HYDROMETRIC DATA COLLECTION IN THE MACKENZIE RIVER BASIN

by

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The data for this report were obtained as a result of investigations carried out under the Environmental-Social Program, Northern Pipelines, of the Task Force on Northern Oil Development, Government of Canada. While the studies and investigations were initiated to provide information necessary for the assessment of pipeline proposals, the knowledge gained is equally useful in planning and assessing highways and other development projects.

SUMMARY

This report outlines the operations of Water Survey of Canada in the Mackenzie Valley area, with particular emphasis on the period since the inception of the Environmental—Social Program, Northern Pipelines.

Prior to 1971 work in the Mackenzie Valley area by Water Survey of Canada was limited. During 1971 and 1972, ten stream gauging stations were constructed at various locations along the Mackenzie River and some of its tributaries. This brings the total number of stations in the Mackenzie Valley area to twenty-six. Eight of the gauging stations are stage only for navigation purposes. Stage and discharge data are collected at the remaining eighteen.

Sediment discharge data collection was commenced in 1972 at nine locations throughout the study area.

Measurement techniques have been changed to meet the needs of the large rivers. Tellurometers are being utilized for distance measuring, and echo sounders for depth measuring. The ERTS satellite system set up in the 1970's is being utilized to transmit stage data to Calgary from northern locations for use in navigation forecasts along the Mackenzie Waterway.

The present network of hydrometric stations in the Mackenzie area is not sufficient to supply the necessary data required for engineering designs on all streams by conventional methods. Correlations of flow rates between the gauged and ungauged areas have been attempted with limited success. These design problems as well as the chemical and biological studies underway that require hydrometric data will have to rely on theoretical methods to satisfy their requirements for flow data.

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INTRODUCTION

One of the functions of Water Survey of Canada is the preparation of an inventory of surface water data in Canada. Prior to 1971, most of the work was carried out in the more populated areas of the country with little effort directed towards work in the Northwest Territories.

The increased oil activity, and the possibility of an oil or gas pipeline being constructed in the Mackenzie area, resulted in the realization that very little was known about water resources of the North and, specifically, of the area through which the pipeline would likely traverse.

The specific objectives of the Water Survey of Canada as related to the Mackenzie Pipeline Study are as follows:

1) To prepare an inventory of surface water data for the Mackenzie basin.

2) To provide basic hydrometric data to indicate possible flood magnitudes, and peak stages at break-up.

3) To provide river level forecasts on the Mackenzie navigation routes.

4) To document sediment transport in fish production areas.

5) To assist in programs to determine the pattern of flow through the Mackenzie Delta.

6) To act as a consultant, on matters pertaining to surface water, to other DOE services involved in the study.

A pipeline route along the Mackenzie Valley would cross many streams. The line would probably go over some of them, but would go under most of them. Rates of water flow, timing and magnitude of flood peaks, scour depths and ice thicknesses are some of the hydrologic parameters that are required for design and construction purposes.

RESUME OF EXISTING DATA

The availability of hydrometric data in the Mackenzie River basin is very limited. As of 1955, there were only nine hydrometric stations operating north of the 60th parallel and of these only two provided daily streamflow data (Clark, 1958[1]). In 1960 an office was opened in Fort Smith, Northwest Territories, charged with the responsibility of establishing and maintaining streamflow and water level stations throughout the District of Mackenzie in the Northwest Territories. Priorities as to rivers gauged, gauge locations, etc., were first given to specifically expressed needs.

Using this criterion, a number of water level gauges were located along the Mackenzie River to aid in forecasting water levels for navigation purposes on the Mackenzie Waterway. Water Transport was, and still is, the major method of transporting goods to the Mackenzie area. (Figures 1 to 5 in the appendix show the results for the 1972 forecast season.) Current water levels at upstream sites on the Mackenzie, Fort Providence and Fort Simpson, and the Liard at Fort Liard, are telephoned to the Calgary office. The water levels, combined with estimated precipitation and antecedent moisture conditions, are used to forecast levels, three, four and five days in advance for Wrigley, Norman Wells, Sans Sault Rapids and Fort Good Hope. The forecast curves are under constant revision as inflow from the ungauged areas in the basin contribute and necessitate changes in the forecast levels.

Actual water level data from the downstream sites are transmitted to Calgary, where they are used to check the accuracy of the forecast values.

Stream gauges presently being operated on the Mackenzie River are

as follows (Figure 7):

Station		Record Available
Mackenzie River near Fort Providence	—	1958-72 stage and discharge
Mackenzie River at Fort Simpson	—	1938-72 stage and discharge
Mackenzie River at Camsell Bend	—	1972 stage only
Mackenzie River at McGern Island	—	1972 stage only
Mackenzie River near Wrigley	—	1963-67, 1971-72 stage only
Mackenzie River near Blackwater River	—	1972 stage only
Mackenzie River at Old Fort Point	—	1972 stage only
Mackenzie River at Norman Wells	—	1943-56, 1960-72 stage and discharge
Mackenzie River at Sans Sault Rapids	—	1962-64, 1968-72 stage only
Mackenzie River at Ramparts	—	1972 stage only
Mackenzie River at Fort Good Hope	—	1963-72 stage only
Mackenzie River above Arctic Red River	—	1972 stage and discharge

In addition to these gauges on the Mackenzie River, the following gauges are being operated on a number of the main tributaries. Stage record, as well as discharge data, is being collected at all these sites, unless indicated as stage only.

Left-Bank Tributaries		Record Available
Kakisa River	—	1962-72
Trout River	—	1965-72
Liard River at Fort Liard	—	1942-58 (stage only), 1959-72
Liard River near the Mouth	—	1972
Martin River	—	1972
Redstone River	—	1964-72
Arctic Red River	—	1968-72
Peel River	—	1969-72

Right-Bank Tributaries		Record Available
Harris River	—	1972
Willowlake River	—	1964-72
Great Bear River	—	1962-72

In 1972 a gauging station was established on the Firth River which rises in the British Mountains and flows north, entering the Beaufort Sea

near Herschel Island. An example of streamflow and water level data is shown in Figure 6 in the Appendix.

Sediment discharge measurements (Figure 8) were taken in 1972 at the following sites:

1) Hay River at Hay River.
2) Kakisa River at outlet of Kakisa Lake.
3) Mackenzie River above Fort Simpson.
4) Liard River near the Mouth.
5) Harris River near Fort Simpson.
6) Mackenzie River above Arctic Red River.
7) Arctic Red River near the Mouth.
8) Peel River above Fort McPherson.
9) Firth River near the Mouth.

Daily sediment sampling, consisting of single samples from which the total sediment load could be calculated, were taken on the Hay River at Hay River and the Mackenzie River above Fort Simpson. Pages 46 to 56 in the Appendix show the sediment results for 1972.

The network of stations in the basin where sediment and flow data are being collected is increasing. However, the network is still not adequate to allow hydrologic analyses on all streams by conventional methods. Indirect measuring techniques and correlation analyses are used to define the unknown parameters on streams that do not have actual flow data.

The flow rates through the Delta channels have also been determined for winter and fall low flow conditions. Flow distribution and rates of flow are required in pollution studies and would be required in the event of an oil or toxic spill within the Delta complex. Flood and ice levels data would also be required for any design or construction work that would be undertaken within the Delta.

Extreme flood events in the Mackenzie Mountains area in the past few years have presented the opportunity to obtain estimates of peak flows on some of the western tributaries of the Mackenzie. MacKay, Fogarasi and Spitzer[2] obtained estimates of peak flows on the Keele, Mountain and Arctic Red Rivers after the 1969 high waters. High water in 1972 on the North and South Nahanni River has also been surveyed. A report on these extreme floods is being prepared for release in 1973. Figures 9 and 10 show the 1972 flows for the Liard River at Fort Liard and the Mackenzie River at Norman Wells compared to the long-term mean. Flows for 1972 at both sites were above the mean due to the high water in July and early August. In contrast, Figure 11 for the Willowlake River near the Mouth, as eastern tributary, shows flows for 1972 slightly below the long-term mean.

Two reports by Bennett[8,9] on Great Slave Lake water levels and Mackenzie River water levels are currently available. Church[10,11] on behalf of the Mackenzie Valley Pipeline Research, Ltd., has also prepared reports on "The Hydrology and Fluvial Characteristics of Rivers in North Alaska, Yukon, Northwest Territories and Northern Alberta." These reports are not available for general distribution at this time.

STUDY AREAS

The area of the Water Survey of Canada pipeline study consists of the Mackenzie drainage basin from Hay River through the Mackenzie Delta and the north slope of the Yukon Territory from the British Mountains to the Beaufort Sea. Within the area a number of rivers have been selected for study.

Requests for data on specific streams in the area required by other study groups are given first priority. Gauges have been installed on the Martin and Harris Rivers to assist study by the Fisheries Research Board. Measurements were also taken on the Rengleng River and Campbell Creek to assist other facets of their study. Gauges were installed at these two sites in March, 1973 and will be operational at spring break-up. The Firth River was instrumented at the request of the Fisheries Service for data on north-slope streams. The monitoring of flows through the Delta channels is being done at the request of the Glaciology Division. Water Quality Division are using all our streamflow data in their chemical analysis studies. Snow survey programs are also being undertaken at selected areas throughout the basin at the request of Atmospheric Environment Service. Six storage precipitation gauges are being operated for the same agency.

METHODS OF DATA COLLECTION

1. Field Techniques

1.1. Water Level Recording

Most stream gauging stations are located at remote sites, necessitating the use of reliable equipment that can operate for several months without servicing. The piece of equipment normally used to collect stage or water level data is the Leupold Stevens A-35 Analog Recorder. This recorder is driven by a servo manometer or pressure sensing device which senses the changes in river level and up-dates the recorder.

To keep the equipment operating twelve months of the year, it was necessary to develop heating devices which would keep the equipment at suitable operating temperatures, using a minimum of fuel. Propane catalytic heaters with low temperature thermostats and specially designed heat compartments were found to be most economical.

1.2. Flow Measuring

Discharge or flow measurements are made at monthly intervals at each stream gauge location. It is known that the velocity of the water varies from surface to stream bed, and from one side of the river to the other. The stream bed is also constantly shifting or changing in cross-sectional configuration. To get an accurate measurement of the total discharge through the cross-section, the section is first arbitrarily divided into a minimum of twenty sections. Measurements of width, depth and mean velocity are obtained for each section. Mean velocity may be derived from

one position within the vertical section, usually at six-tenths of the depth, or from the average of the velocities at two points usually two-tenths depth and eight-tenths depth.

The area "a" for each segment is obtained by multiplying the width "w" by the depth "d." The discharge "q" for the segment is then obtained by multiplying area "a" by mean velocity "v."

The total discharge for the river, at that particular time, is then obtained by summing the discharges from all the individual segments.

$$Q = q_1 + q_2 \ldots\ldots + q_n$$

$$= a_1 v_1 + a_2 v_2 \ldots\ldots + a_n v_n$$

1.3. Sediment Measuring

Figure 12 in the Appendix shows a typical sampling program for sediment discharge. A sampling program is prepared for each stream where sediment data are to be collected.

Measurements are usually made by the depth-integrating method to determine the amount of suspended sediment load carried in the entire cross-section of the stream and to determine the average suspended sediment concentration in the cross-section. It is known that the concentration of suspended sediments tends to increase from the surface of the water in the stream to the stream bed, and to vary from side to side. When making depth-integrated sediment discharge measurements, the stream cross-section is divided into at least five equal-flow portions. A representative suspended sediment sample is taken in each portion by sampling from top to bottom at a constant rate. For each part of the cross-

section, the suspended sediment discharge "r" may be computed by multiplying the flow "q" by the suspended sediment concentration "c."

$$r = qc$$

For the whole cross-section, the suspended sediment discharge "R" may be computed by adding the sediment discharges for the separate areas.

$$R = q_1 c_1 + q_2 c_2 \ldots\ldots + q_n c_n$$

The individual or "daily" suspended sediment samples, taken at a specific location in a cross-section, are collected daily during periods with average or high sediment concentration. In the periods with very heavy sediment concentration, two or three sediment samplings are taken per day, while in the periods with low concentration, one individual sediment observation every few days is felt to be sufficient. The relationship between the suspended sediment concentration of the individual samples and the average concentration in the cross-section determined from the suspended sediment discharge is established for every station. Using this relationship, the sediment concentrations of the individual observations are adjusted to reflect the average suspended sediment concentration in the cross-section. The daily suspended sediment loads, in tons per day, are computed on the basis of stream discharges and the adjusted suspended sediment concentrations.

The individual samples are usually collected by an "observer" who lives near the measuring site and is hired by Water Survey of Canada to collect these samples at pre-determined intervals. In most locations in the Mackenzie River basin, an observer

is not available. It is then necessary to use automatic sampling systems. These systems are programmed to take samples at various time intervals dependent on the water elevation. They can be set to sample as often as every half hour through to once a day in regular flow periods, or to shut off completely in low flow periods. These units can usually be left unattended for periods of up to one month, except in high flow periods when the number of samples taken may exceed the capacity of the machine (usually 40 samples) or when the battery voltages may drop below working level due to the accelerated samplings.

Suspended sediment measurements are presently being made at nine locations in the study area, with daily samples being collected at two of the locations.

1.4. Measuring Equipment

Heavy sediment samplers and sounding weights, ranging in weight to three hundred pounds, are required to properly sample flow rates and sediment loads in the large rivers encountered in the Mackenzie basin. To handle these loads large, stable boats are required. Three catamarans were purchased for this job. These units are twin-hulled, 33-foot vessels with a 14-foot beam. Powered winches are available fore and aft on the boats, allowing simultaneous sediment and flow measurements to be made. Limited accommodation for a crew of three is available on board. The boats are equipped with all the necessary radios, lights, etc., to comply with the communications and navigation regulations of the waterway.

2. Experimental Techniques

In any of the work on the rivers, it is necessary to know the position of the sampling points relative to the shoreline. Previous methods involved using a sextant and a measured baseline laid out on one shore. This method is time consuming and relatively inaccurate. In 1972, most of the distance measuring work on the larger rivers was done using a tellurometer. This is a measuring device using the time of travel of high frequency radio waves between the two units that make up the set. Distances of many thousands of feet can be measured to close accuracy using this instrument. The unit is designed to be operated from a boat or other moving platform, and can make the necessary compensation as the inter-unit signals are lost due to boat movements.

The tellurometer is also being used in an experimental method of making a river discharge measurement, the "Moving Boat" method. Distances, water depths and water velocities are all recorded continuously and simultaneously as the boat traverses the river on a fixed course. Using this method, a discharge measurement can be made in about ten per cent of the normal time required. The method is still experimental; however, once perfected it will be a fast, safe method of obtaining flow measurements in flood stages where floating debris will not allow anchoring of the boat in the river as in the case of a normal discharge measurement.

One problem that has plagued the water level forecast network in the Northwest Territories is the difficulty in obtaining water level information in Calgary in time to make proper forecasts. In areas where telephone or radio facilities are not available, delays of two to three days result before data reaches the forecast office. In an effort to solve this problem, Water Survey of Canada purchased and installed two

"Data Collection Platforms" at Fort Simpson and Norman Wells to be used in conjunction with the ERTS satellite. Water level data is transmitted via the satellite to the receiving station in the U.S.A. It is then telexed to Ottawa and to Calgary. Utilizing this system, data is received in Calgary about 90 minutes after it leaves the platform. These platforms can be connected directly to the existing recording equipment at the gauging site. Data from any remote site within the range of the satellite path can now be received in Calgary within a very short time. It is hoped that more of these platforms can be purchased and installed in the remote Mackenzie Mountains area where storm events that contribute significant flows to the Mackenzie River system can be detected and used in the water level forecasts.

