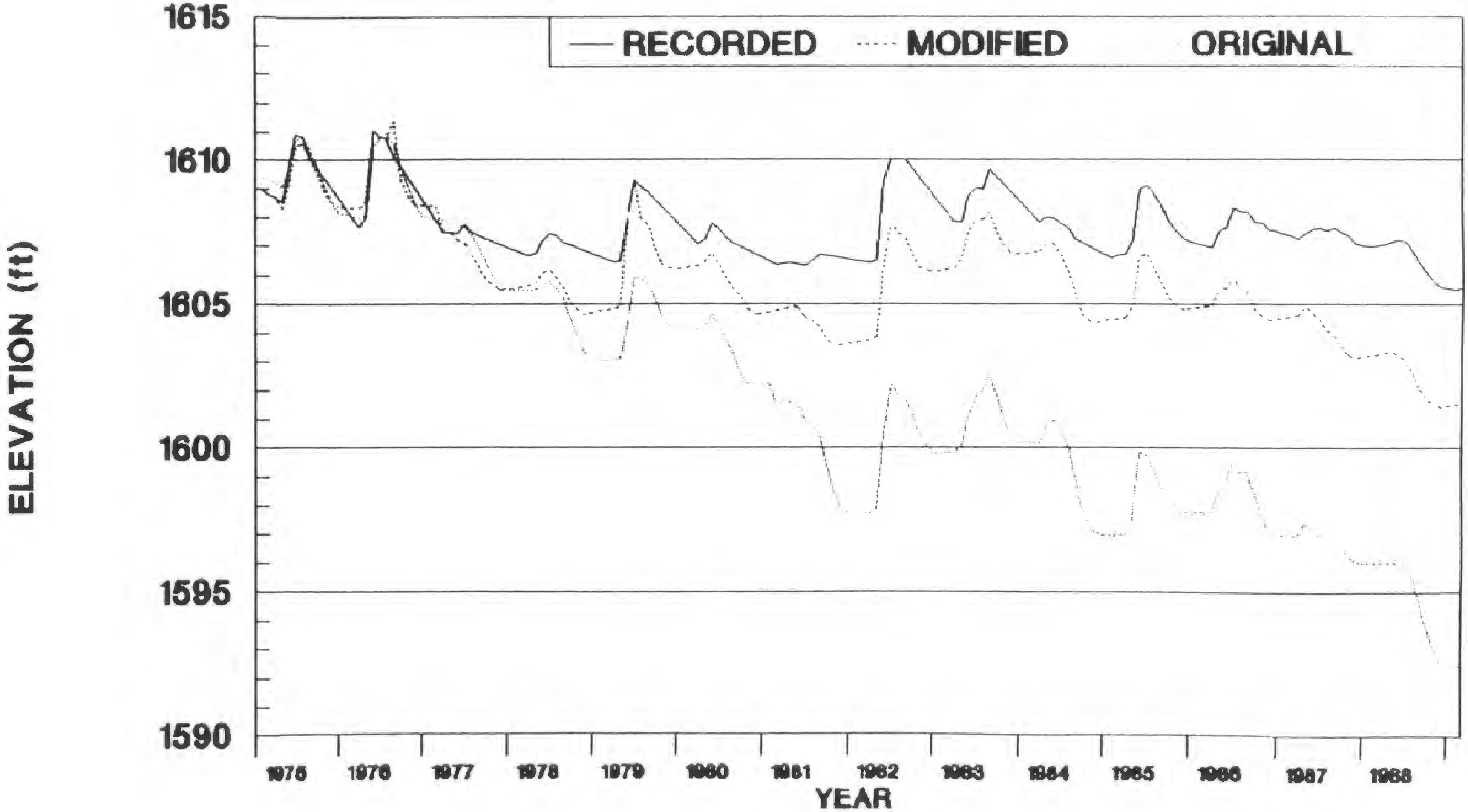


Figure 3.2.2-11

3.2.3 Fall and Winter Segment

Simulation results produced by the fall and winter segment of the modified model are compared with simulation results produced by the original model and with recorded data in Figures 3.2.3-1 & 3.2.3-2.

Figure 3.2.3-1, a plot of Last Mountain Lake elevations, shows the modified model simulates a higher natural lake elevation than that simulated by the original model. This figure also shows the natural elevation of Last Mountain Lake simulated by the modified model dropping at a slower rate than that simulated by the original model. This is the result of the 31 cfs groundwater flow into Last Mountain Lake which is incorporated into the fall and winter segment of the modified model and the revised outflow relationship table.

Figure 3.2.3-2, a plot of the flow in the Qu'Appelle River near Welby for the August/1986 to March/1987 period shows the cumulative affect of the modifications made to the model on the fall and winter simulated natural flow.

One of the major concerns was the low and steadily dropping natural lake elevation of Last Mountain Lake simulated by the original model. Figure 3.2.2-11 shows the natural elevation of Last Mountain Lake simulated with the original and with the modified model for the years 1975 to 1988. This figure shows the natural lake elevation of Last

LAST MOUNTAIN LAKE
SIMULATED NATURAL AND RECORDED ELEVATION
AUGUST 1 1986 TO MARCH 1 1987

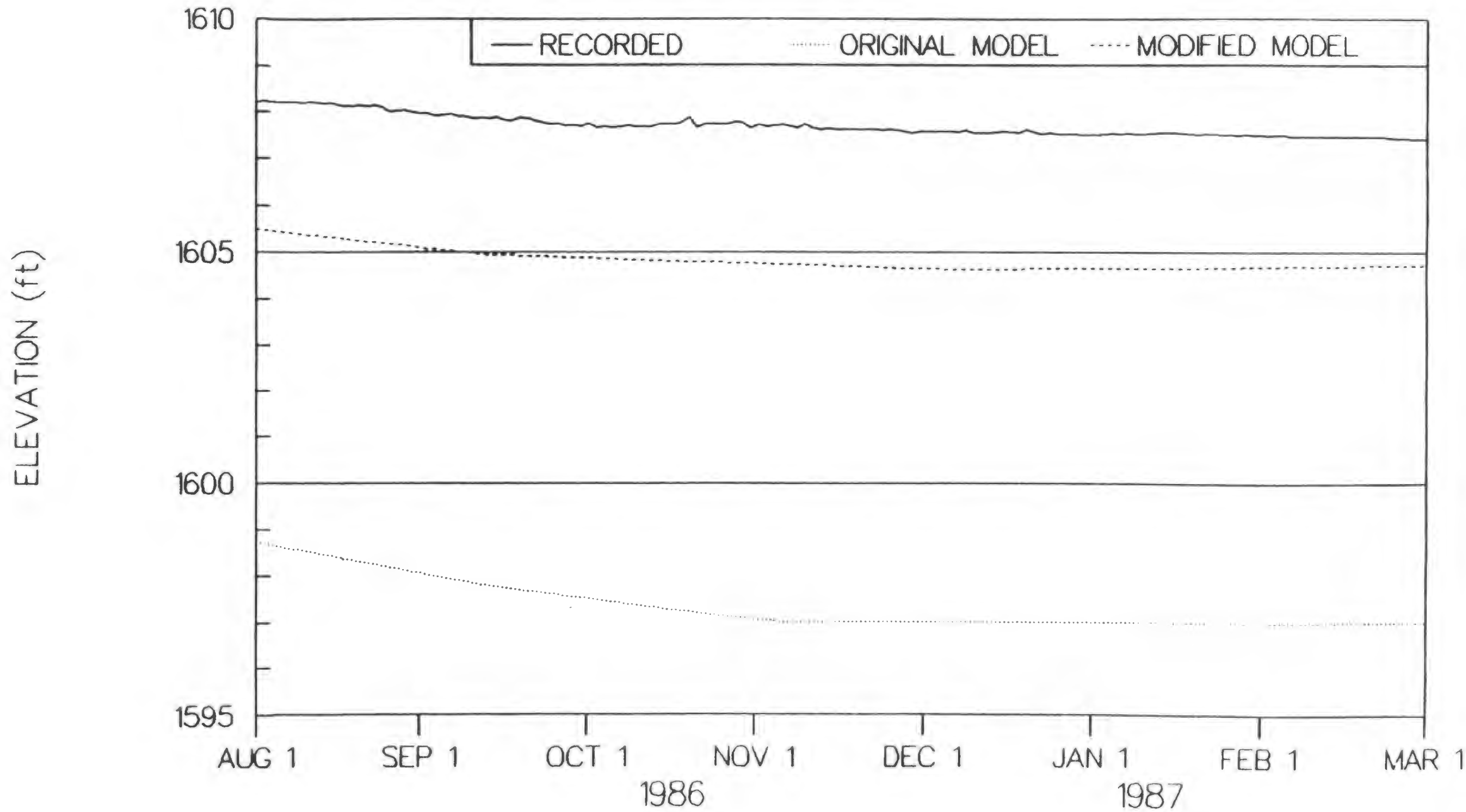


Figure 3.2.3-1

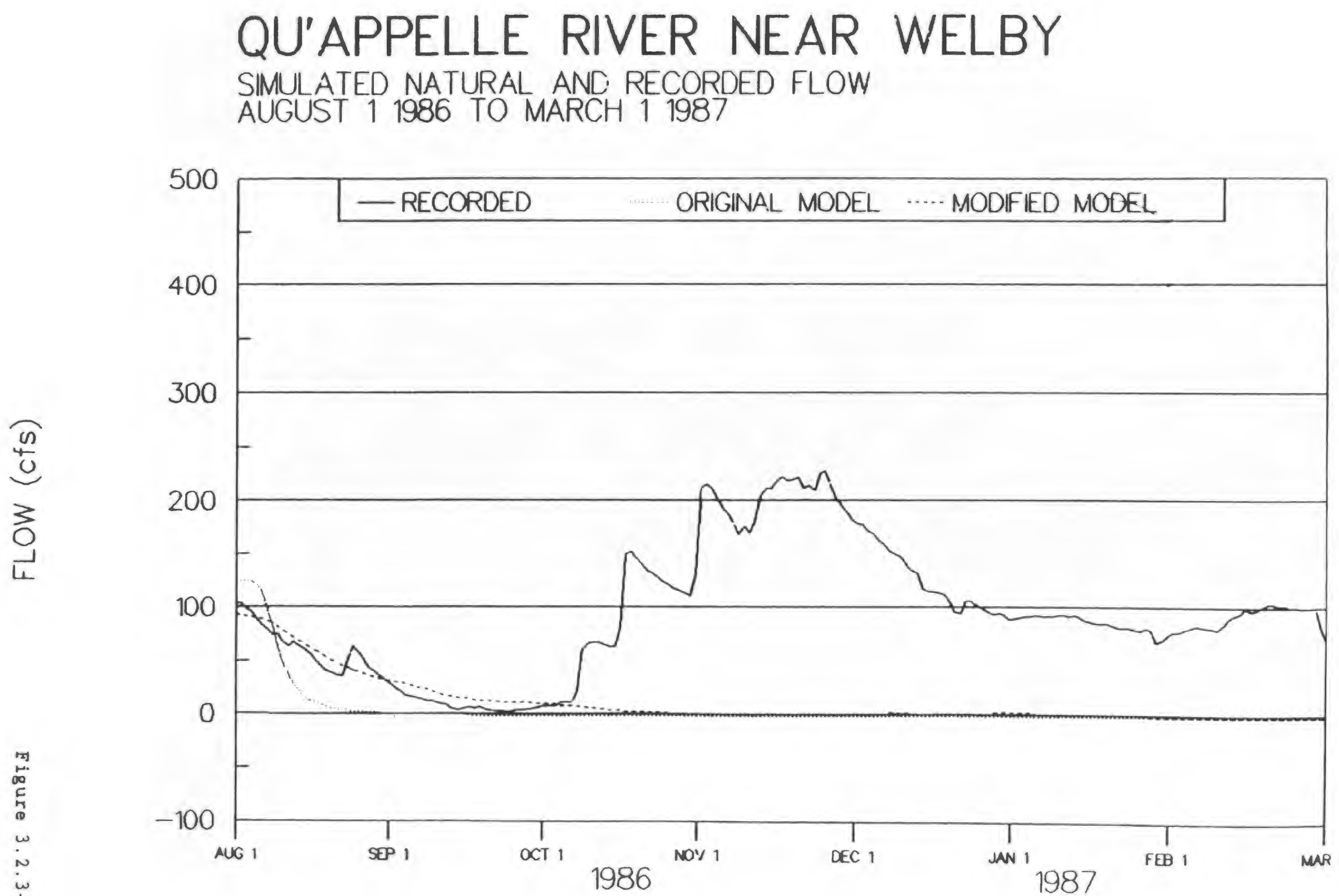

QU'APPELLE RIVER NEAR WELBY
SIMULATED NATURAL AND RECORDED FLOW
AUGUST 1 1986 TO MARCH 1 1987
RECORDED
ORIGINAL MODEL
MODIFIED MODEL
FLOW (cfs)
500
400
300
200
100
0
−100
AUG 1
SEP 1
OCT 1
NOV 1
DEC 1
JAN 1
FEB 1
MAR 1
1986
1987

Figure 3.2.3-2

Mountain Lake simulated with the modified model, is much higher than that simulated with the original model.

Although the difference in the simulated natural elevation of Last Mountain Lake is the cumulative result of a number of changes which were made to the model, the difference is mainly attributed to the modified overflow table (CF20), compensation for lower lake evaporation under natural conditions, and compensation for groundwater inflow in winter.

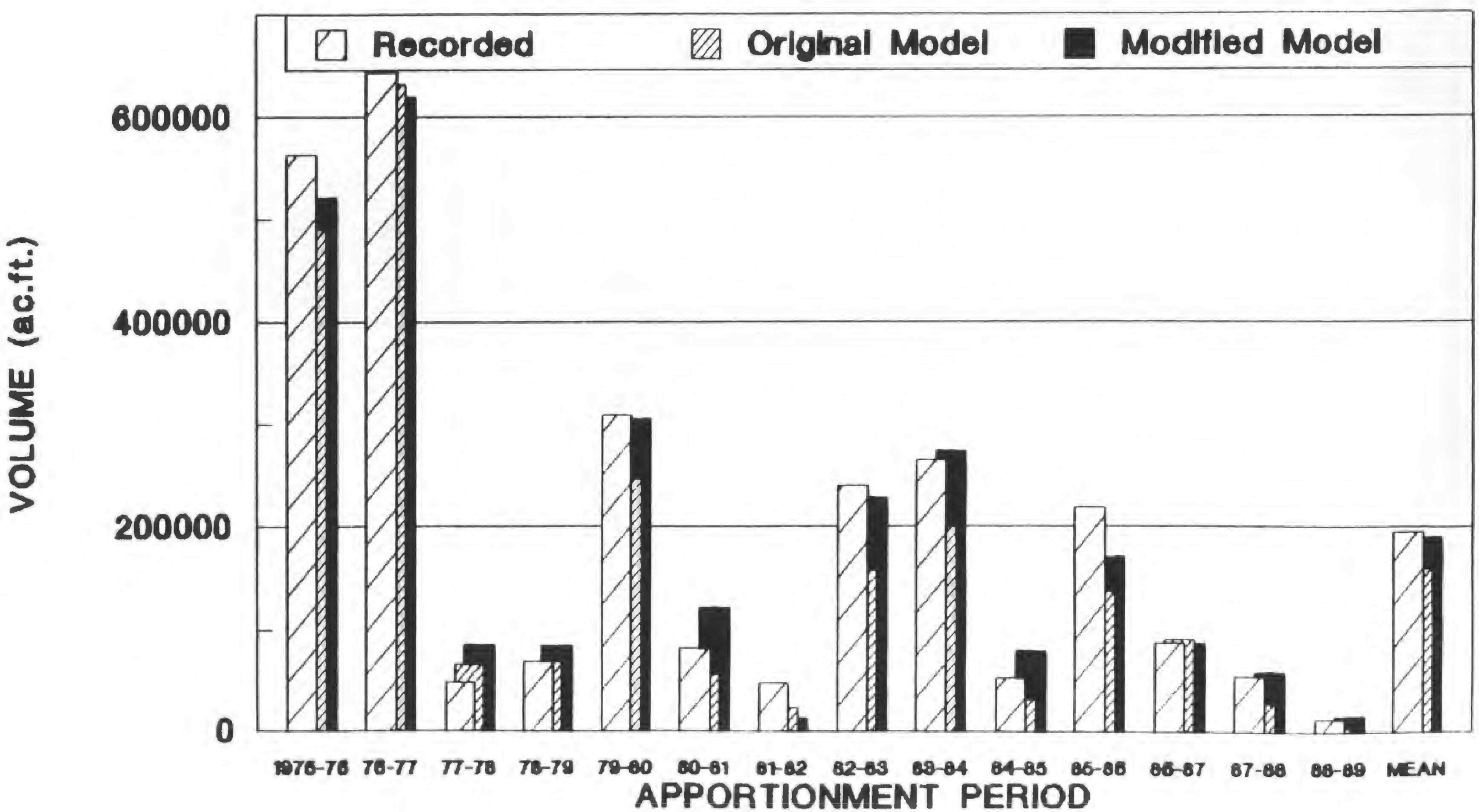
3.3 Apportionment Flow at Saskatchewan/Manitoba Boundary

Apportionment period natural flow volumes for the Qu'Appelle River near Welby, simulated by the original and modified natural flow models for the apportionment period 1975/76 to 1988/89, are shown in Figure 3.3-1. Also shown in this figure, for comparison purposes, are the flow volumes recorded at the hydrometric station 05JM001 - Qu'Appelle River near Welby for these same apportionment periods. The apportionment period is considered to be from April 1 to March 31 of the following year.

Figure 3.3-1 shows that the modified model simulated higher apportionment period flow volumes than those simulated by the original model. The mean apportionment period volume simulated by the original Qu'Appelle River Natural Flow Model for the 1975/76 to 1988/89 period was 159850 acre-feet (197170 dam^3); the mean apportionment period volume simulated by the modified model for the same period was 190830 acre-feet (235390 dam^3); 30980 acre-feet (38210 dam^3) or 19 percent higher.

QU'APPELLE RIVER NEAR WELBY

APPORTIONMENT PERIOD FLOW VOLUMES
COMPARISON OF RECORDED AND SIMULATED NATURAL VOLUMES

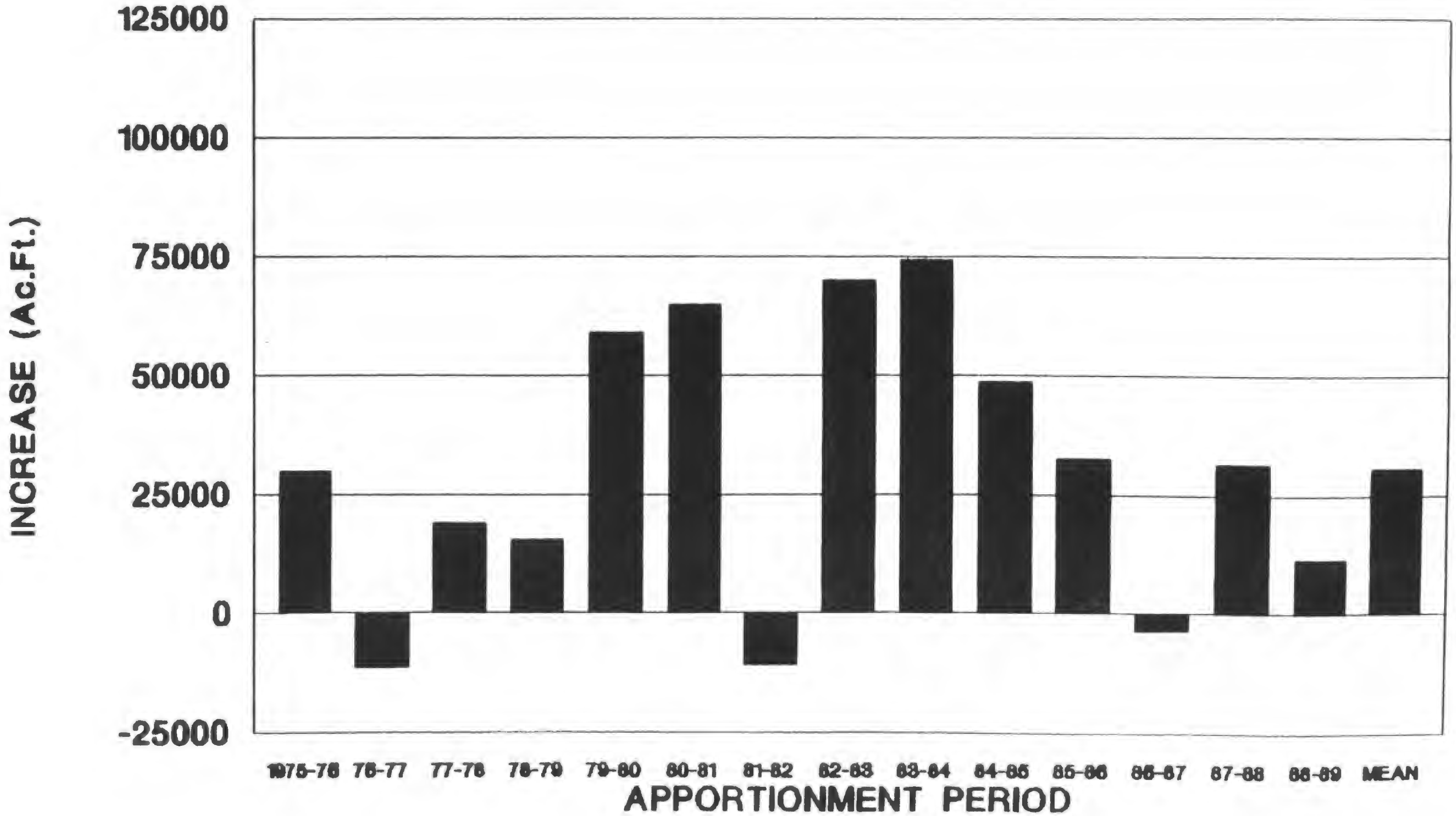


Note: Apportionment Period is April 1 to March 31

Figure 3.3-1

QU'APPELLE RIVER NEAR WELBY

INCREASE IN APPORTIONMENT PERIOD NATURAL FLOW



Note: Apportionment Period is April 1 to March 31

Figure 3.3-2

The increase in the apportionment period natural flow volume estimated at the Saskatchewan/Manitoba Boundary is plotted in Figure 3.3-2. This figure shows the modified model simulated higher apportionment period flow volumes in all but three periods. In reviewing the original model output results in an effort to determine the reason for these three anomalies, it was discovered that in two of the periods in which the modified estimation was lower, the original model had to be run in a number of segments. Although the exact reason for this could not be determined, the fact that the run had to be split up is an indication that problems were experienced with the original model, thus casting doubts on the accuracy of the original model results for these two periods.

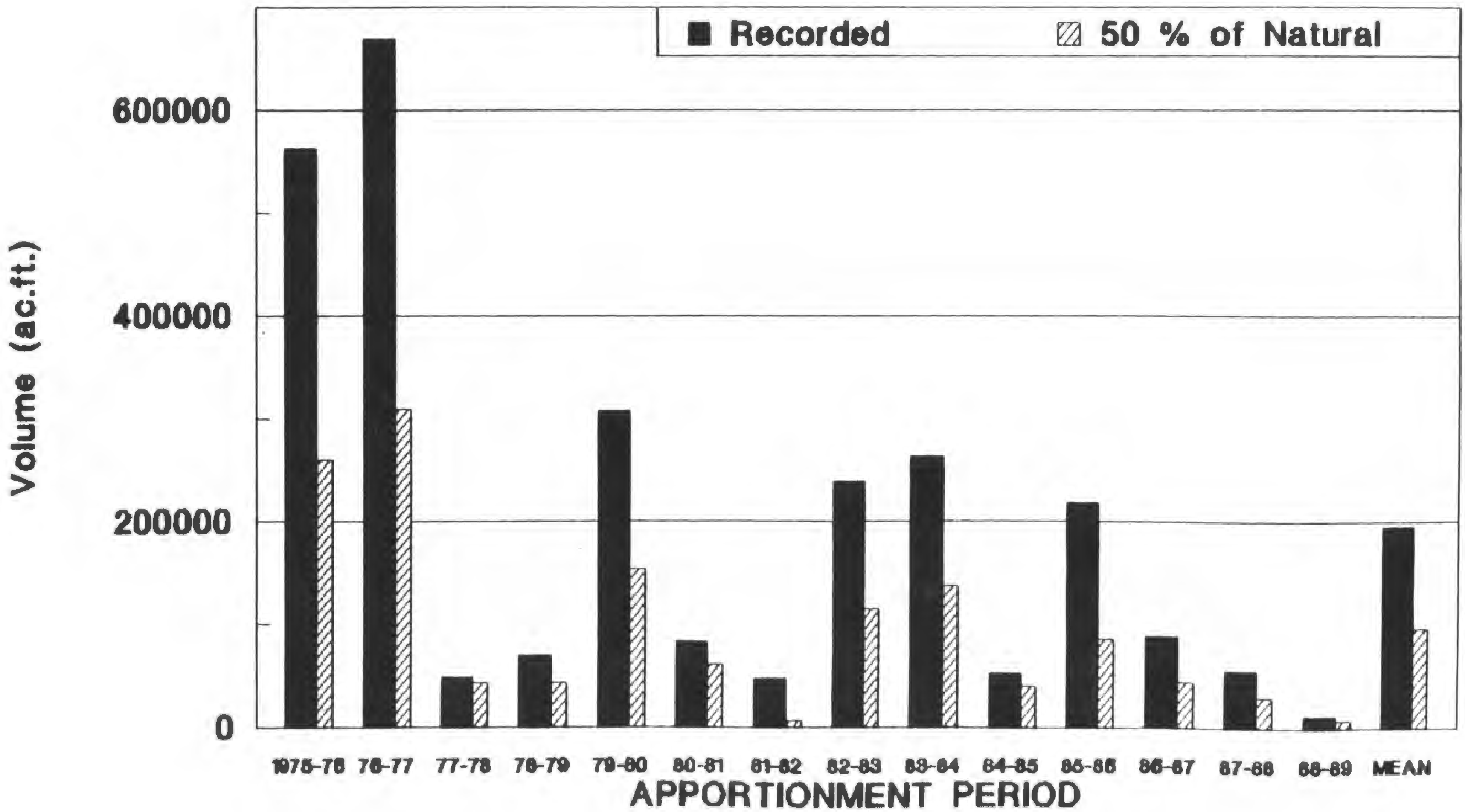
Flow volumes recorded at the Saskatchewan/Manitoba Boundary on the Qu'Appelle River for the 1975/76 to 1988/89 apportionment periods are plotted in Figure 3.3-3. Also plotted in Figure 3.3-3 is the 50 percent of natural flow volumes simulated with the modified model. This figure shows that the Province of Saskatchewan delivered in excess of the required 50 percent of natural flow, as specified in the 1969 Master Agreement on Apportionment, in every period simulated.

Table 3.3-1 summarizes the data plotted in Figures 3.3-1 to 3.3-3.

Licensed diversions in the Saskatchewan portion of the Qu'Appelle River Basin total 79900 dam^3. The mean annual release at the Qu'Appelle Dam for the 1975 to 1988 period was 77100 dam^3. Thus, because the diversion of water into the Qu'Appelle River Basin is close to the amount of uses within

QU'APPELLE RIVER NEAR WELBY

APPORTIONMENT PERIOD FLOW VOLUMES



Note: Apportionment Period is April 1 to March 31

Figure 3.3-3

TABLE 3.3-1

QU'APPELLE RIVER NEAR WELBY APPORTIONMENT PERIOD VOLUMES

Apportionment Period*	Recorded (ac.ft.)	Simulated Natural: Original Model (ac.ft.)	Simulated Natural: Modified Model (ac.ft.)	Increase In Simulated Natural (ac.ft.)	Increase In Simulated Natural (%)	Portion of Natural Delivered To Manitoba: Original Model (%)	Portion of Natural Delivered To Manitoba: Modified Model (%)
1975-1976	563400	490958	521224	30266	6	115	108
1976-1977	669400	631733	620393	-11340	-2	106	108
1977-1978	48654	66700	86015	19315	29	73	57
1978-1979	69333	69799	85505	15706	23	99	81
1979-1980	309250	246656	305914	59258	24	125	101
1980-1981	82319	57420	122412	64992	113	143	67
1981-1982	48254	24106	13163	-10943	-45	200	367
1982-1983	239433	157535	227745	70210	45	152	105
1983-1984	265099	199486	274034	74548	37	133	97
1984-1985	52646	31766	80589	48823	154	166	65
1985-1986	218508	138077	170934	32857	24	158	128
1986-1987	87767	91382	87911	-3471	-4	96	100
1987-1988	55484	28104	60054	31950	114	197	92
1988-1989	12894	4127	15720	11593	281	312	82
Mean	194460	159846	190830	30983	57	148	111

* Note: Apportionment Period is April 1 to March 31

the basin, the volume of flow at the Saskatchewan/Manitoba Boundary would be expected to be close to the volume of flow which would occur under natural conditions. The mean 1975 to 1988 apportionment period simulated natural volume of flow at the Saskatchewan/Manitoba Boundary was 190830 acre-feet (235390 dam^3). The mean recorded flow volume for the same time period was 194460 acre-feet (239870 dam^3), 102 percent of natural.

3.4 Committee on Groundwater Review Comments

Because of the significant contribution of groundwater to the Qu'Appelle River System, and because of the complex relationship between groundwater and surface water, the SSARR sub-committee recommended that the COG review the groundwater section of this report.

Comments from the COG varied from "acceptable", to "highly questionable", to "high by perhaps as much as an order of magnitude". The wide range in comments confirms that true groundwater into the Qu'appelle River System is not known.

The natural flow estimates arrived at in this study are dependent on the groundwater inflow estimate determined in this study. This groundwater inflow estimate was determined using the best information available at this time. The natural flow estimate could change in the event of improved groundwater inflow data.

CHAPTER IV

CONCLUSIONS

The original Qu'Appelle River Natural Flow Model contained a number of inaccuracies which often created difficulty for those using the model and produced simulation results of questionable accuracy. As a result of the modifications made to the natural flow model in this study, the modified Qu'Appelle River Natural Flow Model is easier to use and produces more realistic simulation results.

Table 4-1 lists the modifications made to the Qu'Appelle River Natural Flow Model and summarizes the effect each modification has on the simulated natural flow in the Qu'Appelle River at the Saskatchewan/Manitoba Boundary.

Over the period of 1975 to 1988, the modified model simulated apportionment period volumes for the natural flow in the Qu'Appelle River at the Saskatchewan/Manitoba Boundary which averaged 19 percent higher than those simulated by the original model. However, in spite of the increase in the natural flow estimate, Saskatchewan has always delivered more than the required 50 percent of natural flow.

TABLE 3.4-1

SUMMARY OF EFFECTS OF MODIFICATIONS
ON SIMULATED NATURAL FLOW IN THE QU'APPELLE RIVER
AT THE SASKATCHEWAN/MANITOBA BOUNDARY

Modification	Effect On Natural Flow Estimate	Degree Of Effect
1. Convert Qu'Appelle River Natural Flow Model to Microcomputer Format	Negligible	Negligible
2. Extend Last Mountain Lake Tables	No Effect	No Effect
3. Revise Last Mountain Lake Overflow Table (CF20)	Decrease	Minor
4. Revise Channel Routing Parameters	Negligible	Negligible
5. Revise Overbank Flow Reservoirs	Decrease	Minor
6. Revise Procedure for Simulating Reservoir Regulation	Increase	Major
7. Revise procedure for handling evaporation so that provision is made for lower evaporation under Natural Conditions	Increase	Major
8. Revise procedure for estimating local inflow	Increase	Minor
9. Incorporate effects of groundwater (Last Mountain Lake and Fishing Lakes)	Increase	Major
10. Correct Input Data Format	Increase	Minor

CHAPTER V

RECOMMENDATIONS

As a result of completing the Qu'Appelle River Natural Flow Model Modification Study, the following recommendations are made:

1. That the microcomputer of SSARR be used for running Qu'Appelle River Natural Flow simulations;

2. That the modified version of the Qu'Appelle River Natural Flow Model be used for estimating the natural flow in the Qu'Appelle River at the Saskatchewan/Manitoba Boundary;

3. That the Qu'Appelle River Natural Flow Model be left in Imperial Units as the time required to convert the model would not be cost-effective;

4. That a user's manual for the modified Qu'Appelle River SSARR Model be written to document the modified data input requirements;

REFERENCES

Hydrological Atlas of Canada, Environment Canada, 1978.

PFRA Hydrology Report No. 121, Gross Evaporation for the 30 year period 1951-80 in the Canadian Prairies November, 1989.

Streamflow Synthesis and Reservoir Regulation (SSARR) User Manual, U.S. Army Corps of Engineers, August, 1987.

Micro Computer Version of The SSARR Model, U.S. Army Corps of Engineers, August, 1987.

Qu'Appelle River at Saskatchewan/Manitoba Boundary, Natural Flow, PPWB, December, 1975.

Qu'Appelle River at Saskatchewan/Manitoba Boundary, Natural Flow, User Manual, PPWB, December, 1975.

Report of The Qu'Appelle Basin Study Board, Canada-Saskatchewan-Manitoba, 1972.

Fort Qu'Appelle Geology, Saskatchewan Research Council, 1977.

APPENDIX A

MEMORANDUM OF UNDERSTANDING

PRAIRIE PROVINCES WATER BOARD

COMMITTEE ON HYDROLOGY

MEMORANDUM OF UNDERSTANDING

Made in duplicate.

BETWEEN The Prairie Provinces Water Board (hereinafter referred to as "the Board").

AND Saskatchewan Water Corporation (hereinafter referred to as the "Participating Agency").

TITLE Qu'Appelle River SSARR Model Modification Study.

ARTICLES OF UNDERSTANDING

1. The Participating Agency will perform the services defined in the attached document "Schedule A - Work Required".

2. The Participating Agency will, upon completion of the tasks described in Schedule A, make the information available to the Board.

3. The Board will reimburse the Participating Agency for the work identified in Schedule A in accordance with allowable expenditures, as listed in the attached "Schedule B - Allowable Expenditures", up to a maximum of $29,000.00.

4. The work shall be completed by March 31, 1990 or such other date as may be mutually agreed upon.

5. The performance of the parties to the Memorandum of Understanding is subject to the conditions contained in the attached document "Schedule C - General Conditions".

6. Amendments to the Memorandum of Understanding, including changes of the completion date, may be accomplished by an exchange of letters by the signatories.

AUTHORIZATION

As recommended by the Chairman of the Board, and in compliance with the Board's rules and procedures, the Board and the Participating Agency, therefore, enter into this Memorandum of Understanding.

SIGNED ON BEHALF OF THE BOARD:

By ____________________

on 89-04-24

SIGNED ON BEHALF OF SASKATCHEWAN WATER CORPORATION:

By ____________________

on 89.04.26

SCHEDULE A - WORK REQUIRED

1. Implement the existing Qu'Appelle River Basin SSARR model on a micro-computer. Ensure the current Qu'Appelle River basin micro-computer SSARR model is operational on the micro-computer.

2. Extend stage-area and stage-capacity curves of Last Mountain Lake to cover the entire range of lake levels and incorporate these curves into the SSARR model.

3. Revise channel routing parameters for post conveyance conditions. Determine the reaches where modifications have been carried out, what was done and when it was completed. Enter these revised routing parameters into the SSARR model.

4. Determine reservoir regulation operational procedures (past and present) for each reservoir in the Qu'Qppelle River system and incorporate into SSARR model using reservoir regulation cards.

5. Incorporate evaporation cards into the model taking into consideration increased lake areas due to regulation of lake elevations.

6. Revise procedure for computing ungauged lateral flow. Determine local drainage areas (gross and effective) of each river reach in the Qu'Appelle River system. Estimate natural inflow using drainage area ratios and natural recorded flows at representative WSC gauging stations. Implement this method of estimating local inflows into SSARR model.

7. Evaluate the effects of groundwater flow on Last Mountain Lake and the Fishing Lakes, and, if applicable, incorporate a groundwater component into the model.

8. Re-run the revised model, summarize the results and compare new results to the current model results.

9. Submit interim reports and financial claims quarterly during the study period and submit a draft report by December 1, 1989.

10. Prepare 40 copies of a report on the work done, results obtained and any recommendations in a form satisfactory to the Executive Director by March 31, 1990. All reports and the original documents from which the reports are produced will become the property of the Board.

SCHEDULE B - ALLOWABLE EXPENDITURES

For the purposes of the Board, allowable expenditures comprise those costs associated with carrying out the studies and investigations pursuant to Schedule A of this Memorandum of Understanding. They shall include:

1. Salaries of employees computed on a minimum half-day basis.

2. Transportation and living expenses of such employees while away from their normal headquarters.

3. Rental charges for equipment owned by their parties, while being used for the provision of services, including operators wages.

4. All out-of-pocket operating, maintenance, and transportation expenses for equipment owned by the Participating Agency for the provision of services.

5. Cost of materials, expenses and services including computer time incurred for the provision of work approved by the Board Secretariat.

6. Costs associated with contracts for services.

7. Excluded are indirect overhead costs such as office space, depreciation of furniture, supervisory costs and other items that would represent a normal cost item for the contractor in operating the agencies regular work program.

SCHEDULE C - GENERAL CONDITIONS

Interpretation

1. In this Memorandum of Understanding:

(a)	"the Board"	-	means the Prairie Provinces Water Board as established under Schedule C of the Agreement dated the thirtieth day of October, 1969, between the Governments of Canada, Manitoba, Saskatchewan, and Alberta.
(b)	"Executive Director"	-	means the senior employee of the Board; subject to the Board's directions, responsible for the technical and administrative activities and the day-to-day management of the Board.
(c)	"Standards"	-	standards established between the Board Secretariat and/or the Committee on Hydrology.
(d)	"Schedule"	-	means the order and timing of studies and investigations as set out in Schedule A.
(e)	"Participating Agency"	-	means the agency which will undertake the studies and investigations.

2. The report will be prepared in accordance with the Standards.

3. Any changes to the scope and/or schedule of the work set out in Schedule A deemed to be significant by the Executive Director, must receive prior approval of the Committee on Hydrology and be duly authorized.

4. All work will be conducted in accordance with the schedule. Provided, however, that if in the opinion of the Executive Director, it is considered in the mutual interests of the Participating Agency and the Board, he may revise the Schedule following consultation with the Participating Agency.

5. In the case where the Board or the Participating Agency anticipates serious delays in the completion of the services or of a part thereof within the time set for its completion, the Board may take all or any part of Schedule A out of the hands of the Participating Agency upon receipt of or after giving 30 days written notice.

6. Where the Memorandum of Understanding, or any portion therefore has been terminated, for any reasons, the Board is not obligated to pay the Participating Agency for any expenses after the written notice of termination has been received by the Participating Agency other than those expenses related to the winding up of activities or any part thereof.

7. The allowable expenditures stipulated in Article 3 of this Memorandum of Understanding shall not be exceeded by the Participating Agency without the prior appropriate amendment of the memorandum.

8. This Memorandum of Understanding may be amended by exchange of letters between the Board and the Participating Agency.

9. The Participating Agency shall maintain records, consistent with accounting practices, of all expenditures made pursuant to this Memorandum of Understanding supported by proper documents and vouchers. Such records, documents and vouchers shall be made available to the Board for audit upon request and the Participating Agency shall furnish any and all information in relation thereto.

10. The Participating Agency agrees to pay all debts and liabilities incurred in the performance of services under this Memorandum of Understanding.

11. Claiming Procedures

a. The Participating Agency will submit claims at the end of each fiscal year quarter for work completed under this Memorandum of Understanding during the previous three-month period.

b. Claims for work done in the last quarter of each fiscal year will be *submitted* by the Participating Agency not later than March 15th of that year and will include an estimate of all expenditures to be incurred to the end of the current fiscal year.

c. Adjustments to the claim for the last fiscal year quarter, to account for discrepancies between estimated and actual expenditures, will be reflected in the claim for the first quarter of the following fiscal year.

d. Payment of claims for any fiscal year is subject to the availability of funds for that particular year.

e. All claims by the Participating Agency for work done under this Memorandum of Understanding will be submitted to the Executive Director of the Board, Regina, Saskatchewan.

APPENDIX B

ORIGINAL QU'APPELLE SSARR MODEL CONFIGURATION CHARTS

Source: Natural Flow, Qu'Appelle River at
Saskatchewan/Manitoba Boundary
Environment Canada, December, 1975

TECHNICAL REPORT TO THE
PPWB COMMITTEE ON HYDROLOGY

NATURAL FLOW

QU'APPELLE RIVER

AT SASKATCHEWAN MANITOBA BOUNDARY

PREPARED BY:

DEPARTMENT OF ENVIRONMENT
WATER SURVEY OF CANADA
ATMOSPHERIC ENVIRONMENT SERVICE

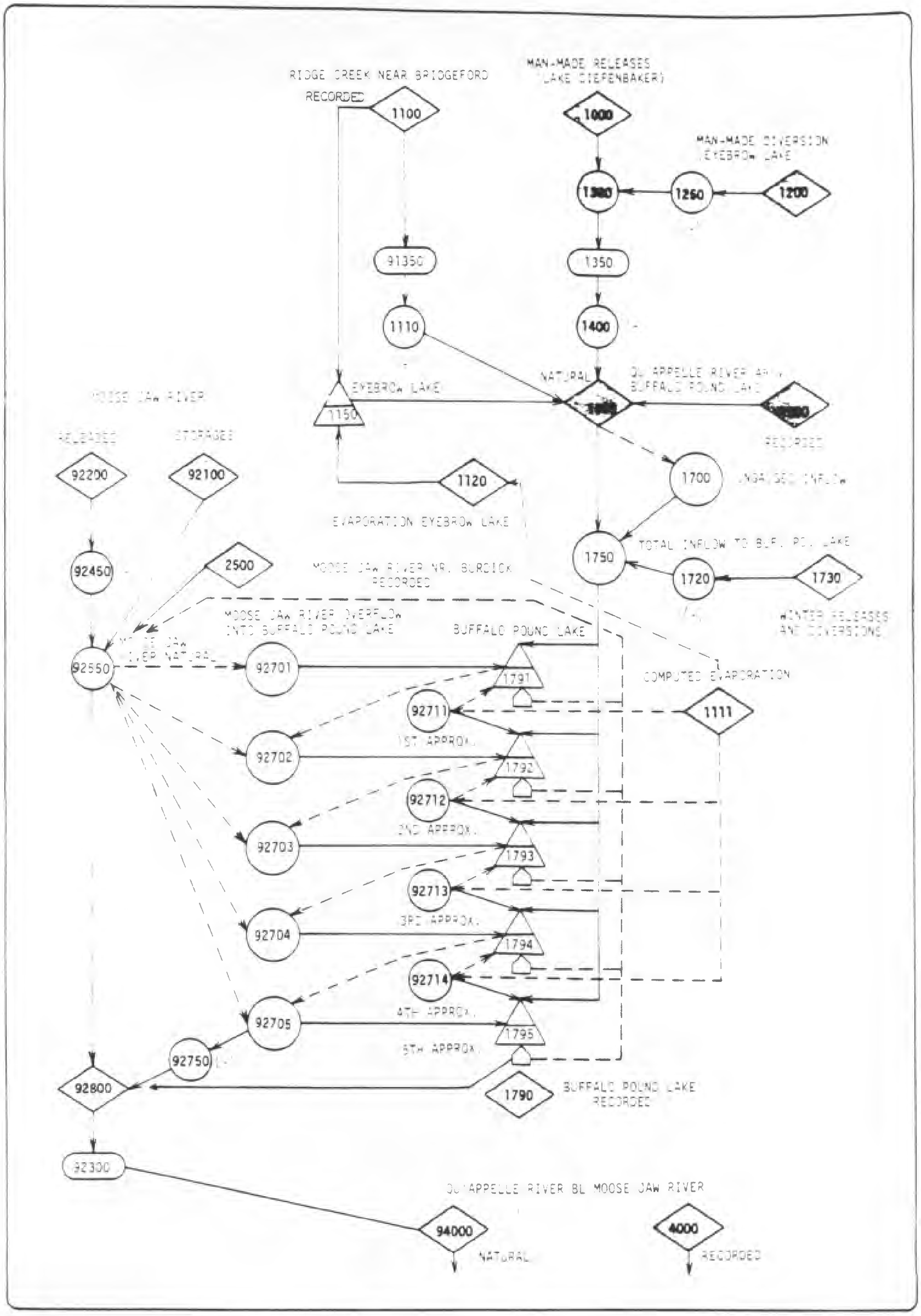


Figure 13: SSARR River System Chart – Lake Diefenbaker to below Moose Jaw River.

Page B-2

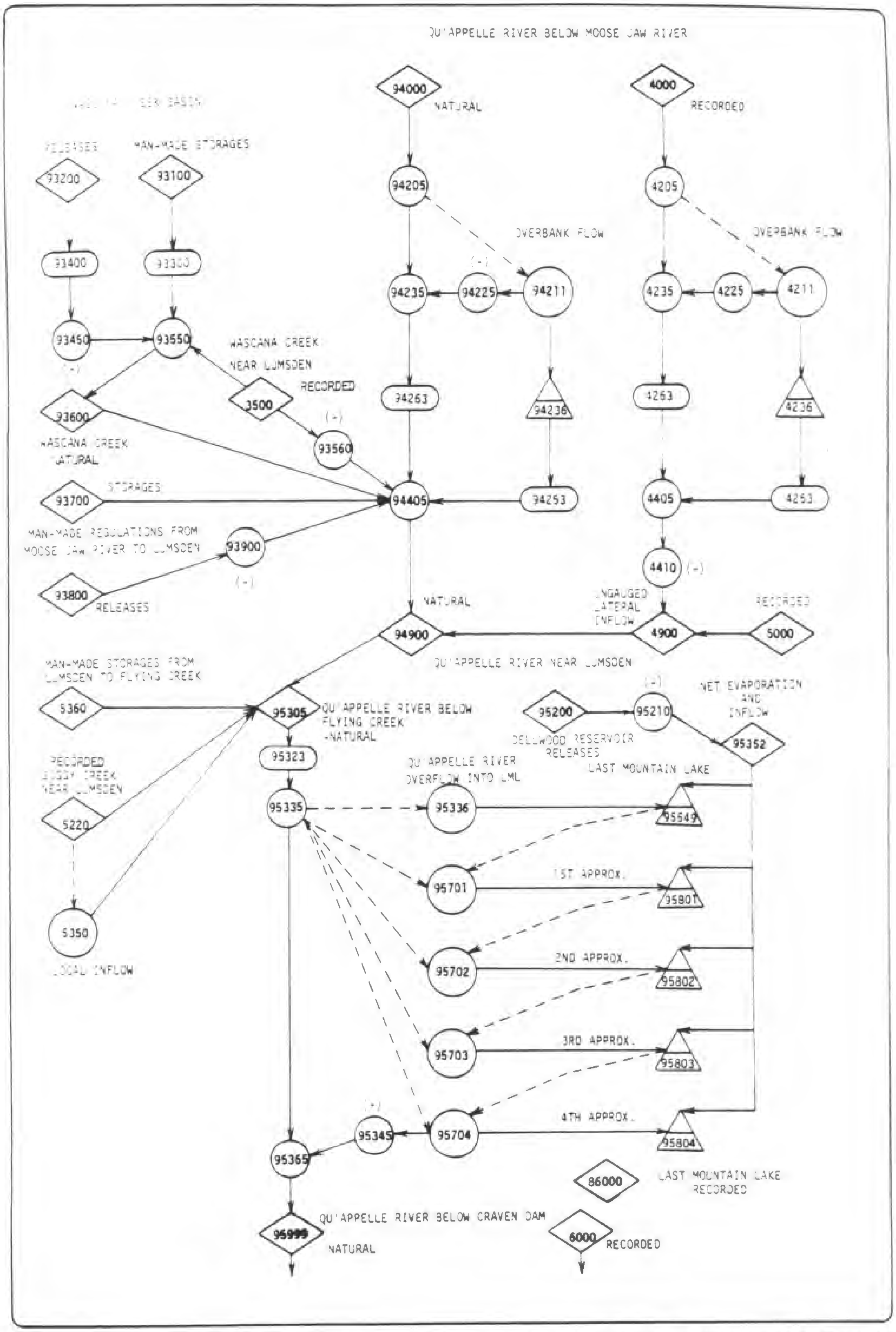


Figure 14: SSARR ~~River~~ System Chart — below Moose Jaw River to Craven Dam.

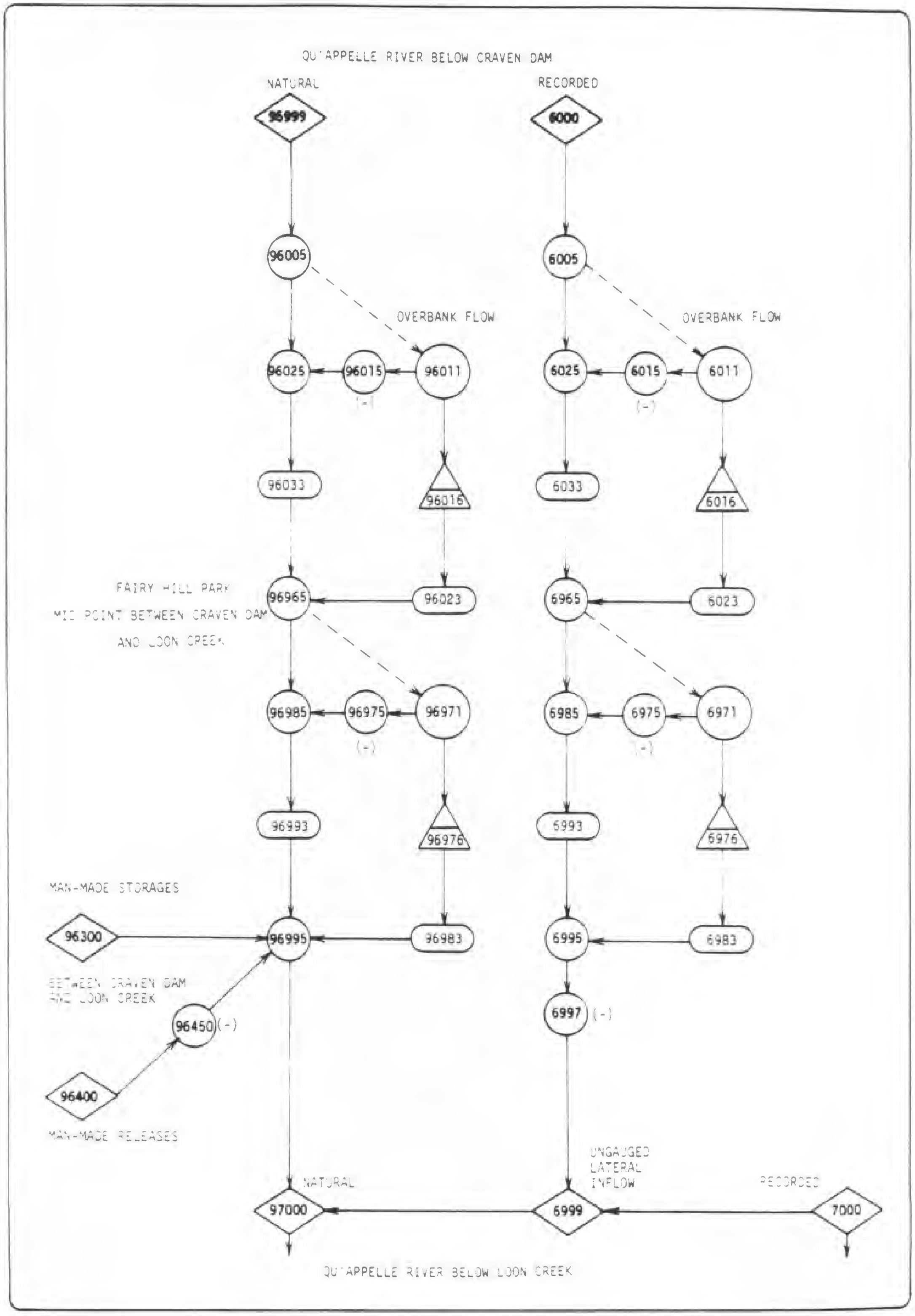


Figure 15: SSARR River System Chart — below Craven Dam to below Loon Creek.

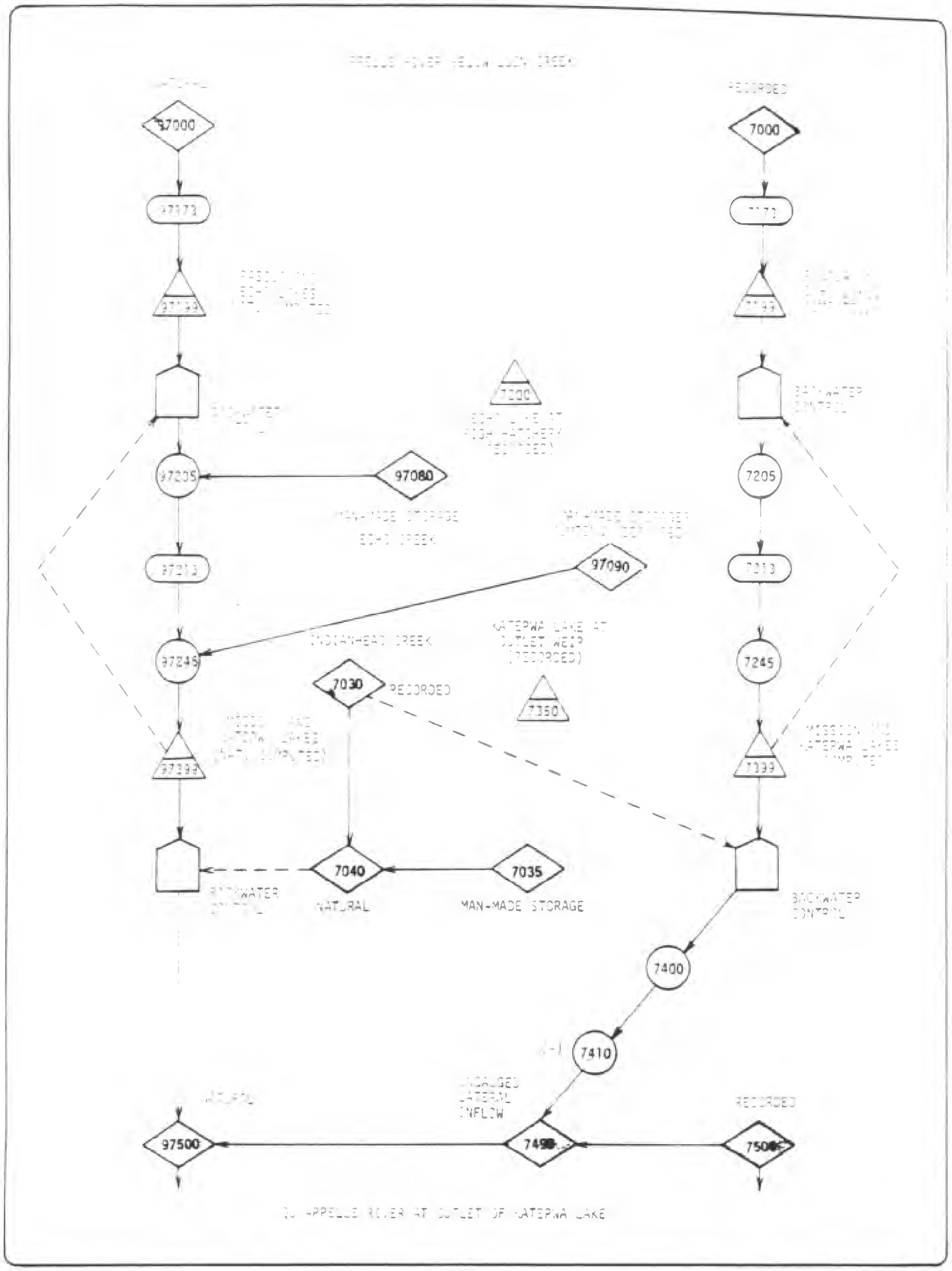


Figure 16: SSARR River System Chart — below Loon Creek to Outlet of Katepwa Lake.

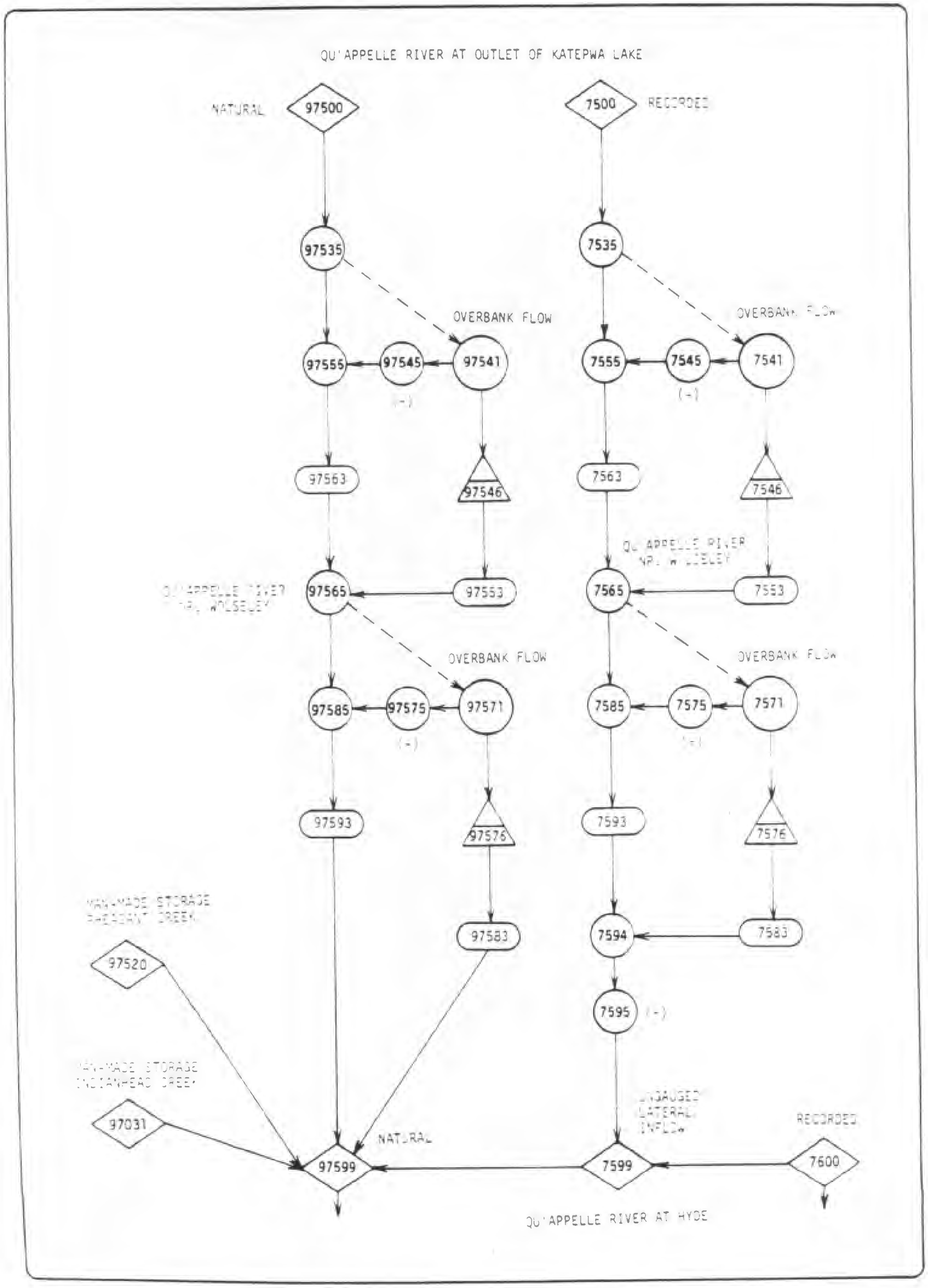


Figure 17: SSARR River System Chart — Outlet of Katepwa Lake to Hyde.

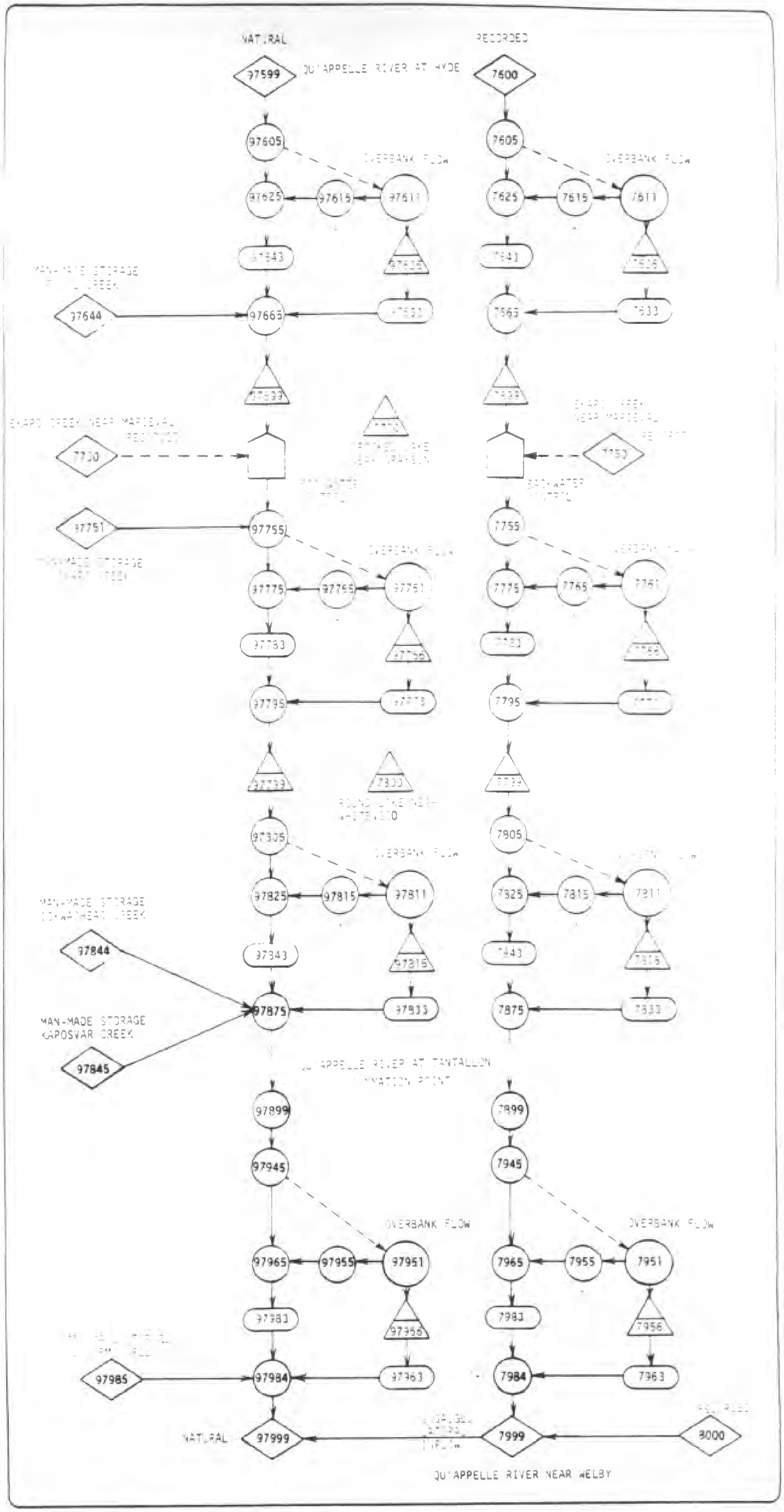


Figure 18: SSARR River System Chart -- Hyde to Welby.

APPENDIX C

INSTRUCTIONS FOR RUNNING MODIFIED QU'APPELLE SSARR NATURAL FLOW MODEL ON MICRO COMPUTER

```
C:\SSARR>FINIT

THIS PROGRAM WILL EMPTY-OUT FILE\IODC
IF YOU ENTER A 'Y':

Y

FILE\IODC INITIALIZED AS EMPTY.
Stop - Program terminated.

C:\SSARR>J

C:\SSARR>jsrexe con con
1234567890123456789012345678901  ENTER SSARR CARD  60 234567890123456789
INFILE Q1288.FIN

INFILE Q1288.FIN

JOB  0000280389 0 0 24011 1  ELBOW TO WELBY MARCH 1 TO JUL 31 1988

CT   30          2          0  0      50        0    150        50
:
6S   7668 1200112881        012031121           0

END OF OUTPUT

Stop - Program terminated.

C:\SSARR>IA

INTERACTIVE SSARR MONITOR. ENTER ? FOR INSTRUCTIONS

RIVER Q12

RIVER Q12

MODEL Q12  RUNNING RIVER MODEL FOR 153 PERIODS.
Stop - Program terminated.

FINAL FILE OF TIME RECORDS IS ON UNIT 22.
Stop - Program terminated.

Enter SSARR main command:  "J", "Z", "MAINT", "PR", "PL", or "IA".

C:\SSARR>PREXE CON CON
PR, X, AND SR CARD PROCESSOR:
PR AND PT CARDS PRODUCE FORMATTED PRINTOUT FROM RIVER MODEL.

X CARDS PRODUCE TELETYPE REPORT.

SR, SQ, AQ, SE, AE, ZSQ, ZAQ, ZSE, ZAE CARDS SAVE RIVER MODEL
MODEL COMPUTED FLOWS AND ELEVATIONS INTO SSARR FILE.

1234567890123456789012345678901 ENTER SSARR CARD  60 234567890123456789
```

```
INFILE Q12.PCD
INFILE Q12.PCD
PR 8   17902    17952    940001    40001                                        11
PRC8  860002   958042    959991    60001                                        11
PR 8   72002    71992   1971992                                                 11
UNIT 8? Q1288.FOP
PRC8   73502    73992   1973992                                                 11
PRC8   75001    74001    975001                                                 11
PR 8   74991    77002     76992  1976992                                        11
PRC8   78002    77992   1977992                                                 11
PR 8   80001    79841    979991    79991                                        11
PR 8  S10004   S40004   S940004  S959994   S60004                               11
PRC8  S75004   S74004    S74994  S975004                                        11
PR 8  S80004   S79844    S79994  S979994                                        11
PRC8  SEVPS4   SEVPN4    S50004  S949004                                        11
PR 8   11503    17953    958043   953351   9599911203107   1200108   240011
PR 8 1971993  1973993   1976993  1977991   9799911203107   1200108   240011
PR 8   72006    71996     73506    73996         1203107   1200108   240011
PR 8   77006    76996     78006    77996         1203107   1200108   240011
BY
END OF INPUT
Stop - Program terminated.
C:\SSARR>
```