3. Ancillary Data

During the course of a flow measurement, a number of vital parameters are recorded. River cross-sections at the measuring site are obtained at the time of each measurement. These cross-sections can be compared and changes in stream bed configuration can be detected (Figure 13 in Appendix). Velocity profiles can also be measured and plotted.

Ice thicknesses and rates of ice formation can be computed from the discharge measurements taken during the winter months. A publication on ice thicknesses of selected streams is presently available with data to 1970[3]. Data to 1972 will be available in 1973.

Water temperatures taken at the time of each discharge measurement have also been compiled and are available to 1970 in published form[4]. An updated version will also be available in 1973.

The data collected using an A-35 recorder is a strip chart record of continuous water level data. This chart is collected each

month and brought to the office where average daily water levels are computed from the continuous record. A relationship between water level and rate of flow is computed using the monthly discharge measurements (Figure 15 in Appendix). This relationship, plus the daily water level, is used to compute daily flow rates. Publication of daily and monthly flow rates is available to 1971[5]. Daily flow and water level data for 1972 is available in unpublished form from the District Office in Calgary.

4. Phasing of the Work

The collection of flow and water level data in the field is the culmination of considerable planning and study in the office. Streams to be gauged are first chosen on the basis of specific expressed needs, or in some instances, as a stream representative of a specific area. Aerial and land reconnaissance is then undertaken to locate suitable gauge sites and suitable landing areas for aircraft in summer and winter. An excellent gauge location will often have to be abandoned in favour of a less favourable location because of the lack of suitable areas to land fixed-wing aircraft.

Once the choice of location has been made, the construction of the monitoring facilities must be undertaken. The cost of the basic instrumentation, plus the high cost of labour and access to these remote sites, results in expenditures of $10,000 on the average for each site chosen. When the cost of operation, in the order of $800 per month, is added to the initial cost, it can be appreciated that great care must be taken in choosing the gauge location to get maximum output for the funds expended.

In an effort to improve coverage of the study area and to

reduce travel times to the measuring sites, field offices were established at Fort Simpson and Norman Wells. These offices, along with the sub-office located at Inuvik, are each responsible for a specified area within the study area with regard to field data collection and streamflow and water level analysis.

Sediment data analysis is the responsibility of the sediment laboratory in Hay River. This is a portable laboratory unit set up to analyze all the sediment samples collected in the Mackenzie study area. The results of the analysis are sent to Calgary where they are processed and published on an annual basis[6].

RESULTS

1. 1971

Five continuous recording water level stations were established on the Mackenzie River in answer to a specific request from the federal Department of Public Works to improve water level forecasts for navigation purposes.

A stream gauge was installed on the Liard River near the confluence with the Mackenzie River for stage, discharge and sediment data.

A stream gauge was established on the Firth River, a tributary to the Beaufort Sea near the Alaska—Yukon border.

Reconnaissance was undertaken at seventeen tributaries to the Mackenzie River to locate possible stream gauging sites.

2. 1972

Gauging stations were constructed at three sites:

a) Mackenzie River above Arctic Red River.

b) Harris River near Fort Simpson (an eastern tributary).

c) Martin River near Fort Simpson (a western tributary).

Four of the five water level stations operated for the Department of Public Works in 1971 were moved down stream to new sites.

Sediment data collection was started at the following sites:

a) Hay River near Hay River.

b) Kakisa River at outlet Kakisa Lake.

c) Mackenzie River above Fort Simpson.

d) Liard River near the Mouth.

e) Harris River near Fort Simpson.

f) Mackenzie River at Norman Wells.

g) Mackenzie River above Arctic Red River.

h) Arctic Red River near the Mouth.

i) Peel River above Fort McPherson.

j) Firth River near the Mouth.

A series of miscellaneous measurements were made in conjunction with the Glaciology Division, Arctic Hydrology Section, to determine the distribution of flow through the Mackenzie River Delta. Knowledge of flow patterns through the Delta is required for transportation of supplies to the various drilling sites. Results to date are inconclusive and further work and analysis is required.

A limited regional hydrology analysis study of the Northwest Territories, including the Mackenzie River basin, was undertaken. Monthly flows and annual floods have been generated for some ungauged streams. Limited results are available due to the lack of streamflow data (Table 1).

Discussions were held with Bolter, Parish and Trimble, Hydrology Consultants, to determine peak flows to be used in the design of culverts along the first few hundred miles of the Mackenzie Highway. These design floods would also be required in the design and analysis of pipeline crossings. (Results in Table 2 of the Appendix.)

Data collection platforms were installed at Fort Simpson and Norman Wells. These units transmit water level information to Calgary via the ERTS satellite and receiving stations based in the United States. The water level data received are used in the daily Mackenzie Navigation Forecasts.

Streamflow and/or water level data were collected at twenty-four sites and sediment data at nine sites.

DISCUSSION

1. Relationship to Other Studies

Streamflow data is a hydrologic parameter that is utilized in many related studies. Gauging stations were located on the Harris, Martin and Rengleng Rivers and Campbell Creek at the request of the Fisheries Research Board. They require streamflow rates in their studies of aquatic organisms. Pre-disturbance rates of sediment discharge are also required to assess after-effects on the aquatic ecology of streams.

The Water Quality Division is utilizing all available flow data to quantify their chemical analysis studies.

Snow survey data and precipitation accumulation gauge data are being obtained at a number of sites on behalf of the Atmospheric Environment Service.

Some low flow data has been utilized by the Fisheries Service in conjunction with their studies on the north slopes of the Yukon Territory.

The results from the extensive measuring program undertaken in the Mackenzie Delta area on behalf of Glaciology Division will be useful in determining the distribution of flow throughout the myriad of channels within the Delta complex.

Water level forecasting will continue to be an important function of Water Survey if construction of the pipeline commences. Most of the construction material would probably be shipped to the area via barge along the Mackenzie River. The studies and improvements to the forecast methods presently being undertaken would be of utmost importance with this increased loading on the river.

2. Analysis of Results

It is not economically feasible to gauge all streams in an area. A study of such factors as drainage basin, topography, and climatic similarity is first undertaken to identify streams that are similar in nature, and to choose one or two that are representative of the area in question. Data collected on these representative or "index" streams can be used to simulate data on the ungauged streams in the area. This type of study was undertaken in late 1972 with data available to October, 1972 (Kerber 1973[7]). Mean annual floods and mean monthly flows for June to September have been generated for fourteen tributaries to the Mackenzie. Table 1 in the Appendix gives these results.

Table 2 in the Appendix shows the design floods on a number of tributaries to the Mackenzie River. These values were prepared by Bolter, Parish and Trimble in their role as Hydrology Consultants to the Department of Public Works on the Mackenzie Highway project.

There is still a requirement for additional index stations in the Mackenzie River basin to fill in the gaps along both the east and west sides of the basin.

CONCLUSIONS

Water levels for navigation on the Mackenzie River can be accurately predicted for the downstream sites during periods of normal or low flow. There is at present, however, no monitoring of extreme storm events in the Mackenzie Mountains areas with sufficient lead time to forecast the extent of high water and to make this data available to the user.

The design of bridges, culverts and pipeline crossings will require a high factor of safety as insufficient flood data are available to allow proper analysis of the individual streams using conventional methods.

IMPLICATIONS AND RECOMMENDATIONS

Stream flow rates vary on a statistical basis, thus requiring a number of years of data for proper evaluation. There seems little chance that sufficiently long records can be obtained before a pipeline application to permit adequate analysis. There are, however, a number of parameters on which data can be collected on a short-term basis and that could be used in pipeline design and construction;

a) Scour depths can be ascertained from discharge measurements before and after major flood events.

b) Dates of freeze-up and break-up are utilized in planning construction phases of bridges, river crossings, river access, etc.

c) Relationships of mean water velocity to stage can be prepared and made available for reference in case of oil or other toxic spills where travel times are required.

d) Rates of ice build-up on the river can be determined from discharge measurements taken during the winter months.

Along the Mackenzie Valley there are at present many streams for which no hydrologic data are available. In most cases it is not possible to simulate flows on these streams as there is a complete absence of base data in the area. Stream gauges will be installed in some of these areas in 1973. The data required for engineering design for specific streams will not be available in sufficient length for several years, so that any design features developed now should include a high factor of safety.

NEEDS FOR FURTHER STUDY

Streamflow data are deficient on both sides of the Mackenzie. A minimum network of gauging stations which would allow simulation of streamflow on the eastern tributaries would consist of stations on the following rivers:

1) Ochre River.
2) River between Two Mountains.
3) Blackwater River.
4) Big Smith Creek.
5) Brackett River.
6) Hanna River.
7) Hare Indian River.
8) Travaillant River.
9) Rengleng River.

A few western tributaries should be instrumented with the standard recording equipment as well as data collection platforms for the ERTS program. These stations would be used for basic data purposes, and directly for navigation forecasts. Probable rivers to be gauged would be:

1) North Nahanni River.
2) Wrigley River.
3) Keele River.
4) Mountain River.
5) Ramparts River.
6) Ontaratue River.

Data from these fifteen sites would greatly increase the amount of knowledge available in the study area. Several years of data from these sites along with the sites already monitored would be sufficient to allow simulation and extrapolation of basic hydrologic parameters for all the streams in the Mackenzie Valley from the 60th parallel through to the Mackenzie Delta and the Alaska-Yukon Border.

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APPENDIX

Table 1

Simulated Flows for Ungauged Streams

Stream	Approximate Drainage Area	Mean May Flow	Mean June Flow	Mean July Flow	Mean August Flow	Mean September Flow	Mean Annual Flood
Rabbitskin River	3,800	1,270	1,750	800	300	100	2,500
Horn River	8,390	2,200	4,900	3,750	3,300	2,800	11,500
Root River	3,870		12,800	8,950	6,000	4,600	29,500
North Nahanni River	5,470		16,000	12,500	11,500	7,600	39,500
Keele River	10,250		23,000	22,500	34,000	13,500	62,000
Blackwater River	6,530	1,850	3,500	3,000	2,550	2,000	7,800
Carcajou River	3,570		12,000	8,400	5,200	4,000	26,000
Mountain River	5,780		16,200	13,000	12,800	8,000	40,000
Ontaratue River	2,300		9,200	5,600	2,500	2,200	20,000
Ramparts River	3,250		11,500	7,700	4,600	3,500	26,000
Hare Indian River	5,980		3,150	2,570	2,300	1,750	5,800
Hart River	14,650		29,000	29,500	6,400	17,500	83,000
Snake River	8,410		20,400	18,700	24,000	11,500	52,000
Peel River	12,100		25,500	26,500	46,000	15,000	69,000

Table 2

Design Floods for Selected Rivers Along the Mackenzie Highway Route*

River	Drainage Area	Discharge
Martin	784 sq. mi.	24,000 cfs
Shale	106 sq. mi.	6,800 cfs
Willowlake	8,330 sq. mi.	90,000 cfs
River between two mountains	1,328 sq. mi.	23,400 cfs
Hodgson	124 sq. mi.	6,200 cfs
Ochre	448 sq. mi.	18,600 cfs
Whitesand	130 sq. mi.	9,200 cfs
Rainbow	26 sq. mi.	1,800 cfs
Blackwater	4,110 sq. mi.	65,000 cfs
Steep	56 sq. mi.	6,700 cfs
Saline	117 sq. mi.	9,000 cfs
Little Smith	184 sq. mi.	10,400 cfs
Big Smith	412 sq. mi.	18,000 cfs

* — Data contributed by Bolter Parish Trimble Ltd., Consulting Engineers

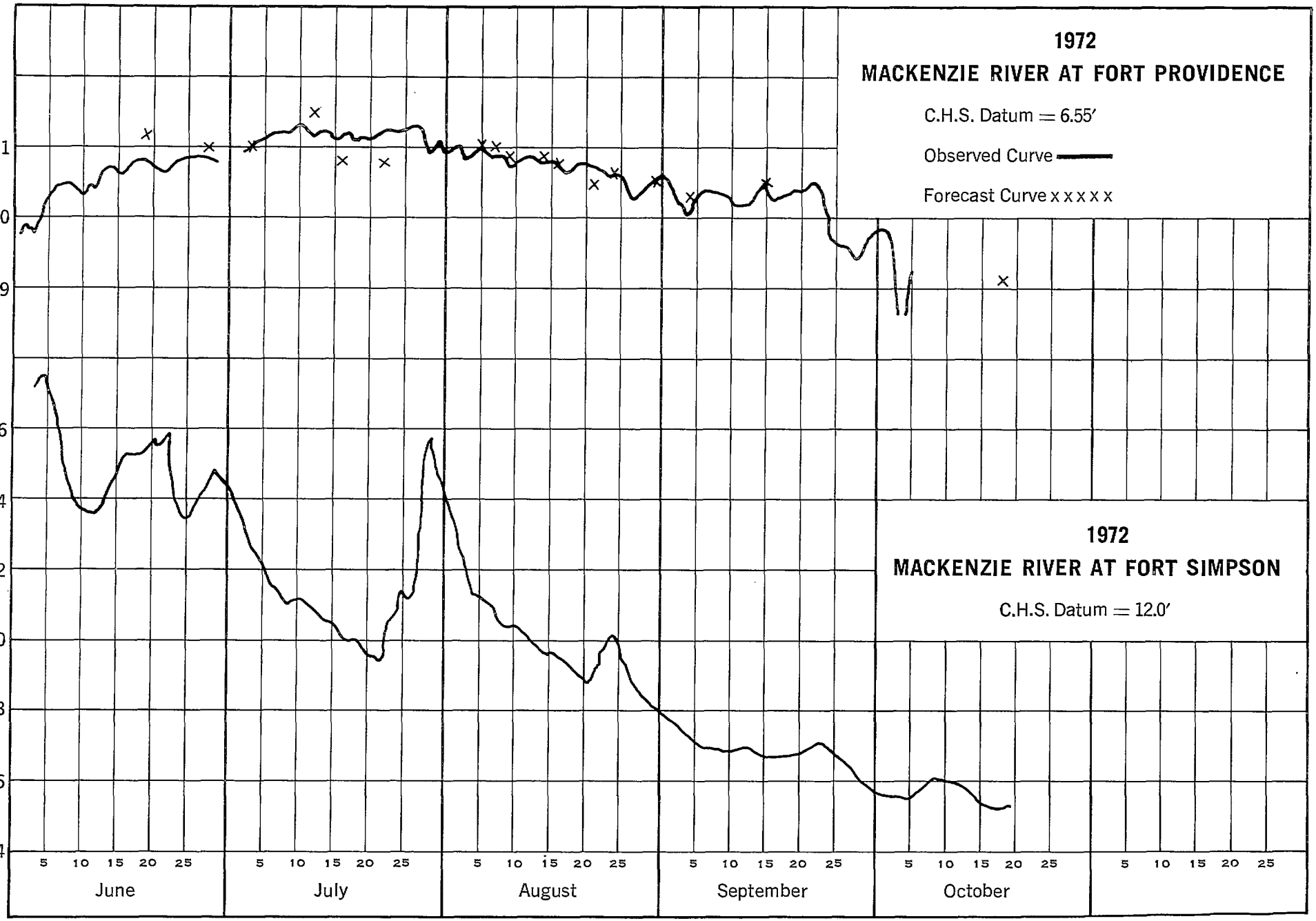

1972
MACKENZIE RIVER AT FORT PROVIDENCE
C.H.S. Datum = 6.55′
Observed Curve
Forecast Curve x x x x x
11
10
9
1972
MACKENZIE RIVER AT FORT SIMPSON
C.H.S. Datum = 12.0′
26
24
22
20
18
16
14
5 10 15 20 25
June
July
August
September
October

Figure 1.