APPENDIX D

MODIFIED QU'APPELLE RIVER SSARR NATURAL FLOW MODEL

SAMPLE INPUT FILES

QU'APPELLE RIVER NATURAL FLOW MODEL

SAMPLE INPUT FILE - SPRING AND SUMMER PORTION OF MODEL

ELBOW DIVERSION TO SASKATCHEWAN/MANITOBA BOUNDARY MARCH 1, 1986 TO APRIL 30, 1986

```
J ENGLISH BATCH NOTRACE
RETURN
 23456789 123456789 123456789 123456789 123456789 123456789 123456789 123456789
 JOB       0000280389 0    0 24011  1        ELBOW TO WELBY MARCH 1 TO AUG 1
CT 1        30         2         0         0        50         0       150        50
CT 2        30      1000       500      3000       500     15000        200099999999
CT 3        30 9999999999999999999999
  OVERBANK FLOW
CT 1        10         2    -10000         0      1100         0      1200        50
CT 2        10      1500       300      2000       500      3000      1000      5000
CT 3        10      2500     15000        5000999999999999999999
CT 1        31         2    -10000         0        50        20       150        60
CT 2        31      1000       400      3000      1000     15000        500099999999
  EYEBROW LAKE EVAP.
CF 1        21    171900    -10000         0         0         0     10000        -0 EYE
CF 2        21    172150    -10000       630         0         0     10000      -630 EVAP
CF 3        21    172500    -10000      1050         0         0     10000     -1050
  BUFFALO POUND LAKE EVAP.
CF 1        35    165300    -10000         0         0         0     10000        -0 BPL
CF 2        35    165400    -10000       132         0         0     10000      -132 EVAP
CF 3        35    165600    -10000       615         0         0     10000      -615
CF 4        35    165800    -10000      1205         0         0     10000     -1205
CF 5        35    166000    -10000      1609         0         0     10000     -1609
CF 6        35    166500    -10000      2170         0         0     10000     -2170
CF 7        35    167000    -10000      2989         0         0     10000     -2989
CF 8        35    167500    -10000      3484         0         0     10000     -3484
CF 8        35    169400    -10000     14000         0         0     10000    -14000
  LAST MOUNTAIN LAKE EVAP.
CF 1        36    150492    -10000         0         0         0     10000        -0 LML
CF 2        36    151575    -10000        41         0         0     10000       -41 EVAP
CF 3        36    152887    -10000       384         0         0     10000      -384
CF 4        36    154199    -10000      1038         0         0     10000     -1038
CF 5        36    155512    -10000      2232         0         0     10000     -2232
CF 6        36    156168    -10000      3125         0         0     10000     -3125
CF 7        36    156824    -10000      4173         0         0     10000     -4173
CF 8        36    157480    -10000      5762         0         0     10000     -5762
CF 9        36    158136    -10000      8046         0         0     10000     -8046
CF10        36    158793    -10000     11004         0         0     10000    -11004
CF11        36    159450    -10000     14067         0         0     10000    -14067
CF12        36    160105    -10000     16694         0         0     10000    -16694
CF13        36    160761    -10000     18790         0         0     10000    -18790
CF14        36    161417    -10000     23982         0         0     10000    -23982
CF15        36    162008    -10000     29619         0         0     10000    -29619
  MOOSE JAW RIVER OVERFLOW INTO B.P.
CF 1        41         0    165300         0    168300              0999999999999999RVISED
CF 2        41       500    165300        70    166300        70    166900         0NAT Q
CF 3        41       500    168300              0999999999999999                    CONDTN
CF 4        41      1000    165300       500    166300       500    166900       200MOOSE
CF 5        41      1000    167200         0    168300              0999999999999999JAW R
CF 6        41      1500    165300       900    166300       900    166900       650OVERFL
CF 7        41      1500    167550         0    168300              0999999999999999INTO
CF 8        41      2000    165300      1300    166300      1300    166900      1000BPL
CF 9        41      2000    167500       400    167550         0    168300         0C2 TBL
CF10        41      2000999999999999999999                                         USED
CF11        41      3000    165300      2150    166300      2150    166600      2000OUTFLW
CF12        41      3000    167100      1740    167700         0    168300         0
CF13        41      3000999999999999999999
CF14        41      4000    165300      3000    166300      3000    166600      2900
CF15        41      4000    167100      2540    167500      2050    167700      1050
CF16        41      4000    167750         0    168300              0999999999999999
CF17        41      5000    165300      3950    166300      3850    166600      3760
CF18        41      5000    167100      3450    167500      2870    167700      1980
CF19        41      5000    167850         0    168300              0999999999999999
CF20        41     16000    165300      6000    166300      5000    166600      3000
CF21        41     16000    167100      2000    168300      1400999999999999999999
CF20        41     32000    165300     12000    166300     10000    166600      6000
CF21        41     32000    167100      4000    168300      2800999999999999999999
  Q.R. OVERFLOW INTO L.M.L.
CF 1        20     -9000    158100        -2    160500        -3    160800      -270 QU'A
CF 2        20     -9000    161300     -1000    161600     -2000999999999999999999 OVERF
CF 3        20         0    158100        -1    160500        -2    160800      -269 INTO
CF 4        20         0    161300      -999    161600     -1999999999999999999999 LML
CF 5        20        25    158100         0    160500        -1    160800      -180
CF 6        20        25    161300      -900    161600     -1900999999999999999999
CF 7        20       500    158100       261    160500       260    160800        90
CF 8        20       500    161300      -280    161600     -1000999999999999999999
CF 9        20      1000    158100       561    160500       560    160800       430
CF10        20      1000    161300        70    161600      -460999999999999999999
CF11        20      2000    158100      1211    160500      1210    160800      1150
CF12        20      2000    161300       880    161600       520999999999999999999
CF13        20      4000    158100      2131    160500      2130    160800      2060
CF14        20      4000    161300      1820    161600      1450999999999999999999
CF15        20      6000    158100      3251    160500      3250    160800      3180
CF16        20      6000    161300      2940    161600      2600999999999999999999
CF17        20      8000    158100      5031    160500      5030    160800      4930
CF18        20      8000    161300      4700    161600      4400999999999999999999
CF19        20     10000    158100      6671    160500      6670    160800      6610
CF20        20     10000    161300      6420    161600      6100999999999999999999
CF21        20     20000    158100     12671    160500     12670    160800     12610
CF22        20     20000    161300     12420    161600     12100999999999999999999
  DRAINAGE AREA RATIO TABLES FOR CALCULATING LOCAL INFLOW
CF 1        49       200     -1000         0         0         0     10000       3900999999999
CF 2        49     50000     -1000         0         0         0     10000       2600999999999
CF 1        50       200         0         0     10000    10700999999999
CF 2        50     50000         0         0     10000    23600999999999
CF 1        51       200         0         0     10000     3900999999999
CF 2        51     50000         0         0     10000     2600999999999
CF 1        52       200         0         0     10000      400999999999
CF 2        52     50000         0         0     10000      200999999999
CF 1        53       200         0         0     10000    12900999999999
CF 2        53     50000         0         0     10000    21900999999999
```

```
CF 1       54          200        0       0   10000   9400999999999
CF 2       54        50000        0       0   10000   8600999999999
 ELBOW DIVERSION TO CRAVEN DAM ("QUA1" IN ORIGINAL MODEL)
23456789 123456789 123456789 123456789 123456789 123456789 123456789 123456789
        10        20        30        40        50        60        70
CC01     1000       0         LAKE DIEF RELEASES-ELBOW DIV STRUCTURE
CC01     1100       0         RIDGE CREEK NR BRIDGEFORD -RECORDED
CC01    31101       0  111          LOCAL INFLOW INTO NAT. EYEBROW LAKE
CC02    31101       1100    RETPER   501000
CC01     1102                 TOTAL NATURAL INFLOW INTO EYE. LAKE
CC01     1110       0         SIGN REVERSAL
CC02     1110 1
CC01     1111       0         BPL EVAP IN 0.01 INCHES PER DAY
CC01     1200       0         MAN-MADE DIVERSION-EYEBROW LAKE
CC01     1250       0         SIGN REVERSAL
CC02     1250 1
CC01     1300       0         SUMMATION PT. LK. DIEF REL AND MM EYEBROW DIV
CR01     1350       0         SUMMATION POINT 1300 -ROUTED
CR02     1350            11 685 12881
CC01     1400       0         SIGN REVERSAL
CC02     1400 1
CR01    91350       0         RIDGE CREEK-ROUTED-RECORDED FLOW
CR02    91350            11 685 12881
CC01     1120       0  112    EVAPORATION ON EYEBROW LAKE-NATURAL
CC02     1120       1111      1149   211000
CL01     1150       0         EYEBROW LAKE NATURAL
CL02     1150                         172600 171900
C110     1150     171900      1             1 172150       1           3000 EST
C111     1150     172250     30          5000 172300      60           6000 TABLE
C112     1150     172500    300         10000 172600    5000          15000
C113     1150 9999999999999999999999999999999
CL01     1149       0         EYEBROW LAKE NATURAL
CL02     1149                         172600 171900
C110     1149     171900      1             0 172150       1           3000 EST
C111     1149     172250     30          5000 172300      60           6000 TABLE
C112     1149     172500    300         10000 172600    5000          15000
C113     1149 99999999999999999999999999999999
CC01     1500       0         QUAPPELLE RIVER AB BUF. PD LAKE -RECORDED
CC01     1600       0         NATURAL FLOW -QUAPPELLE ABOVE BUFFALO PD LAK
CC01    31700       1  111    UNGAUGED INFLOW TO BUFFALO POUND LK
CC02    31700       1600    RETPER   491000
CC01     1750       0         TOTAL INFLOW TO BUF PD LAKE
CC01    92100       0         MOOSE JAW BASIN MAN-MADE STORAGES
CC01    92200       0         MOOSE JAW BASIN MAN-MADE RELEASES
CC01    92450       0         SIGN REVERSAL
CC02    92450 1
CC01     2500       1         MOOSE JAW MR BURDICK- RECORDED FLOW
CC01    32501       1  111          LOCAL INFLOW BURDICK TO BP
CC02    32501       2500    RETPER   51 100
CC01    92550       0         MOOSE JAW NR BURDICK NATURAL FLOW-SUMMATION
CC01    92701       0         OVERFLOW FROM MOOSEJAW INTO BUF PD LK 1ST APPROX
CC02    92701                92550   311000
CL01     1790       1         BUFFALO POUND LAKE AT PUMPING STATION - RECORDED
CL02     1790                         168500 165300
C110     1790     1653                      0 1654                      200BUFFAL
C111     1790     1655                   1000 1656                     2000POUND
C112     1790     1657                   3500 1658                     6300 LAKE
C113     1790     1659                   9000 1660                    13000STORAG
C114     1790     1661                  17200 1662                    21500 TABLE
C115     1790     1665                  35500 1670                    66200 1972
C116     1790     1675                 104700 1676                   112000
C117     1790     1685                 184000999999999999999999999999999999
CL01     1791       1         BUFFALO POUND LAKE AT PUMPING STATION COMP
CL02     1791 1     2500              168500 165300
C110     1791     1653                      0 1654                      200BUFFAL
C111     1791     1655                   1000 1656                     2000POUND
C112     1791     1657                   3500 1658                     6300 LAKE
C113     1791     1659                   9000 1660                    13000STORAG
C114     1791     1661                  17200 1662                    21500 TABLE
C115     1791     1665                  35500 1670                    66200 1972
C116     1791     1675                 104700 1676                   112000
C117     1791     1685                 184000999999999999999999999999999999
C2       1791         -1 1653               0     -1 1654             16000
C2       1791          0 166300            -1      0 166750             300
C2       1791          0 167130           700      0 167400            1200
C2       1791          0 167130           700      0 167400            1200
C2       1791          0 167620          2000      0 169090           16000
C2       1791        100 166530            -1    100 166880             300
C2       1791        100 167200           700    100 167450            1200
C2       1791        100 167660          2000    100 169100           16000
C2       1791        200 166700            -1    200 166940             300
C2       1791        200 167250           700    200 167500            1200
C2       1791        200 167720          2000    200 169200           16000
C2       1791        300 166800            -1    300 167030             300
C2       1791        300 167300           700    300 167550            1200
C2       1791        300 167760          2000    300 169300           16000
C2       1791       1000 167500            -1   1000 167670             300
C2       1791       1000 167770           700   1000 167880            1200
C2       1791       1000 168000          2000   1000 169400           16000
C2       1791      10000 168000            -1  10000 169400           15000
C2       1791    -999999
CL01     1792       1         BUFFALO POUND LAKE AT PUMPING STATION COMP
CL02     1792 1     2500              168500 165300
C110     1792     1653                      0 1654                      200BUFFAL
C111     1792     1655                   1000 1656                     2000POUND
C112     1792     1657                   3500 1658                     6300 LAKE
C113     1792     1659                   9000 1660                    13000STORAG
C114     1792     1661                  17200 1662                    21500 TABLE
C115     1792     1665                  35500 1670                    66200 1972
C116     1792     1675                 104700 1676                   112000
C117     1792     1685                 184000999999999999999999999999999999
C2       1792         -1 1653               0     -1 1654             16000
C2       1792          0 166300            -1      0 166750             300
C2       1792          0 167130           700      0 167400            1200
C2       1792          0 167620          2000      0 169000           16000
C2       1792        100 166530            -1    100 166880             300
C2       1792        100 167200           700    100 167450            1200
C2       1792        100 167660          2000    100 169100           16000
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C2        1792        200 166700            -1     200 166940          300
C2        1792        200 167250           700     200 167500         1200
C2        1792        200 167720          2000     200 169200        16000
C2        1792        300 166800            -1     300 167030          300
C2        1792        300 167300           700     300 167550         1200
C2        1792        300 167760          2000     300 169300        16000
C2        1792       1000 167500            -1    1000 167670          300
C2        1792       1000 167770           700    1000 167880         1200
C2        1792       1000 168000          2000    1000 169400        16000
C2        1792       3000 167500            -1    3000 167670          300
C2        1792       3000 167770           700    3000 167880         1200
C2        1792      10000 168000            -1   10000 169400        15000
C2        1792    -999999
CL01      1793          1         BUFFALO POUND LAKE AT PUMPING STATION COMP
CL02      1793 1     2500               168500 165300
C110      1793     1653                      0 1654                    200BUFFAL
C111      1793     1655                   1000 1656                   2000POUND
C112      1793     1657                   3500 1658                   6300 LAKE
C113      1793     1659                   9000 1660                  13000STORAG
C114      1793     1661                  17200 1662                  21500 TABLE
C115      1793     1665                  35500 1670                  66200 1972
C116      1793     1675                 104700 1676                 112000
C117      1793     1685                 184000999999999999999999999999999999
C2        1793         -1 1653               0      -1 1654        16000
C2        1793          0 166300            -1       0 166750          300
C2        1793          0 167130           700       0 167400         1200
C2        1793          0 167620          2000       0 169090        16000
C2        1793        100 166530            -1     100 166880          300
C2        1793        100 167200           700     100 167450         1200
C2        1793        100 167660          2000     100 169100        16000
C2        1793        200 166700            -1     200 166940          300
C2        1793        200 167250           700     200 167500         1200
C2        1793        200 167720          2000     200 169200        16000
C2        1793        300 166800            -1     300 167030          300
C2        1793        300 167300           700     300 167550         1200
C2        1793        300 167760          2000     300 169300        16000
C2        1793       1000 167500            -1    1000 167670          300
C2        1793       1000 167770           700    1000 167880         1200
C2        1793       1000 168000          2000    1000 169400        16000
C2        1793      10000 168000            -1   10000 169400        15000
C2        1793    -999999
CL01      1794          1         BUFFALO POUND LAKE AT PUMPING STATION COMP
CL02      1794 1     2500               168500 165300
C110      1794     1653                      0 1654                    200BUFFAL
C111      1794     1655                   1000 1656                   2000POUND
C112      1794     1657                   3500 1658                   6300 LAKE
C113      1794     1659                   9000 1660                  13000STORAG
C114      1794     1661                  17200 1662                  21500 TABLE
C115      1794     1665                  35500 1670                  66200 1972
C116      1794     1675                 104700 1676                 112000
C117      1794     1685                 184000999999999999999999999999999999
C2        1794         -1 1653               0      -1 1654        16000
C2        1794          0 166300            -1       0 166750          300
C2        1794          0 167130           700       0 167400         1200
C2        1794          0 167620          2000       0 169090        16000
C2        1794        100 166530            -1     100 166880          300
C2        1794        100 167200           700     100 167450         1200
C2        1794        100 167660          2000     100 169100        16000
C2        1794        200 166700            -1     200 166940          300
C2        1794        200 167250           700     200 167500         1200
C2        1794        200 167720          2000     200 169200        16000
C2        1794        300 166800            -1     300 167030          300
C2        1794        300 167300           700     300 167550         1200
C2        1794        300 167760          2000     300 169300        16000
C2        1794       1000 167500            -1    1000 167670          300
C2        1794       1000 167770           700    1000 167880         1200
C2        1794       1000 168000          2000    1000 169400        16000
C2        1794      10000 168000            -1   10000 169400        15000
C2        1794    -999999
CL01      1795          1         BUFFALO POUND LAKE AT PUMPING STATION COMP
CL02      1795 1     2500               168500 165300
C110      1795     1653                      0 1654                    200BUFFAL
C111      1795     1655                   1000 1656                   2000POUND
C112      1795     1657                   3500 1658                   6300 LAKE
C113      1795     1659                   9000 1660                  13000STORAG
C114      1795     1661                  17200 1662                  21500 TABLE
C115      1795     1665                  35500 1670                  66200 1972
C116      1795     1675                 104700 1676                 112000
C117      1795     1685                 184000999999999999999999999999999999
C2        1795         -1 1653               0      -1 1654        16000
C2        1795          0 166300            -1       0 166750          300
C2        1795          0 167130           700       0 167400         1200
C2        1795          0 167620          2000       0 169090        16000
C2        1795        100 166530            -1     100 166880          300
C2        1795        100 167200           700     100 167450         1200
C2        1795        100 167660          2000     100 169100        16000
C2        1795        200 166700            -1     200 166940          300
C2        1795        200 167250           700     200 167500         1200
C2        1795        200 167720          2000     200 169200        16000
C2        1795        300 166800            -1     300 167030          300
C2        1795        300 167300           700     300 167550         1200
C2        1795        300 167760          2000     300 169300        16000
C2        1795       1000 167500            -1    1000 167670          300
C2        1795       1000 167770           700    1000 167880         1200
C2        1795       1000 168000          2000    1000 169400        16000
C2        1795      10000 168000            -1   10000 169400        15000
C2        1795    -999999
CC01     92711          0  112    BPL EVAPORATION 1ST APPROX IN CFS
CC02     92711       1111         1791    351000
CC01     92702          0  121    OVERFLOW FROM MOOSEJAW INTO BUF PD LK 2ND APPROX
CC02     92702       1791         92550    411000
CC01     92712          0  112    BPL EVAPORATION 2ND APPROX IN CFS
CC02     92712       1111         1792    351000
CC01     92703          0  121    OVERFLOW FROM MOOSEJAW INTO BUF PD LK 3RD APPROX
CC02     92703       1792         92550    411000
CC01     92713          0  112    BPL EVAPORATION 3RD APPROX IN CFS
CC02     92713       1111         1793    351000
CC01     92704          0  121    OVERFLOW FROM MOOSEJAW INTO BUF PD LK 4TH APPROX
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CC02     92704          1793     92550   411000
CC01     92714          0  112     BPL EVAPORATION 4TH APPROX IN CFS
CC02     92714          1111       1794   351000
CC01     92705          0  121     OVERFLOW FROM MOOSEJAW INTO BUF PD LK 5TH APPROX
CC02     92705          1794     92550   411000
CC01     92750          0          SIGN REVERSAL
CC02     92750 1
CC01      2714          0  112     BPL EVAPORATION RECORDED CONDITIONS
CC02      2714          1111       1790   351000
CC01     92800          0          NET NAT FLOW CONTRIB TO QUAPPELLE FLOW
CR01     92300          0          QUAPPELLE  ROUTED-BUF PD TO MOOSE  JAW R.
CR02     92300          0     010061  3187
CC01     94000          1          QUAPPELLE RIVER BELOW MOOSE JAW RIVER NAT.
CC01     94205          0          SUMMED QUAPPELLE R BEL MOOSE JAW
CC01     94211          0          OVERBANK CALCULATIONS - TABLE 10
CC02     94211                   94205   101000
CL01     94236          0          OVER BANK    RESERVOIR MOOSEJAW TO CRAVEN
CL02     94236                                 600    100
C110     94236          100     1              1    200       1           4300
C111     94236          300   310           8600    400     500          12000
C112     94236          500  1000          15000    600   10000          20000
C113     94236 999999999999999999999999999999999
CC01     94225          0          SIGN REVERSAL
CC02     94225 1
CC01     94235          0          SUMMATION POINT QUAPPELLE R BEL MOOSE JAW
CR01     94263          0          ROUTED MOOSE JAW R TTO LUMSDEN
CR02     94263                7 557 11650
CR01     94253          0          ROUTED MOOSE JAW R TO LUMSDEN OVERBANK
CR02     94253                7 557 11650
CC01     93100          0          MAN MADE STORAGES WASCANA CREEK
CR01     93300          0          MAN MADE STORAGES WASCANA CREEK-ROUTED
CR02     93300                1 4    40
CC01     93200          0          REGINA TERTIARY TREATMENT PLANT OUTFLOWS
CR01     93400          0          TREATMENT PLANT OUTFLOWS - ROUTED
CR02     93400                1 4    40
CC01     93450          0          SIGN REVERSAL
CC02     93450 1
CC01      3500          0          WASCANA CREEK NR LUMSDEN RECORDED
CC01     93550          0          WASCANA CK NR LUMSDEN -SUMMED
CC01     93600          0          WASCANA CK NR LUMSDEN -NAT FLOW
CC01     93700          0          MM REGULATION MJR TO LUMSDEN
CC01     93800          0          MM REGULATION MJR TO LUMSDEN -RELEASES
CC01     93900          0          SIGN REVERSAL
CC02     93900 1
CC01     94405          0          SUMMATION POINT QUAPPELLE WASCANA CREEK
CC01      4000          1          QUAPPELLE RIVER BELOW MOOSE JAW RIVER
CC01      4205          0          SUMMED QUAPPELLE R BEL MOOSE JAW
CC01      4235          0          SUMMATION POINT QUAPPELLE R BEL MOOSE JAW
CC01      4211          0          OVERBANK CALCULATIONS - TABLE 10
CC02      4211                     4205   101000
CC01      4225          0          SIGN REVERSAL
CC02      4225 1
CL01      4236          0            OVER BANK RESERVOIR MOOSEJAW TO CRAVEN
CL02      4236                                 600    100
C101      4236          100     1              1    200       1           4300
C103      4236          300   310           8600    400     500          12000
C104      4236          500  1000          15000    600   10000          20000
C105      4236 9999999999999999999999999999999
CR01      4263          0          ROUTED MOOSE JAW R TTO LUMSDEN
CR02      4263                7 557 11650
CR01      4253          0          ROUTED MOOSE JAW R TO LUMSDEN OVERBANK
CR02      4253                7 557 11650
CC01      4405          1          QU'APPELLE RIVER NEAR LUMSDEN - REC. COMPUTED
CC01      4410          0          SIGN REVERSAL
CC02      4410 1
CC01     34122          0  111           LOCAL INFLOW MJR TO LUMSDEN
CC02     34122          5220     RETPER   531000
CC01      4900          0          QUAPPELLE RIVER NR LUMSDEN - UNGAUGED LATERAL INF
CC01      5000          1          QUAPPELLE RIVER NR LUMSDEN RECORDED
CC01     94900          1          QUAPPELLE RIVER NR LUMSDEN-NATURAL FLOW
CC01      2222                     LML COMPUTED MONTHLY NET EVAP (1000ths in/DAY)
CC01      5111             112     EVAP OFF LML ACTUAL CONDITIONS
CC02      5111          2222     86000   361000
CC01      5112                     SIGN CHANGE
CC02      5112 1
CC01     95353                     NATURAL LML NET INFLOW
CC01     95711             112     EVAP OFF NAT LML 1ST APPROX.
CC02     95711          2222     95549   361000
CC01     95712             112     EVAP OFF NAT LML 2ND APPROX.
CC02     95712          2222     95801   361000
CC01     95713             112     EVAP OFF NAT LML 3RD APPROX.
CC02     95713          2222     95802   361000
CC01     95714             112     EVAP OFF NAT LML 4TH APPROX.
CC02     95714          2222     95803   361000
CC01      5360          0          STORAGE IN BOGGY CREEK AREA
CC01      5220          0          BOGGY CREEK -RECORDED
CC01     35350          0  111        UNGAUGED-LOCAL INFLOW LUMSDEN TO CRAVEN
CC02     35350          5220     RETPER   541000
CC01     95305          0          QUAPPELLE RIVER BEL FLYING CREEK -NATURAL
CR01     95323          0          QUAPPELLE RIVER BEL FLYING CREEK -ROUTED
CR02     95323                1 363  9293
CC01     95335          0          QUAPPELLE BEL FLYING CK -SUMMED
CC01     95200          0          DELLWOOD RESERVOIR RELEASES
CC01     95210          0          SIGN REVERSAL
CC02     95210 1
CC01     95352          1          NAT LOCAL INFLOW LAST MTN LAKE-ONE
CL01     86000          0          LAST MOUNTAIN LAKE AT ROWANS RAVIN RECORDED
CL02     86000                             161500 158100
C101     86000       157520     1           314850 159160       1         696325
C102     86000       160800     1          1419308 161654       1        1995768
C103     86000       162441     1          2806469999999999999999999999999999999
CL01     95549          0          LAST MOUNTAIN LAKE AT ROWANS RAVIN COMPUTED
CL02     95549                             161500 158100
C101     95549       157520     1           314850 159160       1         696325
C102     95549       160800     1          1419308 161654       1        1995768
C103     95549       162441     1          2806469999999999999999999999999999999
CL01     95801          0          LAST MOUNTAIN LAKE AT ROWANS RAVIN COMPUTED
CL02     95801                             161500 158100
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C101     95801     157520       1          314850 159160        1          696325
C102     95801     160800       1         1419308 161654        1         1995768
C103     95801     162441       1         280646999999999999999999999999999999
CL01     95802          0        LAST MOUNTAIN LAKE AT ROWANS RAVIN COMPUTED
CL02     95802                             161500 158100
C101     95802     157520       1          314850 159160        1          696325
C102     95802     160800       1         1419308 161654        1         1995768
C103     95802     162441       1         280646999999999999999999999999999999
CL01     95803          0        LAST MOUNTAIN LAKE AT ROWANS RAVIN COMPUTED
CL02     95803                             161500 158100
C101     95803     157520       1          314850 159160        1          696325
C102     95803     160800       1         1419308 161654        1         1995768
C103     95803     162441       1         280646999999999999999999999999999999
CL01     95804          1        LAST MOUNTAIN LAKE AT ROWANS RAVIN COMPUTED
CL02     95804                             161500 158100
C101     95804     157520       1          314850 159160        1          696325
C102     95804     160800       1         1419308 161654        1         1995768
C103     95804     162441       1         280646999999999999999999999999999999
CC01     95336          0        FLOW INTO LAST MTN LAKE-1ST APPROX
CC02     95336                  95335   311000
CC01     95701          0  121   FLOW INTO LAST MTN LAKE-2ND APPROX
CC02     95701        95549     95335   201000
CC01     95702          0  121   FLOW INTO LAST MTN LAKE-3RD APPROX
CC02     95702        95801     95335   201000
CC01     95703          0  121   FLOW INTO LAST MTN LAKE-4TH APPROX
CC02     95703        95802     95335   201000
CC01     95704          0  121   FLOW INTO LAST MTN LAKE-5TH APPROX
CC02     95704        95803     95335   201000
CC01     95345          0        SIGN REVERSAL
CC02     95345 1
CC01     95365          0        QUAPPELLE  BEL LAST MTN LAK -NATURAL FLOW
CC01      6000          3        QUAPPELLE RIVER BELOW CRAVEN DAM - RECORDED
CC01     95999          3        QUAPPELLE RIVER BEL CRAVEN-NATURAL
CL01     S1000          0        CUM. DIEF RELEASES
CL02     S1000                            100000     100
C101     S1000        100       1       -90000000 100000        1       900000000
C101     S1000    9999999999999999999999999999999
CL01     S6000          0        CUM. QU'A R BELOW CRAVEN RECORDED
CL02     S6000                             10000     100
C101     S6000        100       1       -90000000 100000        1       900000000
C101     S6000    9999999999999999999999999999999
CL01     S4000          0        Q.R.BELOW M.J.R. REC
CL02     S4000                             10000     100
C101     S4000        100       1       -90000000 100000        1       900000000
C101     S4000    9999999999999999999999999999999
CL01    S94000          0        Q.R. BELOW M.J.R. NAT
CL02    S94000                             10000     100
C101    S94000        100       1       -90000000 100000        1       900000000
C101    S94000    9999999999999999999999999999999
CL01     S7499          0        CUM. QU'A R BELOW CRAVEN RECORDED
CL02     S7499                             10000     100
C101     S7499        100      -1       -90000000  10000        1       900000000
C101     S7499 999999999999999999999999999999999
CL01    S92714          0        CUM. B.P. EVAP NATURAL CONDITIONS
CL02    S92714                             10000     100
C101    S92714        100       1       -90000000  10000        1       900000000
C101    S92714     99999999999999999999999999999
CL01    S95714          0        CUM. LML  EVAP NATURAL CONDITIONS
CL02    S95714                             10000     100
C101    S95714        100       1       -90000000  10000        1       900000000
C101    S95714     99999999999999999999999999999
CL01     S5000          0        CUM. Q.R. NR LUMSDEN RECORDED
CL02     S5000                             10000     100
C101     S5000        100       1       -90000000  10000        1       900000000
C101     S5000     99999999999999999999999999999
CL01    S94900          0        CUM. Q.R. NR LUMSDEN NATURAL
CL02    S94900                             10000     100
C101    S94900        100       1       -90000000  10000        1       900000000
C101    S94900     99999999999999999999999999999
CL01    S95999          0        CUM. QU'A R BELOW CRAVEN NATURAL CONDITIONS
CL02    S95999                             10000     100
C101    S95999        100       1       -90000000  10000        1       900000000
C101    S95999     99999999999999999999999999999
 QU'APPELLE RIVER BELOW CRAVEN DAM TO QU'APPELLE RIVER NEAR WELBY
 ("QUA2" IN ORIGINAL MODEL)
  OVERBANK FLOW
CT 1        60            2       0       0    1100       0    1500     200
CT 2        60         2000     500    3000    1500   15000    750099999999
CT 3        60999999999999999999
  OVERBANK FLOW
CT 1        61            2       0       0      50       0     100      30
CT 2        61          500     350    1000     800    2000    1500   15000
CT 3        61         50009999999999999999
  OVERBANK FLOW
CT 1        32            2       0       0     300       0     400      50 PRE
CT 2        32          500     100    1000     600    2000    1200    3000 CONV
CT 3        32         2000   15000    50009999999999999999
  OVERBANK FLOW
CT 1        34            2       0       0     150       0     200      25 PRE
CT 2        34          300     100     500     200    1000     700    2000 CONV
CT 3        34         1200   15000    50009999999999999999
  OVERBANK FLOW
CT 1        37            2       0       0     500       0    1000     250 POST
CT 2        37         2000    1200   15000    50009999999999999999         CONV
  OVERBANK FLOW
CT 1        38            2       0       0     300       0     400      50
CT 2        38          500     100    1000     600    2000    1200    3000
CT 3        38         2000   15000    50009999999999999999
  OVERBANK FLOW
CT 1        70            2       0       0     140       0     200      50
CT 2        70          500     250    1000     600    2000    1500   15000
CT 3        70         500099999999999999999
  OVERBANK FLOW
CT 1        75            2       0       0      25       0      30      10
CT 2        75           50      20     100      50     150      50     300
CT 3        75           60     500     150    2000     500   15000    5000
CT 4        75 9999999999999999999999999
  OVERBANK FLOW
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CT 1        80           2      0      0     50      0    150     20
CT 2        80         500    350   1000    800   2000   1500  15000
CT 3        80         5000999999999999999999999
  OVERBANK FLOW
CT 1        90           2      0      0    250      0    300     25
CT 2        90         400    100    500    150   1000    500   2000
CT 3        90        1000  15000   50009999999999999999
  PASQUA AND ECHO EVAP OUTFLOW
CF 1       105      154000 -10000   1417      0      0  10000  -1417
CF 2       105      155500 -10000   1785      0      0  10000  -1785
CF 3       105      156500 -10000   2363      0      0  10000  -2363
CF 4       105      156600 -10000   2690      0      0  10000  -2690
CF 5       105      156700 -10000   2825      0      0  10000  -2825
CF 6       105      156800 -10000   2955      0      0  10000  -2955
CF 7       105      156900 -10000   3081      0      0  10000  -3081
CF 8       105      157000 -10000   3211      0      0  10000  -3211
CF 9       105      157100 -10000   3329      0      0  10000  -3329
CF10       105      157200 -10000   3455      0      0  10000  -3455
CF11       105      157300 -10000   3556      0      0  10000  -3556
CF12       105      157400 -10000   3632      0      0  10000  -3632
CF13       105      157500 -10000   3688      0      0  10000  -3688
CF14       105      157600 -10000   3789      0      0  10000  -3789
  MISSION AND KATEPWA EVAP OUTFLOW
CF 1       106      156400 -10000   2285      0      0  10000  -2285
CF 2       106      156500 -10000   2312      0      0  10000  -2312
CF 3       106      156600 -10000   2348      0      0  10000  -2348
CF 4       106      156700 -10000   2382      0      0  10000  -2382
CF 5       106      156800 -10000   2415      0      0  10000  -2415
CF 6       106      156900 -10000   2457      0      0  10000  -2457
CF 7       106      157000 -10000   2504      0      0  10000  -2504
CF 8       106      157100 -10000   2558      0      0  10000  -2558
CF 9       106      157200 -10000   2615      0      0  10000  -2615
CF10       106      157300 -10000   2678      0      0  10000  -2678
CF11       106      157400 -10000   2749      0      0  10000  -2749
CF12       106      157500 -10000   2821      0      0  10000  -2821
CF13       106      157600 -10000   2898      0      0  10000  -2898
  CROOKED LAKE EVAP OUTFLOW
CF 1       107      147400 -10000   1176      0      0  10000  -1176
CF 2       107      147600 -10000   1218      0      0  10000  -1218
CF 3       107      147800 -10000   1302      0      0  10000  -1302
CF 4       107      148000 -10000   1428      0      0  10000  -1428
CF 5       107      148200 -10000   1600      0      0  10000  -1600
CF 6       107      148400 -10000   1815      0      0  10000  -1815
CF 7       107      148600 -10000   2016      0      0  10000  -2016
CF 8       107      148800 -10000   2184      0      0  10000  -2184
CF 9       107      149000 -10000   2310      0      0  10000  -2310
CF10       107      149200 -10000   2390      0      0  10000  -2390
  ROUND LAKE EVAP OUTFLOW
CF 1       108      144400 -10000    924      0      0  10000   -924
CF 2       108      144600 -10000    945      0      0  10000   -945
CF 3       108      144800 -10000   1027      0      0  10000  -1027
CF 4       108      145000 -10000   1102      0      0  10000  -1102
CF 5       108      145200 -10000   1165      0      0  10000  -1165
CF 6       108      145400 -10000   1233      0      0  10000  -1233
CF 7       108      145600 -10000   1287      0      0  10000  -1287
CF 8       108      145800 -10000   1336      0      0  10000  -1336
CF 9       108      146000 -10000   1365      0      0  10000  -1365
CF10       108      146200 -10000   1407      0      0  10000  -1407
  LOCAL INFLOW TABLE (DRAINAGE AREA RATIOS)
CF         371         200      0      0  10000   9320099999999
CF         371       50000      0      0  10000   5000099999999
CF         373         200      0      0  10000   3000099999999
CF         373       50000      0      0  10000   2320099999999
CF         375         200      0      0  10000   9910099999999
CF         375       50000      1      1  10000   7960099999999
CF         376         200      0      0  10000    950099999999
CF         376       50000      0      0  10000    910099999999
CF         377         200      0      0  10000    640099999999
CF         377       50000      0      0  10000    320099999999
CF         378         200      0      0   1500   4490  15000  44900
CF         378       50000      0      0   1500   3560  15000  35600
CC01    RETPER        1          ESTIMATED RETURN PERIOD OF CURRENT YEAR
CC01      7750        1          EKAPO CREEK NEAR MARIEVAL - RECORDED
CC01     97750        1          EKAPO CREEK NEAR MARIEVAL - NATURAL
CC01      7030        1          INDIANHEAD CREEK NEAR INDIAN HEAD - RECORDED
CC01      7040        1          INDIANHEAD CREEK NEAR INDIAN HEAD - NATURAL
CC01      7985        1          CUTARM CREEK NEAR SPYHILL - RECORDED
CC01     97986        1          CUTARM CREEK NEAR SPYHILL - NATURAL
CC01     97985        1          CUTARM CREEK NEAR SPYHILL - MANMADE STORAGES
CC01     97090                   MAN MADE STORAGES JUMPING DEER CREEK
CC01     96005        0          FLOW BELOW CRAVEN DAM
CC01     96011        0          OVERBANK FLOW = 32 COMP BELOW CRAVEN
CC02     96011                 96005   321000
CC01     96015        0          SIGN REVERSAL
CC02     96015 1
CC01     96025        0          FLOW BELOW CRAVEN WITHOUT OVERBANK
CR01     96033        0          FLOW BELOW CRAVEN - ROUTED
CR02     96033             7 459  9700
CL01     96016        0          DEAD STORAGE RESERVOIR
CL02     96016                          600    100
C110     96016      100      1            1    200      1           3250
C111     96016      300    230         6560    400    500          10000
C112     96016      500   1000        12000    600  10000          15000
C113     96016 999999999999999999999999999999
CR01     96023        0          OVERBANK FLOW - ROUTED
CR02     96023             7 459  9700
CC01     96965        0          QUAPPELLE RIVER AT FAIRY HILL - COMPUTED
CC01     96971        0          OVERBANK FLOW = 37 COMP BELOW FAIRY HILL
CC02     96971                 96965   371000
CL01     96976        0          DEAD STORAGE - RESERVOIR
CL02     96976                          600    100
C110     96976      100      1           10    200      1           2500
C111     96976      300    180         5000    400    500          10000
C112     96976      500   1000        12000    600  10000          15000
C113     96976 999999999999999999999999999999
CC01     96975        0          SIGN REVERSAL
CC02     96975 1
CC01     96985        0          QUAPPELLE FLOW BELOW FAIRY HILL - CHANNEL
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CRO1    96983      0         OVERBANK CHANNEL FLOW - ROUTED
CRO2    96983            5 432  6730
CRO1    96993      0         QUAPPELLE BELOW FAIRY HILL ROUTED
CRO2    96993            5 432  6730
CCO1    96300      0         MAN MADE STORAGES BET CRAVEN AND LOON CREEK
CCO1    96400      0         MAN MADE RELEASES BET CRAVEN AND LOON CREEK
CCO1    96430      0         SIGN REVERSAL
CCO2    96430 1
CCO1    96995      0         QUAP R NATURAL CRAVEN ROUTED TO LOON CK
CCO1     6005      0         FLOW BELOW CRAVEN DAM
CCO1     6011      0         OVERBANK FLOW = 32 COMP BELOW CRAVEN
CCO2     6011                6005   321000
CCO1     6015      0         SIGN REVERSAL
CCO2     6015 1
CCO1     6025      0         FLOW BELOW CRAVEN WITHOUT OVERBANK
CLO1     6016      0         DEAD STORAGE RESERVOIR
CLO2     6016                           600   100
C110     6016       100     1              1   200      1          3250
C111     6016       300   230           6560   400    500         10000
C112     6016       500  1000          12000   600  10000         15000
C113     6016 99999999999999999999999999999
CRO1     6023      0         OVERBANK FLOW - ROUTED
CRO2     6023            7 459  9700
CRO1     6033      0         FLOW BELOW CRAVEN - ROUTED
CRO2     6033            7 459  9700
CCO1     6965      0         QUAPPELLE RIVER AT FAIRY HILL - COMPUTED
CCO1     6971      0         OVERBANK FLOW. FAIRY HILL (CT 34 PRE- 1988)
CCO2     6971                6965   341000        (CT 37 POST 1988)
CLO1     6976      0         DEAD STORAGE - RESERVOIR
CLO2     6976                           600   100
C110     6976       100     1             10   200      1          2500
C111     6976       300   180           5000   400    500         10000
C112     6976       500  1000          12000   600  10000         15000
C113     6976 99999999999999999999999999999
CCO1     6975      0         SIGN REVERSAL
CCO2     6975 1
CCO1     6985      0         QUAPPELLE FLOW BELOW FAIRY FILL - CHANNEL
CRO1     6983      0         OVERBANK CHANNEL FLOW - ROUTED
CRO2     6983            5 432  6730
CRO1     6993      0         QUAPPELLE BELOW FAIRY HILL ROUTED
CRO2     6993            5 432  6730
CCO1     6995      0         SUMMATION POINT ABOVE LOON CREEK REC.
CCO1     6997      0         SIGN REVERSAL
CCO2     6997 1
CCO1     6999                UNGAUGED LATERAL INFLOW CRAVEN TO LOON CK
CCO1    97000                QUAPPELLE R BELOW LOON CREEK - NATURAL
CCO1    97005      0         CHANNEL FLOW BELOW LOON CK
CCO1    97011      0         OVERBANK FLOW = 34 COMP BELOW LOON CK
CCO2    97011               97000   341000
CCO1    97015      0         SIGN REVERSAL
CCO2    97015 1
CCO1    97025      0         FLOW BELOW LOON CK WITHOUT OVERBANK
CLO1    97016      0         DEAD STORAGE RESERVOIR
CLO2    97016                           600   100
C110    97016       100     1             10   200      1          2500
C111    97016       300   230           7500   400    500         10000
C112    97016       500  1000          15000   600  10000         20000
C113    97016 99999999999999999999999999999
CRO1    97183      0         OVERBANK FLOW - ROUTED
CRO2    97183            2 383 40900
CRO1    97173      0         QUAPPELLE AND LOCAL ROUTED
CRO2    97173            2 383 40900
CLO1    97199      0         ECHO LAKE AT FISH HATCHERY - COMPUTED
CLO2    97199 2    97399           157800 156000
C110    97199    156000             124500 156200               135200PASQUA
C111    97199    156400             146300 156600               157900 AND
C112    97199    156800             170700 157000               184200 ECHO
C113    97199    157200             200000 157400               217000 TOTAL
C114    97199    157600             2360009999999999999999999999999999
C210    97199        0 156500       156500      0 157450        157450 CURVE
C211    97199      200 156740       156500    200 156850        156680 ECHO
C212    97199      200 157070       157000    200 157470        157450 VS.
C213    97199      500 156800       156500    500 157500        157450KATEPW
C214    97199     1000 156986       156500   1000 157530        157450 1974
C215    97199     1500 157200       156500   1500 157560        157450
C216    97199     2000 157270       156500   2000 157615        157545/
C217    97199     2500 157420       156500   2500 157650        157450
C218    97199     3000 157550       156500   3000 157700        157450
C219    97199     3500 157615       156500   3500 157740        157450
C2      97199    10000 157750       156500  10000 157800        157450
C220    97199   -999999
CCO1    97080      0         MAN MADE STORAGES ECHO CREEK
CCO1    97174      0  112     EVAP. ECHO LK NAT. FROM INDIAN HEAD DATA
CCO2    97174      7176     97199  1051000
CCO1   297174      0  112     EVAP. ECHO LK NAT. FROM INDIAN HEAD DATA
CCO2   297174      7176    197199  1051000
CCO1    97205      0         FLOW SUMMED BELOW ECHO LAKE
CCO1    97204      0         FLOW SUMMED BELOW ECHO LAKE DUMMY
CRO1    97213      0         ECHO AND PASQUA LAKE ROUTED
CRO2    97213            2 383 40900
CCO1    97245      0         SUMMATION POINT BETWEEN ECHO AND KATEPWA
CCO1    97244      0         DUMMY SUMMATION POINT BETWEEN ECHO AND KATEPWA
CLO1    97399      0         KATEPWA LAKE AT OUTLET WEIR - NATURAL
CLO2    97399 1    7040            157600 15600
C110    97399    156500             214600 156600               220100MISSIO
C111    97399    156700             225800 156800               231400 AND
C112    97399    156900             237300 157000               242800KATEPW
C113    97399    157100             249100 157200               255300 TOTAL
C114    97399    157300             261900 157400               268300
C115    97399    157500             275200 157600               282000
C116    97399  9999999999999999999999999999
C2      97399       -1 156500         -100     -1 156650           500
C2      97399       -1 156775         2000      0 156787          -100  OUT
C2      97399        0 156888          500      0 157020          1000FLOW
C2      97399      500 156947         -100    500 157000           500CURVE
C2      97399      500 157080         1000   1000 157045          -100
C2      97399     1000 157080          500   1000 157136          1000
C2      97399     1500 157120         -100   1500 157111           500
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C2       97399        1500 157178           1000    2000 157180           -100
C2       97399        2000 157190            500    2000 157238           1000
C2       97399        2500 157240           -100    2500 157267            500
C2       97399        2500 157300           1000    3000 157290           -100
C2       97399        3000 157303            500    3000 157350           2000
C2       97399       10000 157850           -100   10000 157900           2000
C2       97399     -999999
CC01     97246        0  112     EVAP. KAT LK FROM INDIANHEAD DATA
CC02     97246        7176      97399  1061000
CC01    297246        0  112     EVAP. KAT LK FROM INDIANHEAD DATA
CC02    297246        7176     197399  1061000
CC01     97498        0          FLOW SUMMED BELOW KAT  LAKE DUMMY
CC01      7000                   QUAPPELLE R BELOW LOON CREEK - RECORDED
CC01      7005        0          CHANNEL FLOW BELOW LOON CK
CC01      7011        0          OVERBANK FLOW B. LOON CK (CT 32 PRE- 1987)
CC02      7011                   7000   321000           (CT 37 POST 1987)
CC01      7015        0          SIGN REVERSAL
CC02      7015 1
CC01      7025        0          FLOW BELOW LOON CK WITHOUT OVERBANK
CL01      7016        0          DEAD STORAGE RESERVOIR
CL02      7016                                600    100
C110      7016        100      1             10     200       1           2500
C111      7016        300    230           7500     400     500          10000
C112      7016        500   1000          15000     600   10000          20000
C113      7016 99999999999999999999999999999999
CR01      7183        0          OVERBANK FLOW - ROUTED
CR02      7183             2 383 40900
CR01      7173        0          QUAPPELLE AND LOCAL ROUTED
CR02      7173             2 383 40900
CC01      7174        0  112     ECHO AND PASQUA EVAP FROM INDIANHEAD DATA
CC02      7174        7176       7200  1051000
CC01      7176                   INDIAN HEAD EVAP DATA IN 1000THS OF FT/DAY
CL01     27199        1          OUTLET ELEV OF ECHO LAKE
CL02     27199                           160000    100
C110     27199     140000                     1 150000                        2
C111     27199     160000                      399999999999999999999999999999
CL01     27699        1          OUTLET ELEV OF CROOKED LAKE
CL02     27699                           160000    100
C110     27699     140000                     1 150000                        2
C111     27699     160000                      399999999999999999999999999999
CL01     27799        1          OUTLET ELEV OF ROUND LAKE
CL02     27799                           160000    100
C110     27799     130000                     1 150000                        2
C111     27799     160000                      399999999999999999999999999999
CC01     37199        1  111                         UNGAUGED LOCAL INFLOW
CC02     37199        7040     RETPER  371  10     INTO ECHO LAKE
CL01      7200        1          ECHO LAKE AT FISH HATCHERY - RECORDED
CL02      7200                           157600 156000
C110      7200     156000                124500 156200                  135200PASQUA
C111      7200     156400                146300 156600                  157900 AND
C112      7200     156800                170700 157000                  184200 ECHO
C113      7200     157200                200000 157400                  217000 TOTAL
C114      7200     157600                236000999999999999999999999999999999
CL01      7199        1          ECHO LAKE AT FISH HATCHERY - RECORDED-COMPUTED
CL02      7199 2     27199               157600 156000
C110      7199     156000                124500 156200                  135200PASQUA
C111      7199     156400                146300 156600                  157900 AND
C112      7199     156800                170700 157000                  184200 ECHO
C113      7199     157200                200000 157400                  217000 TOTAL
C114      7199     157600                236000999999999999999999999999999999
C2 1      7199          -1 156000        156500      -1 156500          157000
C2 2      7199          -1 157000        157500       0 156500          156500
C2 3      7199           0 157000        157000       0 157800          157800
C2 4      7199          50 156533        156500      50 157033          157000
C2 5      7199          50 157533        157500     100 156552          156500
C2 6      7199         100 157052        157000     100 157552          157500
C2 7      7199         200 156583        156500     200 157083          157000
C2 8      7199         200 157583        157500     500 156652          156500
C2 9      7199         500 157152        157000     500 157652          157500
C210      7199        1000 156742        156500    1000 157242          157000
C211      7199        1000 157742        157500    5000 157206          156500
C212      7199        5000 157706        157000    5000 158206          157500
C213      7199       10000 157900        156500   10000 158300          157800
C220      7199     -999999
CC01      7205        0          FLOW SUMMED BELOW ECHO LAKE
CR01      7213        0          ECHO AND PASQUA LAKE ROUTED
CR02      7213             2 383 40900
CC01      7246        0  112     KAT & MISSION EVAP FROM INDIANHEAD DATA
CC02      7246        7176       7350  1061000
CC01      7245        0          SUMMATION POINT BETWEEN ECHO AND KATEPWA
CC01     37399        1  111                         UNGAUGED LOCAL INFLOW
CC02     37399        7040     RETPER  373  10     INTO KATEPWA LAKE
CL01      7350        1          KATEPWA LAKE AT OUTLET WEIR - RECORDED
CL02      7350                           157600 156000
C110      7350     156500                214600 156600                  220100MISSIO
C111      7350     156700                225800 156800                  231400 AND
C112      7350     156900                237300 157000                  242800KATEPW
C113      7350     157100                249100 157200                  255300 TOTAL
C114      7350     157300                261900 157400                  268300
C115      7350     157500                275200 157600                  282000
C116      7350    9999999999999999999999999999
CL01      7399        1          KATEPWA LAKE AT OUTLET WEIR - REC. COMPUTED
CL02      7399 1      7030               157600 156000
C110      7399     156500                214600 156600                  220100MISSIO
C111      7399     156700                225800 156800                  231400 AND
C112      7399     156900                237300 157000                  242800KATEPW
C113      7399     157100                249100 157200                  255300 TOTAL
C114      7399     157300                261900 157400                  268300
C115      7399     157500                275200 157600                  282000
C116      7399    9999999999999999999999999999
C2        7399          -1 156000            -10      -1 156000            500
C2        7399          -1 156000           2000       0 156916            -10CURVE
C2        7399           0 156917            500       0 156961            850BASED
C2        7399           0 156986           1200     200 156951            -10 ON
C2        7399         200 156968            500     200 157021           1200 1974
C2        7399         400 156977            -10     400 156996            500DATA
C2        7399         400 157052           1200     600 156997            -10
C2        7399         600 157032            500     600 157075           1200
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C2        7399        800 157015              -10    800 157107          1200
C2        7399       1000 157035              -10   1000 157132          1200
C2        7399       1500 157091              -10   1500 157203          1200
C2        7399       2000 157158              -10   2000 157264          1200
C2        7399       2500 157225              -10   2500 157318          1200
C2        7399       3000 157284              -10   3000 157370          2000
C2        7399      10000 157850              -10  10000 157900          3000
C2        7399    -999999
CC01     47199          1           RIPARIAN RELEASE OUT OF ECHO LAKE
CC01     47198          1           SIGN CHANGE
CC01     47198 1
CC01     47399          1           RIPARIAN RELEASE OUT OF KATEPWA LAKE
CC01     47398          1           SIGN CHANGE
CC01     47398 1
CC01      7400          0           KATEPWA LAKE AT OUTLET WEIR - SUMMATION POINT
CC01      7410          0           SIGN REVERSAL
CC02      7410 1
CC01      7499          1           QUAPPELLE AT OUTLET KATEPWA WEIR UNGAUGED LAT INFL
CC01     37499          1           GROUNDWATER AND UNGAUGED INFLOW ADJUSTMENT
CC02     37499                      7499     0500
CC01      7500          0           QUAPPELLE RIVERAT OUTLET OF KATEPWA LAKE REC
CC01     97500          0           QUAPPELLE RIVER OF OUTLET OF KAT L
CC01     97535          0           QUAPPELLE BEL KATEPWA LAKE SUMMED - SUMMED
CC01     97541          0           OVERBANK FLOW COMPUTED USING TABLE 60
CC02     97541                    97535   601000
CC01     97545          0           SIGN REVERSAL
CC02     97545 1
CC01     97555          0           QUAPPLE RIVER WITHOUT OVERBANK FLOW
CR01     97563          0           QUAPPELLE                              - ROUTED
CR02     97563               8 350  6460
CL01     97546          0           LAKE CONTAINING OVERBANK FLOW
CL02     97546                                600    100
C110     97546        100      1               10    200       1          3500
C111     97546        500   1000            15000    600   10000         20000
C113     97546 999999999999999999999999999999
CR01     97553          0           OVERBANKFLOW ROUTED
CR02     97553               8 353  5599
CC01     97565                      QUAPPELLE AND LOCAL - SUMMED
CC01     97571          0           OVERBANK FLOW COMPUTED USING TABLE 60
CC02     97571                    97565   601000
CC01     97575          0           SIGN REVERSAL
CC02     97575 1
CC01     97585          0           QUAPPLE RIVER WITHOUT OVERBANK FLOW
CR01     97593          0           QUAPPELLE              - ROUTED
CR02     97593               8 353  5599
CL01     97576          0           RESERVOIR CONTAINING OVERBANK FLOW
CL02     97576                                600    100
C110     97576        100      1               10    200       1          3000
C111     97576        500   1000            15000    600   10000         20000
C113     97576 999999999999999999999999999999
CR01     97583          0           OVERBANK FLOW ROUTED
CR02     97583               8 353  5599
CC01     97031          0           MAN MADE STORAGES ON INDIANHEAD CREEK
CC01     97520          0           MAN MADE STORAGES ON PHEASANT CREEK
CC01      7535          0           QUAPPELLE BEL KATEPWA LAKE SUMMED - SUMMED
CC01      7541          0           OVERBANK FLOW B. KAT. LK (CT 34 PRE- 1980)
CC02      7541                      7535   341000            (CT 37 POST 1980)
CC01      7545          0           SIGN REVERSAL
CC02      7545 1
CC01      7555          0           QUAPPELLE RIVER WITHOUT OVERBANK FLOW
CR01      7563          0           QUAPPELLE                              - ROUTED
CR02      7563               8 350  6460
CL01      7546          0           LAKE CONTAINING OVERBANK FLOW
CL02      7546                                600    100
C110      7546        100      1               10    200       1          3500
C111      7546        500   1000            15000    600   10000         20000
C113      7546 999999999999999999999999999999
CR01      7553          0           OVERBANK FLOW ROUTED
CR02      7553               8 353  5599
CC01     37565          1  111                      UNGAUGED LOCAL INFLOW
CC02     37565       7040      RETPER  3751000      INTO QUAPPELLE @ HYDE
CC01      7565          0           QUAPPELLE AND LOCAL - SUMMED
CC01      7571          0           OVERBANK FLOW COMPUTED USING TABLE 60
CC02      7571                      7565   601000
CC01      7575          0           SIGN REVERSAL
CC02      7575 1
CC01      7585          0           QUAPPELLE RIVER WITHOUT OVERBANK FLOW
CR01      7593          0           QUAPPELLE              - ROUTED
CR02      7593               8 353  5599
CL01      7576          0           RESERVOIR CONTAINING OVERBANK FLOW
CL02      7576                                600    100
C110      7576        100      1               10    200       1          3000
C111      7576        500   1000            15000    600   10000         20000
C113      7576 999999999999999999999999999999
CR01      7583          0           OVERBANK FLOW ROUTED
CR02      7583               8 353  5599
CC01      7594          0           SUMMATION POINT
CC01      7595          0           SIGN REVERSAL
CC02      7595 1
CC01      7599          1           QUAPPELLE RIVER AT HYDE - UNGAUGED LAT INFLOW
CC01      7600          1           QUAPPELLE RIVER AT HYDE - RECORDED
CC01     97599          0           QUAPPELLE RIVER AT HYDE - NATURAL FLOW
CC01     97605          0           QUAPPELLE RIVER BELOW HYDE - SUMMED
CC01     97611          0           OVERBANK FLOW COMPUTED USING TABLE 60
CC02     97611                    97605   601000
CC01     97615          0           SIGN REVERSAL
CC02     97615 1
CC01     97625          0           QUAPPELLE RIVER WITHOUT OVERBANK FLOW
CL01     97626          0           DEAD STORAGE RESERVOIR
CL02     97626                                600    100
C110     97626        100      1               10    200       1          1500
C111     97626        500   1000            10000    600   10000         15000
C113     97626 999999999999999999999999999999
CR01     97643          0           QUAPPEL RIVER BELOW HYDE - ROUTED
CR02     97643               3 386  6810
CR01     97633          0           OVERBANK FLOW - ROUTED
CR02     97633               3 386  6810
CC01     97644          0           MAN MADE STORAGES PEARL  CREEK
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CC01    97665                 FLOW SUMMED JUST ABOVE CROOKED LAKE
CL01    97699       0         CROOKED LAKE NR GRAYSON NATURAL
CL02    97699 1    97750               148900 147000
C110    97699    147300                 70000 147700                  82000
C111    97699    147800                 83000 147900                  84000
C112    97699    148000                 87500 148100                  91200
C113    97699    148200                 95000 148300                  99300
C114    97699    148400                103500 148500                 108000
C115    97699    148600                112500 148700                 117300
C116    97699    148800                122000 148900                 127000
C117    97699    9999999999999999999999999999
C2      97699      -100 147765           -100   -100 147920             500SDOE
C2      97699      -100 148170           2000      0 147880            -100AUG
C2      97699         0 148020            500      0 148240            15001974
C2      97699       200 147970           -100    200 148120             500
C2      97699       200 148310           1500    400 148060            -100
C2      97699       400 148200            500    400 148380            1500
C2      97699       800 148200           -100    800 148320             500
C2      97699       800 148460           1500   1200 148310            -100
C2      97699      1200 148420            500   1200 148530            1500
C2      97699      1600 148420           -100   1600 148500             500
C2      97699      1600 148620           1500   2000 148500            -100
C2      97699      2000 148570            500   2000 148680            1500
C2      97699      2400 148580           -100   2400 148640             500
C2      97699      2400 148720           1500   3000 148660            -100
C2      97699      3000 148700            500   3000 148780            1500
C2      97699      4000 148760           -100   4000 148800             500
C2      97699      4000 148860           1500   4600 148810            -100
C2      97699      4600 148830            500   4600 148880            2000
C2      97699     10000 148900           -100  10000 148910            2000
C2      97699    -999999
CC01    97751       0         MAN MADE STORAGESEKAPO CREEK
CC01    97752       0         DUMMY
CC01    97666       0  112    EVAP. CROOKED LK NAT FROM BROADVIEW DATA
CC02    97666       7668   97699    1071000
CC01   297666       0  112    EVAP. CROOKED LK NAT FROM BROADVIEW DATA
CC02   297666       7668  197699    1071000
CC01    97754       0         FLOW SUMMED BELOW CROOKED LAKE DUMMY
CC01    97755       0         CROOKED LAKE OUTFLOW
CC01    97761       0         OVERBANK FLOW COMPUTED USING TABLE 60
CC02    97761                 97755   601000
CL01    97766       0         DEAD STORAGE RESERVOIR
CL02    97766                             600    100
C110    97766       100      1             10    200      1            1500
C111    97766       500   1000           7500    600  10000           15000
C113    97766 9999999999999999999999999999999
CC01    97765       0         SIGN REVERSAL
CC02    97765 1
CC01    97775       0         QUAPPELLE RIVER BELOW EKAPO WITHOUT OVERBANK
CR01    97773       0         OVERBANK FLOW ROUTED
CR02    97773             6 327  4430
CR01    97783       0         QUAPPELLE RIVER BELOW EKAPO - ROUTED
CR02    97783             6 327  4430
CC01    97795       0         FLOW SUMMED JUST ABOVE ROUND LAKE
CL01    97799       0         ROUND LAKE NEAR WHITEWOOD - COMPUTED
CL02    97799                            145900 144000
C110    97799    144500      1          53500 144600      1           55500
C111    97799    144700      1          58000 144800      1           59000
C112    97799    144900    250          61600 145000    400           64200
C113    97799    145100    700          66900 145200   1000           69600
C114    97799    145300   1300          72400 145400   1700           75200
C115    97799    145500   2150          78100 145600   2700           81000
C116    97799    145700   3300          84000 145800   3920           87000
C117    97799    145900   4800          90000 146000  10000          100000
C118    97799 9999999999999999999999999999999
CC01    97796       0  112    EVAP. ROUND LK FROM INDIANHEAD DATA
CC02    97796       7668   97799    1081000
CC01   297796       0  112    EVAP. ROUND LK FROM INDIANHEAD DATA
CC02   297796       7668  197799    1081000
CC01    97804       0         FLOW SUMMED BELOW ECHO LAKE DUMMY
CC01    97805       0         ROUND LAKE NEAR WHITEWOOD - SUMMED
CC01    97811       0         OVERBANK FLOW COMPUTED BELOW ROUND LAKE
CC02    97811                 97805   601000
CC01    97815       0         SIGN REVERSAL
CC02    97815 1
CC01    97825       0         QUAPPELLE BELOW ROUND LAKE WITHOUT OVERBANK
CL01    97816       0         OVERBANK DEAD STORAGE
CL02    97816                             600    100
C110    97816       100      1             10    200      1            2600
C111    97816       500   1000          12500    600  10000           15000
C113    97816 9999999999999999999999999999999
CR01    97843       0         QUAPPELLE RIVER BELOW ROUND - ROUTED
CR02    97843            10 331  3100
CR01    97833       0         OVERBANK FLOW ROUTED
CR02    97833            10 331  3100
CC01    97844       0         MAN MADE STORAGES AT ISKAWOHEAD CREEK
CC01    97845       0         MAN MADE STORAGES AT KAPOSVAR CREEK
CC01    97875       0         QUAPPELLE            - SUMMED
CC01    97899       0         QUAPPELLE AT TANTALLON SUMMATION POINT
CC01    97945       0         SUMMATION POINT
CC01    97951       0         OVERBANK CALCULATED BELOW TANTALLION
CC02    97951                 97945   601000
CC01    97955       0         SIGN REVERSAL
CC02    97955 1
CL01    97956       0         OVERBANK STORAGE RESERVOIR
CL02    97956                             700    100
C110    97956       100      1             10    200      1            3000
C111    97956       500   1000           7500    600  10000           15000
C113    97956       700  20000           300099999999999999999999999999999999
CC01    97965       0         QUAPPELLE BELOW TANTALLION WITHOUT OVERBANK
CR01    97983       0         QUAPPELLE -ROUTED
CR02    97983              7 329  6110
CR01    97963       0         OVERBANK FLOW - ROUTED
CR02    97963              7 329  6110
CC01    97984       0         SUMMATION POINT
CC01     7605       0         QUAPPELLE RIVER BELOW HYDE - SUMMED
CC01     7611       0         OVERBANK FLOW COMPUTED USING TABLE 60
CC02     7611                  7605   601000
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CC01     7615      0           SIGN REVERSAL
CC02     7615 1
CC01     7625      0           QUAPPELLE RIVER WITHOUT OVERBANK FLOW
CL01     7626      0           DEAD STORAGE RESERVOIR
CL02     7626                          600     100
C110     7626    100       1            10     200        1          1500
C111     7626    500    1000         10000     600    10000         15000
C113     7626 999999999999999999999999999999
CR01     7633      0           OVERBANK FLOW - ROUTED
CR02     7633            3 386   6810
CR01     7643      0           QUAPPEL RIVER BELOW HYDE - ROUTED
CR02     7643            3 386   6810
CC01     7665      0           FLOW SUMMED JUST ABOVE CROOKED LAKE
CC01     7666      0  112      EVAP. CROOKED LK FROM BROADVIEW DATA
CC02     7666   7668           7700  1071000
CC01     7668                  BROADVIEW DATA IN 1000THS OF FEET
  NATURAL LAKES - 2nd ITERATION
CL01   197199      1           ECHO LAKE AT FISH HATCHERY - COMPUTED WITH EVAP.
CL02   197199 2  197399             157800 156000
C110   197199  156000                124500 156200              135200PASQUA
C111   197199  156400                146300 156600              157900 AND
C112   197199  156800                170700 157000              184200 ECHO
C113   197199  157200                200000 157400              217000 TOTAL
C114   197199  157600                2360009999999999999999999999999999
C210   197199      0 156500          156500      0 157450       157450 CURVE
C211   197199    200 156740          156500    200 156850       156680 ECHO
C212   197199    200 157070          157000    200 157870       157850 VS.
C213   197199    500 156800          156500    500 157500       157450KATEPW
C214   197199   1000 156986          156500   1000 157530       157450 1974
C215   197199   1500 157200          156500   1500 157560       157450
C216   197199   2000 157270          156500   2000 157615       157545/
C217   197199   2500 157420          156500   2500 157650       157450
C218   197199   3000 157550          156500   3000 157700       157450
C219   197199   3500 157615          156500   3500 157740       157450
C2     197199  10000 157750          156500  10000 158000       157850
C220   197199 -999999
CL01   197399      1           KATEPWA LAKE AT OUTLET WEIR - NATURAL WITH EVAP.
CL02   197399 1   7040              157600 156000
C110   197399  156500                214600 156600              220100MISSIO
C111   197399  156700                225800 156800              231400MISSIO
C112   197399  156900                237300 157000              242800MISSIO
C113   197399  157100                249100 157200              255300MISSIO
C114   197399  157300                261900 157400              268300MISSIO
C115   197399  157500                275200 157600              282000MISSIO
C116   197399 999999999999999999999999999999
C2     197399     -1 156500            -100     -1 156650          500
C2     197399     -1 156775            2000      0 156787         -100
C2     197399      0 156888             500      0 157020         1000
C2     197399    500 156947            -100    500 157000          500
C2     197399    500 157080            1000   1000 157045         -100
C2     197399   1000 157080             500   1000 157136         1000
C2     197399   1500 157120            -100   1500 157111          500
C2     197399   1500 157178            1000   2000 157180         -100
C2     197399   2000 157190             500   2000 157238         1000
C2     197399   2500 157240            -100   2500 157267          500
C2     197399   2500 157300            1000   3000 157290         -100
C2     197399   3000 157303             500   3000 157350         2000
C2     197399  10000 157850            -100  10000 157900         2000
C2     197399 -999999
CL01   197699      1           CROOKED LAKE NR GRAYSON NATURAL
CL02   197699 1  97750              148900 147000
C110   197699  147300                 70000 147700               82000
C111   197699  147800                 83000 147900               84000
C112   197699  148000                 87500 148100               91200
C113   197699  148200                 95000 148300               99300
C114   197699  148400                103500 148500              108000
C115   197699  148600                112500 148700              117300
C116   197699  148800                122000 148900              127000
C117   197699 999999999999999999999999999999
C2     197699   -100 147765            -100   -100 147920          500SDOE
C2     197699   -100 148170            2000      0 147880         -100AUG
C2     197699      0 148020             500      0 148240         1500
C2     197699    200 147970            -100    200 148120          500
C2     197699    200 148310            1500    400 148060         -100
C2     197699    400 148200             500    400 148380         1500
C2     197699    800 148200            -100    800 148320          500
C2     197699    800 148460            1500   1200 148310         -100
C2     197699   1200 148420             500   1200 148530         1500
C2     197699   1600 148420            -100   1600 148500          500
C2     197699   1600 148620            1500   2000 148500         -100
C2     197699   2000 148570             500   2000 148680         1500
C2     197699   2400 148580            -100   2400 148640          500
C2     197699   2400 148720            1500   3000 148660         -100
C2     197699   3000 148700             500   3000 148780         1500
C2     197699   4000 148760            -100   4000 148800          500
C2     197699   4000 148860            1500   4600 148810         -100
C2     197699   4600 148830             500   4600 148880         2000
C2     197699  10000 148900            -100  10000 148900         2000
C2     197699 -9999999
CL01   197799      1          ROUND LAKE NEAR WHITEWOOD - COMPUTED
CL02   197799                       145900 144000
C110   197799  144500      1          53500 144600       1         55500
C111   197799  144700      1          58000 144800       1         59000
C112   197799  144900    250          61600 145000     400         64200
C113   197799  145100    700          66900 145200    1000         69600
C114   197799  145300   1300          72400 145400    1700         75200
C115   197799  145500   2150          78100 145600    2700         81000
C116   197799  145700   3300          84000 145800    3920         87000
C117   197799  145900   4800          90000 146000   10000        100000
C118   197799 999999999999999999999999999999
  NATURAL LAKES - 3rd ITERATION
CL01   297199      1          ECHO LAKE AT FISH HATCHERY - COMPUTED WITH EVAP.
CL02   297199 2  297399             157800 156000
C110   297199  156000                124500 156200              135200PASQUA
C111   297199  156400                146300 156600              157900 AND
C112   297199  156800                170700 157000              184200 ECHO
C113   297199  157200                200000 157400              217000 TOTAL
C114   297199  157600                2360009999999999999999999999999999
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C210    297199        0 156500        156500     0 157450        157450 CURVE
C211    297199      200 156740        156500   200 156850        156680 ECHO
C212    297199      200 157070        157000   200 157470        157450 VS.
C213    297199      500 156800        156500   500 157500        157450KATEPW
C214    297199     1000 156986        156500  1000 157530        157450 1974
C215    297199     1500 157200        156500  1500 157560        157450
C216    297199     2000 157270        156500  2000 157615        157545/
C217    297199     2500 157420        156500  2500 157650        157450
C218    297199     3000 157550        156500  3000 157700        157450
C219    297199     3500 157615        156500  3500 157740        157450
C2      297199    10000 157850        156500 10000 158050        157850
C220    297199  -999999
CL01    297399        1       KATEPWA LAKE AT OUTLET WEIR - NATURAL WITH EVAP.
CL02    297399 1   7040               157600 156000
C110    297399   156500               214600 156600              220100MISSIO
C111    297399   156700               225800 156800              231400MISSIO
C112    297399   156900               237300 157000              242800MISSIO
C113    297399   157100               249100 157200              255300MISSIO
C114    297399   157300               261900 157400              268300MISSIO
C115    297399   157500               275200 157600              282000MISSIO
C116    297399  999999999999999999999999999
C2      297399       -1 156500          -100    -1 156650           500
C2      297399       -1 156775          2000     0 156787          -100
C2      297399        0 156888           500     0 157020          1000
C2      297399      500 156947          -100   500 157000           500
C2      297399      500 157080          1000  1000 157045          -100
C2      297399     1000 157080           500  1000 157136          1000
C2      297399     1500 157120          -100  1500 157111           500
C2      297399     1500 157178          1000  2000 157180          -100
C2      297399     2000 157190           500  2000 157238          1000
C2      297399     2500 157240          -100  2500 157267           500
C2      297399     2500 157300          1000  3000 157290          -100
C2      297399     3000 157303           500  3000 157350          2000
C2      297399    10000 157850          -100 10000 157900          2000
C2      297399  -999999
CL01    297699        1       CROOKED LAKE NR GRAYSON NATURAL
CL02    297699 1  97750               148900 147000
C110    297699   147300                70000 147700               82000
C111    297699   147800                83000 147900               84000
C112    297699   148000                87500 148100               91200
C113    297699   148200                95000 148300               99300
C114    297699   148400               103500 148500              108000
C115    297699   148600               112500 148700              117300
C116    297699   148800               122000 148900              127000
C117    297699  999999999999999999999999999
C2      297699     -100 147765          -100  -100 147920           500SDOE
C2      297699     -100 148170          2000     0 147880          -100AUG
C2      297699        0 148020           500     0 148240          1500
C2      297699      200 147970          -100   200 148120           500
C2      297699      200 148310          1500   400 148060          -100
C2      297699      400 148200           500   400 148380          1500
C2      297699      800 148200          -100   800 148320           500
C2      297699      800 148460          1500  1200 148310          -100
C2      297699     1200 148420           500  1200 148530          1500
C2      297699     1600 148420          -100  1600 148500           500
C2      297699     1600 148620          1500  2000 148500          -100
C2      297699     2000 148570           500  2000 148680          1500
C2      297699     2400 148580          -100  2400 148640           500
C2      297699     2400 148720          1500  3000 148660          -100
C2      297699     3000 148700           500  3000 148780          1500
C2      297699     4000 148760          -100  4000 148800           500
C2      297699     4000 148860          1500  4600 148810          -100
C2      297699     4600 148830           500  4600 148880          2000
C2      297699    10000 148900          -100 10000 148900          2000
C2      297699  -9999999
CL01    297799        1      ROUND LAKE NEAR WHITEWOOD - COMPUTED
CL02    297799                        145900 144000
C110    297799   144500      1         53500 144600      1        55500
C111    297799   144700      1         58000 144800      1        59000
C112    297799   144900    250         61600 145000    400        64200
C113    297799   145100    700         66900 145200   1000        69600
C114    297799   145300   1300         72400 145400   1700        75200
C115    297799   145500   2150         78100 145600   2700        81000
C116    297799   145700   3300         84000 145800   3920        87000
C117    297799   145900   4800         90000 146000  10000       100000
C118    297799 999999999999999999999999999999
CC01     37699        1  111                       UNGAUGED LOCAL INFLOW
CC02     37699    97750   RETPER  3761000          INTO CROOKED LAKE
CL01      7700        1       CROOKED LAKE NR GRAYSON RECORDED
CL02      7700                        148900 147000
C110      7700   147300                70000 147700               82000
C111      7700   147800                83000 147900               84000
C112      7700   148000                87500 148100               91200
C113      7700   148200                95000 148300               99300
C114      7700   148400               103500 148500              108000
C115      7700   148600               112500 148700              117300
C116      7700   148800               122000 148900              127000
C117      7700  999999999999999999999999999
CL01      7699        1       CROOKED LAKE NR GRAYSON COMPUTED RECORDED
CL02      7699 2  27699               148900 147000
C110      7699   147300                70000 147700               82000
C111      7699   147800                83000 147900               84000
C112      7699   148000                87500 148100               91200
C113      7699   148200                95000 148300               99300
C114      7699   148400               103500 148500              108000
C115      7699   148600               112500 148700              117300
C116      7699   148800               122000 148900              127000
C117      7699  999999999999999999999999999
C2 1      7699        0 147000        147560     0 147000        147860
C2 2      7699        0 147000        148500     1 147560        147560
C2 3      7699        1 147860        147860     1 148500        148500
C2 4      7699       50 147625        147560    50 147891        147860
C2 5      7699       50 148531        148500    75 147664        147560
C2 6      7699       75 147910        147860    75 148550        148500
C2 7      7699      100 147724        147560   100 147939        147860
C2 8      7699      100 148579        148500   200 147863        147560
C2 9      7699      200 148006        147860   200 148646        148500
C210      7699      500 148006        147560   500 148091        147860
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C211      7699       500 148731         148500   1000 148227          147560
C212      7699      1000 148286         147860   1000 148926          148500
C213      7699      1600 148490         147560   1600 148536          147860
C214      7699      1600 148950         148500   5000 148800          147560
C215      7699      5000 148850         147860   5000 148900          148500
C2        7699     10000 149000         147560  10000 149100          147860
C2        7699     10000 149200         148500-999999
CC01      7755                CROOKED LAKE OUTFLOW
CC01      7761         0      OVERBANK FLOW COMPUTED USING TABLE 75
CC02      7761                7755   601000
CL01      7766         0      DEAD STORAGE RESERVOIR
CL02      7766                           600    100
C110      7766       100         1           10    200        1           1500
C111      7766       500      1000         7500    600    10000          15000
C113      7766 999999999999999999999999999999
CC01      7765         0      SIGN REVERSAL
CC02      7765 1
CR01      7773         0      OVERBANK FLOW ROUTED
CR02      7773             6 327  4430
CC01      7775         0      QUAPPELLE RIVER BELOW EKAPO WITHOUT OVERBANK
CR01      7783         0      QUAPPELLE RIVER BELOW EKAPO - ROUTED
CR02      7783             6 327  4430
CC01      7795         0      FLOW SUMMED JUST ABOVE ROUND LAKE
CC01      7796         0  112 EVAP. ROUND LK FROM INDIANHEAD DATA
CC02      7796      7668      7800  1081000
CC01     37799         1  111                   UNGAUGED LOCAL INFLOW
CC02     37799     97750    RETPER  3771000     INTO ROUND LAKE
CL01      7800         1      ROUND LAKE NEAR WHITEWOOD - RECORDED
CL02      7800                          146200 144500
C110      7800    144500                  53500 144600                   55500
C111      7800    144700                  58000 144800                   59000
C112      7800    144900                  61600 145000                   64200
C113      7800    145100                  66900 145200                   69600
C114      7800    145300                  72400 145400                   75200
C115      7800    145500                  78100 145600                   81000
C116      7800    145700                  84000 145800                   87000
C117      7800    145900                  90000 146200                  100000
C1        7800 999999999999999999999999999999
CL01      7799         1      ROUND LAKE NEAR WHITEWOOD - COMPUTED
CL02      7799 2   27799                146200 144500
C110      7799    144500                  53500 144600                   55500
C111      7799    144700                  58000 144800                   59000
C112      7799    144900                  61600 145000                   64200
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C116      7799    145700                  84000 145800                   87000
C117      7799    145900                  90000 146200                  100000
C1        7799 999999999999999999999999999999
C2 1      7799         0 144000         144581      0 144000          144880
C2 2      7799         0 144000         146100      1 144582          144581
C2 3      7799         1 144881         144880      1 146101          146100
C2 4      7799        50 144700         144581     50 144911          144880
C2 5      7799        50 145731         145500     75 144725          144581
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C210      7799       500 145026         144581    500 145111          144880
C211      7799       500 146146         145500   1500 145247          144581
C212      7799      1500 145306         144880   1500 146176          145500
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C2        7799     15000 145850         144581  15000 145900          144880
C2        7799     15000 146300         145500-999999
CC01      7805         0      ROUND LAKE NEAR WHITEWOOD - SUMMED
CC01      7811         0      OVERBANK FLOW COMPUTED BELOW ROUND LAKE
CC02      7811                7805   601000
CC01      7815         0      SIGN REVERSAL
CC02      7815 1
CC01      7825         0      QUAPPELLE BELOW ROUND LAKE WITHOUT OVERBANK
CL01      7816         0      DEAD STORAGE
CL02      7816                           600    100
C110      7816       100         1           10    200        1           2600
C111      7816       500      1000        12500    600    10000          15000
C113      7816 999999999999999999999999999999
CR01      7833         0      OVERBANK FLOW ROUTED
CR02      7833            10 331  3100
CR01      7843         0      QUAPPELLE RIVER BELOW ROUND - ROUTED
CR02      7843            10 331  3100
CC01      7875         0      QUAPPELLE               - SUMMED
CC01     37899         1  111                   UNGAUGED LOCAL INFLOW
CC02     37899     97986    RETPER  378  10     INTO QUAPPELLE @ WELBY
CC01      7899         0      QUAPPELLE RIVER AT TANTALLION - SUM POINT
CC01      7945         0      QUAPPELLE - SUMMED
CC01      7951         0      OVERBANK CALCULATED BELOW TANTALLION
CC02      7951                7945   601000
CC01      7955         0      SIGN REVERSAL
CC02      7955 1
CL01      7956         0      OVERBANK STORAGE RESERVOIR
CL02      7956                           600    100
C110      7956       100                     10    200        1           3000
C111      7956       500      1000        15000    600    10000          20000
C113      7956 999999999999999999999999999999
CC01      7965         0      QUAPPELLE BELOW TANTALLION WITHOUT OVERBANK
CR01      7963         0      OVERBANK FLOW - ROUTED
CR02      7963             7 329  6110
CR01      7983         0      QUAPPELLE - ROUTED
CR02      7983             7 329  6110
CC01      7984         1      QU'APPELLE R. NEAR WELBY SIMULATED
CC01      7998         0      SIGN REVERSAL
CC02      7998 1
CC01      7999         1      QUAPPELLE RIVER NEAR WELBY-UNGAUGED LAT. INF
CC01     97999         1      QUAPPELLE RIVER NEAR WELBY-NATURAL FLOW
CC01      8000         1      QUAPPELLE RIVER NEAR WELBY - RECORDED
CL01     SEVPS         1       CUM. EVAP SIMULATED CONDITIONS
CL02     SEVPS                           300    100
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C102      SEVPS       300      1      9000000009999999999999999999999999999999
CL01      SEVPN       1          CUM. EVAP NATURAL CONDITIONS
CL02      SEVPN                          300       100
C101      SEVPN       100     -1      -90000000   200       0          0
C102      SEVPN       300      1      9000000009999999999999999999999999999999
CL01      S7500       1          CUM. HWY #56 RECORDED
CL02      S7500                          300       100
C101      S7500       100     -1      -90000000   300       1          900000000
C102      S7500    99999999999999999999999999999999
CL01      S7400       1          CUM. HWY #56 SIMULATED
CL02      S7400                          300       100
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CL02      S97500                         300       100
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CL02      S7174                          300       100
C101      S7174       100     -1      -90000000   200       0          0
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CL02      S8000                        10000       100
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CL02      S7984                        10000       100
C101      S7984       100     -1      -90000000 100000      1          900000000
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CL02      S7999                        10000       100
C101      S7999       100     -1      -90000000 100000      1          900000000
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     CROOKED LAKE OUTLET ELEVATION
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     ROUND LAKE OUTLET ELEVATION
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6D	8000812017	8861	39	36	36	50	63	58	51	43
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6D	7600612025	4861	70	79	75	69	70	72	-39235	-1111
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6D	76008120 9	5861	283	233	239	295	283	246	213	179
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6D	70308120 1	7861	0	0	0	0	0	0	0	0
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6S        1111 1200104861      1012030041   10
6S        1111 1200105861     10612031051  106
6S        1111 1200106861     22412030061  224
6S        1111 1200107861     19312031071  193
6S        1111 1200108861     25212031081  252
6S        1111 1200109861      3712030091   37
6S        1111 1200110861      5912031101   59
6S        1111 1200111861       012031111    0
6S        1111 1200112861       012031121    0
6S        2222 1200101861       012031011    0
6S        2222 1200102861       012028021    0
6S        2222 1200103861       012031031    0
6S        2222 1200104861      -912030041   -9
6S        2222 1200105861     12012031051  120
6S        2222 1200106861     22712030061  227
6S        2222 1200107861     12712031071  127
6S        2222 1200108861     25412031081  254
6S        2222 1200109861      7012030091   70
6S        2222 1200110861      6912031101   69
6S        2222 1200111861       012031111    0
6S        2222 1200112861       012031121    0

6S        7176 1200101861       012031011    0
6S        7176 1200102861       012028021    0
6S        7176 1200103861       012031031    0
6S        7176 1200104861     -3812030041  -38
6S        7176 1200105861      5712031051   57
6S        7176 1200106861     12912030061  129
6S        7176 1200107861      2912031071   29
6S        7176 1200108861     20512031081  205
6S        7176 1200109861      5912030091   59
6S        7176 1200110861      5912031101   59
6S        7176 1200111861       012031111    0
6S        7176 1200112861       012031121    0
6S        7668 1200101861       012031011    0
6S        7668 1200102861       012028021    0
6S        7668 1200103861       012031031    0
6S        7668 1200104861     -2012030041  -20
6S        7668 1200105861     10412031051  104
6S        7668 1200106861     12112030061  121
6S        7668 1200107861      4712031071   47
6S        7668 1200108861     18312031081  183
6S        7668 1200109861      6712030091   67
6S        7668 1200110861      4412031101   44
6S        7668 1200111861       012031111    0
6S        7668 1200112861       012031121    0
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QU'APPELLE RIVER NATURAL FLOW MODEL

SAMPLE INPUT FILE - FALL AND WINTER PORTION OF MODEL

ELBOW DIVERSION TO SASKATCHEWAN/MANITOBA BOUNDARY - AUG 1, 1986 TO APRIL 10 1987

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J ENGLISH BATCH NOTRACE
RETURN
 JOB       0001191189        24001  1        ELBOW TO WELBY AUG 1 TO MAR 1
 23456789 123456789 123456789 123456789 123456789 123456789 123456789 123456789
        10         20         30         40         50         60         70
CT 1           8          2         0         0        50     -50099999999        LKEVAP
   EYEBROW LAKE EVAP. OUTFLOW
CF 1          21     171900    -10000         0         0         0    10000         0
CF 2          21     172150    -10000       630         0         0    10000      -630
CF 3          21     172500    -10000      1050         0         0    10000     -1050
   BUFFALO POUND LAKE EVAP. OUTFLOW
CF 1          35     165300    -10000         0         0         0    10000         0
CF 2          35     165400    -10000       132         0         0    10000      -132
CF 3          35     165600    -10000       615         0         0    10000      -615
CF 4          35     165800    -10000      1205         0         0    10000     -1205
CF 5          35     166000    -10000      1609         0         0    10000     -1609
CF 6          35     166500    -10000      2170         0         0    10000     -2170
CF 7          35     167000    -10000      2989         0         0    10000     -2989
CF 8          35     167500    -10000      3484         0         0    10000     -3484
   LAST MOUNTAIN LAKE EVAP. OUTFLOW
CF 1          36     150492    -10000         0         0         0    10000        -0
CF 2          36     151575    -10000        41         0         0    10000       -41
CF 3          36     152887    -10000       384         0         0    10000      -384
CF 4          36     154199    -10000      1038         0         0    10000     -1038
CF 5          36     155512    -10000      2232         0         0    10000     -2232
CF 6          36     156168    -10000      3125         0         0    10000     -3125
CF 7          36     156824    -10000      4173         0         0    10000     -4173
CF 8          36     157480    -10000      5762         0         0    10000     -5762
CF 9          36     158136    -10000      8046         0         0    10000     -8046
CF10          36     158793    -10000     11004         0         0    10000    -11004
CF11          36     159450    -10000     14067         0         0    10000    -14067
CF12          36     160105    -10000     16694         0         0    10000    -16694
CF13          36     160761    -10000     18790         0         0    10000    -18790
CF14          36     161417    -10000     23982         0         0    10000    -23982
CF15          36     162008    -10000     29619         0         0    10000    -29619
  PASQUA AND ECHO EVAP OUTFLOW
CF 1         105     154000    -10000      1417         0         0    10000     -1417
CF 2         105     155500    -10000      1785         0         0    10000     -1785
CF 3         105     156500    -10000      2363         0         0    10000     -2363
CF 4         105     156600    -10000      2690         0         0    10000     -2690
CF 5         105     156700    -10000      2825         0         0    10000     -2825
CF 6         105     156800    -10000      2955         0         0    10000     -2955
CF 7         105     156900    -10000      3081         0         0    10000     -3081
CF 8         105     157000    -10000      3211         0         0    10000     -3211
CF 9         105     157100    -10000      3329         0         0    10000     -3329
CF10         105     157200    -10000      3455         0         0    10000     -3455
CF11         105     157300    -10000      3556         0         0    10000     -3556
CF12         105     157400    -10000      3632         0         0    10000     -3632
CF13         105     157500    -10000      3688         0         0    10000     -3688
CF14         105     157600    -10000      3789         0         0    10000     -3789
   MISSION AND KATEPWA EVAP OUTFLOW
CF 1         106     156400    -10000      2285         0         0    10000     -2285
CF 2         106     156500    -10000      2312         0         0    10000     -2312
CF 3         106     156600    -10000      2348         0         0    10000     -2348
CF 4         106     156700    -10000      2382         0         0    10000     -2382
CF 5         106     156800    -10000      2415         0         0    10000     -2415
CF 6         106     156900    -10000      2457         0         0    10000     -2457
CF 7         106     157000    -10000      2504         0         0    10000     -2504
CF 8         106     157100    -10000      2558         0         0    10000     -2558
CF 9         106     157200    -10000      2615         0         0    10000     -2615
CF10         106     157300    -10000      2678         0         0    10000     -2678
CF11         106     157400    -10000      2749         0         0    10000     -2749
CF12         106     157500    -10000      2821         0         0    10000     -2821
CF13         106     157600    -10000      2898         0         0    10000     -2898
 CROOKED LAKE EVAP OUTFLOW
CF 1         107     147400    -10000      1176         0         0    10000     -1176
CF 2         107     147600    -10000      1218         0         0    10000     -1218
CF 3         107     147800    -10000      1302         0         0    10000     -1302
CF 4         107     148000    -10000      1428         0         0    10000     -1428
CF 5         107     148200    -10000      1600         0         0    10000     -1600
CF 6         107     148400    -10000      1815         0         0    10000     -1815
CF 7         107     148600    -10000      2016         0         0    10000     -2016
CF 8         107     148800    -10000      2184         0         0    10000     -2184
CF 9         107     149000    -10000      2310         0         0    10000     -2310
CF10         107     149200    -10000      2390         0         0    10000     -2390
 ROUND LAKE EVAP OUTFLOW
CF 1         108     144400    -10000       924         0         0    10000      -924
CF 2         108     144600    -10000       945         0         0    10000      -945
CF 3         108     144800    -10000      1027         0         0    10000     -1027
CF 4         108     145000    -10000      1102         0         0    10000     -1102
CF 5         108     145200    -10000      1165         0         0    10000     -1165
CF 6         108     145400    -10000      1233         0         0    10000     -1233
CF 7         108     145600    -10000      1287         0         0    10000     -1287
CF 8         108     145800    -10000      1336         0         0    10000     -1336
CF 9         108     146000    -10000      1365         0         0    10000     -1365
CF10         108     146200    -10000      1407         0         0    10000     -1407
CC01        1120          0  112      EVAPORATION ON EYEBROW LAKE-NATURAL
CC02        1120       1111           1149   211000
CL01        1150          0           EYEBROW LAKE NATURAL
CL02        1150                              1725    1719
C110        1150    1719                            0 17215         1             3000 EST
C111        1150    17225        30              5000 1723         60             6000 TABLE
C112        1150    1725        300              10000999999999999999999999999999999
CL01        1149          0           EYEBROW LAKE EVAP. ELEV.
CL02        1149                              1725    1719
C110        1149    1719                            0 17215         1             3000 EST
C111        1149    17225        30              5000 1723         60             6000 TABLE
C112        1149    1725        300              10000999999999999999999999999999999
CR01       91350          1           EYEBROW LAKE TO BUFFALO POUND
CR02       91350          0     11 685 12881
CC01        1790          0           BUFFALO POUND LAKE RECORDED
C110        1790      10000      10                     166000      100
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C111      1790    167500    1000               99999999999999
CC01      1111         0       BPL EVAP IN 0.001 FEET PER DAY
CC01      2222         0       LML EVAP IN 0.001 FEET PER DAY
CC01      7176         0       FISHING LKS EVAP IN 0.001 FEET PER DAY
CC01      7668         0       LOWER QUAP. EVAP IN 0.001 FEET PER DAY
CC01      1782         0       BACKWATER CONTROL FOR BUFL PND LST MTN ECHO
C110      1782        -1     -10                1       10              ICE
C111      1782         3      30               999999999999999999999999999BCKWTR
CC01      1783         0       BACKWATER CONTROL FOR KATEPWA,CROOKED,ROUND
C110      1783        -1     -10                1       10              ICE
C111      1783         3      30               999999999999999999999999999BCKWTR
CL01      1795         1       BUFFALO POUND LAKE AT PUMPING STATION COMP
CL02      1795 2      1782             167500 165300
C110      1795    1653                      0 1654                    200BUFFAL
C111      1795    1655                   1000 1656                   2000POUND
C112      1795    1657                   3500 1658                   6300 LAKE
C113      1795    1659                   9000 1660                  13000STORAG
C114      1795    1661                  17200 1662                  21500 TABLE
C115      1795    1665                  35500 1670                  66200 1972
C116      1795    1675                 104700999999999999999999999999999
C2        1795         0 1662            -100       0 1666            300
C2        1795        30 1663            -100      30 1667            300
C2        1795        80 1664            -100      80 1668            300
C2        1795       200 1666            -100     200 1670            300
C2        1795       600 1670            -100     600 1674            300
C2        1795   -999999
CL01      1791         1       BUFFALO POUND LAKE EVAP. ELEV.
CL02      1791                         167500 165300
C110      1791    1653                      0 1654                    200BUFFAL
C116      1791    1675                 104700999999999999999999999999999
CC01     92711         0  112     BUFFALO POUND FALL EVAPORATION
CC02     92711         1111    1791   351000
CC01     92800         0       NET NAT FLOW CONTRIB TO QUAPPELLE FLOW
CR01     92300         1       QUAPPELLE  ROUTED-BUF PD TO MOOSE  JAW R.
CR02     92300         0   010040 20000
CC01     94000         0       QUAPPELLE R BEL MOOSE JAW RIVER NAT FLOW
CC01      4000         0       QUAPPELLE RIVER BEL MOOSE JAW REC
CR01     94263         1       ROUTED MOOSE JAW R TO  LUMSDEN
CR02     94263             7 163  1408
CC01     94900         0       QUAPPELLE RIVER NR LUMSDEN-NATURAL FLOW
CC01     95305                 QUAPPELLE RIVER BELOW FLYING CREEK
CC01      5000         0       QUAPPELLE RIVER AT LUMSDEN REC
CR01     95323         1       QUAPPELLE RIVER BEL FLYING CREEK -ROUTED
CR02     95323             1 533 25600
CC01     95335         0       QUAPPELLE BEL FLYING CK -SUMMED
CC01    G95804         1       LML GROUNDWATER INFLOW
CC01    G97199         1       ECHO LAKE GROUNDWATER INFLOW
CC01    G97399         1       KATEPWA LAKE GROUNDWATER INFLOW
CL01     SEVPS         1        CUM. EVAP SIMULATED CONDITIONS
CL02     SEVPS                          300     100
C101     SEVPS       100      -1    -90000000     200       0             0
C102     SEVPS       300       1    900000009999999999999999999999999999
CL01     SEVPN         1        CUM. EVAP NATURAL CONDITIONS
CL02     SEVPN                          300     100
C101     SEVPN       100      -1    -90000000     200       0             0
C102     SEVPN       300       1    900000009999999999999999999999999999
CL01     95804         1       LAST MOUNTAIN LAKE AT ROWANS RAVIN COMPUTED
CL02     95804 2      1782             161500 158100
C101     95804    157520       1         314849 159160       1        696325
C102     95804    160801       1        1419308 161654       1       1995768
C103     95804    162441       1        2806469999999999999999999999999999
C2       95804        -1 158100          -100      -1 160380          300LAST
C2       95804         0 160300          -100       0 160700          300MTN
C2       95804        40 160500          -100      40 160900          300LAKE
C2       95804        80 160600          -100      80 161000          300BACK
C2       95804       150 160700          -100     150 161100          300WATER
C2       95804       350 160900          -100     350 161300          300TABLE
C2       95804       650 161100          -100     650 161500          300
C2       95804   -999999
CL01     95549         1       LAST MOUNTAIN LAKE EVAP. ELEV.
CL02     95549                         161500 158100
C101     95549    157520       1         314849 159160       1        696325
C102     95549    160801       1        1419308 161654       1       1995768
C103     95549    162441       1        2806469999999999999999999999999999
CC01     95548         0  112     LAST MOUNTAIN FALL EVAPORATION
CC02     95548         2222    95549   361000
CC01     86000         0       LAST MOUNTAIN LAKE RECORDED
C110     86000     10000      10                  160800     100
C111     86000    161500    1000               99999999999999
CC01      5342         0       LAST MOUNTAIN CREEK NEAR VALEPORT RECORDED
CC01     95365         0       QUAPPELLE  BEL LAST MTN LAK -NATURAL FLOW
CC01     95999         1       QUAPPELLE RIVER BEL CRAVEN-NATURAL
CC01      6000         0       QUAPPELLE RIVER BEL CRAVEN DAM-RECORDED
CR01     96033         1       FLOW BELOW CRAVEN - ROUTED
CR02     96033             7 459  9700
CC01     96965         0       QUAPPELLE RIVER AT FAIRY HILL - COMPUTED
CR01     96993         1       QUAPPELLE BELOW FAIRY HILL ROUTED
CR02     96993             5 432  6730
CC01     97000         1       QUAPPELLE R BELOW LOON CREEK - NATURAL
CC01      7000         0       QUAPPELLE R BELOW LOON CREEK - RECORDED
CR01     97173         1       QUAPPELLE AND LOCAL ROUTED
CR02     97173             2 383 40900
CL01    297199         1       ECHO LAKE AT FISH HATCHERY - COMPUTED
CL02    297199 2      1782             157600 156000
C110    297199    156000               124500 156200                 135200PASQUA
C111    297199    156400               146300 156600                 157900 AND
C112    297199    156800               170700 157000                 184200 ECHO
C113    297199    157200               200000 157400                 217000 TOTAL
C114    297199    157600               236000999999999999999999999999999
C2      297199        -1 156640          -100      -1 157040          300ECHO
C2      297199         0 156700          -100       0 157100          300LAKE
C2      297199        50 156720          -100      50 157120          300BACK
C2      297199        80 156760          -100      80 157160          300WATER
C2      297199       180 156800          -100     180 157200          300SHIFT
C2      297199       400 156900          -100     400 157300          300
C2      297199       700 157020          -100     700 157420          300
C2      297199      1100 157150          -100    1100 157550          300
C2      297199      1800 157300          -100    1800 157700          300
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C2      297199   -999999
CL01     97197         1          ECHO LAKE EVAP. ELEV.
CL02     97197                               157600 156000
C110     97197     156000                     124500 156200                  135200PASQUA
C114     97197     157600                     2360009999999999999999999999999999
CC01     97198        0  112          ECHO LAKE FALL EVAPORATION
CC02     97198       7176       97197  1051000
CC01      7200        0           ECHO LAKE RECORDED
C110      7200      10000      10                   157000     100
C111      7200     157600    1000                 99999999999999
CC01     97205        0           FLOW SUMMED BELOW ECHO LAKE
CR01     97213        1           ECHO AND PASQUA LAKE ROUTED
CR02     97213              2 383  40900
CC01     97245        0           SUMMATION POINT BETWEEN ECHO AND KATEPWA
CL01    297399        1           KATEPWA LAKE AT OUTLET WEIR - COMPUTED
CL02    297399 2     1783                    157600 156500
C110    297399     156500                    214600 156600                   220100MISSIO
C111    297399     156700                    225800 156800                   231400 AND
C112    297399     156900                    237300 157000                   242800KATEPW
C113    297399     157100                    249100 157200                   255300 TOTAL
C114    297399     157300                    261900 157400                   268300
C115    297399     157500                    275200 157600                   282000
C116    297399   9999999999999999999999999999999
C2      297399         -1 156690              -100       -1 157090              300KATEPA
C2      297399          0 156700              -100        0 157100              300LAKE
C2      297399         80 156715              -100       80 157115              300BACK
C2      297399        100 156730              -100      100 157130              300WATER
C2      297399        250 156770              -100      250 157170              300SHIFT
C2      297399        350 156800              -100      350 157200              300
C2      297399        800 156900              -100      800 157300              300
C2      297399       1500 157000              -100     1500 157400              300
C2      297399       2600 157100              -100     2600 157500              300
C2      297399   -999999
CL01     97397        1           KATEPWA LAKE EVAP. ELEV.
CL02     97397                               157600 156500
C110     97397     156500                    214600 156600                   220100MISSIO
C115     97397     157500                    275200 157600                   282000
C116     97397   9999999999999999999999999999999
CC01     97398        0  112          KATEPWA FALL EVAPORATION
CC02     97398       7176       97397  1061000
CC01      7350        0           KATEPWA LAKE AT OUTLET WEIR RECORDED
C110      7350      10000      10                   157500     100
C111      7350     159000    1000                 99999999999999
CC01     97500        1           QUAPPELLE RIVER AT OULET OF KATEPWA L NATURAL FLOW
CC01      7500        0           QUAPPELLE RIVER OF OUTLET OF KATEPWA LAKE-RECORDED
CC01     97535        0           QUAPPELLE BEL KATEPWA LAKE SUMMED - SUMMED
CR01     97563        1           QUAPPELLE                       - ROUTED
CR02     97563              8 350   6460
CC01     97565        0           QUAPPELLE AND LOCAL - SUMMED
CR01     97593        1           QUAPPELLE           - ROUTED
CR02     97593              8 353   5599
CC01     97599        1           QUAPPELLE RIVER AT HYDE - NATURAL FLOW
CC01      7600        0           QUAPPELLE RIVER AT HYDE - RECORDED
CC01     97605        0           QUAPPELLE RIVER BELOW HYDE - SUMMED
CR01     97643        1           QUAPPEL RIVER BELOW HYDE - ROUTED
CR02     97643              3 386   6810
CC01     97665        0           FLOW SUMMED JUST ABOVE CROOKED LAKE
CL01    297699        1           CROOKED LAKE NEAR GRAYSON - NATURAL FLOW
CL02    297699 2     1783                    149000 145000
C110    297699     145000                     24000 148000                    87500 AUG.
C111    297699     148200                     95000 148400                   103500 1970
C112    297699     148600                    112500 148800                   122000 SDOE
C113    297699     149000                    1320009999999                999999999
C2      297699         -1 147780              -100       -1 148180              300CROOKD
C2      297699          0 147800              -100        0 148200              300LAKE
C2      297699        130 147850              -100      130 148250              300BACK
C2      297699        250 147900              -100      250 148300              300WATER
C2      297699        380 147950              -100      380 148350              300SHIFT
C2      297699        500 148000              -100      500 148400              300
C2      297699        750 148080              -100      750 148480              300
C2      297699       1000 148150              -100     1000 148550              300
C2      297699       1500 148300              -100     1500 148700              300
C2      297699       2300 148500              -100     2300 148900              300
C2      297699   -999999
CL01     97697        1           CROOKED LAKE EVAP. ELEV.
CL02     97697                               149000 145000
C110     97697     145000                     24000 148000                    87500 AUG.
C113     97697     149000                    1320009999999                999999999
CC01     97698        0  112          CROOKED FALL EVAPORATION
CC02     97698       7668       97697  1071000
CC01      7700        0           CROOKED LAKE NEAR GRAYSON - RECORDED
C110      7700      10000      10                   145200     100
C111      7700     149600    1000                 99999999999999
CC01     97755        0           CROOKED LAKE OUTFLOW AND EKAPO - SUMMED
CR01     97783        1           QUAPPELLE RIVER BELOW EKAPO - ROUTED
CR02     97783              6 327   4430
CC01     97795        0           FLOW SUMMED JUST ABOVE ROUND LAKE
CL01    297799        1           ROUND LAKE NEAR WHITEWOOD - COMPUTED
CL02    297799 2     1783                    145900 143400
C110    297799     143400                     30000 144900                    61600 SDOE
C111    297799     145000                     64200 145100                    66900 JULY
C112    297799     145200                     69600 145300                    72400 1974
C113    297799     145400                     75200 145500                    78100
C114    297799     145600                     81000 145700                    84000
C115    297799     145800                     87000 145900                    90000
C116    297799   9999999999999999999999999999999
C2      297799         -1 144680              -100       -1 145080              300ROUND
C2      297799          0 144700              -100        0 145100              300 LAKE
C2      297799        250 144800              -100      250 145200              300BACK
C2      297799        400 144900              -100      400 145300              300WATER
C2      297799        700 145000              -100      700 145400              300
C2      297799       1000 145100              -100     1000 145500              300
C2      297799       1700 145300              -100     1700 145700              300
C2      297799       2700 145600              -100     2700 146000              300
C2      297799   -999999
CL01     97797        1           ROUND LAKE EVAP. ELEV.
CL02     97797                               145900 143400
C110     97797     143400                     30000 144900                    61600 SDOE
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C115      97797     145800                87000 145900              90000
C116      97797    9999999999999999999999999999
CC01      97798         0  112       ROUND FALL EVAPORATION
CC02      97798        7668      97797  1081000
CC01       7800         0        ROUND LAKE NEAR WHITEWOOD - RECORDED
C110       7800      10000     10                 145200    100
C111       7800     145900   1000              99999999999999
CC01      97805         0        ROUND LAKE NEAR WHITEWOOD - SUMMED
CR01      97843         1        QUAPPELLE RIVER BELOW ROUND - ROUTED
CR02      97843              10 331  3100
CC01      97899         0        QUAPPELLE AT TANTALLON SUMMATION POINT
CR01      97983         1        QUAPPELLE -ROUTED
CR02      97983               7 329  6110
CC01      97999         1        QUAPPELLE RIVER NEAR WELBY-NATURAL FLOW
CL01     S97999         1          CUM Q.R. NEAR WELBY
CL02     S97999                            10000    100
C101     S97999         100      -1        -100000  10000       1      100000000
C102     S97999     9999999999999999999999999999
CC01       8000         0        QUAPPELLE RIVER NEAR WELBY - RECORDED
N            Q3
P 01       1111
P 02       2222
P 03       7176
P 04       7668
P 05       1783
P 05       1782
P 06       1149
P 07       1791
P 08      95549
P 09      97197
P 10      97397
P 11      97697
P 12      97797
P 13     G95804        95804
P 14     G97199       297199
P 15     G97399       297399
P 16       1120         1150
P 17       1150        91350
P 18      91350         1795
P 19      92711         1795
P 20       1795        92800
P 21      92800        92300
P 22      92300        94000
 P 23      4000 REMOVED
P 24      94000        94263
P 25      94263        95305
P 26      95305        94900
 P 26      5000 REMOVED
P 27      94900        95323
P 28      95323        95335
P 29      95335        95365
P 30      95548        95804
P 31      95804        95365
 P 32       5342 REMOVED
P 33      95365        95999
 P 34      6000 REMOVED
 P 35     86000 REMOVED
P 36      95999        96033
P 37      96033        96965
P 38      96965        96993
P 39      96993        97000
 P 40      7000 REMOVED
P 41      97000        97173
P 42      97173       297199
P 43      97198       297199
P 44     297199        97205
 P 45      7200 REMOVED
P 46      97205        97213
P 47      97213        97245
P 48      97245       297399
P 49      97398       297399
P 50     297399        97500
 P 51      7350 REMOVED
 P 52      7500 REMOVED
P 53      97500        97535
P 54      97535        97563
P 55      97563        97565
P 56      97565        97593
P 57      97593        97599
 P 58      7600 REMOVED
P 59      97599        97605
P 60      97605        97643
P 61      97643        97665
P 62      97665       297699
P 63      97698       297699
P 64     297699        97755
 P 65      7700 REMOVED
P 66      97755        97783
P 67      97783        97795
P 68      97795       297799
P 69      97798       297799
P 70     297799        97805
 P 71      7800 REMOVED
P 72      97805        97843
P 72      97843        97899
P 73      97899        97983
P 74      97983        97999
P 75      97999       S97999
P 76     S97999
 P 77      8000 REMOVED
T   120010886240120010387000                                   5112
2L       S97999 120010886          0              1
 INITIAL CONDITIONS CARDS (NOT REQUIRED IF RAN AFTER Q12)
 2L        95804 12031 786        50 160549
 2L        95804 120 1 886        50 160549
 2L         1795 12031 775           166599
 2L         1795 120 1 875           166595
 2L       197199 12031 775           157183
```

2L		197399	12031	775	706	156995						
2L		197399	120 1	875	691	156992						
2L		197699	12031	775		148176						
2L		197699	120 1	875		148174						
2L		197799	12031	775		145088						
2L		197799	120 1	875		145088						
2L		1149	120 1	887	0	172024						
2L		1791	120 1	875	1	166595						
2L		95549	120 1	886	50	160549						
2L		97197	120 1	886	1	156884						
2L		97397	120 1	886		156832						
2L		97697	120 1	886	1	147952						
2L		97797	120 1	886	1	144854						
2R	1	91350	120 1	887	0	0	0	0	0	0	0	0
2R	1	91350	120 1	887	0	0	0					
2R	1	92300	12031	7871	1	13	0	0	0	0	0	0
2R	1	92300	120 1	8871	1	11	0	0	0	0	0	0
2R	1	94263	12031	7871	13	14	14	15	15	16	16	16
2R	1	94263	120 1	8871	11	12	13	13	14	14	15	15
2R	1	95323	12031	7871	-10	16	0	0	0	0	0	0
2R	1	95323	120 1	8871	9	10	0	0	0	0	0	0
2R	1	96033	12031	7871	1	4	7	9	12	14	15	16
2R	1	96033	120 1	8871	-1	2	5	7	10	12	14	15
2R	1	96993	12031	7871	16	15	15	14	12	12	0	0
2R	1	96993	120 1	8871	15	15	15	15	14	13	0	0
2R	1	97173	12031	7871	31	19	19	0	0	0	0	0
2R	1	97173	120 1	8871	14	20	19	0	0	0	0	0
2R	1	97213	12031	7871	6	7	9	0	0	0	0	0
2R	1	97213	120 1	8871	6	7	8	0	0	0	0	0
2R	1	97563	12031	7871	-25	-29	-33	-33	-30	-27	-25	-23
2R	1	97563	12031	7871	-22	0	0	0	0	0	0	0
2R	1	97563	120 1	8871	-33	-29	-30	-32	-32	-30	-28	-26
2R	1	97563	120 1	8871	-24	0	0	0	0	0	0	0
2R	1	97593	12031	7871	-22	-21	-21	-21	-21	-21	-22	-23
2R	1	97593	12031	7871	-24	0	0	0	0	0	0	0
2R	1	97593	120 1	8871	-24	-23	-22	-21	-21	-21	-21	-22
2R	1	97593	120 1	8871	-23	0	0	0	0	0	0	0
2R	1	97643	12031	7871	-16	-16	-15	-14	0	0	0	0
2R	1	97643	120 1	8871	-17	-16	-16	-15	0	0	0	0
2R	1	97783	12031	7871	-24	-26	-27	-29	-31	-32	-34	0
2R	1	97783	120 1	8871	-24	-25	-25	-27	-28	-30	-31	0
2R	1	97843	12031	7871	-55	-57	-57	-58	-59	-60	-61	-62
2R	1	97843	12031	7871	-63	-63	-64	0	0	0	0	0
2R	1	97843	120 1	8871	-31	-43	-45	-49	-53	-55	-57	-59
2R	1	97843	120 1	8871	-60	-61	-62	0	0	0	0	0
2R	1	97983	12031	7871	-64	-65	-66	-66	-67	-67	-68	-68
2R	1	97983	120 1	8871	-62	-63	-64	-65	-66	-67	-67	-68
6D		178211200108862			0							
6D		178211203011862			0							
6D		178211200112862			200							
6D		178211200103872			200							
6D		178311200108862			0							
6D		178311203011862			0							
6D		178311200112862			200							
6D		178311200103872			200							
6D		G958041200108861			31							
6D		G958041200103871			31							
6D		G971991200108861			11							
6D		G971991200103871			11							
6D		G973991200108861			11							
6D		G973991200103871			11							
6S		1111	1200101861			012031011	0					
6S		1111	1200102861			012028021	0					
6S		1111	1200103861			012031031	0					
6S		1111	1200104861			1012030041	10					
6S		1111	1200105861			10612031051	106					
6S		1111	1200106861			22412030061	224					
6S		1111	1200107861			19312031071	193					
6S		1111	1200108861			25212031081	252					
6S		1111	1200109861			3712030091	37					
6S		1111	1200110861			5912031101	59					
6S		1111	1200111861			012031111	0					
6S		1111	1200112861			012031121	0					
6S		2222	1200101861			012031011	0					
6S		2222	1200102861			012028021	0					
6S		2222	1200103861			012031031	0					
6S		2222	1200104861			-912030041	-9					
6S		2222	1200105861			12012031051	120					
6S		2222	1200106861			22712030061	227					
6S		2222	1200107861			12712031071	127					
6S		2222	1200108861			25412031081	254					
6S		2222	1200109861			7012030091	70					
6S		2222	1200110861			6912031101	69					
6S		2222	1200111861			012031111	0					
6S		2222	1200112861			012031121	0					
6S		7176	1200101861			012031011	0					
6S		7176	1200102861			012028021	0					
6S		7176	1200103861			012031031	0					
6S		7176	1200104861			-3812030041	-38					
6S		7176	1200105861			5712031051	57					
6S		7176	1200106861			12912030061	129					
6S		7176	1200107861			2912031071	29					
6S		7176	1200108861			20512031081	205					
6S		7176	1200109861			5912030091	59					
6S		7176	1200110861			5912031101	59					
6S		7176	1200111861			012031111	0					
6S		7176	1200112861			012031121	0					
6S		7668	1200101861			012031011	0					
6S		7668	1200102861			012028021	0					
6S		7668	1200103861			012031031	0					
6S		7668	1200104861			-2012030041	-20					
6S		7668	1200105861			10412031051	104					
6S		7668	1200106861			12112030061	121					
6S		7668	1200107861			4712031071	47					