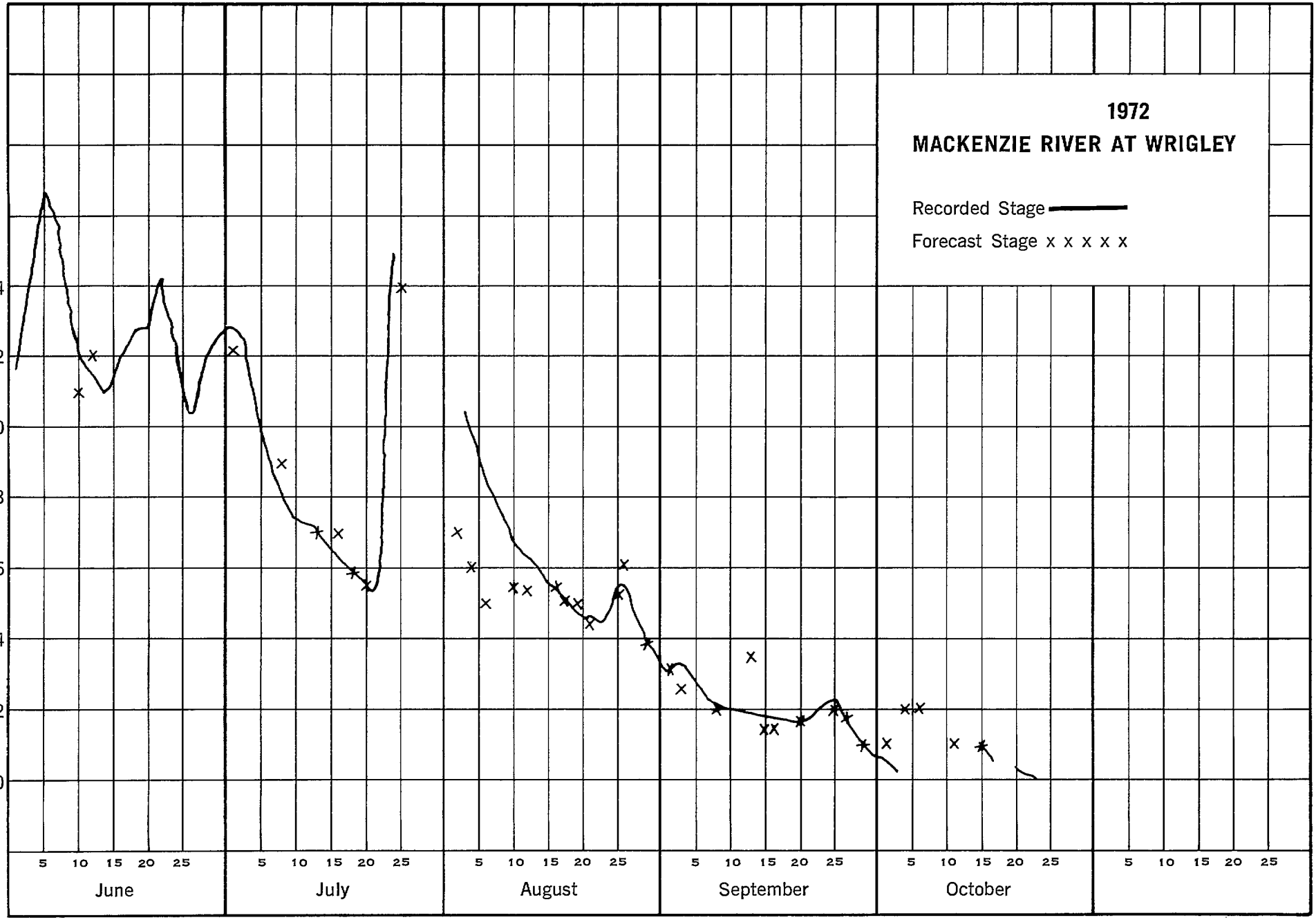

1972
MACKENZIE RIVER AT WRIGLEY
Recorded Stage
Forecast Stage x x x x x
34
32
30
28
26
24
22
20
5 10 15 20 25
June
July
August
September
October

Figure 2.

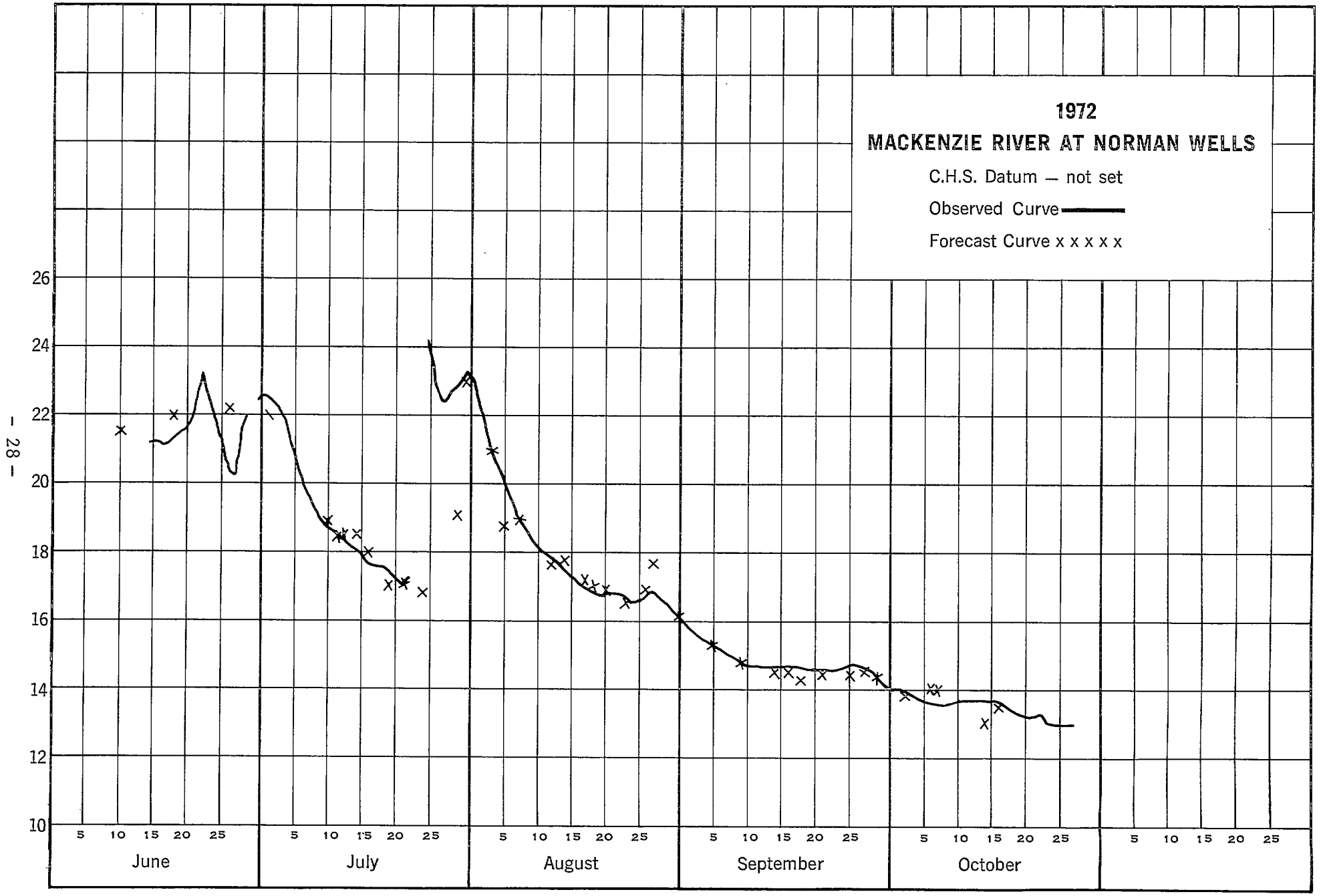

1972
MACKENZIE RIVER AT NORMAN WELLS
C.H.S. Datum — not set
Observed Curve
Forecast Curve x x x x x
26
24
22
20
18
16
14
12
10
5 10 15 20 25
June
July
August
September
October

Figure 3.

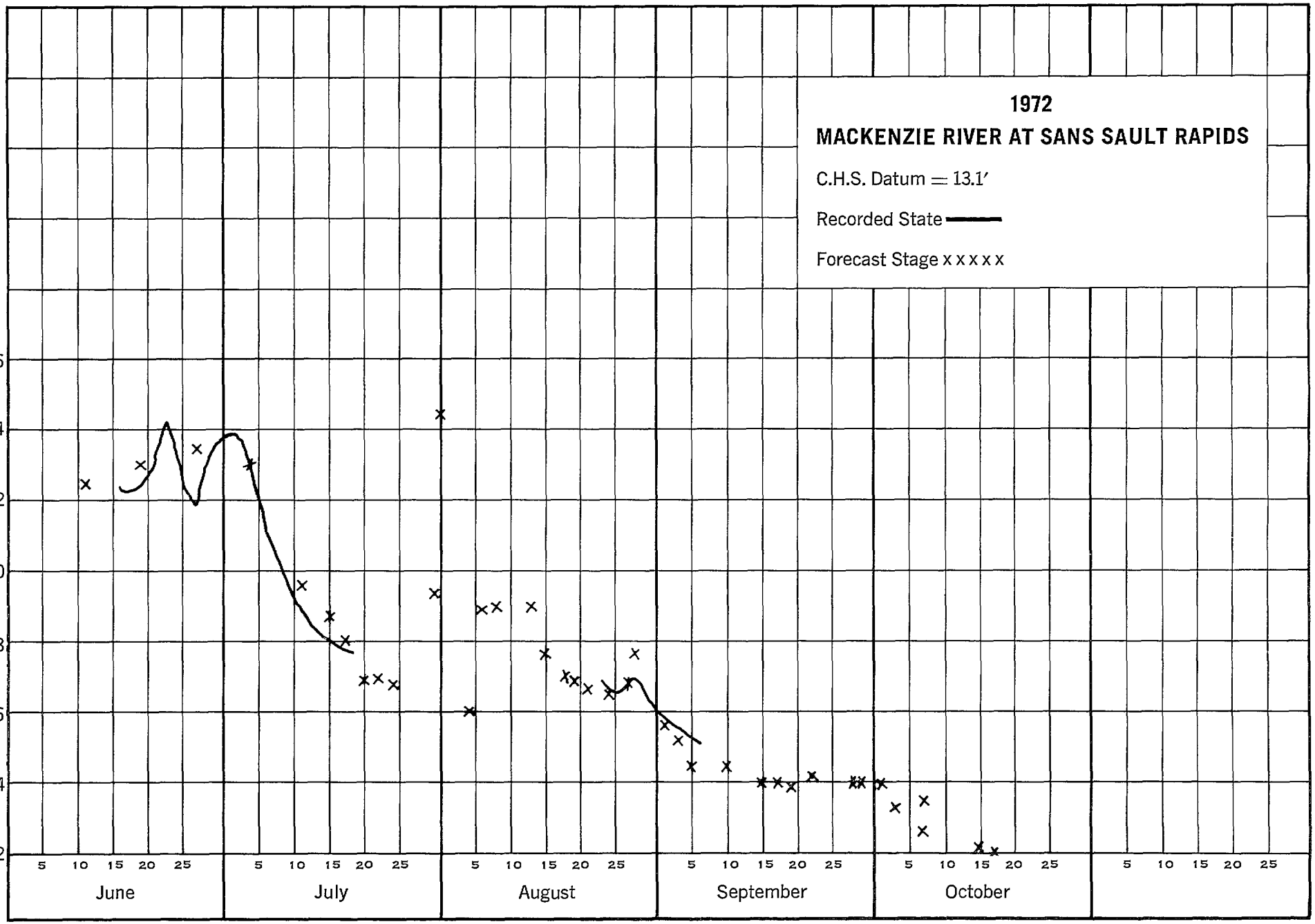

1972
MACKENZIE RIVER AT SANS SAULT RAPIDS
C.H.S. Datum = 13.1'
Recorded State
Forecast Stage x x x x x
26
24
22
20
18
16
14
12
5 10 15 20 25
June
July
August
September
October

Figure 4.

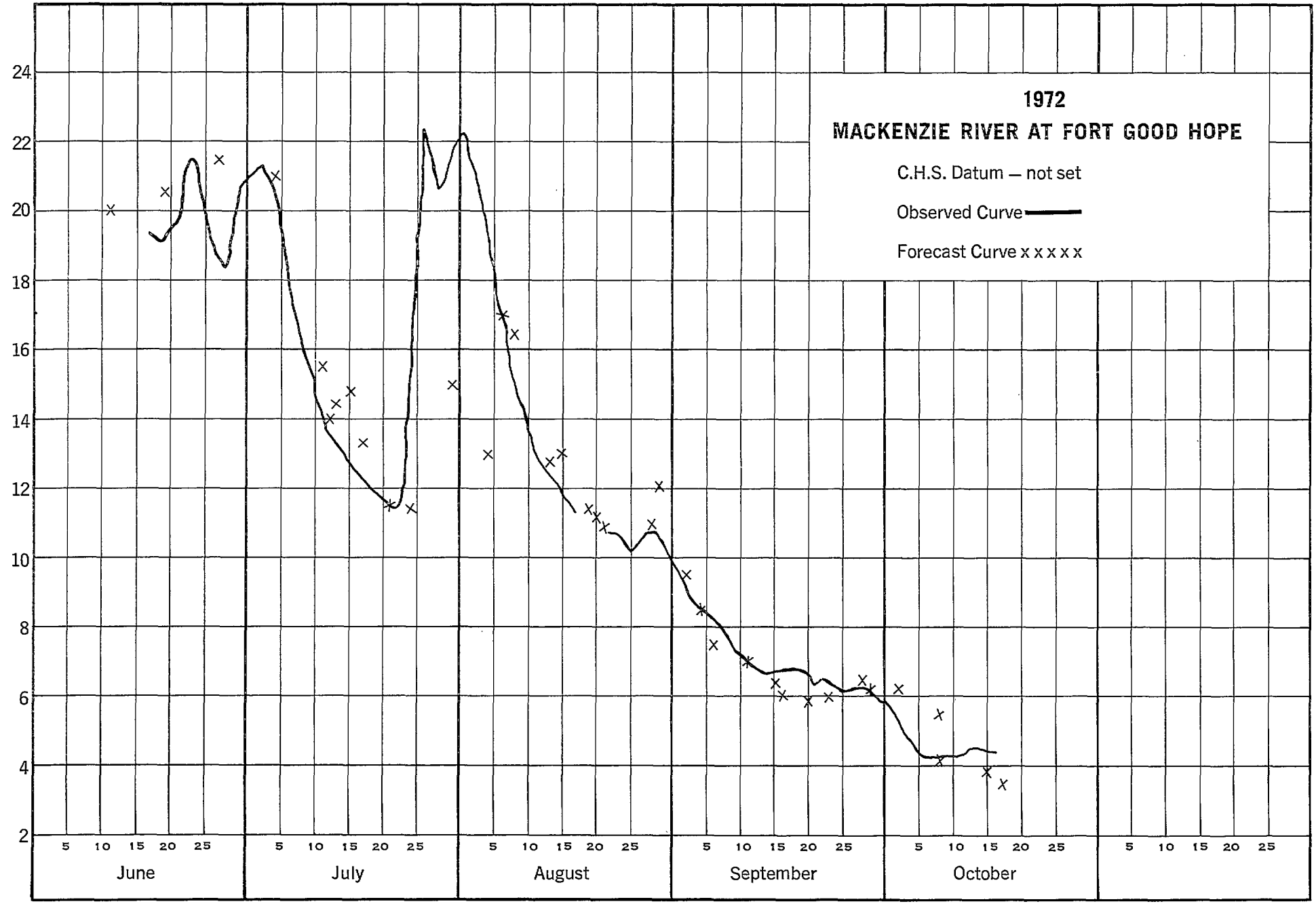

1972
MACKENZIE RIVER AT FORT GOOD HOPE
C.H.S. Datum – not set
Observed Curve
Forecast Curve x x x x x
24
22
20
18
16
14
12
10
8
6
4
2
5 10 15 20 25
June
July
August
September
October

Figure 5.

MACKENZIE RIVER AT NORMAN WELLS - STATION NO. 10KA001

DAILY DISCHARGE IN CUBIC FEET PER SECOND FOR 1970

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	88800 B	86300 B	83900 B	83500 B	109000 B	572000	560000	413000	353000	304000	239000 B	133000 B	1
2	88700 B	86200 B	83800 B	83600 B	111000 B	594000	541000	412000	350000	303000	232000 B	131000 B	2
3	88600 B	86100 B	83700 B	83700 B	114000 B	604000	520000	403000	352000	303000	225000 B	129000 B	3
4	88500 B	86000 B	83700 B	83800 B	118000 B	600000	505000	393000	353000	302000	220000 B	127000 B	4
5	88400 B	85900 B	83600 B	83900 B	120000 B	602000	503000	389000	360000	302000	215000 B	125000 B	5
6	88400 B	85800 B	83500 B	84000 B	123000 B	644000	504000	381000	367000	303000	210000 B	123000 B	6
7	88300 B	85800 B	83400 B	84100 B	125000 B	636000	511000	372000	362000	305000	205000 B	122000 B	7
8	88200 B	85700 B	83400 B	84200 B	129000 B	617000	543000	364000	354000	309000	200000 B	121000 B	8
9	88100 B	85600 B	83300 B	84400 B	132000 B	621000	558000	360000	349000	313000	196000 B	120000 B	9
10	88000 B	85500 B	83300 B	84600 B	137000 B	633000	548000	372000	343000	315000	192000 B	119000 B	10
11	87900 B	85400 B	83200 B	84800 B	140000 B	650000	532000	433000	339000	316000	188000 B	118000 B	11
12	87900 B	85300 B	83200 B	85000 B	148000 B	679000	523000	489000	333000	315000	184000 B	117000 B	12
13	87800 B	85200 B	83100 B	85200 B	153000 B	706000	510000	481000	329000	307000	180000 B	116000 B	13
14	87700 B	85100 B	83100 B	85500 B	160000 B	699000	494000	451000	326000	299000 B	176000 B	115000 B	14
15	87600 B	85000 B	83100 B	85800 B	166000 B	683000	477000	432000	325000	292000 B	172000 B	114000 B	15
16	87500 B	85000 B	83100 B	86100 B	177000 B	695000	477000	424000	323000	286000 B	169000 B	113000 B	16
17	87500 B	84900 B	83100 B	86400 B	184000 B	715000	502000	412000	321000	282000 B	166000 B	112000 B	17
18	87400 B	84800 B	83100 B	86800 B	195000 B	701000	510000	409000	320000	278000 B	163000 B	111000 B	18
19	87300 B	84700 B	83100 B	87300 B	210000 B	676000	495000	466000	318000	274000 B	160000 B	110000 B	19
20	87200 B	84600 B	83100 B	87800 B	230000 B	661000	467000	517000	316000	270000 B	157000 B	109000 B	20
21	87100 B	84600 B	83100 B	88400 B	250000 B	643000	508000	486000	312000	266000 B	154000 B	108000 B	21
22	87100 B	84500 B	83100 B	89200 B	270000 B	621000	726000	464000	313000	262000 B	151000 B	107000 B	22
23	87000 B	84400 B	83100 B	90100 B	291000 B	605000	683000	445000	311000	258000 B	149000 B	106000 B	23
24	86900 B	84300 B	83100 B	93000 B	325000 B	601000	574000	426000	309000	254000 B	147000 B	105000 B	24
25	86800 B	84200 B	83200 B	95000 B	355000 B	601000	513000	409000	309000	250000 B	145000 B	104000 B	25
26	86700 B	84200 B	83200 B	97000 B	389000 B	599000	480000	398000	309000	251000 B	143000 B	104000 B	26
27	86700 B	84100 B	83300 B	99000 B	420000 B	592000	465000	392000	308000	252000 B	141000 B	103000 B	27
28	86600 B	84000 B	83300 B	100000 B	455000 B	589000	453000	384000	308000	253000 B	139000 B	103000 B	28
29	86500 B		83400 B	102000 B	491000 B	583000	441000	376000	307000	253000 B	137000 B	102000 B	29
30	86400 B		83400 B	106000 B	532000	575000	426000	368000	305000	250000 B	135000 B	102000 B	30
31	86300 B		83500 B		552000		417000	362000		246000 B		101000 B	31
TOTAL	2713900	2383200	2582500	2660200	7311000	18997000	15966000	12883000	9884000	8773000	5290000	3530000	TOTAL
MEAN	87500	85100	83300	88700	236000	633000	515000	416000	329000	283000	176000	114000	MEAN
AC-FT	5380000	4730000	5120000	5280000	14500000	37700000	31700000	25600000	19600000	17400000	10500000	7000000	AC-FT
MAX	88800	86300	83900	106000	552000	715000	726000	517000	367000	316000	239000	133000	MAX
MIN	86300	84000	83100	83500	109000	572000	417000	360000	305000	246000	135000	101000	MIN

SUMMARY FOR THE YEAR 1970

MEAN DISCHARGE, 255000 CFS
TOTAL DISCHARGE, 185000000 AC-FT
MAXIMUM DAILY DISCHARGE, 726000 CFS ON JUL 22
MINIMUM DAILY DISCHARGE, 83100 CFS ON MAR 13

MAXIMUM INSTANTANEOUS DISCHARGE
759000 CFS AT 1800 MST ON JUL 22

TYPE OF GAUGE - RECORDING
LOCATION - LAT 65 16 54 N
LONG 126 50 58 W
DRAINAGE AREA 606000 SQ MILES

B-ICE CONDITIONS

NATURAL FLOW

MACKENZIE RIVER AT SANS SAULT RAPIDS - STATION NO. 10KD001

DAILY WATER LEVEL IN FEET FOR 1970

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	---	14.97	---	---	---	---	19.03	16.19	---	12.98	25.69	---	1
2	---	14.90	---	---	---	---	18.66	16.08	---	12.96	25.78	---	2
3	---	14.81	---	---	---	---	18.24	16.09	---	12.90	25.93	---	3
4	---	14.75	---	---	---	---	17.92	15.94	---	12.84	25.74	---	4
5	---	14.71	---	---	---	---	17.71	15.73	---	12.83	25.68	---	5
6	---	14.65	---	---	---	---	17.75	15.59	---	12.83	25.31	---	6
7	---	14.55	---	---	---	---	18.14	15.34	---	12.90	24.92	---	7
8	---	14.51	---	---	---	---	18.29	15.14	14.87	12.99	24.90	---	8
9	---	14.43	---	---	---	---	18.67	14.89	14.65	13.17	24.71	---	9
10	---	14.36	---	---	---	---	18.90	14.96	14.47	13.26	24.07	---	10
11	---	14.30	---	---	---	---	18.51	15.74	14.33	13.23	23.57	---	11
12	---	14.23	---	---	---	---	18.19	17.37	14.16	13.27	23.33	---	12
13	---	14.15	---	---	---	---	17.85	18.12	14.04	13.17	23.27	---	13
14	---	14.05	---	---	---	---	17.54	17.82	13.88	13.04	23.16	---	14
15	---	14.01	---	---	---	---	17.21	17.14	13.89	12.90	22.88	---	15
16	---	13.95	---	---	---	---	17.11	16.72	13.96	12.95	---	---	16
17	---	13.95	---	---	---	---	17.36	16.66	13.75	13.02	---	---	17
18	---	13.88	---	---	---	---	17.67	16.78	13.65	13.18	---	---	18
19	---	---	---	---	---	---	17.61	16.75	13.57	13.33	---	---	19
20	---	---	---	---	---	---	17.24	17.97	13.56	13.32	---	---	20
21	---	---	---	---	---	---	21.33	---	13.44	13.43	---	---	21
22	---	---	---	---	---	---	22.69	---	13.27	14.02	---	---	22
23	---	---	---	---	---	---	23.55	---	13.31	14.17	---	---	23
24	---	---	---	---	---	---	21.61	---	13.23	14.20	---	---	24
25	---	---	---	---	---	---	19.70	---	13.21	14.21	---	---	25
26	---	---	---	---	---	20.43A	18.41	---	13.21	14.22	---	---	26
27	---	---	---	---	---	20.06	17.71	---	13.14	14.21	---	---	27
28	15.12A	---	---	---	---	19.65	17.31	---	13.08	15.76	---	---	28
29	15.11		---	---	---	19.43	17.01	---	13.10	20.35	---	---	29
30	15.08		---	---	---	19.25	16.67	---	13.07	22.11	---	---	30
31	15.02		---		---		16.32	---		24.79		---	31

TYPE OF GAUGE - RECORDING
LOCATION - LAT 65 42 00 N
LONG 128 50 00 W

A-MANUAL GAUGE

NATURAL FLOW

WATER LEVELS ARE REFERRED TO ASSUMED DATUM.

Figure 6.

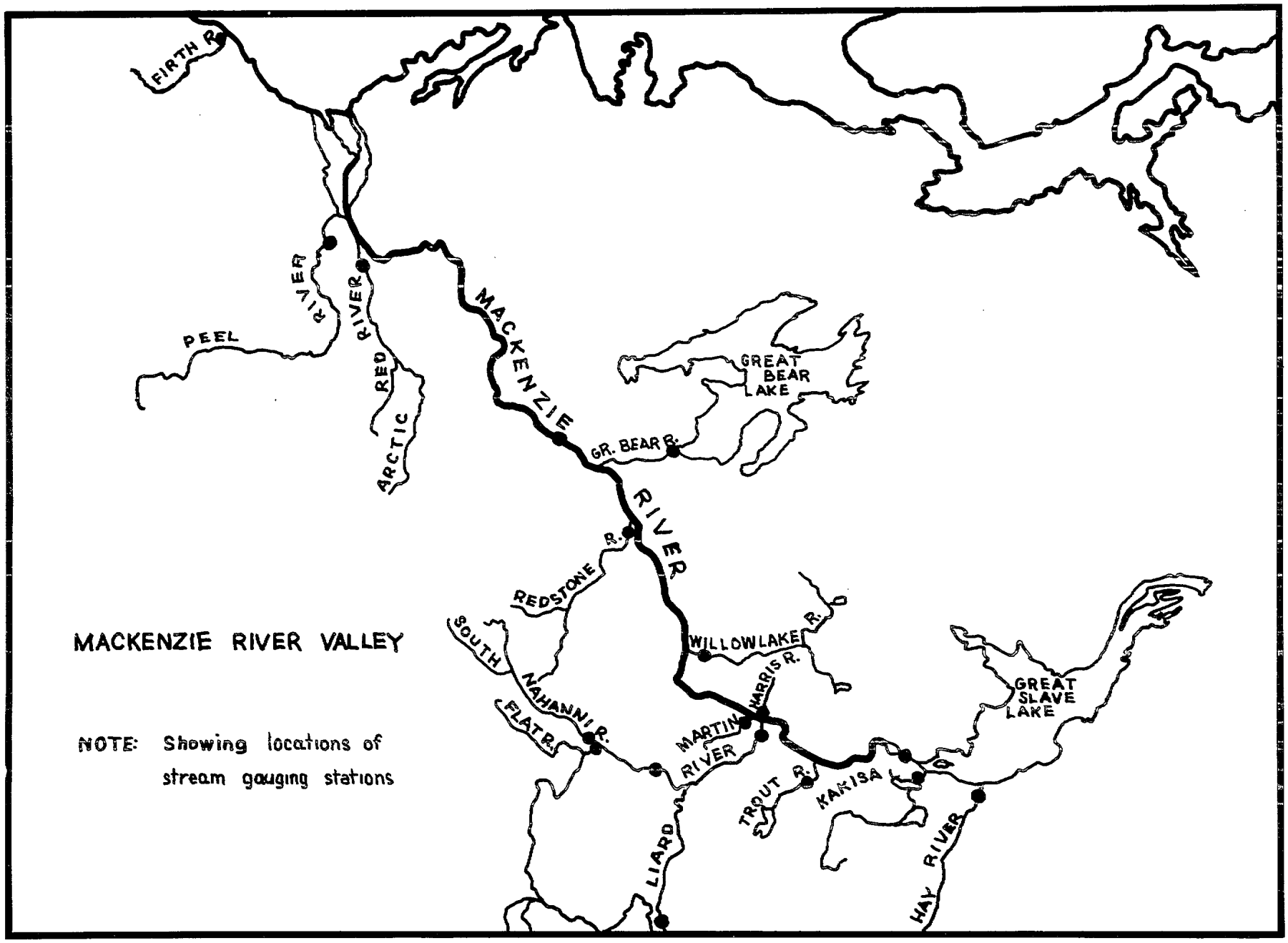

FIRTH R.
PEEL
RIVER
RED
RIVER
ARCTIC
MACKENZIE
GREAT
BEAR
LAKE
GR. BEAR R.
RIVER
REDSTONE R.
SOUTH
NAHANNI R.
FLAT R.
WILLOWLAKE R.
HARRIS R.
MARTIN
RIVER
TROUT R.
KAKISA
LIARD
HAY RIVER
GREAT
SLAVE
LAKE
MACKENZIE RIVER VALLEY
NOTE: Showing locations of
stream gauging stations

Figure 7.