6S	7668	1200108861	18312031081	183
6S	7668	1200109861	6712030091	67
6S	7668	1200110861	4412031101	44
6S	7668	1200111861	012031111	0
6S	7668	1200112861	012031121	0

APPENDIX E

MODIFIED QU'APPELLE RIVER SSARR NATURAL FLOW MODEL

1986 OUTPUT RESULTS

QU'APPELLE RIVER NATURAL FLOW MODEL

SAMPLE OUTPUT FILE - SPRING AND SUMMER PORTION OF MODEL

ELBOW DIVERSION TO SASKATCHEWAN/MANITOBA BOUNDARY MARCH 1, 1986 TO APRIL 30, 1986

1 STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR
1 MAR 86 1200

DATE-HOUR	00001790 BUFFALO POUND LA ELEVATION FEET-MSL	00001795 BUFFALO POUND LA ELEVATION FEET-MSL	00094000 QUAPPELLE RIVER FLOW CFS	00004000 QUAPPELLE RIVER FLOW CFS	00086000 LAST MOUNTAIN LA ELEVATION FEET-MSL	00095804 LAST MOUNTAIN LA ELEVATION FEET-MSL	00095999 QUAPPELLE RIVER FLOW CFS	00006000 QUAPPELLE RIVER FLOW CFS
1 MAR 86 1200	1,670.89	1,661.20	0.	244.	1,606.97	1,604.95	2.	154.
2 MAR 86 1200	1,670.97	1,661.24	267.	305.	1,606.98	1,604.96	-67.	170.
3 MAR 86 1200	1,671.08	1,661.32	329.	303.	1,606.99	1,604.97	44.	197.
4 MAR 86 1200	1,671.21	1,661.40	383.	269.	1,607.01	1,604.98	106.	213.
5 MAR 86 1200	1,671.31	1,661.45	326.	201.	1,607.03	1,605.00	182.	209.
6 MAR 86 1200	1,671.38	1,661.47	254.	95.	1,607.03	1,605.02	205.	189.
7 MAR 86 1200	1,671.40	1,661.47	236.	153.	1,607.04	1,605.04	186.	171.
8 MAR 86 1200	1,671.42	1,661.48	267.	141.	1,607.05	1,605.06	175.	171.
9 MAR 86 1200	1,671.45	1,661.51	338.	182.	1,607.06	1,605.08	181.	170.
10 MAR 86 1200	1,671.46	1,661.55	397.	237.	1,607.06	1,605.09	189.	114.
11 MAR 86 1200	1,671.47	1,661.61	428.	252.	1,607.07	1,605.11	211.	17.
12 MAR 86 1200	1,671.47	1,661.70	442.	303.	1,607.08	1,605.13	236.	17.
13 MAR 86 1200	1,671.48	1,661.78	446.	315.	1,607.10	1,605.16	248.	16.
14 MAR 86 1200	1,671.48	1,661.86	446.	313.	1,607.12	1,605.18	250.	16.
15 MAR 86 1200	1,671.49	1,661.93	442.	291.	1,607.14	1,605.20	256.	17.
16 MAR 86 1200	1,671.50	1,661.98	435.	259.	1,607.17	1,605.22	273.	19.
17 MAR 86 1200	1,671.50	1,662.02	396.	220.	1,607.20	1,605.24	286.	19.
18 MAR 86 1200	1,671.53	1,662.05	376.	172.	1,607.23	1,605.27	295.	19.
19 MAR 86 1200	1,671.53	1,662.08	364.	192.	1,607.24	1,605.29	304.	18.
20 MAR 86 1200	1,671.53	1,662.10	340.	162.	1,607.27	1,605.32	301.	19.
21 MAR 86 1200	1,671.53	1,662.13	335.	176.	1,607.28	1,605.34	302.	20.
22 MAR 86 1200	1,671.54	1,662.16	310.	153.	1,607.31	1,605.37	308.	21.
23 MAR 86 1200	1,671.54	1,662.19	308.	96.	1,607.33	1,605.39	304.	20.
24 MAR 86 1200	1,671.54	1,662.22	322.	157.	1,607.36	1,605.41	293.	20.
25 MAR 86 1200	1,671.54	1,662.24	328.	140.	1,607.38	1,605.44	277.	20.
26 MAR 86 1200	1,671.55	1,662.26	268.	134.	1,607.40	1,605.46	250.	19.
27 MAR 86 1200	1,671.54	1,662.26	179.	170.	1,607.43	1,605.48	224.	18.
28 MAR 86 1200	1,671.55	1,662.26	141.	154.	1,607.47	1,605.49	209.	17.
29 MAR 86 1200	1,671.55	1,662.28	115.	143.	1,607.49	1,605.51	193.	16.
30 MAR 86 1200	1,671.56	1,662.30	97.	130.	1,607.51	1,605.53	175.	15.
31 MAR 86 1200	1,671.58	1,662.32	89.	131.	1,607.52	1,605.54	163.	12.
1 APR 86 1200	1,671.58	1,662.36	80.	121.	1,607.54	1,605.55	147.	11.
2 APR 86 1200	1,671.59	1,662.38	73.	112.	1,607.55	1,605.55	128.	10.
3 APR 86 1200	1,671.58	1,662.38	74.	112.	1,607.56	1,605.55	123.	10.
4 APR 86 1200	1,671.58	1,662.39	76.	119.	1,607.55	1,605.56	122.	10.
5 APR 86 1200	1,671.58	1,662.40	76.	119.	1,607.57	1,605.56	110.	10.
6 APR 86 1200	1,671.58	1,662.41	78.	131.	1,607.58	1,605.56	87.	10.
7 APR 86 1200	1,671.57	1,662.42	83.	137.	1,607.58	1,605.56	71.	8.
8 APR 86 1200	1,671.56	1,662.42	90.	127.	1,607.58	1,605.56	74.	6.
9 APR 86 1200	1,671.54	1,662.43	92.	131.	1,607.59	1,605.55	73.	6.
10 APR 86 1200	1,671.57	1,662.43	79.	117.	1,607.60	1,605.55	60.	4.
11 APR 86 1200	1,671.58	1,662.43	63.	97.	1,607.60	1,605.55	55.	3.
12 APR 86 1200	1,671.52	1,662.43	44.	85.	1,607.60	1,605.55	77.	3.
13 APR 86 1200	1,671.51	1,662.42	30.	69.	1,607.60	1,605.55	122.	4.
14 APR 86 1200	1,671.50	1,662.41	33.	67.	1,607.60	1,605.55	112.	3.
15 APR 86 1200	1,671.38	1,662.42	45.	76.	1,607.60	1,605.55	93.	3.
16 APR 86 1200	1,671.32	1,662.43	61.	88.	1,607.61	1,605.55	88.	41.
17 APR 86 1200	1,671.47	1,662.44	76.	106.	1,607.62	1,605.55	88.	105.
18 APR 86 1200	1,671.49	1,662.45	78.	111.	1,607.63	1,605.55	92.	106.

1 STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR
1 MAR 86 1200

DATE-HOUR	00001790 BUFFALO POUND LA ELEVATION FEET-MSL	00001795 BUFFALO POUND LA ELEVATION FEET-MSL	00094000 QUAPPELLE RIVER FLOW CFS	00004000 QUAPPELLE RIVER FLOW CFS	00086000 LAST MOUNTAIN LA ELEVATION FEET-MSL	00095804 LAST MOUNTAIN LA ELEVATION FEET-MSL	00095999 QUAPPELLE RIVER FLOW CFS	00006000 QUAPPELLE RIVER FLOW CFS
19 APR 86 1200	1,671.50	1,662.45	66.	103.	1,607.63	1,605.55	98.	114.
20 APR 86 1200	1,671.44	1,662.45	50.	89.	1,607.63	1,605.55	97.	112.
21 APR 86 1200	1,671.38	1,662.45	38.	78.	1,607.64	1,605.54	89.	109.
22 APR 86 1200	1,671.43	1,662.45	30.	73.	1,607.66	1,605.54	83.	107.
23 APR 86 1200	1,671.49	1,662.45	26.	71.	1,607.68	1,605.54	80.	106.
24 APR 86 1200	1,671.39	1,662.45	25.	69.	1,607.69	1,605.54	79.	104.
25 APR 86 1200	1,671.35	1,662.44	24.	66.	1,607.69	1,605.54	75.	86.
26 APR 86 1200	1,671.34	1,662.45	23.	64.	1,607.69	1,605.54	71.	58.
27 APR 86 1200	1,671.33	1,662.47	22.	64.	1,607.69	1,605.53	68.	58.
28 APR 86 1200	1,671.34	1,662.50	21.	64.	1,607.69	1,605.53	67.	79.
29 APR 86 1200	1,671.37	1,662.52	20.	64.	1,607.69	1,605.53	66.	112.
30 APR 86 1200	1,671.42	1,662.55	18.	63.	1,607.69	1,605.53	65.	112.
1 MAY 86 1200	1,671.39	1,662.57	15.	83.	1,607.69	1,605.53	64.	112.
2 MAY 86 1200	1,671.32	1,662.58	60.	262.	1,607.69	1,605.53	62.	77.
3 MAY 86 1200	1,671.34	1,662.58	130.	263.	1,607.69	1,605.53	80.	50.
4 MAY 86 1200	1,671.47	1,662.57	155.	275.	1,607.69	1,605.53	104.	57.
5 MAY 86 1200	1,671.67	1,662.57	174.	297.	1,607.80	1,605.54	102.	81.
6 MAY 86 1200	1,671.65	1,662.58	209.	311.	1,607.86	1,605.54	160.	111.
7 MAY 86 1200	1,671.61	1,662.58	225.	337.	1,607.86	1,605.55	280.	115.
8 MAY 86 1200	1,671.61	1,662.59	232.	324.	1,607.86	1,605.57	315.	113.
9 MAY 86 1200	1,671.71	1,662.60	304.	371.	1,607.86	1,605.58	327.	121.
10 MAY 86 1200	1,671.74	1,662.62	388.	519.	1,607.86	1,605.60	389.	127.
11 MAY 86 1200	1,671.77	1,662.67	425.	544.	1,607.92	1,605.63	473.	126.
12 MAY 86 1200	1,671.81	1,662.77	448.	607.	1,607.97	1,605.65	478.	125.
13 MAY 86 1200	1,671.73	1,662.90	466.	696.	1,607.97	1,605.68	432.	123.
14 MAY 86 1200	1,671.71	1,663.03	470.	759.	1,608.00	1,605.70	409.	123.
15 MAY 86 1200	1,671.73	1,663.15	471.	805.	1,608.06	1,605.72	398.	127.
16 MAY 86 1200	1,671.77	1,663.31	483.	830.	1,608.10	1,605.74	386.	132.

17 MAY 86 1200	1,671.61	1,663.47	492.	837.	1,608.11	1,605.76	374.	143.
18 MAY 86 1200	1,671.61	1,663.61	493.	809.	1,608.15	1,605.78	354.	135.
19 MAY 86 1200	1,671.58	1,663.71	483.	745.	1,608.18	1,605.80	338.	129.
20 MAY 86 1200	1,671.49	1,663.76	458.	646.	1,608.19	1,605.81	333.	123.
21 MAY 86 1200	1,671.18	1,663.78	400.	551.	1,608.19	1,605.83	320.	119.
22 MAY 86 1200	1,671.27	1,663.79	322.	501.	1,608.19	1,605.84	296.	115.
23 MAY 86 1200	1,671.47	1,663.81	264.	480.	1,608.29	1,605.86	271.	114.
24 MAY 86 1200	1,671.45	1,663.83	217.	449.	1,608.31	1,605.87	251.	113.
25 MAY 86 1200	1,671.39	1,663.84	172.	406.	1,608.32	1,605.88	223.	112.
26 MAY 86 1200	1,671.36	1,663.84	131.	371.	1,608.32	1,605.88	193.	109.
27 MAY 86 1200	1,671.31	1,663.83	105.	331.	1,608.32	1,605.89	168.	109.
28 MAY 86 1200	1,671.35	1,663.81	94.	336.	1,608.34	1,605.90	151.	109.
29 MAY 86 1200	1,671.37	1,663.79	79.	328.	1,608.34	1,605.90	138.	108.
30 MAY 86 1200	1,671.36	1,663.76	58.	304.	1,608.37	1,605.90	130.	109.
31 MAY 86 1200	1,671.41	1,663.73	42.	284.	1,608.39	1,605.91	121.	108.
1 JUN 86 1200	1,671.27	1,663.68	36.	266.	1,608.40	1,605.90	110.	106.
2 JUN 86 1200	1,671.35	1,663.65	40.	241.	1,608.40	1,605.89	101.	104.
3 JUN 86 1200	1,671.44	1,663.63	45.	70.	1,608.40	1,605.88	95.	103.
4 JUN 86 1200	1,671.39	1,663.60	41.	80.	1,608.40	1,605.86	83.	84.
5 JUN 86 1200	1,671.44	1,663.56	34.	61.	1,608.42	1,605.85	76.	60.
6 JUN 86 1200	1,671.47	1,663.55	31.	55.	1,608.43	1,605.84	76.	61.

1 STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 MAR 86 1200 SSARR MODEL

DATE-HOUR	00001790 BUFFALO POUND LA ELEVATION FEET-MSL	00001795 BUFFALO POUND LA ELEVATION FEET-MSL	00094000 QUAPPELLE RIVER FLOW CFS	00004000 QUAPPELLE RIVER FLOW CFS	00086000 LAST MOUNTAIN LA ELEVATION FEET-MSL	00095804 LAST MOUNTAIN LA ELEVATION FEET-MSL	00095999 QUAPPELLE RIVER FLOW CFS	00006000 QUAPPELLE RIVER FLOW CFS
7 JUN 86 1200	1,671.43	1,663.53	30.	100.	1,608.43	1,605.82	76.	61.
8 JUN 86 1200	1,671.31	1,663.51	30.	101.	1,608.43	1,605.81	78.	58.
9 JUN 86 1200	1,671.43	1,663.50	29.	106.	1,608.43	1,605.79	85.	61.
10 JUN 86 1200	1,671.41	1,663.48	28.	105.	1,608.43	1,605.78	88.	59.
11 JUN 86 1200	1,671.46	1,663.46	26.	103.	1,608.43	1,605.77	84.	58.
12 JUN 86 1200	1,671.49	1,663.44	24.	103.	1,608.43	1,605.76	81.	60.
13 JUN 86 1200	1,671.36	1,663.42	23.	97.	1,608.43	1,605.74	76.	57.
14 JUN 86 1200	1,671.29	1,663.40	21.	91.	1,608.43	1,605.73	72.	54.
15 JUN 86 1200	1,671.27	1,663.38	20.	91.	1,608.43	1,605.72	69.	54.
16 JUN 86 1200	1,671.25	1,663.36	19.	93.	1,608.43	1,605.70	68.	56.
17 JUN 86 1200	1,671.25	1,663.34	18.	93.	1,608.43	1,605.69	68.	57.
18 JUN 86 1200	1,671.29	1,663.32	17.	94.	1,608.43	1,605.68	67.	59.
19 JUN 86 1200	1,671.34	1,663.29	15.	95.	1,608.43	1,605.66	71.	57.
20 JUN 86 1200	1,671.29	1,663.27	14.	94.	1,608.43	1,605.65	75.	55.
21 JUN 86 1200	1,671.35	1,663.25	13.	93.	1,608.43	1,605.64	71.	49.
22 JUN 86 1200	1,671.33	1,663.23	11.	91.	1,608.43	1,605.63	68.	50.
23 JUN 86 1200	1,671.25	1,663.20	10.	102.	1,608.43	1,605.61	66.	68.
24 JUN 86 1200	1,671.24	1,663.18	9.	145.	1,608.43	1,605.60	64.	93.
25 JUN 86 1200	1,671.23	1,663.16	8.	147.	1,608.43	1,605.59	66.	95.
26 JUN 86 1200	1,671.22	1,663.13	7.	145.	1,608.43	1,605.58	69.	95.
27 JUN 86 1200	1,671.15	1,663.11	6.	144.	1,608.43	1,605.56	64.	95.
28 JUN 86 1200	1,671.13	1,663.09	5.	143.	1,608.43	1,605.55	58.	95.
29 JUN 86 1200	1,671.00	1,663.07	4.	139.	1,608.43	1,605.54	56.	95.
30 JUN 86 1200	1,671.07	1,663.04	4.	137.	1,608.43	1,605.52	56.	97.
1 JUL 86 1200	1,671.16	1,663.02	4.	147.	1,608.43	1,605.52	57.	97.
2 JUL 86 1200	1,671.10	1,663.01	4.	142.	1,608.43	1,605.51	59.	95.
3 JUL 86 1200	1,671.17	1,662.99	3.	142.	1,608.43	1,605.51	62.	95.
4 JUL 86 1200	1,671.12	1,662.96	1.	140.	1,608.43	1,605.50	59.	95.
5 JUL 86 1200	1,671.17	1,662.94	1.	141.	1,608.43	1,605.50	56.	95.
6 JUL 86 1200	1,671.15	1,662.92	1.	143.	1,608.43	1,605.49	55.	95.
7 JUL 86 1200	1,671.03	1,662.90	1.	138.	1,608.43	1,605.49	56.	96.
8 JUL 86 1200	1,671.04	1,662.88	1.	137.	1,608.43	1,605.48	57.	96.
9 JUL 86 1200	1,670.99	1,662.86	1.	137.	1,608.43	1,605.48	54.	94.
10 JUL 86 1200	1,671.02	1,662.84	1.	137.	1,608.43	1,605.47	52.	71.
11 JUL 86 1200	1,671.03	1,662.82	1.	116.	1,608.43	1,605.47	52.	44.
12 JUL 86 1200	1,671.14	1,662.80	1.	125.	1,608.43	1,605.46	51.	44.
13 JUL 86 1200	1,671.21	1,662.78	1.	128.	1,608.43	1,605.46	54.	43.
14 JUL 86 1200	1,671.19	1,662.76	1.	124.	1,608.43	1,605.45	75.	44.
15 JUL 86 1200	1,671.18	1,662.74	1.	121.	1,608.43	1,605.45	84.	42.
16 JUL 86 1200	1,671.12	1,662.72	1.	118.	1,608.43	1,605.44	63.	41.
17 JUL 86 1200	1,671.11	1,662.69	1.	115.	1,608.43	1,605.44	54.	38.
18 JUL 86 1200	1,671.17	1,662.67	1.	118.	1,608.43	1,605.44	50.	36.
19 JUL 86 1200	1,671.15	1,662.66	1.	118.	1,608.43	1,605.43	54.	35.
20 JUL 86 1200	1,671.11	1,662.63	1.	115.	1,608.43	1,605.43	56.	34.
21 JUL 86 1200	1,671.10	1,662.61	1.	114.	1,608.43	1,605.42	49.	33.
22 JUL 86 1200	1,671.01	1,662.58	1.	110.	1,608.43	1,605.42	44.	32.
23 JUL 86 1200	1,671.14	1,662.53	1.	115.	1,608.43	1,605.41	42.	34.
24 JUL 86 1200	1,671.08	1,662.47	1.	114.	1,608.43	1,605.41	41.	32.
25 JUL 86 1200	1,671.03	1,662.41	1.	110.	1,608.43	1,605.40	40.	31.

1 STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 MAR 86 1200 SSARR MODEL

DATE-HOUR	00001790 BUFFALO POUND LA ELEVATION FEET-MSL	00001795 BUFFALO POUND LA ELEVATION FEET-MSL	00094000 QUAPPELLE RIVER FLOW CFS	00004000 QUAPPELLE RIVER FLOW CFS	00086000 LAST MOUNTAIN LA ELEVATION FEET-MSL	00095804 LAST MOUNTAIN LA ELEVATION FEET-MSL	00095999 QUAPPELLE RIVER FLOW CFS	00006000 QUAPPELLE RIVER FLOW CFS
26 JUL 86 1200	1,671.00	1,662.36	1.	109.	1,608.43	1,605.40	38.	31.
27 JUL 86 1200	1,670.92	1,662.30	1.	108.	1,608.43	1,605.39	37.	31.
28 JUL 86 1200	1,670.95	1,662.24	1.	107.	1,608.43	1,605.39	36.	30.
29 JUL 86 1200	1,670.95	1,662.19	1.	105.	1,608.43	1,605.38	38.	29.
30 JUL 86 1200	1,671.00	1,662.13	1.	109.	1,608.43	1,605.37	41.	29.
31 JUL 86 1200	1,670.87	1,662.08	1.	96.	1,608.43	1,605.37	41.	28.
1 AUG 86 1200	1,670.82	1,662.02	1.	35.	1,608.43	1,605.36	40.	26.

STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 MAR 86 1200

SSARR MODEL

DATE-HOUR	00007200 ECHO LAKE AT FIS ELEVATION FEET-MSL	00007199 ECHO LAKE AT FIS ELEVATION FEET-MSL	00297199 ECHO LAKE AT FIS ELEVATION FEET-MSL	00007350 KATEPWA LAKE AT ELEVATION FEET-MSL	00007399 KATEPWA LAKE AT ELEVATION FEET-MSL	00297399 KATEPWA LAKE AT ELEVATION FEET-MSL	00007500 QUAPPELLE RIVERA FLOW CFS	00007400 KATEPWA LAKE AT FLOW CFS	00097500 FLOW CFS
1 MAR 86 1200	1,569.61	1,569.61	1,568.60	1,569.30	1,569.30	1,568.54	123.	165.	-46.
2 MAR 86 1200	1,569.60	1,569.65	1,568.60	1,569.31	1,569.32	1,568.53	149.	99.	150.
3 MAR 86 1200	1,569.60	1,569.79	1,568.60	1,569.33	1,569.38	1,568.52	200.	127.	132.
4 MAR 86 1200	1,569.60	1,569.95	1,568.60	1,569.35	1,569.43	1,568.53	196.	159.	138.
5 MAR 86 1200	1,569.62	1,570.08	1,568.59	1,569.37	1,569.47	1,568.54	185.	181.	146.
6 MAR 86 1200	1,569.61	1,570.15	1,568.59	1,569.36	1,569.48	1,568.55	176.	191.	159.
7 MAR 86 1200	1,569.63	1,570.18	1,568.58	1,569.33	1,569.47	1,568.54	173.	188.	161.
8 MAR 86 1200	1,569.64	1,570.19	1,568.57	1,569.34	1,569.46	1,568.54	171.	181.	163.
9 MAR 86 1200	1,569.64	1,570.20	1,568.56	1,569.34	1,569.45	1,568.54	162.	176.	163.
10 MAR 86 1200	1,569.65	1,570.20	1,568.55	1,569.34	1,569.45	1,568.54	157.	173.	162.
11 MAR 86 1200	1,569.64	1,570.21	1,568.54	1,569.33	1,569.45	1,568.54	154.	172.	160.
12 MAR 86 1200	1,569.64	1,570.22	1,568.53	1,569.33	1,569.45	1,568.53	149.	173.	156.
13 MAR 86 1200	1,569.63	1,570.24	1,568.52	1,569.33	1,569.46	1,568.52	145.	177.	152.
14 MAR 86 1200	1,569.63	1,570.29	1,568.51	1,569.33	1,569.48	1,568.53	144.	186.	146.
15 MAR 86 1200	1,569.63	1,570.35	1,568.50	1,569.33	1,569.51	1,568.55	166.	202.	153.
16 MAR 86 1200	1,569.63	1,570.39	1,568.49	1,569.37	1,569.53	1,568.57	206.	217.	162.
17 MAR 86 1200	1,569.63	1,570.43	1,568.48	1,569.38	1,569.55	1,568.60	215.	232.	173.
18 MAR 86 1200	1,569.64	1,570.46	1,568.48	1,569.40	1,569.56	1,568.63	219.	244.	184.
19 MAR 86 1200	1,569.65	1,570.47	1,568.49	1,569.40	1,569.57	1,568.65	208.	253.	193.
20 MAR 86 1200	1,569.67	1,570.48	1,568.50	1,569.40	1,569.58	1,568.67	198.	261.	199.
21 MAR 86 1200	1,569.73	1,570.51	1,568.51	1,569.37	1,569.59	1,568.67	186.	266.	202.
22 MAR 86 1200	1,569.80	1,570.57	1,568.53	1,569.36	1,569.59	1,568.67	176.	266.	202.
23 MAR 86 1200	1,569.86	1,570.62	1,568.56	1,569.31	1,569.58	1,568.65	152.	258.	198.
24 MAR 86 1200	1,569.91	1,570.67	1,568.60	1,569.28	1,569.56	1,568.63	141.	243.	192.
25 MAR 86 1200	1,569.97	1,570.71	1,568.64	1,569.26	1,569.53	1,568.61	129.	222.	186.
26 MAR 86 1200	1,570.02	1,570.75	1,568.69	1,569.24	1,569.50	1,568.57	118.	201.	176.
27 MAR 86 1200	1,570.06	1,570.78	1,568.73	1,569.23	1,569.47	1,568.54	108.	184.	165.
28 MAR 86 1200	1,570.09	1,570.81	1,568.78	1,569.23	1,569.44	1,568.51	105.	167.	154.
29 MAR 86 1200	1,570.12	1,570.85	1,568.82	1,569.22	1,569.41	1,568.48	102.	152.	145.
30 MAR 86 1200	1,570.15	1,570.88	1,568.86	1,569.21	1,569.39	1,568.46	97.	138.	137.
31 MAR 86 1200	1,570.18	1,570.90	1,568.90	1,569.21	1,569.36	1,568.43	93.	125.	130.
1 APR 86 1200	1,570.20	1,570.92	1,568.94	1,569.17	1,569.34	1,568.41	86.	113.	124.
2 APR 86 1200	1,570.19	1,570.95	1,568.97	1,569.15	1,569.32	1,568.40	79.	103.	118.
3 APR 86 1200	1,570.21	1,570.97	1,569.00	1,569.15	1,569.31	1,568.38	75.	94.	114.
4 APR 86 1200	1,570.24	1,570.99	1,569.03	1,569.14	1,569.30	1,568.37	70.	86.	110.
5 APR 86 1200	1,570.26	1,571.00	1,569.06	1,569.13	1,569.28	1,568.36	66.	79.	107.
6 APR 86 1200	1,570.27	1,571.02	1,569.09	1,569.13	1,569.27	1,568.36	64.	73.	105.
7 APR 86 1200	1,570.28	1,571.04	1,569.11	1,569.13	1,569.26	1,568.35	61.	68.	104.
8 APR 86 1200	1,570.28	1,571.05	1,569.13	1,569.12	1,569.26	1,568.35	59.	63.	104.
9 APR 86 1200	1,570.27	1,571.06	1,569.15	1,569.12	1,569.25	1,568.35	55.	59.	104.
10 APR 86 1200	1,570.27	1,571.08	1,569.16	1,569.10	1,569.24	1,568.36	55.	56.	105.
11 APR 86 1200	1,570.27	1,571.09	1,569.18	1,569.11	1,569.24	1,568.36	61.	53.	107.
12 APR 86 1200	1,570.25	1,571.10	1,569.19	1,569.11	1,569.23	1,568.37	57.	50.	109.
13 APR 86 1200	1,570.22	1,571.11	1,569.20	1,569.10	1,569.23	1,568.38	54.	48.	111.
14 APR 86 1200	1,570.24	1,571.12	1,569.20	1,569.11	1,569.22	1,568.38	58.	46.	114.
15 APR 86 1200	1,570.24	1,571.13	1,569.21	1,569.10	1,569.22	1,568.39	54.	44.	117.
16 APR 86 1200	1,570.22	1,571.14	1,569.21	1,569.09	1,569.22	1,568.40	52.	42.	119.
17 APR 86 1200	1,570.23	1,571.15	1,569.21	1,569.11	1,569.22	1,568.41	53.	41.	122.
18 APR 86 1200	1,570.26	1,571.16	1,569.21	1,569.11	1,569.21	1,568.42	53.	40.	125.

STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 MAR 86 1200

SSARR MODEL

DATE-HOUR	00007200 ECHO LAKE AT FIS ELEVATION FEET-MSL	00007199 ECHO LAKE AT FIS ELEVATION FEET-MSL	00297199 ECHO LAKE AT FIS ELEVATION FEET-MSL	00007350 KATEPWA LAKE AT ELEVATION FEET-MSL	00007399 KATEPWA LAKE AT ELEVATION FEET-MSL	00297399 KATEPWA LAKE AT ELEVATION FEET-MSL	00007500 QUAPPELLE RIVERA FLOW CFS	00007400 KATEPWA LAKE AT FLOW CFS	00097500 FLOW CFS
19 APR 86 1200	1,570.27	1,571.16	1,569.21	1,569.10	1,569.21	1,568.42	53.	39.	127.
20 APR 86 1200	1,570.25	1,571.17	1,569.20	1,569.08	1,569.21	1,568.43	49.	38.	129.
21 APR 86 1200	1,570.23	1,571.18	1,569.20	1,569.07	1,569.21	1,568.44	46.	37.	131.
22 APR 86 1200	1,570.23	1,571.19	1,569.20	1,569.08	1,569.21	1,568.44	46.	36.	133.
23 APR 86 1200	1,570.25	1,571.19	1,569.20	1,569.09	1,569.21	1,568.45	51.	36.	134.
24 APR 86 1200	1,570.26	1,571.20	1,569.19	1,569.09	1,569.21	1,568.45	52.	35.	136.
25 APR 86 1200	1,570.22	1,571.20	1,569.19	1,569.08	1,569.20	1,568.46	51.	34.	137.
26 APR 86 1200	1,570.18	1,571.21	1,569.19	1,569.09	1,569.20	1,568.46	52.	34.	138.
27 APR 86 1200	1,570.18	1,571.22	1,569.19	1,569.09	1,569.20	1,568.46	53.	34.	139.
28 APR 86 1200	1,570.22	1,571.22	1,569.18	1,569.10	1,569.20	1,568.46	53.	33.	140.
29 APR 86 1200	1,570.26	1,571.23	1,569.18	1,569.09	1,569.20	1,568.47	53.	33.	140.
30 APR 86 1200	1,570.30	1,571.24	1,569.17	1,569.10	1,569.20	1,568.47	55.	33.	141.
1 MAY 86 1200	1,570.31	1,571.24	1,569.17	1,569.08	1,569.20	1,568.46	51.	30.	140.
2 MAY 86 1200	1,570.29	1,571.25	1,569.16	1,569.06	1,569.19	1,568.46	46.	26.	138.
3 MAY 86 1200	1,570.33	1,571.25	1,569.15	1,569.06	1,569.18	1,568.45	45.	23.	136.
4 MAY 86 1200	1,570.35	1,571.27	1,569.14	1,569.07	1,569.18	1,568.45	48.	21.	133.
5 MAY 86 1200	1,570.40	1,571.29	1,569.14	1,569.15	1,569.18	1,568.45	58.	21.	134.
6 MAY 86 1200	1,570.51	1,571.48	1,569.13	1,569.24	1,569.25	1,568.55	118.	55.	91.
7 MAY 86 1200	1,570.55	1,571.70	1,569.13	1,569.22	1,569.33	1,568.67	116.	103.	191.
8 MAY 86 1200	1,570.56	1,571.76	1,569.13	1,569.19	1,569.33	1,568.75	114.	103.	227.
9 MAY 86 1200	1,570.58	1,571.79	1,569.13	1,569.21	1,569.31	1,568.83	115.	95.	250.
10 MAY 86 1200	1,570.67	1,571.88	1,569.14	1,569.25	1,569.33	1,568.92	123.	101.	264.
11 MAY 86 1200	1,570.74	1,571.97	1,569.16	1,569.23	1,569.35	1,569.01	113.	114.	310.
12 MAY 86 1200	1,570.82	1,571.99	1,569.18	1,569.24	1,569.34	1,569.06	115.	109.	332.
13 MAY 86 1200	1,570.85	1,571.99	1,569.21	1,569.20	1,569.32	1,569.07	94.	101.	339.
14 MAY 86 1200	1,570.87	1,571.98	1,569.24	1,569.18	1,569.31	1,569.06	87.	95.	336.
15 MAY 86 1200	1,570.90	1,571.97	1,569.28	1,569.17	1,569.31	1,569.03	78.	93.	325.
16 MAY 86 1200	1,570.95	1,571.96	1,569.32	1,569.16	1,569.31	1,568.98	85.	95.	309.
17 MAY 86 1200	1,570.94	1,571.95	1,569.35	1,569.12	1,569.32	1,568.92	61.	99.	292.
18 MAY 86 1200	1,570.94	1,571.94	1,569.39	1,569.12	1,569.33	1,568.87	56.	106.	272.
19 MAY 86 1200	1,570.99	1,571.94	1,569.42	1,569.11	1,569.34	1,568.80	54.	113.	252.
20 MAY 86 1200	1,571.01	1,571.93	1,569.44	1,569.10	1,569.35	1,568.75	51.	120.	232.
21 MAY 86 1200	1,571.00	1,571.92	1,569.46	1,569.08	1,569.37	1,568.69	44.	126.	214.
22 MAY 86 1200	1,570.96	1,571.91	1,569.48	1,569.06	1,569.38	1,568.64	38.	132.	196.

DATE-HOUR									
23 MAY 86 1200	1,571.02	1,571.91	1,569.50	1,569.08	1,569.39	1,568.59	42.	138.	181.
24 MAY 86 1200	1,571.08	1,571.90	1,569.51	1,569.08	1,569.39	1,568.55	42.	142.	167.
25 MAY 86 1200	1,571.11	1,571.89	1,569.52	1,569.07	1,569.40	1,568.51	43.	146.	156.
26 MAY 86 1200	1,571.13	1,571.89	1,569.53	1,569.07	1,569.41	1,568.48	42.	149.	147.
27 MAY 86 1200	1,571.14	1,571.88	1,569.53	1,569.05	1,569.41	1,568.46	37.	151.	139.
28 MAY 86 1200	1,571.17	1,571.87	1,569.54	1,569.06	1,569.41	1,568.44	36.	152.	132.
29 MAY 86 1200	1,571.18	1,571.86	1,569.54	1,569.06	1,569.41	1,568.42	35.	152.	127.
30 MAY 86 1200	1,571.17	1,571.85	1,569.54	1,569.06	1,569.41	1,568.41	34.	152.	123.
31 MAY 86 1200	1,571.15	1,571.84	1,569.54	1,569.07	1,569.41	1,568.40	44.	152.	120.
1 JUN 86 1200	1,571.15	1,571.83	1,569.54	1,569.05	1,569.41	1,568.39	30.	149.	117.
2 JUN 86 1200	1,571.16	1,571.82	1,569.53	1,569.05	1,569.40	1,568.38	29.	146.	114.
3 JUN 86 1200	1,571.19	1,571.80	1,569.52	1,569.06	1,569.39	1,568.38	34.	142.	112.
4 JUN 86 1200	1,571.19	1,571.79	1,569.50	1,569.03	1,569.39	1,568.37	18.	138.	110.
5 JUN 86 1200	1,571.18	1,571.78	1,569.48	1,569.04	1,569.38	1,568.37	17.	134.	108.
6 JUN 86 1200	1,571.21	1,571.76	1,569.46	1,569.05	1,569.37	1,568.36	27.	131.	107.