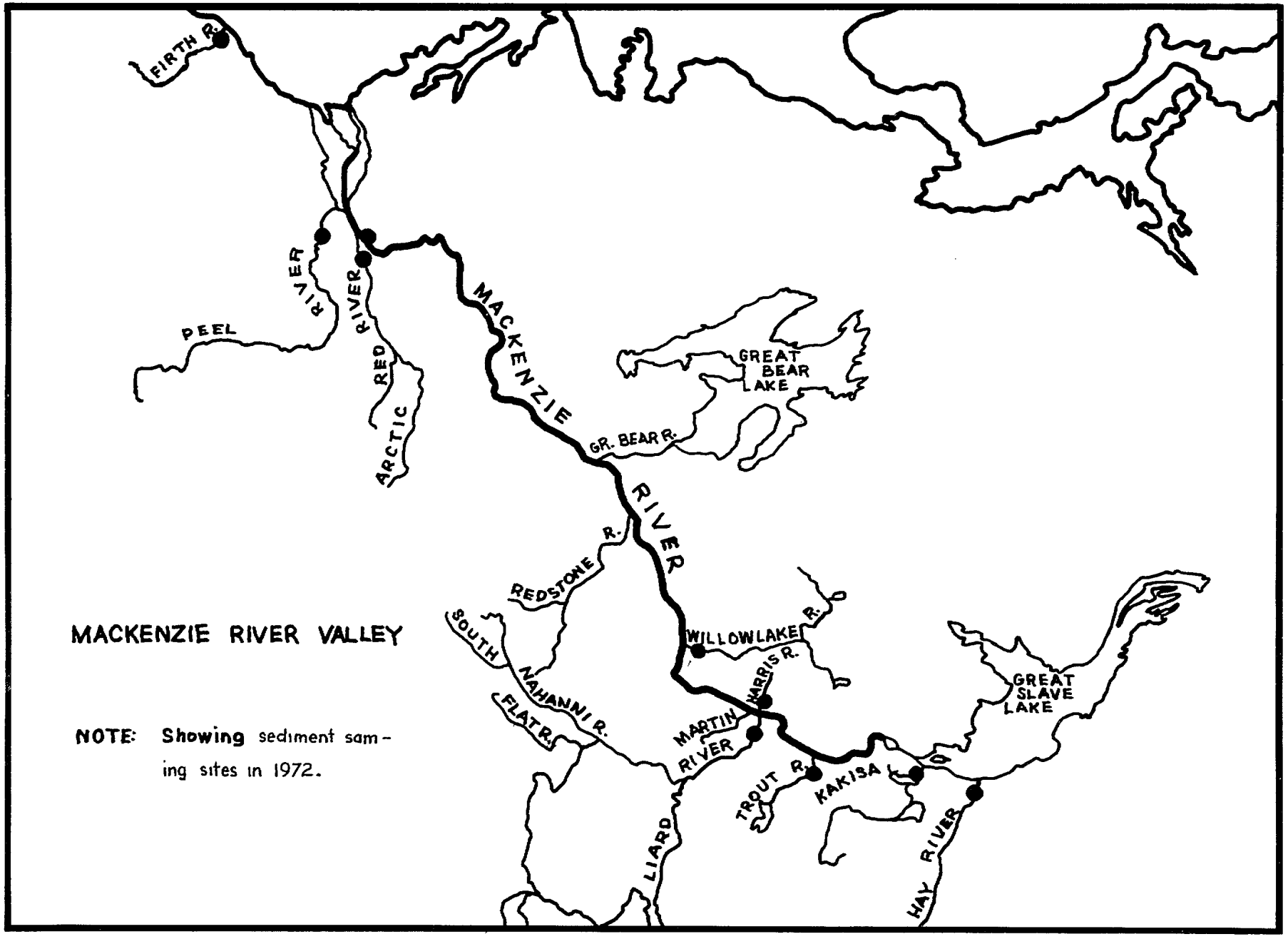

FIRTH R.
PEEL RIVER
RED RIVER
ARCTIC
MACKENZIE RIVER
GR. BEAR R.
GREAT BEAR LAKE
REDSTONE R.
SOUTH NAHANNI R.
FLAT R.
WILLOWLAKE R.
HARRIS R.
MARTIN RIVER
TROUT R.
KAKISA
GREAT SLAVE LAKE
LIARD
HAY RIVER
MACKENZIE RIVER VALLEY
NOTE: Showing sediment sam-
ing sites in 1972.

Figure 8.

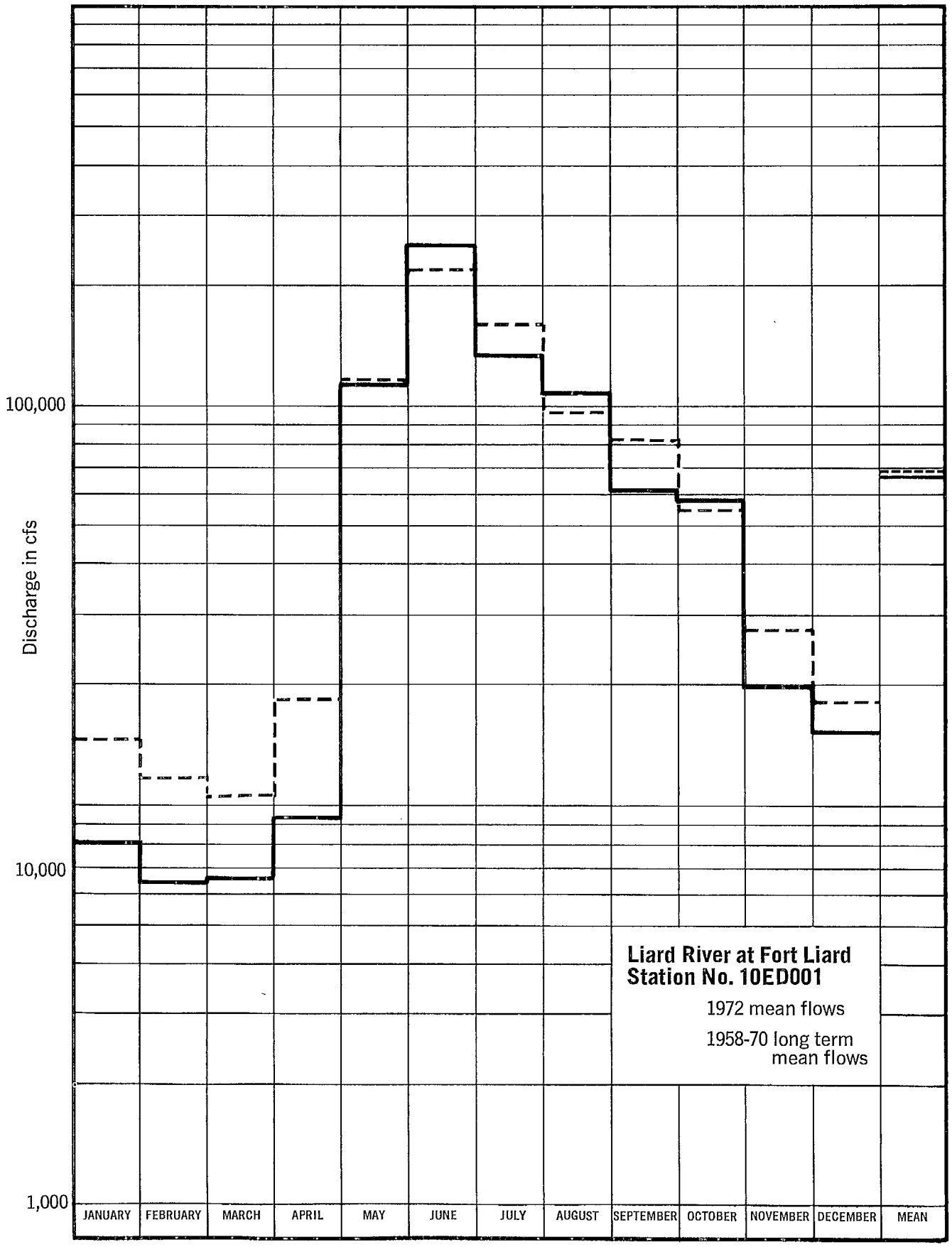

100,000
10,000
1,000
Discharge in cfs
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
MEAN
Liard River at Fort Liard
Station No. 10ED001
1972 mean flows
1958-70 long term mean flows

Figure 9.

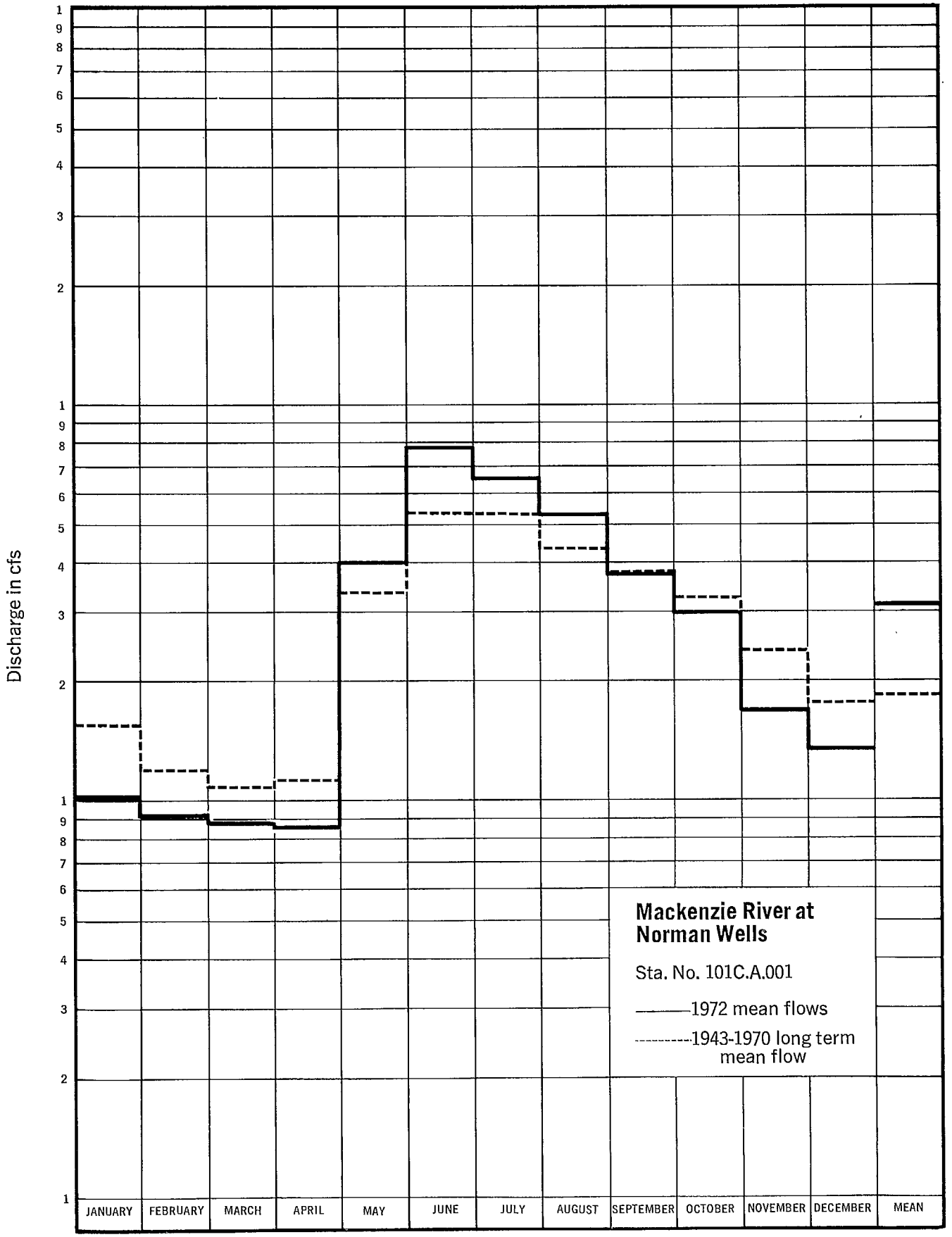

Discharge in cfs
1
9
8
7
6
5
4
3
2
1
9
8
7
6
5
4
3
2
1
9
8
7
6
5
4
3
2
1
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
MEAN
Mackenzie River at Norman Wells
Sta. No. 101C.A.001
1972 mean flows
1943-1970 long term mean flow

Figure 10.

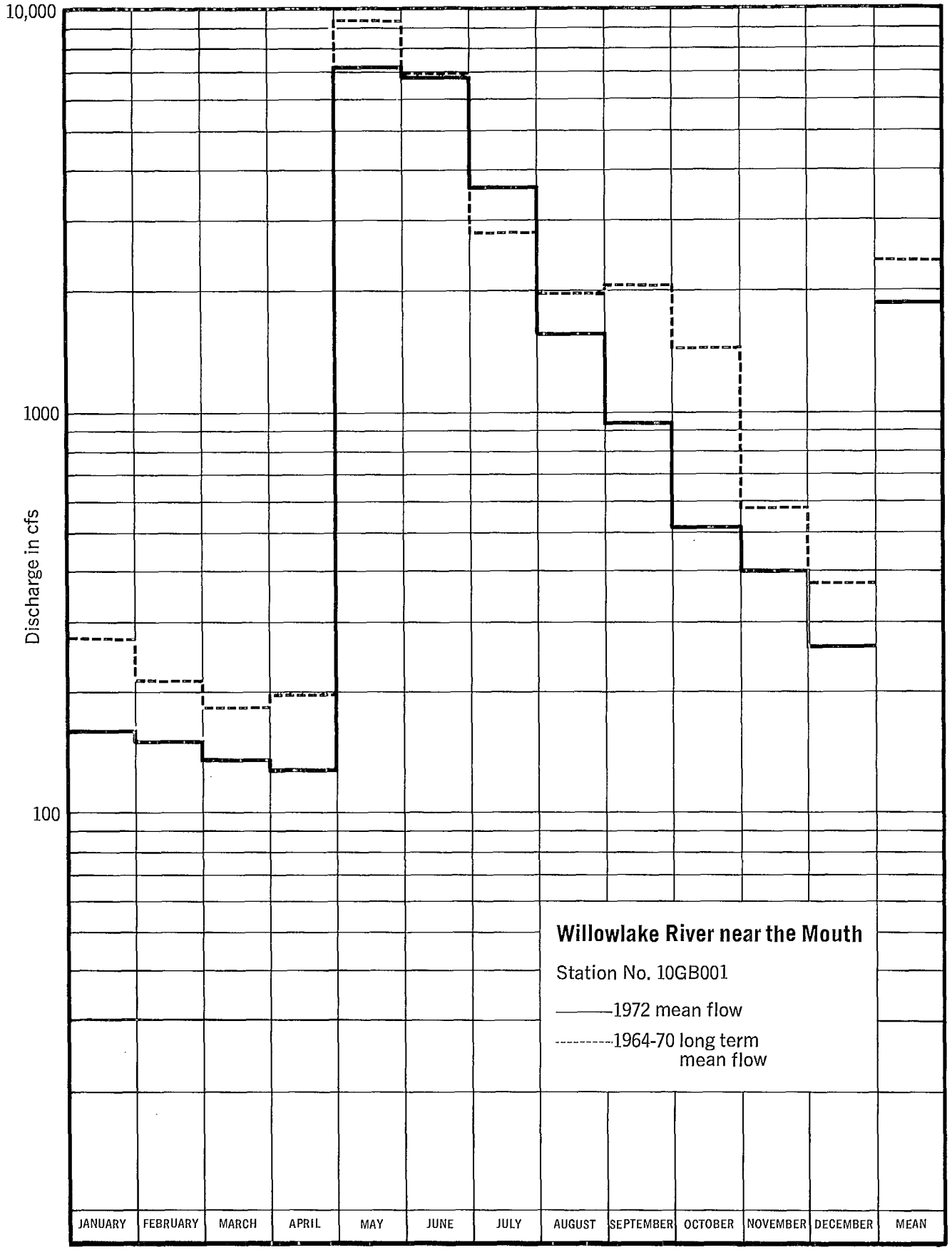

10,000
1000
100
Discharge in cfs
Willowlake River near the Mouth
Station No. 10GB001
1972 mean flow
1964-70 long term mean flow
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
MEAN

Figure 11.