1 STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR
1 MAR 86 1200

SSARR MODEL

DATE-HOUR	00007200 ECHO LAKE AT FIS ELEVATION FEET-MSL	00007199 ECHO LAKE AT FIS ELEVATION FEET-MSL	00297199 ECHO LAKE AT FIS ELEVATION FEET-MSL	00007350 KATEPWA LAKE AT ELEVATION FEET-MSL	00007399 KATEPWA LAKE AT ELEVATION FEET-MSL	00297399 KATEPWA LAKE AT ELEVATION FEET-MSL	00007500 QUAPPELLE RIVERA FLOW CFS	00007400 KATEPWA LAKE AT FLOW CFS	00097500 FLOW CFS
7 JUN 86 1200	1,571.24	1,571.75	1,569.44	1,569.05	1,569.37	1,568.36	23.	127.	106.
8 JUN 86 1200	1,571.22	1,571.74	1,569.42	1,569.02	1,569.36	1,568.36	13.	123.	106.
9 JUN 86 1200	1,571.24	1,571.73	1,569.39	1,569.06	1,569.35	1,568.36	25.	120.	105.
10 JUN 86 1200	1,571.26	1,571.72	1,569.36	1,569.07	1,569.35	1,568.36	34.	116.	105.
11 JUN 86 1200	1,571.24	1,571.70	1,569.33	1,569.08	1,569.34	1,568.36	32.	113.	105.
12 JUN 86 1200	1,571.29	1,571.69	1,569.31	1,569.08	1,569.34	1,568.36	49.	109.	106.
13 JUN 86 1200	1,571.24	1,571.68	1,569.28	1,569.04	1,569.33	1,568.36	21.	106.	106.
14 JUN 86 1200	1,571.20	1,571.66	1,569.24	1,569.02	1,569.32	1,568.36	12.	102.	104.
15 JUN 86 1200	1,571.20	1,571.65	1,569.21	1,569.03	1,569.32	1,568.35	16.	98.	103.
16 JUN 86 1200	1,571.21	1,571.64	1,569.18	1,569.03	1,569.31	1,568.35	15.	95.	101.
17 JUN 86 1200	1,571.20	1,571.64	1,569.15	1,569.04	1,569.30	1,568.34	12.	91.	99.
18 JUN 86 1200	1,571.21	1,571.64	1,569.12	1,569.04	1,569.30	1,568.34	12.	86.	97.
19 JUN 86 1200	1,571.22	1,571.64	1,569.09	1,569.05	1,569.29	1,568.33	24.	82.	96.
20 JUN 86 1200	1,571.22	1,571.64	1,569.06	1,569.04	1,569.28	1,568.33	24.	76.	94.
21 JUN 86 1200	1,571.24	1,571.64	1,569.04	1,569.04	1,569.27	1,568.32	28.	70.	93.
22 JUN 86 1200	1,571.25	1,571.64	1,569.01	1,569.04	1,569.26	1,568.32	27.	65.	92.
23 JUN 86 1200	1,571.22	1,571.63	1,568.99	1,569.02	1,569.25	1,568.32	13.	59.	91.
24 JUN 86 1200	1,571.19	1,571.63	1,568.96	1,569.00	1,569.24	1,568.31	8.	54.	89.
25 JUN 86 1200	1,571.20	1,571.63	1,568.94	1,569.01	1,569.23	1,568.30	15.	49.	87.
26 JUN 86 1200	1,571.21	1,571.63	1,568.92	1,569.01	1,569.22	1,568.30	18.	44.	85.
27 JUN 86 1200	1,571.21	1,571.62	1,568.90	1,568.99	1,569.21	1,568.29	12.	40.	84.
28 JUN 86 1200	1,571.21	1,571.62	1,568.88	1,568.99	1,569.21	1,568.29	10.	36.	82.
29 JUN 86 1200	1,571.19	1,571.62	1,568.86	1,568.97	1,569.20	1,568.28	2.	32.	80.
30 JUN 86 1200	1,571.19	1,571.62	1,568.85	1,568.98	1,569.19	1,568.28	2.	29.	78.
1 JUL 86 1200	1,571.22	1,571.63	1,568.83	1,569.00	1,569.19	1,568.28	8.	28.	78.
2 JUL 86 1200	1,571.24	1,571.64	1,568.83	1,568.99	1,569.20	1,568.28	5.	30.	78.
3 JUL 86 1200	1,571.25	1,571.65	1,568.82	1,569.01	1,569.20	1,568.28	14.	31.	79.
4 JUL 86 1200	1,571.28	1,571.66	1,568.82	1,569.00	1,569.20	1,568.28	4.	31.	79.
5 JUL 86 1200	1,571.34	1,571.67	1,568.81	1,569.08	1,569.20	1,568.28	35.	32.	79.
6 JUL 86 1200	1,571.38	1,571.68	1,568.81	1,569.07	1,569.20	1,568.28	35.	32.	80.
7 JUL 86 1200	1,571.36	1,571.70	1,568.81	1,569.03	1,569.20	1,568.28	22.	32.	80.
8 JUL 86 1200	1,571.34	1,571.71	1,568.80	1,569.03	1,569.20	1,568.28	23.	32.	80.
9 JUL 86 1200	1,571.33	1,571.72	1,568.79	1,569.02	1,569.20	1,568.28	23.	33.	80.
10 JUL 86 1200	1,571.34	1,571.73	1,568.79	1,569.02	1,569.20	1,568.28	27.	33.	80.
11 JUL 86 1200	1,571.38	1,571.74	1,568.78	1,569.06	1,569.20	1,568.28	38.	33.	80.
12 JUL 86 1200	1,571.44	1,571.76	1,568.78	1,569.08	1,569.20	1,568.28	52.	33.	80.
13 JUL 86 1200	1,571.48	1,571.77	1,568.77	1,569.09	1,569.20	1,568.29	54.	34.	81.
14 JUL 86 1200	1,571.53	1,571.78	1,568.77	1,569.10	1,569.20	1,568.29	59.	34.	82.
15 JUL 86 1200	1,571.54	1,571.79	1,568.77	1,569.09	1,569.21	1,568.29	49.	35.	82.
16 JUL 86 1200	1,571.54	1,571.80	1,568.76	1,569.08	1,569.21	1,568.29	45.	36.	82.
17 JUL 86 1200	1,571.55	1,571.80	1,568.75	1,569.09	1,569.21	1,568.29	58.	37.	82.
18 JUL 86 1200	1,571.59	1,571.81	1,568.75	1,569.10	1,569.21	1,568.29	65.	38.	82.
19 JUL 86 1200	1,571.60	1,571.81	1,568.74	1,569.07	1,569.21	1,568.29	63.	39.	82.
20 JUL 86 1200	1,571.58	1,571.81	1,568.73	1,569.05	1,569.21	1,568.29	42.	40.	82.
21 JUL 86 1200	1,571.58	1,571.82	1,568.73	1,569.05	1,569.22	1,568.29	38.	41.	81.
22 JUL 86 1200	1,571.56	1,571.82	1,568.71	1,569.03	1,569.22	1,568.28	29.	43.	79.
23 JUL 86 1200	1,571.56	1,571.82	1,568.70	1,569.04	1,569.22	1,568.27	33.	44.	77.
24 JUL 86 1200	1,571.57	1,571.82	1,568.69	1,569.02	1,569.22	1,568.27	30.	45.	76.
25 JUL 86 1200	1,571.55	1,571.81	1,568.68	1,569.00	1,569.23	1,568.26	18.	46.	73.

1 STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR
1 MAR 86 1200

SSARR MODEL

DATE-HOUR	00007200 ECHO LAKE AT FIS ELEVATION FEET-MSL	00007199 ECHO LAKE AT FIS ELEVATION FEET-MSL	00297199 ECHO LAKE AT FIS ELEVATION FEET-MSL	00007350 KATEPWA LAKE AT ELEVATION FEET-MSL	00007399 KATEPWA LAKE AT ELEVATION FEET-MSL	00297399 KATEPWA LAKE AT ELEVATION FEET-MSL	00007500 QUAPPELLE RIVERA FLOW CFS	00007400 KATEPWA LAKE AT FLOW CFS	00097500 FLOW CFS
26 JUL 86 1200	1,571.55	1,571.81	1,568.67	1,569.00	1,569.23	1,568.26	18.	47.	71.
27 JUL 86 1200	1,571.52	1,571.81	1,568.66	1,569.00	1,569.23	1,568.25	16.	48.	69.
28 JUL 86 1200	1,571.53	1,571.81	1,568.65	1,569.02	1,569.23	1,568.24	25.	49.	67.
29 JUL 86 1200	1,571.52	1,571.81	1,568.64	1,569.02	1,569.23	1,568.24	26.	50.	65.
30 JUL 86 1200	1,571.51	1,571.80	1,568.63	1,569.02	1,569.23	1,568.23	37.	51.	64.
31 JUL 86 1200	1,571.49	1,571.80	1,568.63	1,568.99	1,569.24	1,568.23	29.	52.	62.
1 AUG 86 1200	1,571.48	1,571.79	1,568.61	1,568.99	1,569.23	1,568.22	23.	49.	59.

STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 MAR 86 1200 SSARR MODEL

DATE-HOUR	00007499 QUAPPELLE AT OUT FLOW CFS	00007700 CROOKED LAKE NR ELEVATION FEET-MSL	00007699 CROOKED LAKE NR ELEVATION FEET-MSL	00197699 CROOKED LAKE NR ELEVATION FEET-MSL	00297699 CROOKED LAKE NR ELEVATION FEET-MSL	00007800 ROUND LAKE NEAR ELEVATION FEET-MSL	00007799 ROUND LAKE NEAR ELEVATION FEET-MSL	00197799 OUND LAKE NEAR W ELEVATION FEET-MSL	00297799 ELEVATION FEET-MSL
1 MAR 86 1200	-42.	1,479.19	1,479.19	1,479.79	1,479.79	1,448.59	1,448.59	1,448.23	1,448.23
2 MAR 86 1200	49.	1,479.21	1,479.23	1,479.74	1,479.74	1,448.61	1,448.58	1,448.16	1,448.16
3 MAR 86 1200	72.	1,479.23	1,479.32	1,479.65	1,479.65	1,448.63	1,448.56	1,448.12	1,448.12
4 MAR 86 1200	37.	1,479.28	1,479.42	1,479.58	1,479.58	1,448.65	1,448.53	1,448.11	1,448.11
5 MAR 86 1200	4.	1,479.36	1,479.50	1,479.48	1,479.48	1,448.67	1,448.48	1,448.13	1,448.13
6 MAR 86 1200	-15.	1,479.44	1,479.57	1,479.34	1,479.34	1,448.69	1,448.41	1,448.18	1,448.18
7 MAR 86 1200	-14.	1,479.53	1,479.63	1,479.20	1,479.20	1,448.69	1,448.34	1,448.24	1,448.24
8 MAR 86 1200	-10.	1,479.64	1,479.69	1,479.11	1,479.11	1,448.72	1,448.27	1,448.28	1,448.28
9 MAR 86 1200	-13.	1,479.72	1,479.75	1,479.07	1,479.07	1,448.77	1,448.21	1,448.30	1,448.30
10 MAR 86 1200	-15.	1,479.78	1,479.79	1,479.07	1,479.07	1,448.81	1,448.15	1,448.29	1,448.29
11 MAR 86 1200	-17.	1,479.83	1,479.84	1,479.06	1,479.06	1,448.84	1,448.10	1,448.28	1,448.28
12 MAR 86 1200	-23.	1,479.85	1,479.89	1,479.07	1,479.07	1,448.90	1,448.06	1,448.26	1,448.26
13 MAR 86 1200	-31.	1,479.86	1,479.96	1,479.09	1,479.09	1,448.96	1,448.02	1,448.23	1,448.23
14 MAR 86 1200	-41.	1,479.84	1,480.04	1,479.17	1,479.17	1,449.02	1,447.97	1,448.21	1,448.21
15 MAR 86 1200	-35.	1,479.84	1,480.13	1,479.28	1,479.28	1,449.10	1,447.94	1,448.21	1,448.21
16 MAR 86 1200	-11.	1,479.88	1,480.22	1,479.41	1,479.41	1,449.19	1,447.96	1,448.21	1,448.21
17 MAR 86 1200	-17.	1,479.92	1,480.31	1,479.52	1,479.52	1,449.29	1,448.01	1,448.22	1,448.22
18 MAR 86 1200	-25.	1,479.98	1,480.37	1,479.62	1,479.62	1,449.39	1,448.04	1,448.24	1,448.24
19 MAR 86 1200	-45.	1,480.01	1,480.44	1,479.70	1,479.70	1,449.46	1,448.09	1,448.29	1,448.29
20 MAR 86 1200	-62.	1,480.07	1,480.49	1,479.77	1,479.77	1,449.53	1,448.15	1,448.36	1,448.36
21 MAR 86 1200	-80.	1,480.14	1,480.54	1,479.84	1,479.84	1,449.59	1,448.22	1,448.44	1,448.44
22 MAR 86 1200	-90.	1,480.22	1,480.58	1,479.90	1,479.90	1,449.69	1,448.31	1,448.53	1,448.53
23 MAR 86 1200	-106.	1,480.31	1,480.64	1,479.97	1,479.97	1,449.81	1,448.40	1,448.61	1,448.61
24 MAR 86 1200	-102.	1,480.40	1,480.72	1,480.06	1,480.06	1,449.91	1,448.49	1,448.69	1,448.69
25 MAR 86 1200	-93.	1,480.48	1,480.86	1,480.19	1,480.19	1,449.98	1,448.57	1,448.76	1,448.76
26 MAR 86 1200	-83.	1,480.53	1,481.03	1,480.36	1,480.36	1,450.02	1,448.64	1,448.82	1,448.82
27 MAR 86 1200	-75.	1,480.58	1,481.18	1,480.53	1,480.53	1,450.08	1,448.72	1,448.89	1,448.89
28 MAR 86 1200	-62.	1,480.75	1,481.29	1,480.67	1,480.67	1,450.06	1,448.83	1,448.97	1,448.97
29 MAR 86 1200	-50.	1,480.92	1,481.35	1,480.76	1,480.76	1,449.91	1,448.97	1,449.07	1,449.07
30 MAR 86 1200	-41.	1,481.08	1,481.38	1,480.82	1,480.82	1,449.74	1,449.12	1,449.18	1,449.18
31 MAR 86 1200	-32.	1,481.24	1,481.41	1,480.87	1,480.87	1,449.59	1,449.27	1,449.29	1,449.29
1 APR 86 1200	-27.	1,481.36	1,481.41	1,480.90	1,480.90	1,449.43	1,449.40	1,449.40	1,449.40
2 APR 86 1200	-24.	1,481.45	1,481.39	1,480.89	1,480.89	1,449.32	1,449.51	1,449.50	1,449.50
3 APR 86 1200	-19.	1,481.49	1,481.33	1,480.85	1,480.85	1,449.28	1,449.72	1,449.59	1,449.59
4 APR 86 1200	-16.	1,481.51	1,481.26	1,480.78	1,480.78	1,449.33	1,450.05	1,449.67	1,449.67
5 APR 86 1200	-13.	1,481.52	1,481.19	1,480.70	1,480.70	1,449.40	1,450.36	1,449.73	1,449.73
6 APR 86 1200	-9.	1,481.52	1,481.12	1,480.62	1,480.62	1,449.46	1,450.64	1,449.77	1,449.77
7 APR 86 1200	-7.	1,481.53	1,481.12	1,480.55	1,480.55	1,449.51	1,450.90	1,449.80	1,449.80
8 APR 86 1200	-4.	1,481.57	1,481.20	1,480.47	1,480.47	1,449.57	1,451.10	1,449.80	1,449.80
9 APR 86 1200	-4.	1,481.61	1,481.27	1,480.40	1,480.40	1,449.64	1,451.22	1,449.80	1,449.80
10 APR 86 1200	-1.	1,481.65	1,481.34	1,480.33	1,480.33	1,449.70	1,451.27	1,449.78	1,449.78
11 APR 86 1200	7.	1,481.69	1,481.40	1,480.26	1,480.26	1,449.76	1,451.30	1,449.74	1,449.74
12 APR 86 1200	6.	1,481.70	1,481.46	1,480.19	1,480.19	1,449.83	1,451.31	1,449.70	1,449.70
13 APR 86 1200	5.	1,481.72	1,481.51	1,480.13	1,480.13	1,449.89	1,451.32	1,449.65	1,449.65
14 APR 86 1200	12.	1,481.76	1,481.56	1,480.08	1,480.08	1,449.95	1,451.32	1,449.60	1,449.60
15 APR 86 1200	9.	1,481.77	1,481.60	1,480.03	1,480.03	1,450.02	1,451.33	1,449.54	1,449.54
16 APR 86 1200	9.	1,481.78	1,481.64	1,479.99	1,479.99	1,450.09	1,451.33	1,449.48	1,449.48
17 APR 86 1200	11.	1,481.80	1,481.67	1,479.95	1,479.95	1,450.17	1,451.33	1,449.42	1,449.42
18 APR 86 1200	12.	1,481.82	1,481.70	1,479.92	1,479.92	1,450.23	1,451.34	1,449.35	1,449.35

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STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 MAR 86 1200 SSARR MODEL

DATE-HOUR	00007499 QUAPPELLE AT OUT FLOW CFS	00007700 CROOKED LAKE NR ELEVATION FEET-MSL	00007699 CROOKED LAKE NR ELEVATION FEET-MSL	00197699 CROOKED LAKE NR ELEVATION FEET-MSL	00297699 CROOKED LAKE NR ELEVATION FEET-MSL	00007800 ROUND LAKE NEAR ELEVATION FEET-MSL	00007799 ROUND LAKE NEAR ELEVATION FEET-MSL	00197799 OUND LAKE NEAR W ELEVATION FEET-MSL	00297799 ELEVATION FEET-MSL
19 APR 86 1200	13.	1,481.83	1,481.73	1,479.89	1,479.89	1,450.27	1,451.36	1,449.29	1,449.29
20 APR 86 1200	10.	1,481.82	1,481.76	1,479.86	1,479.86	1,450.34	1,451.38	1,449.24	1,449.24
21 APR 86 1200	8.	1,481.81	1,481.78	1,479.84	1,479.84	1,450.41	1,451.40	1,449.18	1,449.18
22 APR 86 1200	9.	1,481.83	1,481.79	1,479.82	1,479.82	1,450.47	1,451.43	1,449.12	1,449.12
23 APR 86 1200	15.	1,481.87	1,481.81	1,479.80	1,479.80	1,450.54	1,451.45	1,449.06	1,449.06
24 APR 86 1200	16.	1,481.87	1,481.82	1,479.78	1,479.78	1,450.63	1,451.48	1,449.01	1,449.01
25 APR 86 1200	16.	1,481.85	1,481.84	1,479.77	1,479.77	1,450.71	1,451.51	1,448.96	1,448.96
26 APR 86 1200	17.	1,481.84	1,481.85	1,479.76	1,479.76	1,450.77	1,451.54	1,448.92	1,448.92
27 APR 86 1200	18.	1,481.85	1,481.86	1,479.76	1,479.76	1,450.84	1,451.57	1,448.88	1,448.88
28 APR 86 1200	19.	1,481.86	1,481.87	1,479.75	1,479.75	1,450.91	1,451.60	1,448.84	1,448.84
29 APR 86 1200	19.	1,481.86	1,481.88	1,479.75	1,479.75	1,450.96	1,451.63	1,448.81	1,448.81
30 APR 86 1200	22.	1,481.86	1,481.89	1,479.75	1,479.75	1,450.99	1,451.66	1,448.79	1,448.79
1 MAY 86 1200	20.	1,481.86	1,481.89	1,479.74	1,479.74	1,451.04	1,451.68	1,448.76	1,448.76
2 MAY 86 1200	19.	1,481.85	1,481.89	1,479.73	1,479.73	1,451.06	1,451.70	1,448.73	1,448.73
3 MAY 86 1200	22.	1,481.84	1,481.89	1,479.73	1,479.73	1,451.10	1,451.71	1,448.71	1,448.71
4 MAY 86 1200	26.	1,481.85	1,481.88	1,479.72	1,479.72	1,451.13	1,451.73	1,448.69	1,448.69
5 MAY 86 1200	36.	1,481.89	1,481.88	1,479.72	1,479.72	1,451.19	1,451.75	1,448.67	1,448.67
6 MAY 86 1200	62.	1,481.99	1,481.88	1,479.72	1,479.72	1,451.31	1,451.76	1,448.66	1,448.66
7 MAY 86 1200	13.	1,481.99	1,481.89	1,479.74	1,479.74	1,451.37	1,451.78	1,448.65	1,448.65
8 MAY 86 1200	11.	1,482.00	1,481.90	1,479.79	1,479.79	1,451.39	1,451.79	1,448.64	1,448.64
9 MAY 86 1200	19.	1,482.10	1,481.95	1,479.88	1,479.88	1,451.41	1,451.81	1,448.63	1,448.63
10 MAY 86 1200	22.	1,482.16	1,482.03	1,479.97	1,479.97	1,451.46	1,451.83	1,448.64	1,448.64
11 MAY 86 1200	-1.	1,482.19	1,482.11	1,480.04	1,480.04	1,451.48	1,451.85	1,448.65	1,448.65
12 MAY 86 1200	5.	1,482.25	1,482.18	1,480.11	1,480.11	1,451.51	1,451.88	1,448.67	1,448.67
13 MAY 86 1200	-6.	1,482.27	1,482.26	1,480.19	1,480.19	1,451.54	1,451.91	1,448.71	1,448.71
14 MAY 86 1200	-8.	1,482.27	1,482.34	1,480.26	1,480.26	1,451.58	1,451.95	1,448.75	1,448.75
15 MAY 86 1200	-15.	1,482.28	1,482.40	1,480.31	1,480.31	1,451.59	1,451.99	1,448.80	1,448.80
16 MAY 86 1200	-10.	1,482.26	1,482.45	1,480.35	1,480.35	1,451.59	1,452.03	1,448.84	1,448.84
17 MAY 86 1200	-38.	1,482.22	1,482.48	1,480.38	1,480.38	1,451.61	1,452.08	1,448.89	1,448.89
18 MAY 86 1200	-50.	1,482.20	1,482.49	1,480.41	1,480.41	1,451.60	1,452.14	1,448.94	1,448.94
19 MAY 86 1200	-59.	1,482.18	1,482.50	1,480.43	1,480.43	1,451.59	1,452.19	1,448.98	1,448.98
20 MAY 86 1200	-68.	1,482.16	1,482.51	1,480.45	1,480.45	1,451.57	1,452.25	1,449.02	1,449.02
21 MAY 86 1200	-82.	1,482.11	1,482.50	1,480.45	1,480.45	1,451.53	1,452.31	1,449.06	1,449.06
22 MAY 86 1200	-94.	1,482.07	1,482.49	1,480.45	1,480.45	1,451.55	1,452.36	1,449.10	1,449.10

23 MAY 86 1200	-95.	1,482.06	1,482.47	1,480.44	1,480.44	1,451.60	1,452.41	1,449.13	1,449.13
24 MAY 86 1200	-100.	1,482.03	1,482.45	1,480.42	1,480.42	1,451.54	1,452.46	1,449.16	1,449.16
25 MAY 86 1200	-103.	1,481.99	1,482.43	1,480.40	1,480.40	1,451.50	1,452.51	1,449.19	1,449.19
26 MAY 86 1200	-107.	1,481.96	1,482.41	1,480.37	1,480.37	1,451.46	1,452.56	1,449.20	1,449.20
27 MAY 86 1200	-114.	1,481.93	1,482.38	1,480.33	1,480.33	1,451.44	1,452.59	1,449.22	1,449.22
28 MAY 86 1200	-116.	1,481.91	1,482.36	1,480.30	1,480.30	1,451.41	1,452.63	1,449.22	1,449.22
29 MAY 86 1200	-117.	1,481.90	1,482.34	1,480.26	1,480.26	1,451.39	1,452.66	1,449.22	1,449.22
30 MAY 86 1200	-118.	1,481.88	1,482.32	1,480.21	1,480.21	1,451.37	1,452.70	1,449.22	1,449.22
31 MAY 86 1200	-108.	1,481.87	1,482.32	1,480.17	1,480.17	1,451.36	1,452.74	1,449.20	1,449.20
1 JUN 86 1200	-119.	1,481.84	1,482.32	1,480.12	1,480.12	1,451.33	1,452.76	1,449.18	1,449.18
2 JUN 86 1200	-117.	1,481.85	1,482.31	1,480.07	1,480.07	1,451.35	1,452.77	1,449.16	1,449.16
3 JUN 86 1200	-108.	1,481.85	1,482.30	1,480.03	1,480.03	1,451.34	1,452.77	1,449.13	1,449.13
4 JUN 86 1200	-120.	1,481.83	1,482.29	1,479.98	1,479.98	1,451.32	1,452.77	1,449.10	1,449.10
5 JUN 86 1200	-117.	1,481.83	1,482.28	1,479.94	1,479.94	1,451.31	1,452.76	1,449.06	1,449.06
6 JUN 86 1200	-104.	1,481.86	1,482.28	1,479.89	1,479.89	1,451.32	1,452.76	1,449.02	1,449.02

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STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR
1 MAR 86 1200

SSARR MODEL

DATE-HOUR	00007499 QUAPPELLE AT OUT FLOW CFS	00007700 CROOKED LAKE NR ELEVATION FEET-MSL	00007699 CROOKED LAKE NR ELEVATION FEET-MSL	00197699 CROOKED LAKE NR ELEVATION FEET-MSL	00297699 CROOKED LAKE NR ELEVATION FEET-MSL	00007800 ROUND LAKE NEAR ELEVATION FEET-MSL	00007799 ROUND LAKE NEAR ELEVATION FEET-MSL	00197799 OUND LAKE NEAR W ELEVATION FEET-MSL	00297799 ELEVATION FEET-MSL
7 JUN 86 1200	-104.	1,481.87	1,482.26	1,479.85	1,479.85	1,451.31	1,452.75	1,448.97	1,448.97
8 JUN 86 1200	-110.	1,481.85	1,482.25	1,479.81	1,479.81	1,451.29	1,452.75	1,448.93	1,448.93
9 JUN 86 1200	-94.	1,481.88	1,482.24	1,479.78	1,479.78	1,451.30	1,452.74	1,448.89	1,448.89
10 JUN 86 1200	-82.	1,481.88	1,482.23	1,479.74	1,479.74	1,451.30	1,452.73	1,448.85	1,448.85
11 JUN 86 1200	-80.	1,481.90	1,482.22	1,479.71	1,479.71	1,451.31	1,452.72	1,448.81	1,448.81
12 JUN 86 1200	-60.	1,481.89	1,482.21	1,479.68	1,479.68	1,451.30	1,452.71	1,448.77	1,448.77
13 JUN 86 1200	-84.	1,481.87	1,482.19	1,479.65	1,479.65	1,451.27	1,452.70	1,448.73	1,448.73
14 JUN 86 1200	-90.	1,481.86	1,482.18	1,479.63	1,479.63	1,451.26	1,452.69	1,448.70	1,448.70
15 JUN 86 1200	-82.	1,481.87	1,482.17	1,479.61	1,479.61	1,451.27	1,452.67	1,448.67	1,448.67
16 JUN 86 1200	-80.	1,481.88	1,482.16	1,479.59	1,479.59	1,451.27	1,452.65	1,448.64	1,448.64
17 JUN 86 1200	-79.	1,481.88	1,482.15	1,479.58	1,479.58	1,451.28	1,452.64	1,448.61	1,448.61
18 JUN 86 1200	-74.	1,481.91	1,482.15	1,479.57	1,479.57	1,451.29	1,452.62	1,448.58	1,448.58
19 JUN 86 1200	-58.	1,481.91	1,482.14	1,479.56	1,479.56	1,451.31	1,452.60	1,448.56	1,448.56
20 JUN 86 1200	-52.	1,481.91	1,482.13	1,479.55	1,479.55	1,451.31	1,452.58	1,448.53	1,448.53
21 JUN 86 1200	-42.	1,481.91	1,482.13	1,479.54	1,479.54	1,451.31	1,452.56	1,448.51	1,448.51
22 JUN 86 1200	-38.	1,481.90	1,482.12	1,479.53	1,479.53	1,451.30	1,452.54	1,448.49	1,448.49
23 JUN 86 1200	-46.	1,481.88	1,482.11	1,479.51	1,479.52	1,451.27	1,452.52	1,448.48	1,448.48
24 JUN 86 1200	-46.	1,481.87	1,482.10	1,479.50	1,479.50	1,451.26	1,452.50	1,448.46	1,448.46
25 JUN 86 1200	-34.	1,481.87	1,482.09	1,479.49	1,479.49	1,451.26	1,452.48	1,448.45	1,448.45
26 JUN 86 1200	-26.	1,481.96	1,482.08	1,479.48	1,479.48	1,451.28	1,452.46	1,448.43	1,448.43
27 JUN 86 1200	-28.	1,481.95	1,482.07	1,479.48	1,479.48	1,451.28	1,452.44	1,448.42	1,448.42
28 JUN 86 1200	-26.	1,481.94	1,482.07	1,479.47	1,479.47	1,451.27	1,452.42	1,448.41	1,448.41
29 JUN 86 1200	-30.	1,481.91	1,482.06	1,479.47	1,479.47	1,451.25	1,452.40	1,448.40	1,448.40
30 JUN 86 1200	-27.	1,481.90	1,482.06	1,479.46	1,479.46	1,451.23	1,452.38	1,448.39	1,448.39
1 JUL 86 1200	-20.	1,481.91	1,482.05	1,479.45	1,479.45	1,451.25	1,452.36	1,448.38	1,448.38
2 JUL 86 1200	-25.	1,481.89	1,482.05	1,479.44	1,479.44	1,451.25	1,452.34	1,448.38	1,448.38
3 JUL 86 1200	-17.	1,481.87	1,482.04	1,479.44	1,479.44	1,451.24	1,452.32	1,448.37	1,448.37
4 JUL 86 1200	-27.	1,481.84	1,482.04	1,479.43	1,479.43	1,451.23	1,452.31	1,448.37	1,448.37
5 JUL 86 1200	2.	1,481.91	1,482.03	1,479.43	1,479.43	1,451.33	1,452.29	1,448.36	1,448.36
6 JUL 86 1200	2.	1,481.88	1,482.02	1,479.43	1,479.43	1,451.35	1,452.28	1,448.36	1,448.36
7 JUL 86 1200	-10.	1,481.84	1,482.01	1,479.42	1,479.42	1,451.36	1,452.26	1,448.35	1,448.35
8 JUL 86 1200	-9.	1,481.81	1,482.00	1,479.42	1,479.42	1,451.37	1,452.25	1,448.35	1,448.35
9 JUL 86 1200	-10.	1,481.80	1,482.00	1,479.42	1,479.42	1,451.37	1,452.24	1,448.34	1,448.34
10 JUL 86 1200	-6.	1,481.80	1,481.99	1,479.42	1,479.42	1,451.38	1,452.23	1,448.34	1,448.34
11 JUL 86 1200	4.	1,481.81	1,481.98	1,479.42	1,479.42	1,451.40	1,452.22	1,448.33	1,448.33
12 JUL 86 1200	18.	1,481.81	1,481.98	1,479.43	1,479.43	1,451.41	1,452.21	1,448.33	1,448.33
13 JUL 86 1200	19.	1,481.84	1,481.98	1,479.44	1,479.44	1,451.41	1,452.20	1,448.33	1,448.33
14 JUL 86 1200	24.	1,481.91	1,481.97	1,479.44	1,479.44	1,451.42	1,452.20	1,448.33	1,448.33
15 JUL 86 1200	13.	1,481.91	1,481.97	1,479.44	1,479.44	1,451.42	1,452.20	1,448.33	1,448.33
16 JUL 86 1200	8.	1,481.89	1,481.96	1,479.45	1,479.45	1,451.42	1,452.19	1,448.33	1,448.33
17 JUL 86 1200	20.	1,481.89	1,481.96	1,479.45	1,479.45	1,451.41	1,452.19	1,448.33	1,448.33
18 JUL 86 1200	26.	1,481.88	1,481.95	1,479.46	1,479.46	1,451.39	1,452.18	1,448.33	1,448.33
19 JUL 86 1200	23.	1,481.85	1,481.95	1,479.47	1,479.47	1,451.35	1,452.17	1,448.33	1,448.33
20 JUL 86 1200	1.	1,481.84	1,481.95	1,479.48	1,479.48	1,451.33	1,452.16	1,448.34	1,448.34
21 JUL 86 1200	-3.	1,481.84	1,481.95	1,479.49	1,479.49	1,451.31	1,452.14	1,448.34	1,448.34
22 JUL 86 1200	-14.	1,481.83	1,481.94	1,479.49	1,479.49	1,451.30	1,452.13	1,448.34	1,448.34
23 JUL 86 1200	-11.	1,481.84	1,481.94	1,479.49	1,479.49	1,451.31	1,452.12	1,448.35	1,448.35
24 JUL 86 1200	-15.	1,481.83	1,481.94	1,479.48	1,479.48	1,451.29	1,452.11	1,448.35	1,448.35
25 JUL 86 1200	-28.	1,481.81	1,481.93	1,479.48	1,479.48	1,451.28	1,452.11	1,448.35	1,448.35

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STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR
1 MAR 86 1200

SSARR MODEL

DATE-HOUR	00007499 QUAPPELLE AT OUT FLOW CFS	00007700 CROOKED LAKE NR ELEVATION FEET-MSL	00007699 CROOKED LAKE NR ELEVATION FEET-MSL	00197699 CROOKED LAKE NR ELEVATION FEET-MSL	00297699 CROOKED LAKE NR ELEVATION FEET-MSL	00007800 ROUND LAKE NEAR ELEVATION FEET-MSL	00007799 ROUND LAKE NEAR ELEVATION FEET-MSL	00197799 OUND LAKE NEAR W ELEVATION FEET-MSL	00297799 ELEVATION FEET-MSL
26 JUL 86 1200	-29.	1,481.82	1,481.93	1,479.47	1,479.47	1,451.29	1,452.10	1,448.36	1,448.36
27 JUL 86 1200	-32.	1,481.82	1,481.91	1,479.45	1,479.45	1,451.30	1,452.10	1,448.36	1,448.36
28 JUL 86 1200	-24.	1,481.86	1,481.90	1,479.43	1,479.43	1,451.33	1,452.09	1,448.36	1,448.36
29 JUL 86 1200	-24.	1,481.85	1,481.88	1,479.41	1,479.41	1,451.32	1,452.09	1,448.36	1,448.36
30 JUL 86 1200	-14.	1,481.85	1,481.86	1,479.40	1,479.40	1,451.28	1,452.09	1,448.36	1,448.36
31 JUL 86 1200	-23.	1,481.82	1,481.85	1,479.38	1,479.38	1,451.26	1,452.09	1,448.35	1,448.35
1 AUG 86 1200	-26.	1,481.79	1,481.82	1,479.36	1,479.36	1,451.24	1,452.08	1,448.34	1,448.34

RUN DATE RUN NO. INITIAL DATE, HOUR
1 MAR 86 1200

DATE-HOUR	00008000 QUAPPELLE RIVER FLOW CFS	00007984 QU'APPELLE R. NE FLOW CFS	00097999 QUAPPELLE RIVER FLOW CFS	00007999 QUAPPELLE RIVER FLOW CFS
1 MAR 86 1200	149.	143.	69.	5.
2 MAR 86 1200	152.	143.	72.	8.
3 MAR 86 1200	157.	144.	168.	12.
4 MAR 86 1200	157.	162.	159.	-5.
5 MAR 86 1200	155.	237.	129.	-82.
6 MAR 86 1200	154.	348.	120.	-194.
7 MAR 86 1200	160.	421.	145.	-261.
8 MAR 86 1200	174.	445.	168.	-271.
9 MAR 86 1200	179.	451.	172.	-272.
10 MAR 86 1200	177.	450.	171.	-273.
11 MAR 86 1200	176.	448.	177.	-272.
12 MAR 86 1200	172.	447.	185.	-275.
13 MAR 86 1200	173.	445.	200.	-272.
14 MAR 86 1200	178.	445.	218.	-267.
15 MAR 86 1200	185.	444.	234.	-259.
16 MAR 86 1200	238.	444.	291.	-206.
17 MAR 86 1200	456.	446.	509.	9.
18 MAR 86 1200	600.	455.	652.	145.
19 MAR 86 1200	699.	454.	749.	245.
20 MAR 86 1200	812.	455.	861.	357.
21 MAR 86 1200	826.	466.	873.	360.
22 MAR 86 1200	844.	585.	890.	259.
23 MAR 86 1200	911.	576.	954.	335.
24 MAR 86 1200	1,040.	684.	1,090.	354.
25 MAR 86 1200	1,010.	777.	989.	237.
26 MAR 86 1200	964.	797.	949.	167.
27 MAR 86 1200	985.	799.	974.	186.
28 MAR 86 1200	982.	798.	979.	184.
29 MAR 86 1200	1,040.	794.	1,050.	244.
30 MAR 86 1200	1,150.	788.	1,170.	363.
31 MAR 86 1200	1,390.	793.	1,420.	595.
1 APR 86 1200	1,100.	844.	1,140.	254.
2 APR 86 1200	798.	861.	845.	-63.
3 APR 86 1200	657.	833.	694.	-176.
4 APR 86 1200	569.	758.	597.	-189.
5 APR 86 1200	463.	664.	504.	-201.
6 APR 86 1200	327.	553.	416.	-226.
7 APR 86 1200	268.	438.	426.	-170.
8 APR 86 1200	233.	340.	458.	-107.
9 APR 86 1200	210.	267.	486.	-57.
10 APR 86 1200	187.	219.	496.	-31.
11 APR 86 1200	173.	183.	501.	-10.
12 APR 86 1200	162.	156.	502.	5.
13 APR 86 1200	152.	134.	497.	17.
14 APR 86 1200	143.	119.	487.	24.
15 APR 86 1200	132.	106.	472.	25.
16 APR 86 1200	124.	94.	460.	29.
17 APR 86 1200	122.	86.	453.	35.
18 APR 86 1200	118.	79.	443.	38.

1 STREAMFLOW ROUTING

SSARR MODEL

RUN DATE RUN NO. INITIAL DATE, HOUR
1 MAR 86 1200

DATE-HOUR	00008000 QUAPPELLE RIVER FLOW CFS	00007984 QU'APPELLE R. NE FLOW CFS	00097999 QUAPPELLE RIVER FLOW CFS	00007999 QUAPPELLE RIVER FLOW CFS
19 APR 86 1200	113.	77.	430.	35.
20 APR 86 1200	110.	74.	418.	35.
21 APR 86 1200	108.	71.	407.	36.
22 APR 86 1200	104.	67.	392.	36.
23 APR 86 1200	102.	67.	377.	34.
24 APR 86 1200	100.	72.	363.	27.
25 APR 86 1200	97.	67.	353.	30.
26 APR 86 1200	95.	60.	349.	34.
27 APR 86 1200	94.	62.	342.	31.
28 APR 86 1200	91.	66.	327.	24.
29 APR 86 1200	93.	68.	318.	24.
30 APR 86 1200	97.	68.	313.	28.
1 MAY 86 1200	101.	72.	309.	29.
2 MAY 86 1200	98.	76.	296.	21.
3 MAY 86 1200	99.	77.	286.	21.
4 MAY 86 1200	102.	83.	364.	18.
5 MAY 86 1200	112.	104.	386.	7.
6 MAY 86 1200	156.	172.	474.	-16.
7 MAY 86 1200	250.	268.	582.	-17.
8 MAY 86 1200	338.	373.	630.	-35.
9 MAY 86 1200	340.	431.	595.	-91.
10 MAY 86 1200	347.	441.	586.	-93.
11 MAY 86 1200	351.	441.	585.	-90.
12 MAY 86 1200	353.	430.	498.	-77.
13 MAY 86 1200	343.	390.	468.	-46.
14 MAY 86 1200	360.	300.	462.	59.
15 MAY 86 1200	351.	223.	445.	128.
16 MAY 86 1200	345.	171.	446.	174.
17 MAY 86 1200	346.	146.	458.	200.
18 MAY 86 1200	353.	129.	477.	224.
19 MAY 86 1200	341.	120.	475.	221.
20 MAY 86 1200	333.	116.	476.	217.
21 MAY 86 1200	326.	110.	478.	216.
22 MAY 86 1200	314.	103.	477.	211.

23 MAY 86 1200	291.	96.	466.	195.
24 MAY 86 1200	264.	93.	447.	170.
25 MAY 86 1200	260.	92.	449.	168.
26 MAY 86 1200	274.	88.	470.	185.
27 MAY 86 1200	262.	86.	464.	176.
28 MAY 86 1200	242.	86.	449.	156.
29 MAY 86 1200	216.	87.	425.	129.
30 MAY 86 1200	200.	87.	410.	113.
31 MAY 86 1200	181.	87.	392.	93.
1 JUN 86 1200	164.	88.	375.	75.
2 JUN 86 1200	144.	87.	355.	56.
3 JUN 86 1200	132.	88.	343.	43.
4 JUN 86 1200	124.	85.	335.	38.
5 JUN 86 1200	120.	82.	332.	37.
6 JUN 86 1200	114.	80.	328.	34.

1 STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 MAR 86 1200 SSARR MODEL

DATE-HOUR	00008000 QUAPPELLE RIVER FLOW CFS	00007984 QU'APPELLE R. NE FLOW CFS	00097999 QUAPPELLE RIVER FLOW CFS	00007999 QUAPPELLE RIVER FLOW CFS
7 JUN 86 1200	107.	76.	320.	30.
8 JUN 86 1200	93.	73.	305.	19.
9 JUN 86 1200	81.	74.	289.	6.
10 JUN 86 1200	79.	75.	282.	3.
11 JUN 86 1200	73.	73.	270.	-1.
12 JUN 86 1200	68.	70.	257.	-2.
13 JUN 86 1200	64.	69.	243.	-5.
14 JUN 86 1200	62.	69.	228.	-7.
15 JUN 86 1200	64.	66.	218.	-2.
16 JUN 86 1200	63.	63.	208.	-1.
17 JUN 86 1200	60.	61.	198.	-1.
18 JUN 86 1200	58.	57.	191.	1.
19 JUN 86 1200	56.	56.	183.	-0.
20 JUN 86 1200	62.	56.	182.	5.
21 JUN 86 1200	62.	57.	175.	4.
22 JUN 86 1200	63.	58.	169.	4.
23 JUN 86 1200	61.	57.	161.	3.
24 JUN 86 1200	58.	56.	153.	1.
25 JUN 86 1200	55.	56.	145.	-1.
26 JUN 86 1200	56.	58.	140.	-1.
27 JUN 86 1200	54.	58.	133.	-4.
28 JUN 86 1200	49.	60.	125.	-11.
29 JUN 86 1200	48.	55.	121.	-7.
30 JUN 86 1200	47.	55.	118.	-8.
1 JUL 86 1200	47.	55.	116.	-8.
2 JUL 86 1200	45.	55.	110.	-10.
3 JUL 86 1200	44.	54.	105.	-10.
4 JUL 86 1200	47.	52.	105.	-5.
5 JUL 86 1200	54.	54.	111.	-0.
6 JUL 86 1200	60.	61.	116.	-1.
7 JUL 86 1200	61.	61.	118.	0.
8 JUL 86 1200	70.	56.	129.	13.
9 JUL 86 1200	67.	57.	129.	9.
10 JUL 86 1200	62.	62.	122.	-1.
11 JUL 86 1200	60.	66.	116.	-6.
12 JUL 86 1200	60.	67.	110.	-7.
13 JUL 86 1200	60.	61.	108.	-1.
14 JUL 86 1200	75.	63.	123.	12.
15 JUL 86 1200	75.	64.	126.	10.
16 JUL 86 1200	85.	63.	138.	21.
17 JUL 86 1200	84.	65.	139.	18.
18 JUL 86 1200	73.	68.	129.	4.
19 JUL 86 1200	69.	71.	123.	-2.
20 JUL 86 1200	78.	72.	129.	5.
21 JUL 86 1200	88.	71.	136.	17.
22 JUL 86 1200	90.	67.	136.	22.
23 JUL 86 1200	86.	61.	131.	24.
24 JUL 86 1200	83.	58.	126.	24.
25 JUL 86 1200	81.	58.	122.	22.