DEPARTMENT OF ENERGY, MINES AND RESOURCES -
INLAND WATERS BRANCH — WATER SURVEY OF CANADA

Mackenzie River at Norman Wells
Station No. 10KA001

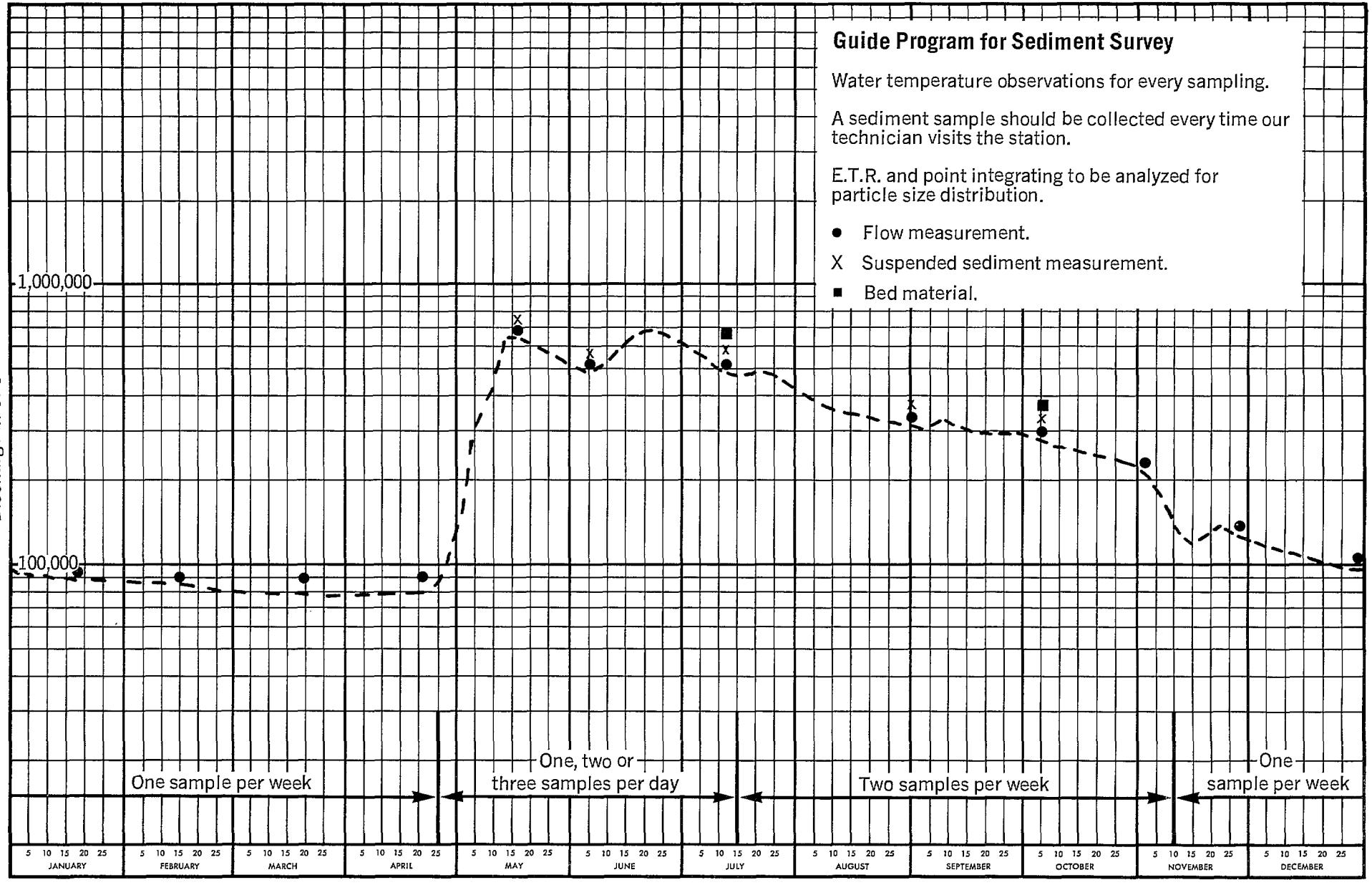


Figure 12.

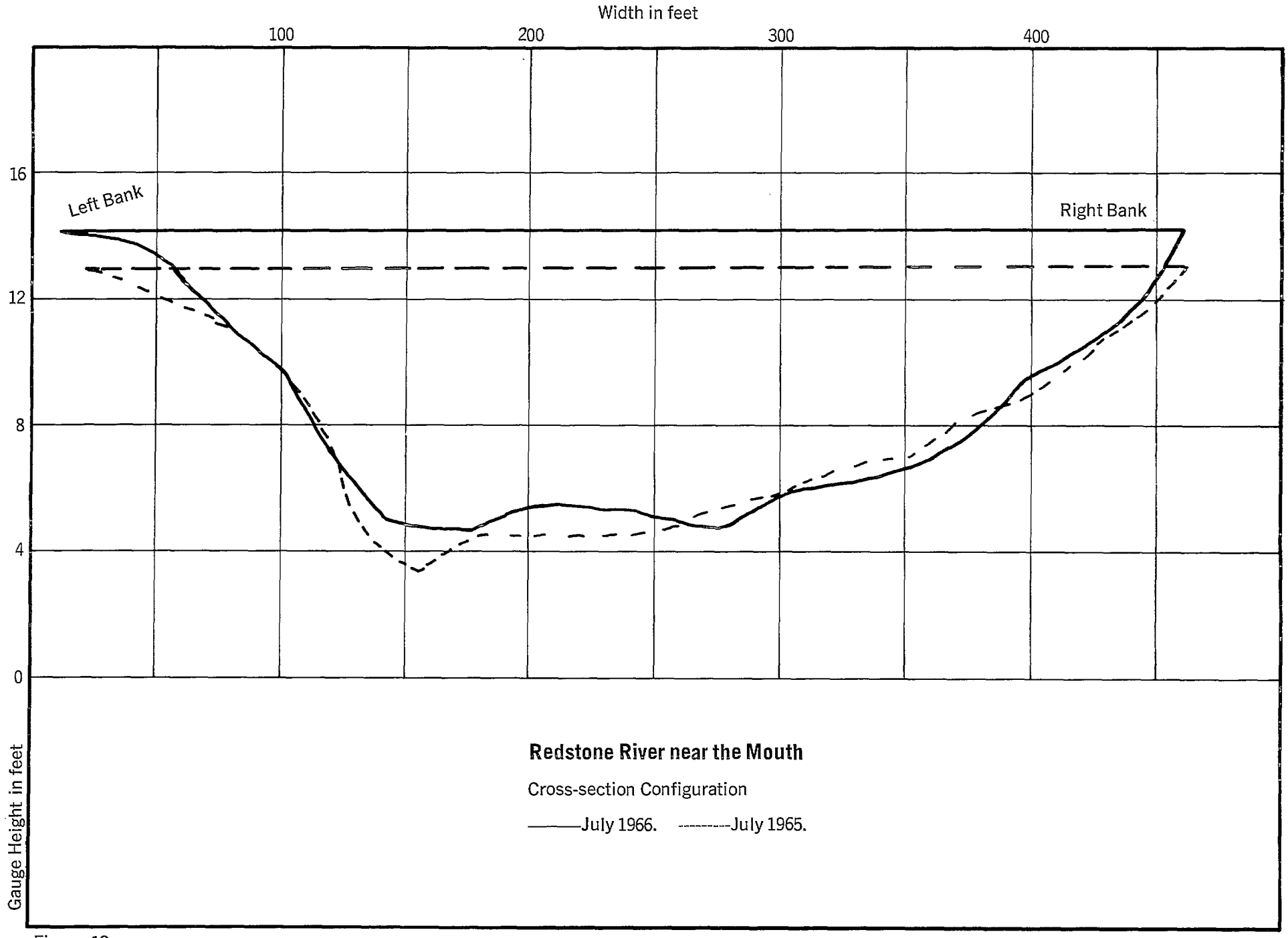

Width in feet
100
200
300
400
16
12
8
4
0
Left Bank
Right Bank
Gauge Height in feet
Redstone River near the Mouth
Cross-section Configuration
———July 1966. ---------July 1965.

Figure 13.

Mackenzie River at Norman Wells

Relationship of River Stage to Mean Water Velocity

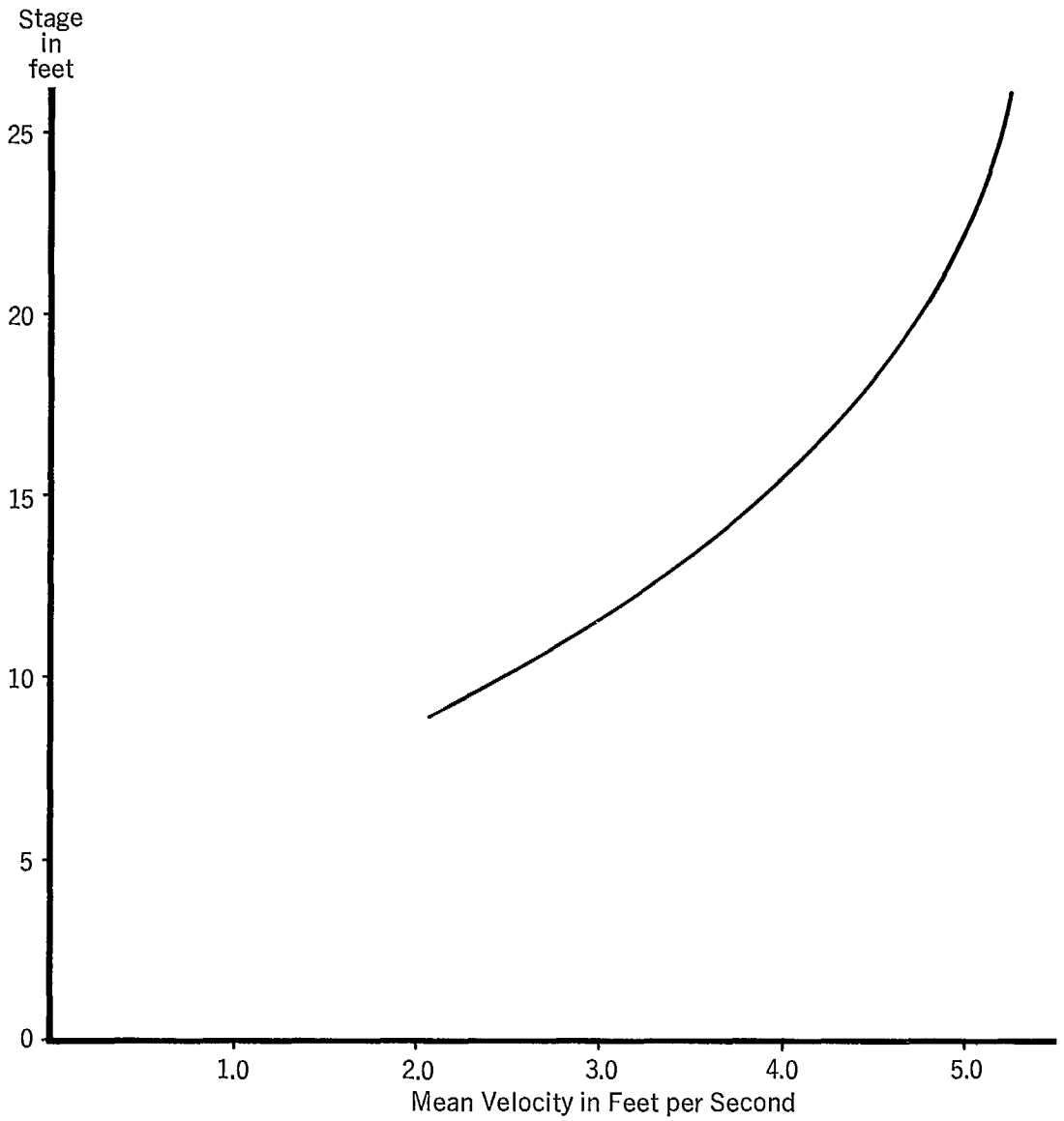


Figure 14.

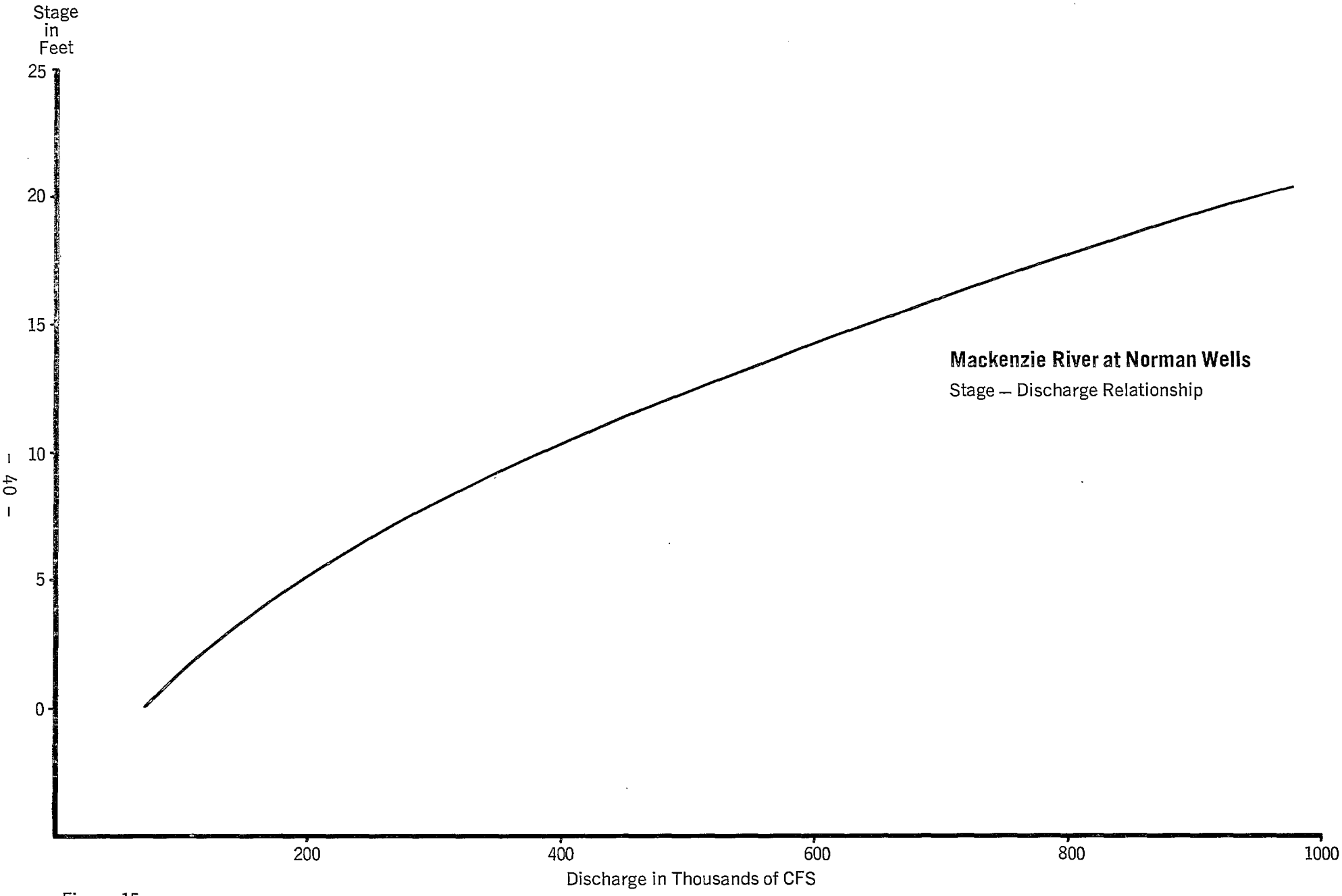

Stage
in
Feet
25
20
15
10
5
0
200
400
600
800
1000
Discharge in Thousands of CFS
Mackenzie River at Norman Wells
Stage – Discharge Relationship

Figure 15.

DEPARTMENT OF ENERGY, MINES AND RESOURCES -
INLAND WATERS BRANCH – WATER SURVEY OF CANADA

Liard River at Fort Liard
Station No. 10ED001

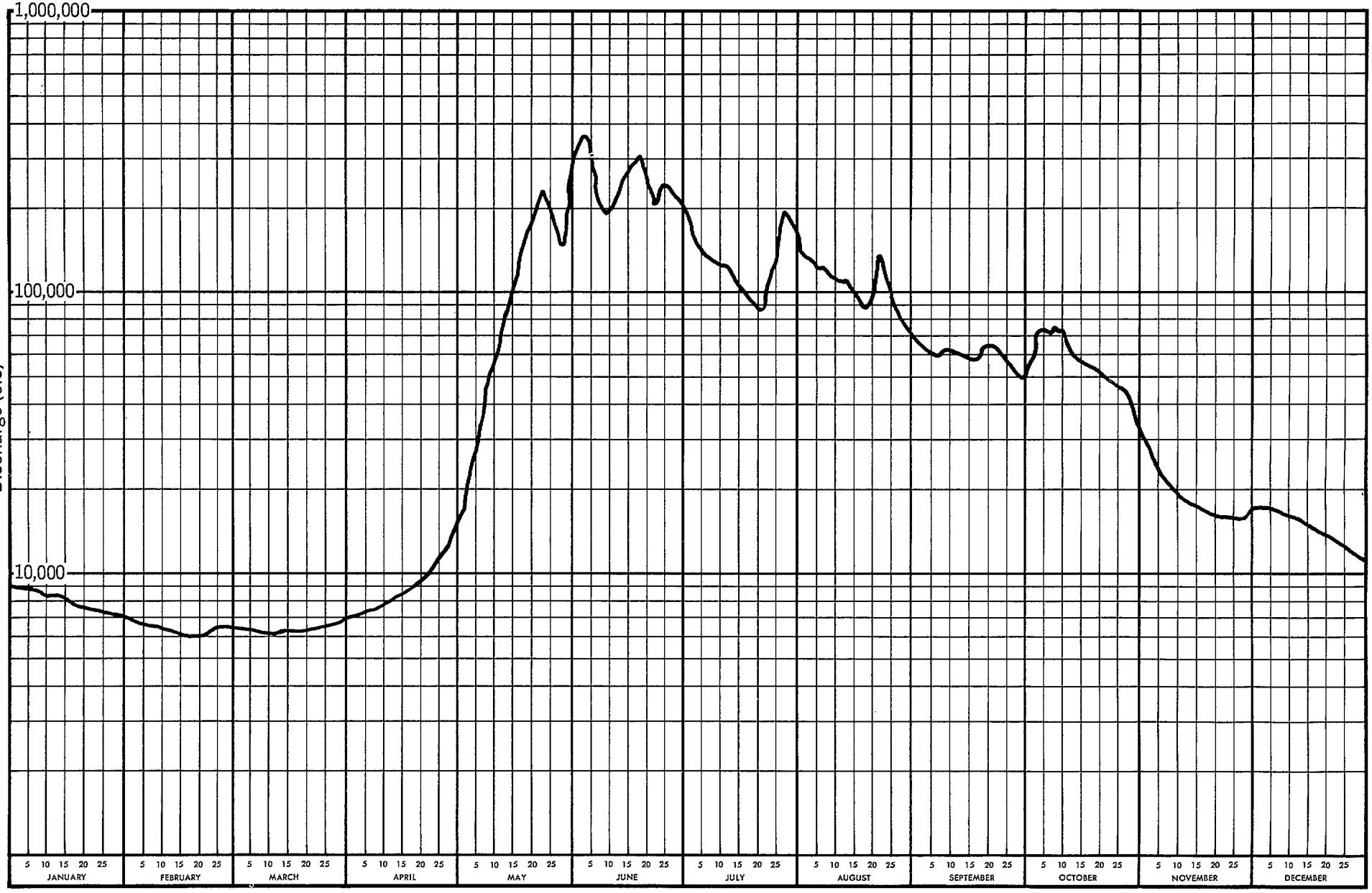


Figure 16.

DEPARTMENT OF ENERGY, MINES AND RESOURCES -
INLAND WATERS BRANCH – WATER SURVEY OF CANADA

Willowlake River near the Mouth
Station No. 10GB001

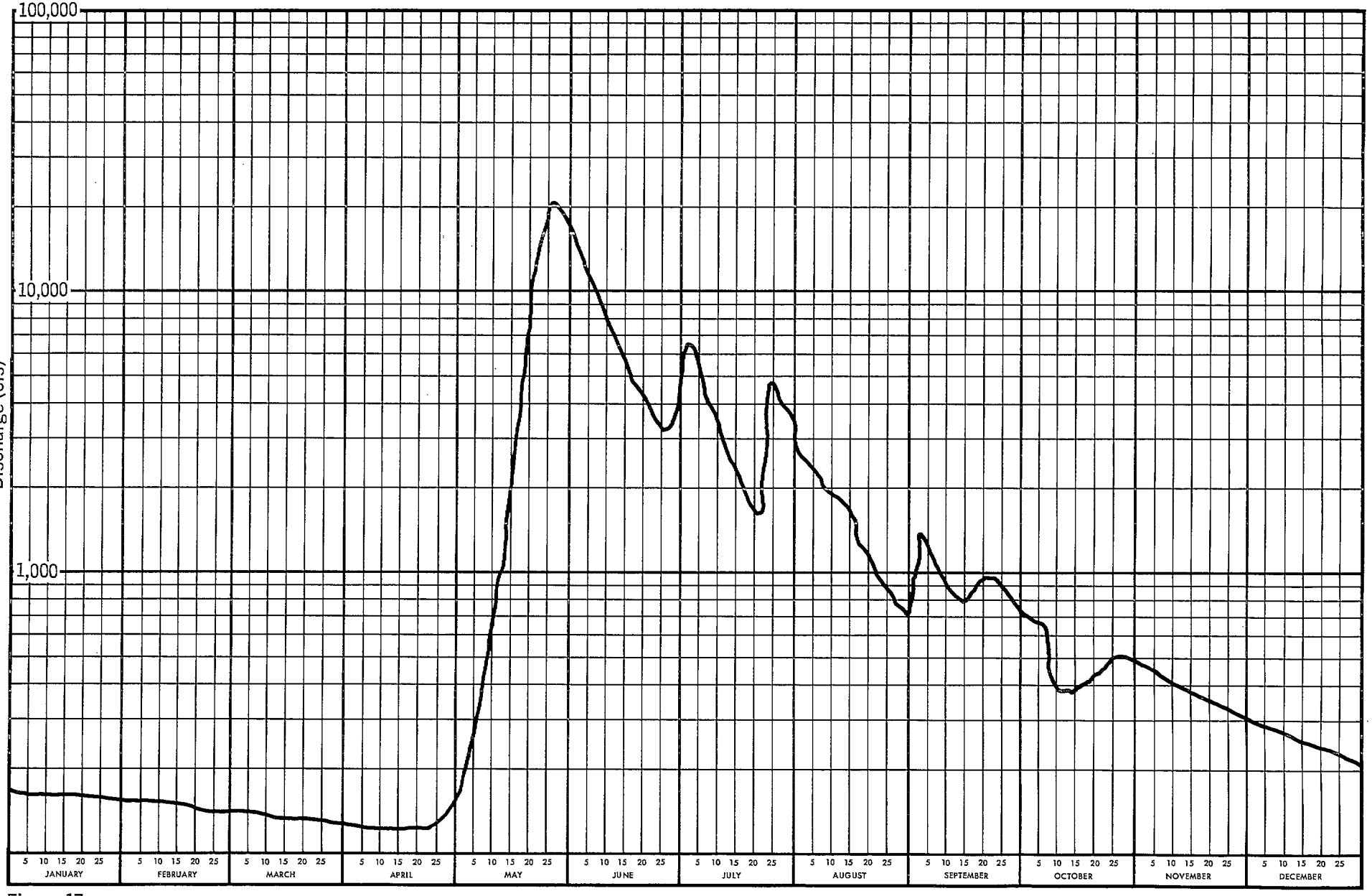


Figure 17.

DEPARTMENT OF ENERGY, MINES AND RESOURCES -
INLAND WATERS BRANCH – WATER SURVEY OF CANADA

Mackenzie River near Fort Providence
Station No. 10FB001

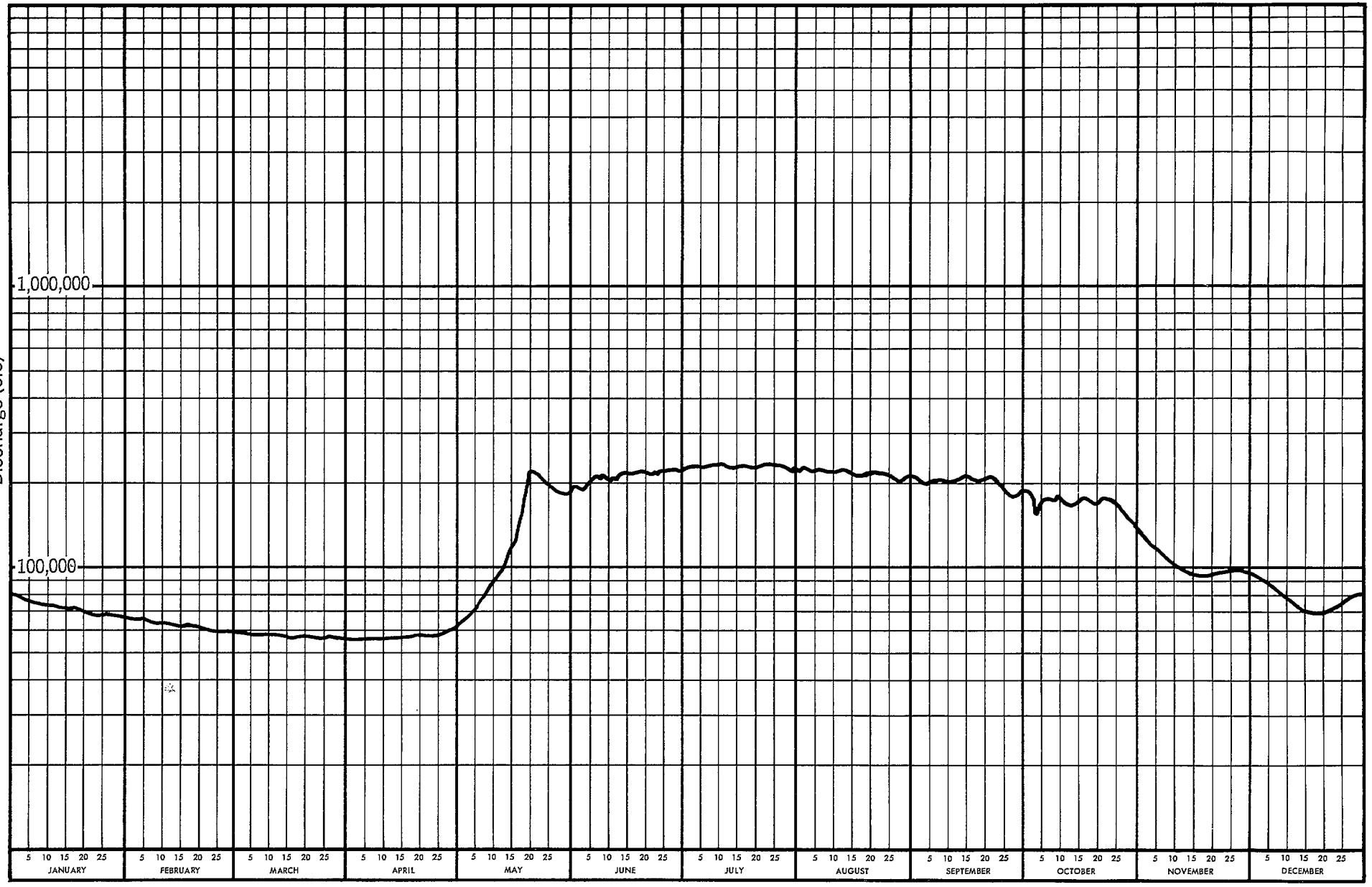


Figure 18.

DEPARTMENT OF ENERGY, MINES AND RESOURCES -
INLAND WATERS BRANCH – WATER SURVEY OF CANADA

Mackenzie River at Fort Simpson
Station No. 10GC001

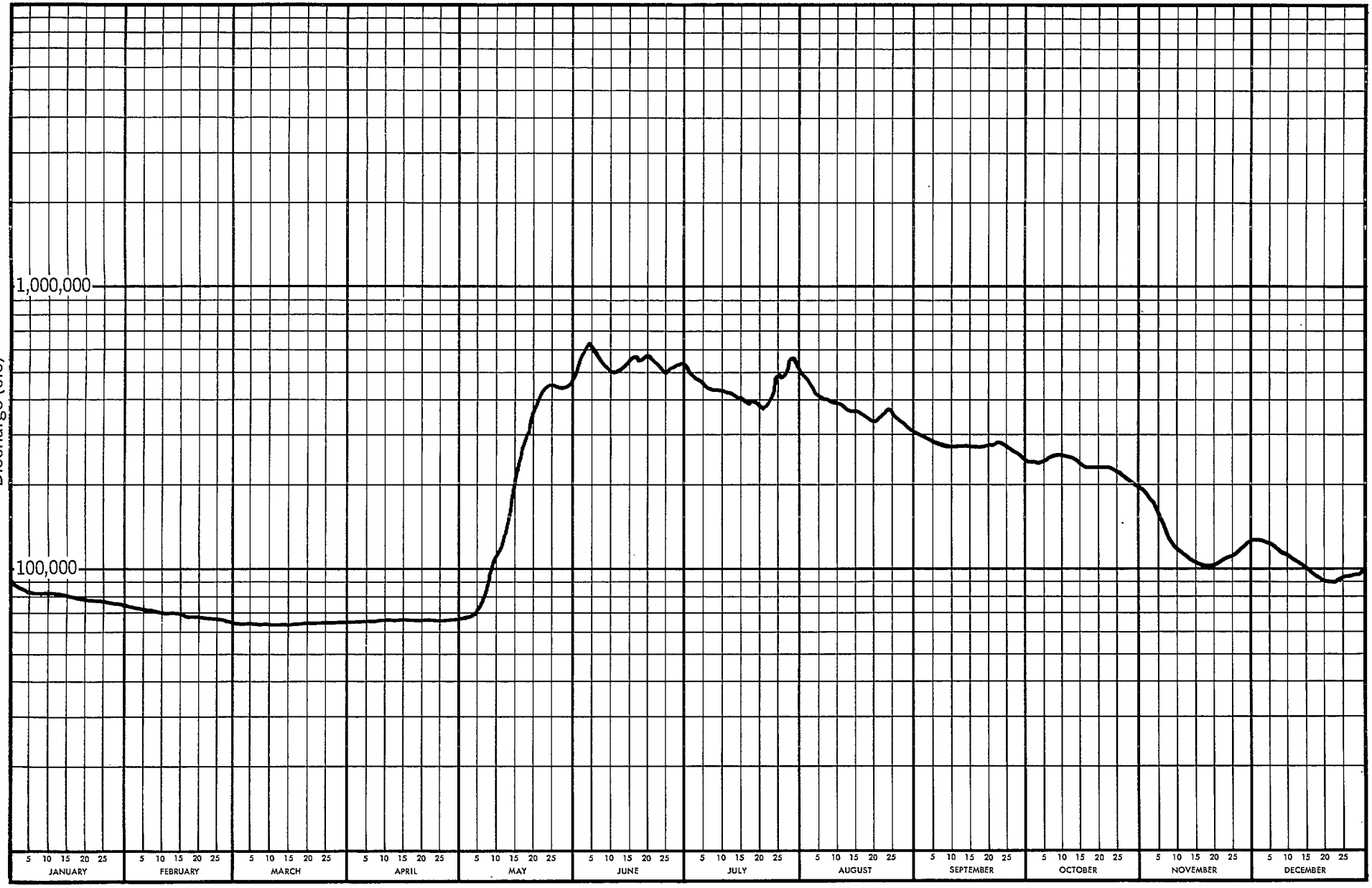


Figure 19.