1 STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 MAR 86 1200 SSARR MODEL

DATE-HOUR	00008000 QUAPPELLE RIVER FLOW CFS	00007984 QU'APPELLE R. NE FLOW CFS	00097999 QUAPPELLE RIVER FLOW CFS	00007999 QUAPPELLE RIVER FLOW CFS
26 JUL 86 1200	92.	58.	130.	33.
27 JUL 86 1200	99.	60.	134.	38.
28 JUL 86 1200	108.	59.	141.	49.
29 JUL 86 1200	118.	59.	151.	58.
30 JUL 86 1200	104.	58.	138.	45.
31 JUL 86 1200	104.	57.	139.	46.
1 AUG 86 1200	97.	58.	133.	38.

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STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR
1 MAR 86 1200

SSARR MODEL

DATE-HOUR	S1000 CUM. DIEF RELEAS STORAGE ACRE-FEET	S4000 Q.R.BELOW M.J.R. STORAGE ACRE-FEET	S94000 Q.R. BELOW M.J.R STORAGE ACRE-FEET	S95999 CUM. QU'A R BELO STORAGE ACRE-FEET	S6000 CUM. QU'A R BELO STORAGE ACRE-FEET	S7500 CUM. HWY #56 RE STORAGE ACRE-FEET	S7400 CUM. HWY #56 SI STORAGE ACRE-FEET	S7499 CUM. QU'A R BELO STORAGE ACRE-FEET	S97500 STORAGE ACRE-FEET
1 MAR 86 1200	3.	3.	3.	3.	3.	-27.	-0.	3.	0.
2 MAR 86 1200	99.	549.	268.	-64.	320.	268.	215.	10.	0.
3 MAR 86 1200	202.	1,146.	858.	-93.	681.	622.	429.	135.	429.
4 MAR 86 1200	298.	1,714.	1,559.	54.	1,080.	1,035.	858.	246.	644.
5 MAR 86 1200	386.	2,171.	2,252.	342.	1,507.	1,389.	1,073.	283.	858.
6 MAR 86 1200	490.	2,466.	2,828.	726.	1,898.	1,743.	1,502.	276.	1,287.
7 MAR 86 1200	585.	2,710.	3,315.	1,109.	2,252.	2,097.	1,931.	246.	1,502.
8 MAR 86 1200	674.	2,997.	3,816.	1,471.	2,584.	2,452.	2,146.	231.	1,931.
9 MAR 86 1200	770.	3,315.	4,414.	1,810.	2,931.	2,747.	2,575.	202.	2,146.
10 MAR 86 1200	866.	3,728.	5,136.	2,186.	3,211.	3,101.	3,004.	180.	2,575.
11 MAR 86 1200	954.	4,214.	5,955.	2,577.	3,337.	3,396.	3,219.	143.	2,789.
12 MAR 86 1200	1,050.	4,768.	6,811.	3,012.	3,366.	3,691.	3,648.	106.	3,219.
13 MAR 86 1200	1,146.	5,372.	7,689.	3,492.	3,396.	3,986.	3,862.	54.	3,433.
14 MAR 86 1200	1,234.	5,999.	8,574.	3,986.	3,425.	4,281.	4,292.	-19.	3,648.
15 MAR 86 1200	1,330.	6,590.	9,451.	4,480.	3,455.	4,576.	4,721.	-93.	4,077.
16 MAR 86 1200	1,434.	7,135.	10,322.	5,004.	3,484.	4,989.	5,150.	-130.	4,292.
17 MAR 86 1200	1,530.	7,607.	11,148.	5,557.	3,528.	5,402.	5,579.	-160.	4,721.
18 MAR 86 1200	1,618.	7,991.	11,908.	6,132.	3,565.	5,815.	6,008.	-204.	5,150.
19 MAR 86 1200	1,721.	8,360.	12,638.	6,722.	3,602.	6,228.	6,437.	-270.	5,364.
20 MAR 86 1200	1,817.	8,706.	13,331.	7,327.	3,632.	6,641.	7,081.	-373.	5,794.
21 MAR 86 1200	1,913.	9,038.	14,002.	7,925.	3,669.	7,054.	7,510.	-514.	6,223.
22 MAR 86 1200	2,016.	9,363.	14,637.	8,529.	3,705.	7,408.	8,154.	-683.	6,652.
23 MAR 86 1200	2,112.	9,606.	15,249.	9,127.	3,742.	7,703.	8,583.	-875.	7,081.
24 MAR 86 1200	2,208.	9,857.	15,869.	9,717.	3,779.	7,998.	9,012.	-1,074.	7,296.
25 MAR 86 1200	2,311.	10,145.	16,518.	10,278.	3,831.	8,293.	9,656.	-1,281.	7,725.
26 MAR 86 1200	2,415.	10,410.	17,108.	10,809.	3,860.	8,529.	9,871.	-1,450.	8,154.
27 MAR 86 1200	2,511.	10,713.	17,543.	11,273.	3,897.	8,765.	10,300.	-1,605.	8,368.
28 MAR 86 1200	2,614.	11,030.	17,860.	11,701.	3,927.	8,942.	10,729.	-1,738.	8,798.
29 MAR 86 1200	2,717.	11,325.	18,111.	12,092.	3,956.	9,179.	10,943.	-1,849.	9,012.
30 MAR 86 1200	2,820.	11,598.	18,325.	12,453.	3,986.	9,356.	11,373.	-1,937.	9,441.
31 MAR 86 1200	2,931.	11,856.	18,502.	12,785.	4,015.	9,533.	11,587.	-2,011.	9,656.
1 APR 86 1200	3,027.	12,099.	18,672.	13,095.	4,030.	9,710.	11,802.	-2,070.	9,871.
2 APR 86 1200	3,130.	12,335.	18,819.	13,368.	4,052.	9,887.	12,016.	-2,114.	10,085.
3 APR 86 1200	3,241.	12,549.	18,967.	13,619.	4,067.	10,064.	12,231.	-2,159.	10,300.
4 APR 86 1200	3,344.	12,778.	19,114.	13,855.	4,089.	10,182.	12,445.	-2,195.	10,514.
5 APR 86 1200	3,447.	13,014.	19,269.	14,084.	4,111.	10,359.	12,660.	-2,225.	10,729.
6 APR 86 1200	3,558.	13,257.	19,417.	14,275.	4,126.	10,477.	12,660.	-2,240.	10,943.
7 APR 86 1200	3,661.	13,523.	19,579.	14,438.	4,148.	10,595.	12,875.	-2,262.	11,158.
8 APR 86 1200	3,764.	13,789.	19,741.	14,585.	4,155.	10,713.	13,089.	-2,269.	11,373.
9 APR 86 1200	3,875.	14,032.	19,925.	14,725.	4,163.	10,831.	13,089.	-2,277.	11,587.
10 APR 86 1200	3,978.	14,275.	20,095.	14,858.	4,178.	10,949.	13,304.	-2,277.	11,802.
11 APR 86 1200	4,082.	14,489.	20,235.	14,976.	4,178.	11,067.	13,304.	-2,269.	12,016.
12 APR 86 1200	4,200.	14,666.	20,339.	15,094.	4,185.	11,185.	13,518.	-2,247.	12,231.
13 APR 86 1200	4,303.	14,821.	20,405.	15,293.	4,185.	11,303.	13,518.	-2,240.	12,445.
14 APR 86 1200	4,414.	14,947.	20,479.	15,529.	4,192.	11,421.	13,733.	-2,225.	12,660.
15 APR 86 1200	4,517.	15,094.	20,552.	15,728.	4,200.	11,539.	13,733.	-2,203.	12,875.
16 APR 86 1200	4,620.	15,249.	20,656.	15,898.	4,237.	11,598.	13,733.	-2,173.	13,089.
17 APR 86 1200	4,731.	15,441.	20,788.	16,083.	4,377.	11,716.	13,947.	-2,159.	13,304.
18 APR 86 1200	4,834.	15,662.	20,943.	16,252.	4,583.	11,834.	13,947.	-2,129.	13,733.

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STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR
1 MAR 86 1200

SSARR MODEL

DATE-HOUR	S1000 CUM. DIEF RELEAS STORAGE ACRE-FEET	S4000 Q.R.BELOW M.J.R. STORAGE ACRE-FEET	S94000 Q.R. BELOW M.J.R STORAGE ACRE-FEET	S95999 CUM. QU'A R BELO STORAGE ACRE-FEET	S6000 CUM. QU'A R BELO STORAGE ACRE-FEET	S7500 CUM. HWY #56 RE STORAGE ACRE-FEET	S7400 CUM. HWY #56 SI STORAGE ACRE-FEET	S7499 CUM. QU'A R BELO STORAGE ACRE-FEET	S97500 STORAGE ACRE-FEET
19 APR 86 1200	4,937.	15,861.	21,084.	16,444.	4,805.	11,952.	13,947.	-2,099.	13,947.
20 APR 86 1200	5,055.	16,053.	21,194.	16,636.	5,026.	12,070.	14,162.	-2,077.	14,162.
21 APR 86 1200	5,159.	16,223.	21,283.	16,820.	5,240.	12,129.	14,162.	-2,048.	14,377.
22 APR 86 1200	5,262.	16,363.	21,349.	16,982.	5,454.	12,247.	14,377.	-2,033.	14,591.
23 APR 86 1200	5,372.	16,510.	21,408.	17,145.	5,668.	12,306.	14,377.	-2,011.	15,020.
24 APR 86 1200	5,476.	16,643.	21,452.	17,307.	5,867.	12,424.	14,377.	-1,974.	15,235.
25 APR 86 1200	5,608.	16,776.	21,504.	17,462.	6,058.	12,542.	14,377.	-1,945.	15,450.
26 APR 86 1200	5,808.	16,909.	21,548.	17,602.	6,191.	12,660.	14,591.	-1,908.	15,664.
27 APR 86 1200	6,036.	17,027.	21,585.	17,735.	6,309.	12,778.	14,591.	-1,871.	16,093.
28 APR 86 1200	6,302.	17,159.	21,637.	17,875.	6,442.	12,837.	14,591.	-1,834.	16,308.
29 APR 86 1200	6,656.	17,277.	21,674.	18,008.	6,634.	12,955.	14,806.	-1,790.	16,522.
30 APR 86 1200	7,113.	17,410.	21,710.	18,126.	6,855.	13,073.	14,806.	-1,745.	16,737.
1 MAY 86 1200	7,703.	17,543.	21,740.	18,251.	7,069.	13,191.	14,806.	-1,701.	17,166.
2 MAY 86 1200	8,360.	17,882.	21,814.	18,376.	7,253.	13,309.	15,020.	-1,657.	17,381.
3 MAY 86 1200	9,001.	18,406.	22,006.	18,524.	7,379.	13,368.	15,020.	-1,620.	17,595.
4 MAY 86 1200	9,651.	18,937.	22,286.	18,701.	7,482.	13,486.	15,020.	-1,561.	18,024.
5 MAY 86 1200	10,300.	19,498.	22,610.	18,900.	7,615.	13,545.	15,020.	-1,509.	18,239.
6 MAY 86 1200	10,956.	20,102.	22,979.	19,158.	7,807.	13,722.	15,235.	-1,399.	18,454.
7 MAY 86 1200	11,605.	20,744.	23,407.	19,601.	8,028.	13,958.	15,235.	-1,325.	18,668.
8 MAY 86 1200	12,247.	21,401.	23,864.	20,176.	8,249.	14,194.	15,450.	-1,296.	19,097.
9 MAY 86 1200	12,903.	22,087.	24,395.	20,818.	8,485.	14,430.	15,664.	-1,266.	19,526.
10 MAY 86 1200	13,553.	22,964.	25,074.	21,526.	8,729.	14,666.	15,879.	-1,229.	20,170.
11 MAY 86 1200	14,209.	24,012.	25,885.	22,382.	8,979.	14,902.	16,093.	-1,200.	20,599.
12 MAY 86 1200	14,799.	25,155.	26,741.	23,318.	9,215.	15,138.	16,308.	-1,200.	21,243.
13 MAY 86 1200	15,227.	26,446.	27,648.	24,226.	9,466.	15,374.	16,522.	-1,200.	21,887.
14 MAY 86 1200	15,559.	27,884.	28,570.	25,052.	9,710.	15,551.	16,737.	-1,214.	22,531.
15 MAY 86 1200	15,898.	29,433.	29,507.	25,856.	9,953.	15,728.	16,952.	-1,229.	23,389.
16 MAY 86 1200	16,230.	31,063.	30,451.	26,623.	10,211.	15,846.	17,166.	-1,259.	23,818.
17 MAY 86 1200	16,569.	32,708.	31,417.	27,383.	10,484.	16,024.	17,381.	-1,303.	24,462.
18 MAY 86 1200	16,901.	34,346.	32,391.	28,106.	10,757.	16,142.	17,595.	-1,391.	25,105.
19 MAY 86 1200	17,241.	35,880.	33,350.	28,784.	11,008.	16,260.	17,810.	-1,495.	25,535.
20 MAY 86 1200	17,572.	37,252.	34,279.	29,448.	11,259.	16,319.	18,024.	-1,620.	26,178.
21 MAY 86 1200	17,904.	38,439.	35,128.	30,097.	11,502.	16,437.	18,239.	-1,775.	26,608.
22 MAY 86 1200	18,236.	39,487.	35,850.	30,702.	11,731.	16,496.	18,454.	-1,945.	26,822.

23 MAY 86 1200	18,642.	40,453.	36,418.	31,262.	11,952.	16,614.	18,668.	-2,129.	27,251.
24 MAY 86 1200	19,151.	41,375.	36,898.	31,779.	12,173.	16,673.	19,097.	-2,328.	27,680.
25 MAY 86 1200	19,719.	42,223.	37,281.	32,244.	12,402.	16,791.	19,312.	-2,527.	27,895.
26 MAY 86 1200	20,280.	42,983.	37,576.	32,657.	12,616.	16,850.	19,526.	-2,726.	28,324.
27 MAY 86 1200	20,899.	43,676.	37,812.	33,018.	12,830.	16,968.	19,956.	-2,948.	28,539.
28 MAY 86 1200	21,615.	44,340.	38,012.	33,328.	13,044.	17,027.	20,170.	-3,176.	28,753.
29 MAY 86 1200	22,382.	44,997.	38,174.	33,608.	13,257.	17,086.	20,385.	-3,405.	28,968.
30 MAY 86 1200	23,156.	45,624.	38,314.	33,874.	13,464.	17,145.	20,814.	-3,634.	29,397.
31 MAY 86 1200	23,923.	46,206.	38,410.	34,124.	13,678.	17,263.	21,029.	-3,862.	29,612.
1 JUN 86 1200	24,698.	46,752.	38,484.	34,353.	13,892.	17,322.	21,458.	-4,084.	29,826.
2 JUN 86 1200	25,354.	47,246.	38,565.	34,560.	14,106.	17,381.	21,672.	-4,312.	30,041.
3 JUN 86 1200	25,782.	47,549.	38,646.	34,751.	14,298.	17,440.	21,887.	-4,541.	30,255.
4 JUN 86 1200	26,114.	47,704.	38,727.	34,921.	14,489.	17,499.	22,316.	-4,762.	30,470.
5 JUN 86 1200	26,453.	47,837.	38,801.	35,083.	14,622.	17,499.	22,531.	-4,998.	30,684.
6 JUN 86 1200	26,793.	47,955.	38,867.	35,231.	14,747.	17,558.	22,745.	-5,205.	30,899.

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STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 MAR 86 1200 SSARR MODEL

DATE-HOUR	S1000 CUM. DIEF RELEAS STORAGE ACRE-FEET	S4000 Q.R.BELOW M.J.R. STORAGE ACRE-FEET	S94000 Q.R. BELOW M.J.R STORAGE ACRE-FEET	S95999 CUM. QU'A R BELO STORAGE ACRE-FEET	S6000 CUM. QU'A R BELO STORAGE ACRE-FEET	S7500 CUM. HWY #56 RE STORAGE ACRE-FEET	S7400 CUM. HWY #56 SI STORAGE ACRE-FEET	S7499 CUM. QU'A R BELO STORAGE ACRE-FEET	S97500 STORAGE ACRE-FEET
7 JUN 86 1200	27,132.	48,102.	38,926.	35,378.	14,865.	17,617.	22,960.	-5,419.	31,114.
8 JUN 86 1200	27,471.	48,301.	38,985.	35,533.	14,976.	17,676.	23,174.	-5,625.	31,328.
9 JUN 86 1200	27,818.	48,500.	39,037.	35,696.	15,094.	17,676.	23,603.	-5,824.	31,543.
10 JUN 86 1200	28,157.	48,707.	39,096.	35,865.	15,212.	17,735.	23,818.	-6,001.	31,757.
11 JUN 86 1200	28,504.	48,913.	39,148.	36,027.	15,330.	17,794.	24,033.	-6,164.	31,972.
12 JUN 86 1200	28,858.	49,113.	39,199.	36,190.	15,441.	17,912.	24,247.	-6,296.	32,187.
13 JUN 86 1200	29,212.	49,312.	39,243.	36,352.	15,551.	17,971.	24,462.	-6,437.	32,401.
14 JUN 86 1200	29,559.	49,496.	39,288.	36,500.	15,662.	18,030.	24,676.	-6,606.	32,616.
15 JUN 86 1200	29,913.	49,673.	39,325.	36,632.	15,765.	18,030.	24,891.	-6,783.	32,830.
16 JUN 86 1200	30,259.	49,858.	39,361.	36,772.	15,869.	18,089.	25,105.	-6,946.	33,045.
17 JUN 86 1200	30,606.	50,042.	39,398.	36,905.	15,987.	18,089.	25,105.	-7,093.	33,259.
18 JUN 86 1200	30,938.	50,219.	39,428.	37,038.	16,097.	18,148.	25,320.	-7,248.	33,474.
19 JUN 86 1200	31,277.	50,411.	39,465.	37,171.	16,215.	18,148.	25,535.	-7,381.	33,474.
20 JUN 86 1200	31,631.	50,588.	39,494.	37,318.	16,319.	18,207.	25,749.	-7,484.	33,689.
21 JUN 86 1200	31,971.	50,772.	39,516.	37,458.	16,422.	18,266.	25,749.	-7,580.	33,903.
22 JUN 86 1200	32,317.	50,957.	39,538.	37,591.	16,518.	18,325.	25,964.	-7,661.	34,118.
23 JUN 86 1200	32,657.	51,141.	39,561.	37,724.	16,636.	18,384.	26,178.	-7,742.	34,332.
24 JUN 86 1200	33,003.	51,384.	39,575.	37,849.	16,783.	18,384.	26,178.	-7,831.	34,547.
25 JUN 86 1200	33,357.	51,672.	39,590.	37,982.	16,975.	18,384.	26,393.	-7,912.	34,761.
26 JUN 86 1200	33,704.	51,960.	39,605.	38,115.	17,159.	18,443.	26,393.	-7,971.	34,761.
27 JUN 86 1200	34,065.	52,247.	39,612.	38,240.	17,344.	18,443.	26,393.	-8,022.	34,976.
28 JUN 86 1200	34,419.	52,535.	39,627.	38,366.	17,536.	18,502.	26,608.	-8,074.	35,191.
29 JUN 86 1200	34,773.	52,808.	39,634.	38,484.	17,720.	18,502.	26,608.	-8,126.	35,405.
30 JUN 86 1200	35,128.	53,081.	39,642.	38,587.	17,904.	18,502.	26,608.	-8,185.	35,405.
1 JUL 86 1200	35,482.	53,361.	39,649.	38,698.	18,096.	18,502.	26,822.	-8,229.	35,620.
2 JUL 86 1200	35,843.	53,641.	39,656.	38,816.	18,281.	18,561.	26,822.	-8,281.	35,834.
3 JUL 86 1200	36,197.	53,922.	39,656.	38,926.	18,472.	18,561.	26,822.	-8,318.	36,049.
4 JUL 86 1200	36,551.	54,202.	39,664.	39,044.	18,657.	18,561.	27,037.	-8,354.	36,049.
5 JUL 86 1200	36,905.	54,475.	39,664.	39,155.	18,841.	18,620.	27,037.	-8,384.	36,263.
6 JUL 86 1200	37,259.	54,755.	39,664.	39,273.	19,026.	18,679.	27,037.	-8,377.	36,478.
7 JUL 86 1200	37,613.	55,036.	39,664.	39,376.	19,217.	18,738.	27,037.	-8,384.	36,693.
8 JUL 86 1200	37,975.	55,308.	39,664.	39,494.	19,402.	18,797.	27,251.	-8,399.	36,693.
9 JUL 86 1200	38,329.	55,581.	39,664.	39,597.	19,594.	18,856.	27,251.	-8,421.	36,907.
10 JUL 86 1200	38,683.	55,847.	39,664.	39,701.	19,748.	18,915.	27,251.	-8,428.	37,122.
11 JUL 86 1200	39,029.	56,098.	39,664.	39,804.	19,866.	18,974.	27,466.	-8,428.	37,336.
12 JUL 86 1200	39,376.	56,334.	39,664.	39,915.	19,948.	19,033.	27,466.	-8,413.	37,336.
13 JUL 86 1200	39,723.	56,585.	39,664.	40,003.	20,029.	19,151.	27,466.	-8,377.	37,551.
14 JUL 86 1200	40,077.	56,828.	39,664.	40,143.	20,110.	19,269.	27,680.	-8,325.	37,766.
15 JUL 86 1200	40,424.	57,071.	39,664.	40,291.	20,198.	19,387.	27,680.	-8,288.	37,980.
16 JUL 86 1200	40,770.	57,307.	39,664.	40,438.	20,280.	19,446.	27,680.	-8,259.	37,980.
17 JUL 86 1200	41,117.	57,536.	39,664.	40,549.	20,353.	19,564.	27,895.	-8,229.	38,195.
18 JUL 86 1200	41,464.	57,765.	39,664.	40,652.	20,427.	19,682.	27,895.	-8,185.	38,409.
19 JUL 86 1200	41,818.	58,001.	39,664.	40,763.	20,493.	19,859.	27,895.	-8,133.	38,624.
20 JUL 86 1200	42,164.	58,229.	39,664.	40,866.	20,560.	19,918.	28,110.	-8,104.	38,624.
21 JUL 86 1200	42,518.	58,451.	39,664.	40,969.	20,626.	20,036.	28,110.	-8,104.	38,838.
22 JUL 86 1200	42,872.	58,672.	39,664.	41,058.	20,685.	20,095.	28,110.	-8,126.	39,053.
23 JUL 86 1200	43,219.	58,893.	39,664.	41,139.	20,752.	20,154.	28,324.	-8,148.	39,268.
24 JUL 86 1200	43,566.	59,122.	39,664.	41,220.	20,811.	20,213.	28,324.	-8,170.	39,268.
25 JUL 86 1200	43,920.	59,336.	39,664.	41,301.	20,870.	20,272.	28,539.	-8,222.	39,482.

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STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 MAR 86 1200 SSARR MODEL

DATE-HOUR	S1000 CUM. DIEF RELEAS STORAGE ACRE-FEET	S4000 Q.R.BELOW M.J.R. STORAGE ACRE-FEET	S94000 Q.R. BELOW M.J.R STORAGE ACRE-FEET	S95999 CUM. QU'A R BELO STORAGE ACRE-FEET	S6000 CUM. QU'A R BELO STORAGE ACRE-FEET	S7500 CUM. HWY #56 RE STORAGE ACRE-FEET	S7400 CUM. HWY #56 SI STORAGE ACRE-FEET	S7499 CUM. QU'A R BELO STORAGE ACRE-FEET	S97500 STORAGE ACRE-FEET
26 JUL 86 1200	44,267.	59,550.	39,664.	41,382.	20,929.	20,272.	28,539.	-8,266.	39,697.
27 JUL 86 1200	44,628.	59,764.	39,664.	41,449.	20,988.	20,331.	28,753.	-8,332.	39,697.
28 JUL 86 1200	44,982.	59,970.	39,664.	41,523.	21,054.	20,390.	28,753.	-8,391.	39,911.
29 JUL 86 1200	45,329.	60,184.	39,664.	41,596.	21,113.	20,449.	28,968.	-8,443.	40,126.
30 JUL 86 1200	45,683.	60,398.	39,664.	41,678.	21,165.	20,508.	28,968.	-8,480.	40,126.
31 JUL 86 1200	46,044.	60,590.	39,664.	41,751.	21,216.	20,567.	28,968.	-8,509.	40,340.
1 AUG 86 1200	46,361.	60,723.	39,664.	41,825.	21,268.	20,626.	29,182.	-8,554.	40,340.

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STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR
1 MAR 86 1200

SSARR MODEL

DATE-HOUR	S8000 CUM Q.R. NEAR W STORAGE ACRE-FEET	S7984 CUM Q.R. NEAR W STORAGE ACRE-FEET	S7999 CUM Q.R. NEAR W STORAGE ACRE-FEET	S97999 CUM Q.R. NEAR W STORAGE ACRE-FEET	SEVPS CUM. EVAP SIMUL STORAGE ACRE-FEET	SEVPN CUM. EVAP NATUR STORAGE ACRE-FEET	S5000 CUM. Q.R. NR LUM STORAGE ACRE-FEET	S94900 CUM. Q.R. NR LUM STORAGE ACRE-FEET
1 MAR 86 1200	3.	3.	3.	3.	0.	0.	3.	3.
2 MAR 86 1200	305.	290.	17.	121.	0.	0.	283.	-145.
3 MAR 86 1200	608.	578.	40.	342.	0.	0.	770.	69.
4 MAR 86 1200	925.	880.	47.	667.	0.	0.	1,389.	556.
5 MAR 86 1200	1,227.	1,279.	-34.	1,043.	0.	0.	2,038.	1,279.
6 MAR 86 1200	1,544.	1,861.	-307.	1,566.	0.	0.	2,584.	2,090.
7 MAR 86 1200	1,847.	2,629.	-764.	2,282.	0.	0.	2,975.	2,791.
8 MAR 86 1200	2,186.	3,484.	-1,281.	3,115.	0.	0.	3,322.	3,455.
9 MAR 86 1200	2,540.	4,377.	-1,819.	3,993.	0.	0.	3,691.	4,148.
10 MAR 86 1200	2,887.	5,269.	-2,358.	4,871.	0.	0.	4,045.	4,871.
11 MAR 86 1200	3,241.	6,162.	-2,903.	5,763.	0.	0.	4,443.	5,697.
12 MAR 86 1200	3,595.	7,047.	-3,435.	6,663.	0.	0.	4,908.	6,619.
13 MAR 86 1200	3,942.	7,939.	-3,980.	7,593.	0.	0.	5,446.	7,585.
14 MAR 86 1200	4,288.	8,824.	-4,511.	8,544.	0.	0.	6,014.	8,552.
15 MAR 86 1200	4,642.	9,702.	-5,035.	9,518.	0.	0.	6,626.	9,525.
16 MAR 86 1200	5,070.	10,587.	-5,492.	10,499.	0.	0.	7,298.	10,565.
17 MAR 86 1200	5,763.	11,472.	-5,684.	11,480.	0.	0.	7,976.	11,642.
18 MAR 86 1200	6,811.	12,372.	-5,529.	12,483.	0.	0.	8,603.	12,675.
19 MAR 86 1200	8,094.	13,272.	-5,146.	13,494.	0.	0.	9,156.	13,663.
20 MAR 86 1200	9,606.	14,172.	-4,541.	14,497.	0.	0.	9,687.	14,652.
21 MAR 86 1200	11,222.	15,087.	-3,833.	15,507.	0.	0.	10,270.	15,669.
22 MAR 86 1200	12,881.	16,134.	-3,221.	16,643.	0.	0.	10,919.	16,746.
23 MAR 86 1200	14,629.	17,285.	-2,623.	17,882.	0.	0.	11,598.	17,831.
24 MAR 86 1200	16,555.	18,531.	-1,945.	19,217.	0.	0.	12,225.	18,871.
25 MAR 86 1200	18,598.	19,984.	-1,355.	20,693.	0.	0.	12,800.	19,844.
26 MAR 86 1200	20,560.	21,548.	-949.	22,219.	0.	0.	13,331.	20,715.
27 MAR 86 1200	22,500.	23,134.	-595.	23,776.	0.	0.	13,825.	21,467.
28 MAR 86 1200	24,440.	24,727.	-233.	25,347.	0.	0.	14,364.	22,160.
29 MAR 86 1200	26,453.	26,306.	194.	26,940.	0.	0.	14,954.	22,795.
30 MAR 86 1200	28,629.	27,869.	799.	28,541.	0.	0.	15,551.	23,326.
31 MAR 86 1200	31,144.	29,441.	1,751.	30,163.	0.	0.	16,149.	23,820.
1 APR 86 1200	33,608.	31,071.	2,592.	31,875.	0.	0.	16,680.	24,240.
2 APR 86 1200	35,496.	32,760.	2,783.	33,652.	215.	215.	17,145.	24,587.
3 APR 86 1200	36,935.	34,442.	2,547.	35,423.	215.	215.	17,595.	24,897.
4 APR 86 1200	38,159.	36,020.	2,186.	37,067.	215.	215.	18,052.	25,221.
5 APR 86 1200	39,184.	37,436.	1,802.	38,550.	429.	429.	18,443.	25,480.
6 APR 86 1200	39,966.	38,646.	1,375.	39,885.	429.	429.	18,738.	25,635.
7 APR 86 1200	40,556.	39,627.	984.	41,110.	429.	429.	18,967.	25,708.
8 APR 86 1200	41,058.	40,401.	711.	42,268.	644.	644.	19,247.	25,834.
9 APR 86 1200	41,493.	41,006.	556.	43,367.	644.	644.	19,512.	25,937.
10 APR 86 1200	41,891.	41,486.	467.	44,429.	858.	858.	19,697.	25,966.
11 APR 86 1200	42,245.	41,891.	423.	45,461.	858.	858.	19,859.	25,966.
12 APR 86 1200	42,585.	42,223.	423.	46,465.	858.	858.	20,221.	26,195.
13 APR 86 1200	42,895.	42,518.	445.	47,438.	1,073.	1,073.	20,729.	26,579.
14 APR 86 1200	43,190.	42,762.	497.	48,368.	1,073.	1,073.	21,120.	26,859.
15 APR 86 1200	43,470.	42,990.	549.	49,267.	1,073.	1,073.	21,430.	27,036.
16 APR 86 1200	43,728.	43,197.	600.	50,145.	1,287.	1,287.	21,725.	27,206.
17 APR 86 1200	43,964.	43,374.	667.	50,986.	1,287.	1,287.	22,020.	27,390.
18 APR 86 1200	44,215.	43,536.	740.	51,805.	1,502.	1,502.	22,367.	27,589.

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STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR
1 MAR 86 1200

SSARR MODEL

DATE-HOUR	S8000 CUM Q.R. NEAR W STORAGE ACRE-FEET	S7984 CUM Q.R. NEAR W STORAGE ACRE-FEET	S7999 CUM Q.R. NEAR W STORAGE ACRE-FEET	S97999 CUM Q.R. NEAR W STORAGE ACRE-FEET	SEVPS CUM. EVAP SIMUL STORAGE ACRE-FEET	SEVPN CUM. EVAP NATUR STORAGE ACRE-FEET	S5000 CUM. Q.R. NR LUM STORAGE ACRE-FEET	S94900 CUM. Q.R. NR LUM STORAGE ACRE-FEET
19 APR 86 1200	44,444.	43,699.	821.	52,594.	1,502.	1,502.	22,736.	27,818.
20 APR 86 1200	44,657.	43,846.	888.	53,369.	1,502.	1,502.	23,097.	28,039.
21 APR 86 1200	44,879.	44,001.	962.	54,114.	1,717.	1,717.	23,414.	28,216.
22 APR 86 1200	45,093.	44,134.	1,035.	54,836.	1,717.	1,717.	23,702.	28,371.
23 APR 86 1200	45,299.	44,267.	1,109.	55,530.	1,717.	1,717.	23,968.	28,526.
24 APR 86 1200	45,498.	44,414.	1,168.	56,208.	1,931.	1,931.	24,226.	28,659.
25 APR 86 1200	45,697.	44,547.	1,227.	56,857.	1,931.	1,931.	24,469.	28,769.
26 APR 86 1200	45,889.	44,680.	1,293.	57,484.	2,146.	2,146.	24,698.	28,865.
27 APR 86 1200	46,081.	44,805.	1,360.	58,119.	2,146.	2,146.	24,919.	28,954.
28 APR 86 1200	46,265.	44,938.	1,419.	58,724.	2,146.	2,146.	25,140.	29,042.
29 APR 86 1200	46,442.	45,070.	1,471.	59,321.	2,360.	2,360.	25,362.	29,116.
30 APR 86 1200	46,634.	45,211.	1,522.	59,889.	2,360.	2,360.	25,576.	29,205.
1 MAY 86 1200	46,833.	45,351.	1,581.	60,457.	2,146.	2,146.	25,797.	29,271.
2 MAY 86 1200	47,033.	45,491.	1,633.	61,010.	1,502.	1,502.	26,003.	29,337.
3 MAY 86 1200	47,239.	45,653.	1,670.	61,541.	858.	858.	26,372.	29,514.
4 MAY 86 1200	47,438.	45,815.	1,721.	62,153.	215.	429.	26,933.	29,795.
5 MAY 86 1200	47,645.	46,000.	1,751.	62,869.	-429.	-236.	27,597.	30,023.
6 MAY 86 1200	47,910.	46,273.	1,743.	63,732.	-1,073.	-815.	28,541.	30,540.
7 MAY 86 1200	48,323.	46,715.	1,707.	64,809.	-1,706.	-1,405.	29,854.	31,550.
8 MAY 86 1200	48,906.	47,357.	1,655.	66,070.	-2,350.	-1,985.	31,226.	32,730.
9 MAY 86 1200	49,585.	48,146.	1,530.	67,405.	-2,993.	-2,575.	32,568.	33,933.
10 MAY 86 1200	50,256.	49,017.	1,345.	68,770.	-3,626.	-3,154.	34,161.	35,393.
11 MAY 86 1200	50,957.	49,894.	1,168.	70,112.	-4,270.	-3,744.	36,153.	37,244.
12 MAY 86 1200	51,650.	50,757.	1,006.	71,351.	-4,914.	-4,334.	38,262.	39,133.
13 MAY 86 1200	52,351.	51,576.	880.	72,443.	-5,558.	-4,914.	40,283.	40,815.
14 MAY 86 1200	53,044.	52,262.	895.	73,350.	-6,201.	-5,504.	42,356.	42,422.
15 MAY 86 1200	53,752.	52,786.	1,080.	74,066.	-6,845.	-6,094.	44,510.	43,986.
16 MAY 86 1200	54,445.	53,177.	1,382.	74,656.	-7,489.	-6,684.	46,708.	45,491.
17 MAY 86 1200	55,131.	53,494.	1,758.	75,180.	-8,132.	-7,274.	48,891.	46,937.
18 MAY 86 1200	55,825.	53,767.	2,179.	75,681.	-8,776.	-7,864.	50,986.	48,272.
19 MAY 86 1200	56,518.	54,018.	2,621.	76,190.	-9,420.	-8,454.	52,926.	49,533.
20 MAY 86 1200	57,182.	54,246.	3,056.	76,706.	-10,074.	-9,044.	54,763.	50,757.
21 MAY 86 1200	57,838.	54,475.	3,484.	77,215.	-10,718.	-9,634.	56,393.	51,908.
22 MAY 86 1200	58,480.	54,689.	3,912.	77,747.	-11,362.	-10,235.	57,809.	52,926.

23 MAY 86 1200	59,078.	54,888.	4,318.	78,278.	-12,016.	-10,825.	59,100.	53,833.
24 MAY 86 1200	59,631.	55,072.	4,679.	78,823.	-12,660.	-11,415.	60,332.	54,645.
25 MAY 86 1200	60,147.	55,264.	5,018.	79,384.	-13,304.	-12,006.	61,482.	55,323.
26 MAY 86 1200	60,686.	55,441.	5,372.	79,945.	-13,958.	-12,596.	62,500.	55,869.
27 MAY 86 1200	61,217.	55,618.	5,727.	80,520.	-14,602.	-13,186.	63,437.	56,312.
28 MAY 86 1200	61,711.	55,795.	6,058.	81,088.	-15,256.	-13,787.	64,300.	56,680.
29 MAY 86 1200	62,168.	55,965.	6,339.	81,685.	-15,900.	-14,377.	65,089.	56,983.
30 MAY 86 1200	62,589.	56,142.	6,582.	82,275.	-16,555.	-14,967.	65,864.	57,248.
31 MAY 86 1200	62,965.	56,312.	6,789.	82,866.	-17,198.	-15,557.	66,601.	57,470.
1 JUN 86 1200	63,312.	56,496.	6,958.	83,456.	-18,142.	-16,415.	67,280.	57,647.
2 JUN 86 1200	63,621.	56,666.	7,084.	84,046.	-19,366.	-17,520.	67,914.	57,779.
3 JUN 86 1200	63,894.	56,843.	7,194.	84,651.	-20,599.	-18,636.	68,490.	57,897.
4 JUN 86 1200	64,145.	57,020.	7,275.	85,241.	-21,822.	-19,752.	68,925.	57,957.
5 JUN 86 1200	64,388.	57,182.	7,349.	85,823.	-23,046.	-20,868.	69,205.	57,971.
6 JUN 86 1200	64,632.	57,352.	7,423.	86,413.	-24,279.	-21,973.	69,456.	58,038.

1 STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 MAR 86 1200 SSARR MODEL

DATE-HOUR	S8000 CUM Q.R. NEAR W STORAGE ACRE-FEET	S7984 CUM Q.R. NEAR W STORAGE ACRE-FEET	S7999 CUM Q.R. NEAR W STORAGE ACRE-FEET	S97999 CUM Q.R. NEAR W STORAGE ACRE-FEET	SEVPS CUM. EVAP SIMUL STORAGE ACRE-FEET	SEVPN CUM. EVAP NATUR STORAGE ACRE-FEET	S5000 CUM. Q.R. NR LUM STORAGE ACRE-FEET	S94900 CUM. Q.R. NR LUM STORAGE ACRE-FEET
7 JUN 86 1200	64,853.	57,507.	7,489.	86,996.	-25,513.	-23,088.	69,655.	58,097.
8 JUN 86 1200	65,052.	57,661.	7,541.	87,564.	-26,736.	-24,204.	69,854.	58,163.
9 JUN 86 1200	65,222.	57,802.	7,563.	88,132.	-27,959.	-25,309.	70,105.	58,288.
10 JUN 86 1200	65,384.	57,957.	7,578.	88,685.	-29,193.	-26,425.	70,378.	58,414.
11 JUN 86 1200	65,539.	58,104.	7,585.	89,238.	-30,427.	-27,530.	70,665.	58,517.
12 JUN 86 1200	65,672.	58,252.	7,585.	89,762.	-31,650.	-28,635.	70,953.	58,606.
13 JUN 86 1200	65,805.	58,392.	7,578.	90,264.	-32,884.	-29,751.	71,233.	58,672.
14 JUN 86 1200	65,937.	58,532.	7,563.	90,743.	-34,107.	-30,856.	71,484.	58,716.
15 JUN 86 1200	66,063.	58,665.	7,556.	91,200.	-35,341.	-31,961.	71,742.	58,768.
16 JUN 86 1200	66,188.	58,797.	7,556.	91,628.	-36,564.	-33,077.	71,993.	58,812.
17 JUN 86 1200	66,306.	58,923.	7,556.	92,027.	-37,787.	-34,182.	72,244.	58,871.
18 JUN 86 1200	66,432.	59,041.	7,556.	92,418.	-39,021.	-35,287.	72,495.	58,915.
19 JUN 86 1200	66,550.	59,159.	7,556.	92,794.	-40,244.	-36,392.	72,782.	59,011.
20 JUN 86 1200	66,660.	59,269.	7,563.	93,148.	-41,478.	-37,497.	73,092.	59,107.
21 JUN 86 1200	66,793.	59,380.	7,578.	93,502.	-42,701.	-38,602.	73,372.	59,188.
22 JUN 86 1200	66,918.	59,498.	7,585.	93,834.	-43,935.	-39,707.	73,653.	59,255.
23 JUN 86 1200	67,044.	59,616.	7,593.	94,144.	-45,158.	-40,812.	73,918.	59,306.
24 JUN 86 1200	67,154.	59,734.	7,600.	94,461.	-46,391.	-41,918.	74,184.	59,365.
25 JUN 86 1200	67,272.	59,845.	7,600.	94,756.	-47,615.	-43,023.	74,494.	59,439.
26 JUN 86 1200	67,383.	59,963.	7,600.	95,043.	-48,848.	-44,128.	74,848.	59,535.
27 JUN 86 1200	67,501.	60,081.	7,593.	95,316.	-50,071.	-45,233.	75,194.	59,594.
28 JUN 86 1200	67,604.	60,199.	7,585.	95,597.	-51,295.	-46,327.	75,548.	59,631.
29 JUN 86 1200	67,700.	60,317.	7,563.	95,862.	-52,528.	-47,432.	75,902.	59,660.
30 JUN 86 1200	67,796.	60,427.	7,548.	96,120.	-53,751.	-48,537.	76,264.	59,712.
1 JUL 86 1200	67,892.	60,538.	7,534.	96,371.	-54,696.	-49,374.	76,647.	59,756.
2 JUL 86 1200	67,988.	60,656.	7,519.	96,615.	-55,372.	-49,964.	77,046.	59,830.
3 JUL 86 1200	68,076.	60,759.	7,497.	96,843.	-56,037.	-50,544.	77,459.	59,919.
4 JUL 86 1200	68,165.	60,870.	7,489.	97,072.	-56,702.	-51,134.	77,850.	59,978.
5 JUL 86 1200	68,276.	60,981.	7,482.	97,293.	-57,367.	-51,713.	78,233.	60,014.
6 JUL 86 1200	68,386.	61,091.	7,482.	97,522.	-58,032.	-52,303.	78,624.	60,066.
7 JUL 86 1200	68,504.	61,217.	7,482.	97,758.	-58,708.	-52,893.	79,015.	60,132.
8 JUL 86 1200	68,637.	61,335.	7,497.	97,986.	-59,373.	-53,473.	79,414.	60,184.
9 JUL 86 1200	68,777.	61,445.	7,519.	98,230.	-60,039.	-54,052.	79,797.	60,221.
10 JUL 86 1200	68,903.	61,571.	7,534.	98,466.	-60,704.	-54,642.	80,158.	60,265.
11 JUL 86 1200	69,028.	61,696.	7,526.	98,717.	-61,369.	-55,221.	80,527.	60,302.
12 JUL 86 1200	69,153.	61,836.	7,512.	98,953.	-62,034.	-55,811.	80,889.	60,339.
13 JUL 86 1200	69,264.	61,962.	7,504.	99,181.	-62,710.	-56,391.	81,280.	60,405.
14 JUL 86 1200	69,412.	62,087.	7,519.	99,403.	-63,375.	-56,981.	81,796.	60,612.
15 JUL 86 1200	69,552.	62,220.	7,541.	99,631.	-64,040.	-57,560.	82,305.	60,804.
16 JUL 86 1200	69,714.	62,345.	7,571.	99,860.	-64,706.	-58,140.	82,681.	60,885.
17 JUL 86 1200	69,884.	62,478.	7,615.	100,096.	-65,382.	-58,730.	83,035.	60,922.
18 JUL 86 1200	70,039.	62,611.	7,637.	100,347.	-66,047.	-59,309.	83,367.	60,951.
19 JUL 86 1200	70,179.	62,751.	7,644.	100,590.	-66,712.	-59,888.	83,743.	61,025.
20 JUL 86 1200	70,334.	62,891.	7,644.	100,841.	-67,377.	-60,478.	84,112.	61,099.
21 JUL 86 1200	70,496.	63,039.	7,666.	101,077.	-68,053.	-61,058.	84,429.	61,121.
22 JUL 86 1200	70,680.	63,179.	7,711.	101,306.	-68,718.	-61,637.	84,732.	61,128.
23 JUL 86 1200	70,850.	63,304.	7,762.	101,527.	-69,383.	-62,227.	85,027.	61,128.
24 JUL 86 1200	71,020.	63,430.	7,814.	101,741.	-70,049.	-62,807.	85,336.	61,143.
25 JUL 86 1200	71,182.	63,548.	7,858.	101,940.	-70,714.	-63,386.	85,632.	61,150.

1 STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 MAR 86 1200 SSARR MODEL

DATE-HOUR	S8000 CUM Q.R. NEAR W STORAGE ACRE-FEET	S7984 CUM Q.R. NEAR W STORAGE ACRE-FEET	S7999 CUM Q.R. NEAR W STORAGE ACRE-FEET	S97999 CUM Q.R. NEAR W STORAGE ACRE-FEET	SEVPS CUM. EVAP SIMUL STORAGE ACRE-FEET	SEVPN CUM. EVAP NATUR STORAGE ACRE-FEET	S5000 CUM. Q.R. NR LUM STORAGE ACRE-FEET	S94900 CUM. Q.R. NR LUM STORAGE ACRE-FEET
26 JUL 86 1200	71,351.	63,666.	7,917.	102,139.	-71,379.	-63,965.	85,919.	61,150.
27 JUL 86 1200	71,543.	63,784.	7,984.	102,331.	-72,055.	-64,545.	86,199.	61,143.
28 JUL 86 1200	71,757.	63,902.	8,079.	102,523.	-72,720.	-65,135.	86,487.	61,143.
29 JUL 86 1200	71,986.	64,027.	8,183.	102,700.	-73,385.	-65,714.	86,804.	61,165.
30 JUL 86 1200	72,200.	64,138.	8,286.	102,884.	-74,050.	-66,293.	87,129.	61,209.
31 JUL 86 1200	72,414.	64,263.	8,389.	103,076.	-74,716.	-66,873.	87,431.	61,239.
1 AUG 86 1200	72,613.	64,374.	8,470.	103,253.	-75,788.	-67,817.	87,719.	61,254.

1 STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 MAR 86 1200 SSARR MODEL

DATE-HOUR	00001150 EYEBROW LAKE NAT FLOW CFS	00001150 EYEBROW LAKE NAT ELEVATION FEET-MSL	00001795 BUFFALO POUND LA FLOW CFS	00001795 BUFFALO POUND LA ELEVATION FEET-MSL	00095804 LAST MOUNTAIN LA FLOW CFS	00095804 LAST MOUNTAIN LA ELEVATION FEET-MSL	00095335 QUAPPELLE BEL FL FLOW CFS	00095999 QUAPPELLE RIVER FLOW CFS
31 JUL 86 1200	1.	1,719.59	-0.	1,662.08	1.	1,605.37	12.	41.

1 STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 MAR 86 1200 SSARR MODEL

DATE-HOUR	00297199 ECHO LAKE AT FIS FLOW CFS	00297199 ECHO LAKE AT FIS ELEVATION FEET-MSL	00297399 KATEPWA LAKE AT FLOW CFS	00297399 KATEPWA LAKE AT ELEVATION FEET-MSL	00297699 CROOKED LAKE NR FLOW CFS	00297699 CROOKED LAKE NR ELEVATION FEET-MSL	00297799 OUND LAKE NEAR W FLOW CFS	00097999 QUAPPELLE RIVER FLOW CFS
31 JUL 86 1200	62.	1,568.63	62.	1,568.23	75.	1,479.38	89.	139.

1 STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 MAR 86 1200 SSARR MODEL

DATE-HOUR	00007200 ECHO LAKE AT FIS ELEVATION FEET-MSL	00007200 ECHO LAKE AT FIS STORAGE ACRE-FEET	00007199 ECHO LAKE AT FIS ELEVATION FEET-MSL	00007199 ECHO LAKE AT FIS STORAGE ACRE-FEET	00007350 KATEPWA LAKE AT ELEVATION FEET-MSL	00007350 KATEPWA LAKE AT STORAGE ACRE-FEET	00007399 KATEPWA LAKE AT ELEVATION FEET-MSL	00007399 KATEPWA LAKE AT STORAGE ACRE-FEET
31 JUL 86 1200	1,571.49	195,971.	1,571.80	198,414.	1,568.99	237,241.	1,569.24	238,593.

1 STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 MAR 86 1200 SSARR MODEL

DATE-HOUR	00007700 CROOKED LAKE NR ELEVATION FEET-MSL	00007700 CROOKED LAKE NR STORAGE ACRE-FEET	00007699 CROOKED LAKE NR ELEVATION FEET-MSL	00007699 CROOKED LAKE NR STORAGE ACRE-FEET	00007800 ROUND LAKE NEAR ELEVATION FEET-MSL	00007800 ROUND LAKE NEAR STORAGE ACRE-FEET	00007799 ROUND LAKE NEAR ELEVATION FEET-MSL	00007799 ROUND LAKE NEAR STORAGE ACRE-FEET
31 JUL 86 1200	1,481.82	94,316.	1,481.85	94,416.	1,451.26	67,602.	1,452.09	69,846.

QU'APPELLE RIVER NATURAL FLOW MODEL

SAMPLE OUTPUT FILE - FALL AND WINTER PORTION OF MODEL

ELBOW DIVERSION TO SASKATCHEWAN/MANITOBA BOUNDARY - AUG 1, 1986 TO APRIL 10 1987

1 STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR 1 AUG 86 1200 SSARR MODEL

DATE-HOUR	00001150 EYEBROW LAKE NAT ELEVATION FEET-MSL	00001795 BUFFALO POUND LA ELEVATION FEET-MSL	00095804 LAST MOUNTAIN LA ELEVATION FEET-MSL	00297199 ECHO LAKE AT FIS ELEVATION FEET-MSL	00297399 KATEPWA LAKE AT ELEVATION FEET-MSL	00297699 CROOKED LAKE NEA ELEVATION FEET-MSL	00297799 ROUND LAKE NEAR ELEVATION FEET-MSL	00097999 QUAPPELLE RIVER FLOW CFS	S97999 STORAGE ACRE-FEET
1 AUG 86 1200	1,719.58	1,662.02	1,605.36	1,568.61	1,568.22	1,479.36	1,448.34	93.	1.
2 AUG 86 1200	1,719.57	1,662.01	1,605.34	1,568.59	1,568.20	1,479.32	1,448.32	92.	188.
3 AUG 86 1200	1,719.56	1,661.98	1,605.32	1,568.56	1,568.18	1,479.29	1,448.30	91.	373.
4 AUG 86 1200	1,719.56	1,661.96	1,605.30	1,568.54	1,568.16	1,479.27	1,448.29	90.	556.
5 AUG 86 1200	1,719.55	1,661.94	1,605.28	1,568.52	1,568.15	1,479.25	1,448.28	89.	737.
6 AUG 86 1200	1,719.54	1,661.92	1,605.26	1,568.49	1,568.13	1,479.23	1,448.27	88.	916.
7 AUG 86 1200	1,719.54	1,661.90	1,605.24	1,568.47	1,568.12	1,479.22	1,448.25	86.	1,092.
8 AUG 86 1200	1,719.53	1,661.88	1,605.22	1,568.45	1,568.11	1,479.21	1,448.24	84.	1,264.
9 AUG 86 1200	1,719.52	1,661.86	1,605.20	1,568.43	1,568.10	1,479.20	1,448.23	81.	1,430.
10 AUG 86 1200	1,719.52	1,661.84	1,605.18	1,568.40	1,568.10	1,479.19	1,448.21	77.	1,589.
11 AUG 86 1200	1,719.51	1,661.82	1,605.16	1,568.38	1,568.09	1,479.19	1,448.20	74.	1,742.
12 AUG 86 1200	1,719.50	1,661.80	1,605.14	1,568.36	1,568.08	1,479.18	1,448.19	71.	1,888.
13 AUG 86 1200	1,719.49	1,661.78	1,605.12	1,568.34	1,568.08	1,479.18	1,448.17	68.	2,028.
14 AUG 86 1200	1,719.49	1,661.75	1,605.10	1,568.31	1,568.08	1,479.19	1,448.16	65.	2,162.
15 AUG 86 1200	1,719.48	1,661.73	1,605.07	1,568.29	1,568.07	1,479.19	1,448.15	62.	2,291.
16 AUG 86 1200	1,719.47	1,661.71	1,605.05	1,568.27	1,568.07	1,479.19	1,448.15	59.	2,414.
17 AUG 86 1200	1,719.47	1,661.69	1,605.03	1,568.25	1,568.06	1,479.18	1,448.14	56.	2,531.
18 AUG 86 1200	1,719.46	1,661.67	1,605.01	1,568.23	1,568.06	1,479.18	1,448.14	53.	2,642.
19 AUG 86 1200	1,719.45	1,661.65	1,604.99	1,568.20	1,568.06	1,479.17	1,448.13	50.	2,748.
20 AUG 86 1200	1,719.45	1,661.63	1,604.97	1,568.18	1,568.06	1,479.16	1,448.13	48.	2,848.
21 AUG 86 1200	1,719.44	1,661.61	1,604.95	1,568.17	1,568.05	1,479.15	1,448.12	45.	2,943.
22 AUG 86 1200	1,719.44	1,661.59	1,604.93	1,568.15	1,568.05	1,479.14	1,448.12	43.	3,033.
23 AUG 86 1200	1,719.43	1,661.56	1,604.91	1,568.13	1,568.05	1,479.13	1,448.11	41.	3,119.
24 AUG 86 1200	1,719.42	1,661.54	1,604.89	1,568.11	1,568.04	1,479.12	1,448.11	39.	3,201.
25 AUG 86 1200	1,719.42	1,661.52	1,604.87	1,568.10	1,568.04	1,479.11	1,448.10	37.	3,279.
26 AUG 86 1200	1,719.41	1,661.50	1,604.85	1,568.09	1,568.04	1,479.10	1,448.10	36.	3,354.
27 AUG 86 1200	1,719.40	1,661.48	1,604.83	1,568.07	1,568.03	1,479.09	1,448.09	34.	3,426.
28 AUG 86 1200	1,719.40	1,661.46	1,604.81	1,568.06	1,568.03	1,479.08	1,448.08	33.	3,496.
29 AUG 86 1200	1,719.39	1,661.44	1,604.79	1,568.05	1,568.02	1,479.08	1,448.07	32.	3,564.
30 AUG 86 1200	1,719.38	1,661.42	1,604.77	1,568.04	1,568.02	1,479.07	1,448.06	31.	3,630.
31 AUG 86 1200	1,719.38	1,661.40	1,604.75	1,568.03	1,568.01	1,479.06	1,448.05	30.	3,693.

DATE-HOUR	EYEBROW LAKE NAT ELEVATION FEET-MSL	BUFFALO POUND LA ELEVATION FEET-MSL	LAST MOUNTAIN LA ELEVATION FEET-MSL	ECHO LAKE AT FIS ELEVATION FEET-MSL	KATEPWA LAKE AT ELEVATION FEET-MSL	CROOKED LAKE NEA ELEVATION FEET-MSL	ROUND LAKE NEAR ELEVATION FEET-MSL	QUAPPELLE RIVER FLOW CFS	STORAGE ACRE-FEET
1 SEP 86 1200	1,719.37	1,661.38	1,604.74	1,568.03	1,568.02	1,479.06	1,448.05	29.	3,754.
2 SEP 86 1200	1,719.37	1,661.38	1,604.74	1,568.03	1,568.02	1,479.07	1,448.05	28.	3,813.
3 SEP 86 1200	1,719.37	1,661.38	1,604.73	1,568.03	1,568.02	1,479.07	1,448.05	27.	3,870.
4 SEP 86 1200	1,719.37	1,661.37	1,604.73	1,568.03	1,568.03	1,479.07	1,448.05	25.	3,924.
5 SEP 86 1200	1,719.37	1,661.37	1,604.72	1,568.04	1,568.03	1,479.07	1,448.05	24.	3,976.
6 SEP 86 1200	1,719.37	1,661.37	1,604.72	1,568.04	1,568.03	1,479.07	1,448.05	23.	4,025.
7 SEP 86 1200	1,719.37	1,661.37	1,604.71	1,568.04	1,568.03	1,479.07	1,448.05	21.	4,071.
8 SEP 86 1200	1,719.37	1,661.36	1,604.71	1,568.04	1,568.03	1,479.07	1,448.05	20.	4,114.
9 SEP 86 1200	1,719.36	1,661.36	1,604.70	1,568.04	1,568.03	1,479.06	1,448.05	18.	4,155.
10 SEP 86 1200	1,719.36	1,661.36	1,604.70	1,568.04	1,568.03	1,479.06	1,448.05	17.	4,193.
11 SEP 86 1200	1,719.36	1,661.36	1,604.69	1,568.04	1,568.03	1,479.06	1,448.04	16.	4,229.
12 SEP 86 1200	1,719.36	1,661.35	1,604.69	1,568.04	1,568.03	1,479.05	1,448.04	15.	4,263.
13 SEP 86 1200	1,719.36	1,661.35	1,604.68	1,568.05	1,568.03	1,479.05	1,448.04	14.	4,295.
14 SEP 86 1200	1,719.36	1,661.35	1,604.68	1,568.05	1,568.02	1,479.04	1,448.04	14.	4,326.
15 SEP 86 1200	1,719.36	1,661.34	1,604.67	1,568.05	1,568.02	1,479.04	1,448.04	13.	4,355.
16 SEP 86 1200	1,719.36	1,661.34	1,604.67	1,568.05	1,568.02	1,479.04	1,448.04	13.	4,383.
17 SEP 86 1200	1,719.36	1,661.34	1,604.66	1,568.05	1,568.02	1,479.03	1,448.04	12.	4,411.
18 SEP 86 1200	1,719.36	1,661.34	1,604.66	1,568.05	1,568.02	1,479.03	1,448.03	12.	4,438.

1

STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR
1 AUG 86 1200

SSARR MODEL

DATE-HOUR	00001150 EYEBROW LAKE NAT ELEVATION FEET-MSL	00001795 BUFFALO POUND LA ELEVATION FEET-MSL	00095804 LAST MOUNTAIN LA ELEVATION FEET-MSL	00297199 ECHO LAKE AT FIS ELEVATION FEET-MSL	00297399 KATEPWA LAKE AT ELEVATION FEET-MSL	00297699 CROOKED LAKE NEA ELEVATION FEET-MSL	00297799 ROUND LAKE NEAR ELEVATION FEET-MSL	00097999 QUAPPELLE RIVER FLOW CFS	S97999 STORAGE ACRE-FEET
19 SEP 86 1200	1,719.36	1,661.33	1,604.65	1,568.05	1,568.02	1,479.03	1,448.03	12.	4,464.
20 SEP 86 1200	1,719.36	1,661.33	1,604.65	1,568.05	1,568.02	1,479.02	1,448.03	11.	4,490.
21 SEP 86 1200	1,719.35	1,661.33	1,604.64	1,568.04	1,568.02	1,479.02	1,448.02	11.	4,515.
22 SEP 86 1200	1,719.35	1,661.32	1,604.64	1,568.04	1,568.02	1,479.02	1,448.02	11.	4,540.
23 SEP 86 1200	1,719.35	1,661.32	1,604.63	1,568.04	1,568.02	1,479.02	1,448.02	11.	4,565.
24 SEP 86 1200	1,719.35	1,661.32	1,604.63	1,568.04	1,568.02	1,479.02	1,448.01	11.	4,589.
25 SEP 86 1200	1,719.35	1,661.32	1,604.62	1,568.04	1,568.02	1,479.02	1,448.01	11.	4,613.
26 SEP 86 1200	1,719.35	1,661.31	1,604.62	1,568.04	1,568.02	1,479.02	1,448.01	10.	4,637.
27 SEP 86 1200	1,719.35	1,661.31	1,604.61	1,568.04	1,568.02	1,479.02	1,448.01	10.	4,660.
28 SEP 86 1200	1,719.35	1,661.31	1,604.61	1,568.04	1,568.02	1,479.02	1,448.00	10.	4,682.
29 SEP 86 1200	1,719.35	1,661.30	1,604.60	1,568.04	1,568.02	1,479.02	1,448.00	9.	4,704.
30 SEP 86 1200	1,719.35	1,661.30	1,604.60	1,568.04	1,568.02	1,479.02	1,448.00	9.	4,725.
1 OCT 86 1200	1,719.35	1,661.30	1,604.59	1,568.04	1,568.02	1,479.02	1,448.00	8.	4,745.
2 OCT 86 1200	1,719.34	1,661.29	1,604.59	1,568.04	1,568.02	1,479.02	1,448.00	8.	4,764.
3 OCT 86 1200	1,719.34	1,661.29	1,604.58	1,568.04	1,568.02	1,479.02	1,448.00	8.	4,782.
4 OCT 86 1200	1,719.34	1,661.28	1,604.58	1,568.04	1,568.02	1,479.02	1,448.00	7.	4,799.
5 OCT 86 1200	1,719.34	1,661.28	1,604.58	1,568.04	1,568.02	1,479.02	1,448.00	7.	4,816.
6 OCT 86 1200	1,719.34	1,661.28	1,604.57	1,568.04	1,568.02	1,479.02	1,448.00	6.	4,832.
7 OCT 86 1200	1,719.34	1,661.27	1,604.57	1,568.04	1,568.02	1,479.02	1,448.00	6.	4,847.
8 OCT 86 1200	1,719.33	1,661.27	1,604.56	1,568.04	1,568.02	1,479.02	1,448.00	5.	4,861.
9 OCT 86 1200	1,719.33	1,661.26	1,604.56	1,568.04	1,568.01	1,479.02	1,448.00	5.	4,874.
10 OCT 86 1200	1,719.33	1,661.26	1,604.55	1,568.03	1,568.01	1,479.02	1,448.00	4.	4,886.
11 OCT 86 1200	1,719.33	1,661.25	1,604.55	1,568.03	1,568.01	1,479.02	1,448.00	4.	4,897.
12 OCT 86 1200	1,719.33	1,661.25	1,604.54	1,568.03	1,568.01	1,479.02	1,448.00	4.	4,908.
13 OCT 86 1200	1,719.33	1,661.24	1,604.54	1,568.03	1,568.01	1,479.02	1,448.00	3.	4,918.
14 OCT 86 1200	1,719.32	1,661.24	1,604.53	1,568.03	1,568.01	1,479.02	1,448.00	3.	4,927.
15 OCT 86 1200	1,719.32	1,661.23	1,604.53	1,568.03	1,568.01	1,479.02	1,448.00	3.	4,936.
16 OCT 86 1200	1,719.32	1,661.23	1,604.52	1,568.03	1,568.01	1,479.02	1,448.00	3.	4,944.
17 OCT 86 1200	1,719.32	1,661.22	1,604.52	1,568.03	1,568.01	1,479.02	1,448.00	2.	4,952.
18 OCT 86 1200	1,719.32	1,661.22	1,604.51	1,568.03	1,568.01	1,479.02	1,448.00	2.	4,959.
19 OCT 86 1200	1,719.32	1,661.21	1,604.51	1,568.03	1,568.01	1,479.02	1,448.00	2.	4,966.
20 OCT 86 1200	1,719.31	1,661.21	1,604.50	1,568.03	1,568.01	1,479.01	1,448.00	2.	4,972.
21 OCT 86 1200	1,719.31	1,661.21	1,604.50	1,568.03	1,568.01	1,479.01	1,448.00	1.	4,978.
22 OCT 86 1200	1,719.31	1,661.20	1,604.50	1,568.03	1,568.01	1,479.01	1,448.00	1.	4,984.
23 OCT 86 1200	1,719.31	1,661.20	1,604.49	1,568.03	1,568.01	1,479.01	1,448.00	1.	4,989.
24 OCT 86 1200	1,719.31	1,661.19	1,604.49	1,568.03	1,568.01	1,479.01	1,448.00	1.	4,994.
25 OCT 86 1200	1,719.31	1,661.19	1,604.48	1,568.03	1,568.01	1,479.01	1,448.00	1.	4,999.
26 OCT 86 1200	1,719.30	1,661.18	1,604.48	1,568.03	1,568.01	1,479.01	1,448.00	1.	5,004.
27 OCT 86 1200	1,719.30	1,661.18	1,604.47	1,568.03	1,568.01	1,479.01	1,448.00	1.	5,008.
28 OCT 86 1200	1,719.30	1,661.17	1,604.47	1,568.03	1,568.01	1,479.01	1,448.00	1.	5,012.
29 OCT 86 1200	1,719.30	1,661.17	1,604.46	1,568.03	1,568.01	1,479.01	1,448.00	1.	5,016.
30 OCT 86 1200	1,719.30	1,661.16	1,604.46	1,568.03	1,568.01	1,479.01	1,448.00	1.	5,020.
31 OCT 86 1200	1,719.30	1,661.16	1,604.45	1,568.03	1,568.01	1,479.01	1,448.00	1.	5,024.
1 NOV 86 1200	1,719.30	1,661.16	1,604.45	1,568.03	1,568.01	1,479.01	1,448.00	1.	5,028.
2 NOV 86 1200	1,719.30	1,661.16	1,604.45	1,568.03	1,568.02	1,479.02	1,448.00	1.	5,031.
3 NOV 86 1200	1,719.30	1,661.16	1,604.45	1,568.04	1,568.02	1,479.02	1,448.00	1.	5,034.
4 NOV 86 1200	1,719.30	1,661.16	1,604.45	1,568.04	1,568.02	1,479.02	1,448.00	1.	5,037.
5 NOV 86 1200	1,719.30	1,661.16	1,604.46	1,568.04	1,568.02	1,479.02	1,448.01	1.	5,040.
6 NOV 86 1200	1,719.30	1,661.16	1,604.46	1,568.05	1,568.03	1,479.02	1,448.01	1.	5,043.

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STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR
1 AUG 86 1200

SSARR MODEL

DATE-HOUR	00001150 EYEBROW LAKE NAT ELEVATION FEET-MSL	00001795 BUFFALO POUND LA ELEVATION FEET-MSL	00095804 LAST MOUNTAIN LA ELEVATION FEET-MSL	00297199 ECHO LAKE AT FIS ELEVATION FEET-MSL	00297399 KATEPWA LAKE AT ELEVATION FEET-MSL	00297699 CROOKED LAKE NEA ELEVATION FEET-MSL	00297799 ROUND LAKE NEAR ELEVATION FEET-MSL	00097999 QUAPPELLE RIVER FLOW CFS	S97999 STORAGE ACRE-FEET
7 NOV 86 1200	1,719.30	1,661.16	1,604.46	1,568.05	1,568.03	1,479.03	1,448.01	1.	5,046.
8 NOV 86 1200	1,719.30	1,661.16	1,604.46	1,568.05	1,568.03	1,479.03	1,448.01	1.	5,049.
9 NOV 86 1200	1,719.30	1,661.16	1,604.46	1,568.05	1,568.03	1,479.03	1,448.01	1.	5,052.
10 NOV 86 1200	1,719.30	1,661.16	1,604.46	1,568.06	1,568.03	1,479.03	1,448.01	1.	5,055.
11 NOV 86 1200	1,719.30	1,661.16	1,604.46	1,568.06	1,568.03	1,479.03	1,448.01	1.	5,058.
12 NOV 86 1200	1,719.30	1,661.16	1,604.46	1,568.06	1,568.03	1,479.03	1,448.02	1.	5,061.
13 NOV 86 1200	1,719.30	1,661.16	1,604.46	1,568.06	1,568.03	1,479.03	1,448.02	1.	5,064.
14 NOV 86 1200	1,719.30	1,661.16	1,604.46	1,568.06	1,568.03	1,479.03	1,448.02	1.	5,067.
15 NOV 86 1200	1,719.30	1,661.16	1,604.47	1,568.07	1,568.04	1,479.03	1,448.02	1.	5,070.
16 NOV 86 1200	1,719.30	1,661.16	1,604.47	1,568.07	1,568.04	1,479.03	1,448.02	1.	5,073.
17 NOV 86 1200	1,719.30	1,661.16	1,604.47	1,568.07	1,568.04	1,479.03	1,448.02	1.	5,076.
18 NOV 86 1200	1,719.30	1,661.16	1,604.47	1,568.07	1,568.04	1,479.03	1,448.02	1.	5,079.
19 NOV 86 1200	1,719.30	1,661.16	1,604.47	1,568.07	1,568.04	1,479.03	1,448.02	1.	5,082.
20 NOV 86 1200	1,719.30	1,661.16	1,604.47	1,568.07	1,568.04	1,479.03	1,448.03	1.	5,085.
21 NOV 86 1200	1,719.30	1,661.16	1,604.47	1,568.07	1,568.04	1,479.03	1,448.03	1.	5,088.

22 NOV 86 1200	1,719.30	1,661.16	1,604.47	1,568.07	1,568.04	1,479.03	1,448.03	1.	5,091.
23 NOV 86 1200	1,719.30	1,661.16	1,604.47	1,568.07	1,568.04	1,479.03	1,448.03	1.	5,094.
24 NOV 86 1200	1,719.30	1,661.16	1,604.47	1,568.07	1,568.04	1,479.03	1,448.03	1.	5,097.
25 NOV 86 1200	1,719.30	1,661.16	1,604.47	1,568.08	1,568.04	1,479.03	1,448.03	1.	5,100.
26 NOV 86 1200	1,719.30	1,661.16	1,604.48	1,568.08	1,568.04	1,479.04	1,448.03	1.	5,103.
27 NOV 86 1200	1,719.30	1,661.16	1,604.48	1,568.08	1,568.05	1,479.04	1,448.03	1.	5,107.
28 NOV 86 1200	1,719.30	1,661.16	1,604.48	1,568.08	1,568.05	1,479.04	1,448.03	1.	5,111.
29 NOV 86 1200	1,719.30	1,661.16	1,604.48	1,568.08	1,568.05	1,479.05	1,448.03	1.	5,115.
30 NOV 86 1200	1,719.30	1,661.16	1,604.48	1,568.08	1,568.05	1,479.05	1,448.03	1.	5,120.
1 DEC 86 1200	1,719.30	1,661.16	1,604.48	1,568.08	1,568.05	1,479.06	1,448.03	2.	5,126.
2 DEC 86 1200	1,719.30	1,661.16	1,604.48	1,568.09	1,568.06	1,479.08	1,448.04	2.	5,133.
3 DEC 86 1200	1,719.30	1,661.16	1,604.48	1,568.09	1,568.07	1,479.10	1,448.05	3.	5,141.
4 DEC 86 1200	1,719.30	1,661.16	1,604.49	1,568.10	1,568.08	1,479.11	1,448.06	3.	5,150.
5 DEC 86 1200	1,719.30	1,661.16	1,604.49	1,568.11	1,568.09	1,479.13	1,448.07	4.	5,160.
6 DEC 86 1200	1,719.30	1,661.16	1,604.49	1,568.11	1,568.10	1,479.15	1,448.08	4.	5,171.
7 DEC 86 1200	1,719.30	1,661.16	1,604.49	1,568.12	1,568.11	1,479.18	1,448.09	5.	5,183.
8 DEC 86 1200	1,719.30	1,661.17	1,604.49	1,568.13	1,568.12	1,479.20	1,448.09	5.	5,195.
9 DEC 86 1200	1,719.30	1,661.17	1,604.49	1,568.13	1,568.12	1,479.22	1,448.10	5.	5,208.
10 DEC 86 1200	1,719.30	1,661.17	1,604.49	1,568.14	1,568.13	1,479.24	1,448.10	5.	5,222.
11 DEC 86 1200	1,719.30	1,661.17	1,604.50	1,568.14	1,568.14	1,479.26	1,448.10	6.	5,236.
12 DEC 86 1200	1,719.30	1,661.17	1,604.50	1,568.15	1,568.14	1,479.28	1,448.10	5.	5,250.
13 DEC 86 1200	1,719.30	1,661.17	1,604.50	1,568.16	1,568.15	1,479.30	1,448.11	5.	5,264.
14 DEC 86 1200	1,719.30	1,661.17	1,604.50	1,568.16	1,568.16	1,479.32	1,448.11	5.	5,277.
15 DEC 86 1200	1,719.30	1,661.17	1,604.50	1,568.17	1,568.16	1,479.34	1,448.11	5.	5,290.
16 DEC 86 1200	1,719.30	1,661.17	1,604.50	1,568.18	1,568.17	1,479.36	1,448.11	5.	5,302.
17 DEC 86 1200	1,719.30	1,661.17	1,604.50	1,568.18	1,568.18	1,479.38	1,448.11	4.	5,314.
18 DEC 86 1200	1,719.30	1,661.17	1,604.51	1,568.19	1,568.18	1,479.39	1,448.11	4.	5,325.
19 DEC 86 1200	1,719.30	1,661.17	1,604.51	1,568.19	1,568.19	1,479.41	1,448.11	4.	5,336.
20 DEC 86 1200	1,719.30	1,661.17	1,604.51	1,568.20	1,568.19	1,479.42	1,448.11	3.	5,346.
21 DEC 86 1200	1,719.30	1,661.17	1,604.51	1,568.21	1,568.20	1,479.43	1,448.12	3.	5,355.
22 DEC 86 1200	1,719.30	1,661.17	1,604.51	1,568.21	1,568.21	1,479.44	1,448.12	3.	5,364.
23 DEC 86 1200	1,719.30	1,661.17	1,604.51	1,568.22	1,568.21	1,479.45	1,448.12	2.	5,372.
24 DEC 86 1200	1,719.30	1,661.17	1,604.51	1,568.22	1,568.22	1,479.46	1,448.12	2.	5,380.
25 DEC 86 1200	1,719.30	1,661.17	1,604.51	1,568.23	1,568.22	1,479.47	1,448.12	2.	5,387.

1 STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR
1 AUG 86 1200

SSARR MODEL

DATE-HOUR	00001150 EYEBROW LAKE NAT ELEVATION FEET-MSL	00001795 BUFFALO POUND LA ELEVATION FEET-MSL	00095804 LAST MOUNTAIN LA ELEVATION FEET-MSL	00297199 ECHO LAKE AT FIS ELEVATION FEET-MSL	00297399 KATEPWA LAKE AT ELEVATION FEET-MSL	00297699 CROOKED LAKE NEA ELEVATION FEET-MSL	00297799 ROUND LAKE NEAR ELEVATION FEET-MSL	00097999 QUAPPELLE RIVER FLOW CFS	S97999 STORAGE ACRE-FEET
26 DEC 86 1200	1,719.30	1,661.17	1,604.52	1,568.24	1,568.23	1,479.48	1,448.12	2.	5,394.
27 DEC 86 1200	1,719.30	1,661.17	1,604.52	1,568.24	1,568.23	1,479.48	1,448.12	2.	5,400.
28 DEC 86 1200	1,719.30	1,661.17	1,604.52	1,568.25	1,568.24	1,479.49	1,448.12	1.	5,406.
29 DEC 86 1200	1,719.30	1,661.17	1,604.52	1,568.25	1,568.24	1,479.50	1,448.12	1.	5,411.
30 DEC 86 1200	1,719.30	1,661.17	1,604.52	1,568.26	1,568.25	1,479.50	1,448.12	1.	5,416.
31 DEC 86 1200	1,719.30	1,661.17	1,604.52	1,568.26	1,568.25	1,479.51	1,448.12	1.	5,421.
1 JAN 87 1200	1,719.30	1,661.17	1,604.52	1,568.27	1,568.26	1,479.51	1,448.12	1.	5,426.
2 JAN 87 1200	1,719.30	1,661.17	1,604.53	1,568.27	1,568.26	1,479.52	1,448.12	1.	5,431.
3 JAN 87 1200	1,719.30	1,661.17	1,604.53	1,568.28	1,568.26	1,479.52	1,448.12	1.	5,436.
4 JAN 87 1200	1,719.30	1,661.17	1,604.53	1,568.28	1,568.27	1,479.53	1,448.12	1.	5,440.
5 JAN 87 1200	1,719.30	1,661.17	1,604.53	1,568.29	1,568.27	1,479.53	1,448.12	1.	5,444.
6 JAN 87 1200	1,719.30	1,661.17	1,604.53	1,568.29	1,568.28	1,479.54	1,448.12	1.	5,448.
7 JAN 87 1200	1,719.30	1,661.17	1,604.53	1,568.30	1,568.28	1,479.54	1,448.12	1.	5,452.
8 JAN 87 1200	1,719.30	1,661.17	1,604.53	1,568.30	1,568.29	1,479.54	1,448.12	1.	5,455.
9 JAN 87 1200	1,719.30	1,661.17	1,604.54	1,568.31	1,568.29	1,479.55	1,448.12	0.	5,458.
10 JAN 87 1200	1,719.30	1,661.17	1,604.54	1,568.31	1,568.30	1,479.55	1,448.12	0.	5,461.
11 JAN 87 1200	1,719.30	1,661.17	1,604.54	1,568.32	1,568.30	1,479.55	1,448.12	0.	5,463.
12 JAN 87 1200	1,719.30	1,661.17	1,604.54	1,568.32	1,568.30	1,479.56	1,448.12	0.	5,465.
13 JAN 87 1200	1,719.30	1,661.17	1,604.54	1,568.33	1,568.31	1,479.56	1,448.12	-0.	5,467.
14 JAN 87 1200	1,719.30	1,661.17	1,604.54	1,568.33	1,568.31	1,479.56	1,448.12	-0.	5,469.
15 JAN 87 1200	1,719.30	1,661.17	1,604.54	1,568.34	1,568.32	1,479.56	1,448.12	-0.	5,470.
16 JAN 87 1200	1,719.30	1,661.17	1,604.55	1,568.34	1,568.32	1,479.57	1,448.12	-0.	5,471.
17 JAN 87 1200	1,719.30	1,661.17	1,604.55	1,568.35	1,568.33	1,479.57	1,448.12	-0.	5,472.
18 JAN 87 1200	1,719.30	1,661.17	1,604.55	1,568.35	1,568.33	1,479.57	1,448.12	-1.	5,473.
19 JAN 87 1200	1,719.30	1,661.17	1,604.55	1,568.36	1,568.34	1,479.57	1,448.12	-1.	5,474.
20 JAN 87 1200	1,719.30	1,661.17	1,604.55	1,568.36	1,568.34	1,479.58	1,448.12	-1.	5,475.
21 JAN 87 1200	1,719.30	1,661.17	1,604.55	1,568.36	1,568.34	1,479.58	1,448.12	-1.	5,476.
22 JAN 87 1200	1,719.30	1,661.17	1,604.55	1,568.37	1,568.35	1,479.58	1,448.12	-1.	5,476.
23 JAN 87 1200	1,719.30	1,661.17	1,604.56	1,568.37	1,568.35	1,479.58	1,448.12	-1.	5,476.
24 JAN 87 1200	1,719.30	1,661.17	1,604.56	1,568.38	1,568.36	1,479.58	1,448.12	-1.	5,476.
25 JAN 87 1200	1,719.30	1,661.17	1,604.56	1,568.38	1,568.36	1,479.59	1,448.12	-1.	5,476.
26 JAN 87 1200	1,719.30	1,661.17	1,604.56	1,568.39	1,568.36	1,479.59	1,448.12	-1.	5,476.
27 JAN 87 1200	1,719.30	1,661.17	1,604.56	1,568.39	1,568.37	1,479.59	1,448.12	-1.	5,476.
28 JAN 87 1200	1,719.30	1,661.17	1,604.56	1,568.39	1,568.37	1,479.59	1,448.12	-1.	5,476.
29 JAN 87 1200	1,719.30	1,661.17	1,604.56	1,568.40	1,568.38	1,479.59	1,448.12	-1.	5,476.
30 JAN 87 1200	1,719.30	1,661.17	1,604.57	1,568.40	1,568.38	1,479.59	1,448.12	-1.	5,476.
31 JAN 87 1200	1,719.30	1,661.17	1,604.57	1,568.41	1,568.39	1,479.60	1,448.12	-1.	5,476.
1 FEB 87 1200	1,719.30	1,661.17	1,604.57	1,568.41	1,568.39	1,479.60	1,448.12	-1.	5,476.
2 FEB 87 1200	1,719.30	1,661.17	1,604.57	1,568.41	1,568.39	1,479.60	1,448.12	-1.	5,476.
3 FEB 87 1200	1,719.30	1,661.17	1,604.57	1,568.42	1,568.40	1,479.60	1,448.12	-1.	5,476.
4 FEB 87 1200	1,719.30	1,661.17	1,604.57	1,568.42	1,568.40	1,479.60	1,448.12	-1.	5,476.
5 FEB 87 1200	1,719.30	1,661.17	1,604.57	1,568.43	1,568.41	1,479.60	1,448.12	-1.	5,476.
6 FEB 87 1200	1,719.30	1,661.17	1,604.58	1,568.43	1,568.41	1,479.60	1,448.12	-1.	5,476.
7 FEB 87 1200	1,719.30	1,661.17	1,604.58	1,568.43	1,568.42	1,479.61	1,448.12	-1.	5,476.
8 FEB 87 1200	1,719.30	1,661.17	1,604.58	1,568.44	1,568.42	1,479.61	1,448.12	-1.	5,476.
9 FEB 87 1200	1,719.30	1,661.17	1,604.58	1,568.44	1,568.42	1,479.61	1,448.12	-1.	5,476.
10 FEB 87 1200	1,719.30	1,661.17	1,604.58	1,568.45	1,568.43	1,479.61	1,448.12	-1.	5,476.
11 FEB 87 1200	1,719.30	1,661.17	1,604.58	1,568.45	1,568.43	1,479.61	1,448.12	-1.	5,476.
12 FEB 87 1200	1,719.30	1,661.17	1,604.58	1,568.45	1,568.44	1,479.61	1,448.12	-1.	5,476.

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STREAMFLOW ROUTING

RUN DATE RUN NO. INITIAL DATE, HOUR
1 AUG 86 1200

DATE-HOUR	00001150 EYEBROW LAKE NAT ELEVATION FEET-MSL	00001795 BUFFALO POUND LA ELEVATION FEET-MSL	00095804 LAST MOUNTAIN LA ELEVATION FEET-MSL	00297199 ECHO LAKE AT FIS ELEVATION FEET-MSL	00297399 KATEPWA LAKE AT ELEVATION FEET-MSL	00297699 CROOKED LAKE NEA ELEVATION FEET-MSL	00297799 ROUND LAKE NEAR ELEVATION FEET-MSL	00097999 QUAPPELLE RIVER FLOW CFS	S97999 STORAGE ACRE-FEET
13 FEB 87 1200	1,719.30	1,661.17	1,604.59	1,568.46	1,568.44	1,479.61	1,448.12	-1.	5,476.
14 FEB 87 1200	1,719.30	1,661.17	1,604.59	1,568.46	1,568.44	1,479.61	1,448.12	-1.	5,476.
15 FEB 87 1200	1,719.30	1,661.17	1,604.59	1,568.47	1,568.45	1,479.61	1,448.12	-1.	5,476.
16 FEB 87 1200	1,719.30	1,661.17	1,604.59	1,568.47	1,568.45	1,479.62	1,448.12	-1.	5,476.
17 FEB 87 1200	1,719.30	1,661.17	1,604.59	1,568.47	1,568.46	1,479.62	1,448.12	-1.	5,476.
18 FEB 87 1200	1,719.30	1,661.17	1,604.59	1,568.48	1,568.46	1,479.62	1,448.12	-1.	5,476.
19 FEB 87 1200	1,719.30	1,661.17	1,604.59	1,568.48	1,568.46	1,479.62	1,448.12	-1.	5,476.
20 FEB 87 1200	1,719.30	1,661.17	1,604.60	1,568.49	1,568.47	1,479.62	1,448.12	-1.	5,476.
21 FEB 87 1200	1,719.30	1,661.17	1,604.60	1,568.49	1,568.47	1,479.62	1,448.12	-1.	5,476.
22 FEB 87 1200	1,719.30	1,661.17	1,604.60	1,568.49	1,568.48	1,479.62	1,448.12	-1.	5,476.
23 FEB 87 1200	1,719.30	1,661.17	1,604.60	1,568.50	1,568.48	1,479.62	1,448.12	-1.	5,476.
24 FEB 87 1200	1,719.30	1,661.17	1,604.60	1,568.50	1,568.48	1,479.62	1,448.12	-1.	5,476.
25 FEB 87 1200	1,719.30	1,661.17	1,604.60	1,568.51	1,568.49	1,479.62	1,448.12	-1.	5,476.
26 FEB 87 1200	1,719.30	1,661.17	1,604.60	1,568.51	1,568.49	1,479.62	1,448.12	-1.	5,476.
27 FEB 87 1200	1,719.30	1,661.17	1,604.60	1,568.51	1,568.50	1,479.62	1,448.12	-1.	5,476.
28 FEB 87 1200	1,719.30	1,661.17	1,604.61	1,568.52	1,568.50	1,479.62	1,448.12	-1.	5,476.
1 MAR 87 1200	1,719.30	1,661.17	1,604.61	1,568.52	1,568.50	1,479.62	1,448.12	-1.	5,476.