DEPARTMENT OF ENERGY, MINES AND RESOURCES -
INLAND WATERS BRANCH – WATER SURVEY OF CANADA

Mackenzie River at Norman Wells
Station No. 10KA001

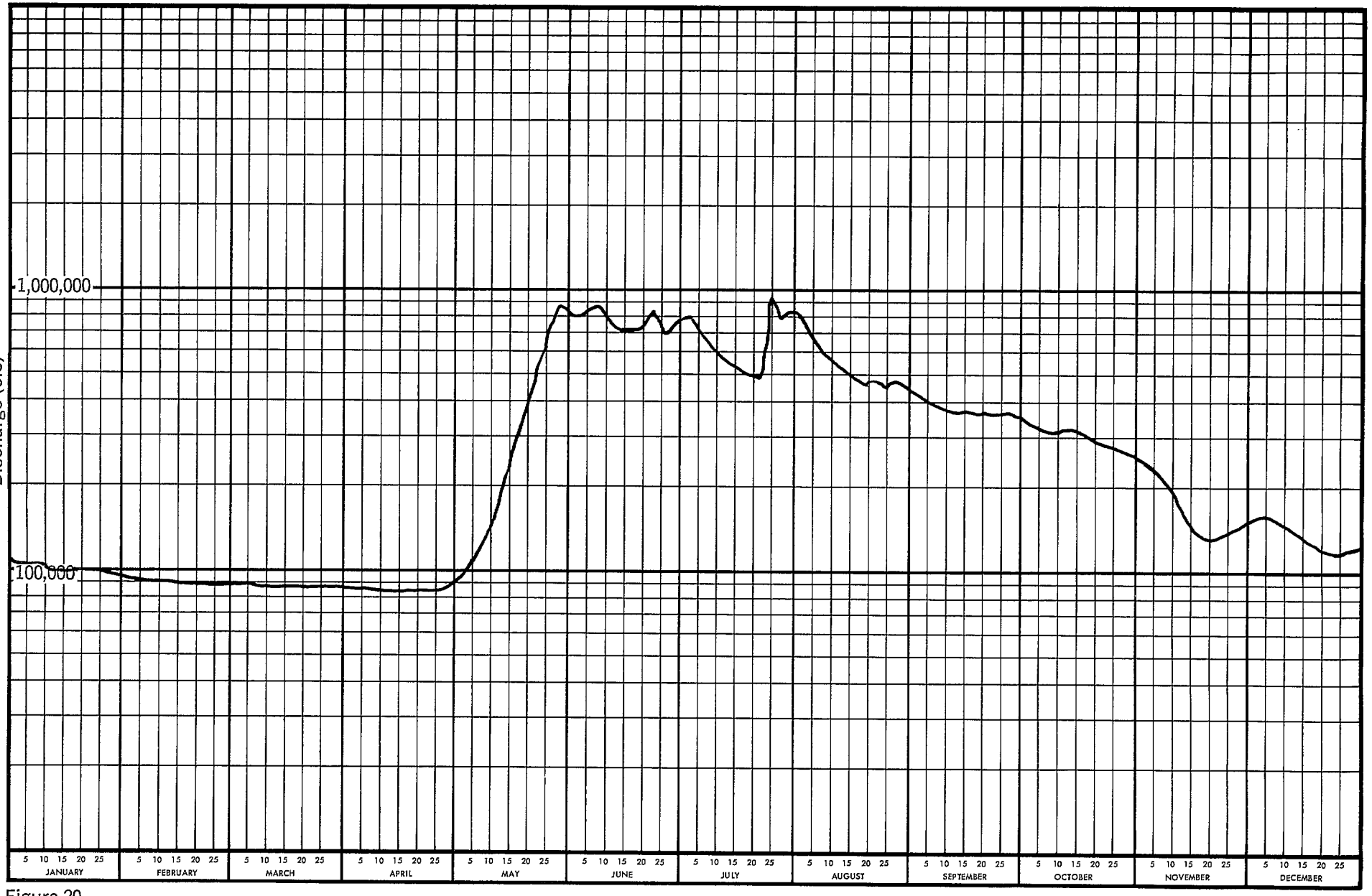


Figure 20.

ARCTIC RED RIVER NEAR THE MOUTH 10LA002

1972 Sediment Results

(1) Computed daily mean concentrations -- none -- not enough information collected.

(2) Three "daily" suspended sediment samples tkane near the mouth of the river which is nearly fifty air miles from the measuring site.
No tie-in with measuring site.

July 13, 1972 - 729 mg/1

Aug. 15, 1972 - 107 mg/1

Sept. 8, 1972 - 208 mg/1

(3) Four depth integrated suspended sediment measurements.

Date	Mean Concentration	Flow
June 16, 1972	1,667 mg/1	21,900 cfs
July 22, 1972	358 mg/1	10,200 cfs
Aug. 29, 1972	104 mg/1	8,000 cfs
Sept.21, 1972	114 mg/1	8,350 cfs

Mean particle size values for June 16 and July 22 measurements are attached.

(4) Two bed material measurements - July 22 and September 21.
Mean cross section particle size values attached.

(5) Miscellaneous water temperatures.

FIRTH RIVER NEAR THE MOUTH 10MD001

1972 Sediment Results

(1) Computed daily mean concentrations -- none -- insufficient number of samples.

(2) One "Daily" suspended sample

June 21, 1972 - 37 mg/l

(3) Two depth integrated suspended sediment measurements.

Date	Mean Concentration	Flow
July 25, 1972	23 mg/l	3,200 cfs
Sept.12, 1972	3 mg/l	1,640 cfs

(4) One bed material measurement - unable to derive mean particle size values.

(5) Miscellaneous water temperatures.

HARRIS RIVER NEAR THE MOUTH 10GC002

1972 Sediment Results

(1) Computed daily mean concentrations -- none -- insufficient numbers of samples taken.

(2) Five "daily" suspended samples - all dip samples.

July 5, 1972	-	2 mg/l
July 10, 1972	-	2 mg/l
July 14, 1972	-	3 mg/l
July 20, 1972	-	0 mg/l
Aug. 10, 1972	-	1 mg/l

HAY RIVER NEAR HAY RIVER 070B001

1972 Sediment Results

(1) Computed daily mean suspended sediment concentrations -- for July and August.

(2) Six "daily" suspended samples

July 21, 1972	-	619 mg/l
July 25, 1972	-	116 mg/l
July 28, 1972	-	44 mg/l
Aug. 1, 1972	-	18 mg/l
Aug. 4, 1972	-	9 mg/l
Aug. 9, 1972	-	8 mg/l

(3) Three depth integrated suspended sediment measurements.

Date	Mean Concentration	K Factor	Flow
July 17, 1972	40 mg/l	1.03	5,860 cfs
July 21, 1972	626 mg/l	1.00	6,370 cfs
Aug. 22, 1972	10 mg/l	0.95	1,970 cfs

Mean particle size values for July 21 measurement are attached.

(4) Miscellaneous water temperatures.

HAY RIVER NEAR HAY RIVER

Daily Mean Sediment Concentration
in Milligrams per Litre
for 1972

DAY	JULY	AUGUST
1	46 E	17 S
2	113 E	14
3	246 E	12
4	411 E	11 S
5	497 E	9
6	474 E	9
7	411 E	8
8	336 E	8
9	271 E	8 S
10	220 E	8
11	183 E	8
12	140 E	8
13	103 E	7
14	65 E	9
15	28	12
16	11	15
17	109 S	14
18	853	13
19	880	12
20	762	12
21	647 S	12
22	503	10 S
23	358	9
24	221	8
25	124 S	8
26	95	7
27	66	7
28	46 S	7
29	31	7
30	20	6
31	15	6
TOTAL	8,285	301
MEAN	267	10
MAX	880	17
MIN	11	6

E---Estimated
S---Samples Collected This Day

KAKISA RIVER AT OUTLET KAKISA LAKE 07UC001

1972 Sediment Results

(1) Computed daily mean concentration -- none -- insufficient number of samples.

(2) Two "Daily" suspended samples.

July 19, 1972 - 7 mg/l

Aug. 10, 1972 - 9 mg/l

(3) Miscellaneous water temperatures.

LIARD RIVER NEAR THE MOUTH 10ED002

1972 Sediment Results

(1) Computed daily mean concentrations -- none because of lack of consistency in sampling locations and insufficient number of samples.

(2) Eight "Daily" suspended samples.

June 28, 1972	-	978 mg/1
July 10, 1972	-	241 mg/1
July 14, 1972	-	186 mg/1
July 25, 1972	-	1,303 mg/1 - Dip Sample
July 27, 1972	-	983 mg/1 - Dip Sample
July 27, 1972	-	1,182 mg/1
Aug. 2, 1972	-	641 mg/1
Sept.15, 1972	-	69 mg/1

(3) Two depth integrated suspended sediment measurements.

Date	Mean Concentration	Flow
July 27, 1972	1,546 mg/1	290,000 cfs
Sept.15, 1972	73 mg/1	70,600 cfs

Mean particle size values for the July measurement are attached.

(4) Miscellaneous water temperatures.

MACKENZIE RIVER ABOVE ARCTIC RED RIVER 10LA003

1972 Sediment Results

(1) Computed daily mean concentrations -- none because of insufficient frequency of sampling.

(2) Two "Daily" suspended samples

Aug. 15, 1972 - 379 mg/l

Sept. 9, 1972 - 223 mg/l

(3) One depth integrated suspended sediment measurement.

Date	Mean Concentration	Flow
July 13, 1972	295 mg/l	609,000 cfs

Mean particle size values for this measurement are attached.

(4) One bed material measurement - July 13. Mean cross section particle size values attached.

(5) Miscellaneous water temperatures.

MACKENZIE RIVER ABOVE LIARD RIVER 10GC004

1972 Sediment Results

(1) Computed daily mean concentration -- June 1 to August 31.

(2) Five "Daily" suspended samples

June 28, 1972	-	17 mg/l
July 10, 1972	-	23 mg/l
July 14, 1972	-	21 mg/l
July 27, 1972	-	19 mg/l
Aug. 2, 1972	-	17 mg/l

MACKENZIE RIVER ABOVE LIARD RIVER

Daily Mean Sediment Concentration
in Milligrams per Litre
for 1972

DAY	JUNE	JULY	AUGUST
1	12	18	17
2	12	19	17 S
3	12	19	16
4	12	20	16
5	12	20	17
6	13	20	16
7	13	21	16
8	13	22	15
9	13	22	14
10	13	23 S	14
11	14	23	15
12	14	22	15
13	14	22	15
14	14	21 S	15
15	14	20	15
16	15	20	14
17	15	19	14
18	15	19	14
19	15	18	14
20	15	18	14
21	15	19	14
22	15	19	14
23	16	20	13
24	16	20	13
25	16	21	12
26	16	20	12
27	17	19 S	12
28	17 S	19	12
29	17	18	12
30	18	18	12
31		18	12
TOTAL	433	617	441
MEAN	14	20	14
MAX	18	23	17
MIN	12	18	12

S - Sample(s) collected this Day

PEEL RIVER NEAR FT. MCPHERSON 10MC002

1972 Sediment Results

(1) Computed daily mean values -- none -- insufficient number of samples taken.

(2) No "daily" samples taken.

(3) Two depth integrated suspended sediment measurements.

Date	Mean Concentration	Flow
July 18, 1972	207 mg/1	17,800
Sept. 8, 1972	133 mg/1	36,339

(4) One bed material measurement - July 18. Mean cross section particle size values attached.

STATION NAME Arctic Red River near The Mouth STATION NUMBER 10LA002

Daily Discharge in Cubic Feet per second for 1972

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1	555B	330B	301B	334B	1430B	31,200B	18,700	8130	7330	3370	1130B	711B	1
2	546B	329B	300B	336B	1490B	35,500B	15,900	7870	6790	3250	1020B	709B	2
3	538B	328B	301B	337B	1550B	39,900B	13,600	15,700	7000	3140B	979B	706B	3
4	529B	327B	302B	338B	1600B	44,200	12,200	17,700	8740	3030B	896B	704B	4
5	520B	326B	303B	339B	1660B	48,600	10,500	13,800	9160	2940B	822B	702B	5
6	511B	325B	305B	340B	1720B	39,400	8980	10,800	8270	2820B	767B	700B	6
7	503B	324B	306B	341B	1780B	33,700	8070	9010	7410	2720B	761B	698B	7
8	494B	323B	307B	342B	1830B	35,100	7610	8070	6710	2630B	759B	696B	8
9	485B	322B	308B	344B	1890B	34,100	8480	8010	6030	2550B	757B	694B	9
10	476B	321B	309B	345B	1950B	28,700	7840	9520	5740	2460B	755B	692B	10
11	468B	320B	310B	346B	2000B	31,500	6870	10,200	5350	2380B	753B	690B	11
12	459B	319B	311B	347B	2060B	28,900	6280	8860	5200	2290B	751B	688B	12
13	450B	318B	313B	404B	2120B	23,500	5860	7670	5350	2200B	748B	685B	13
14	441B	317B	314B	461B	2170B	23,600	5530	7060	5890	2120B	746B	683B	14
15	433B	316B	315B	518B	2230B	23,800	5400	7390	9160	2050B	744B	681B	15
16	424B	315B	316B	575B	2290B	22,600	5530	7640	11,200	1990B	742B	679B	16
17	415B	314B	317B	633B	2350B	20,300	6030	7270	12,700	1900B	740B	677B	17
18	406B	313B	318B	690B	2400B	18,000	6030	6950	12,800	1830B	738B	675B	18
19	398B	312B	320B	747B	2460B	20,000	5790	10,500	11,700	1770B	736B	673B	19
20	389B	311B	321B	804B	3170B	18,000	6920	14,900	9830	1700B	734B	671B	20
21	380B	310B	322B	861B	4050B	16,000	6920	12,900	8360	1630B	732B	669B	21
22	371B	309B	323B	918B	5690B	12,700	10,700	10,700	7110	1580B	730B	667B	22
23	363B	308B	324B	975B	9430B	10,600	14,800	9280	5930	1510B	727B	665B	23
24	354B	307B	325B	1030B	8740B	9890	14,700	8390	4940	1450B	725B	663B	24
25	345B	306B	326B	1090B	9990B	10,600	13,200	7690	4520	1400B	723B	661B	25
26	336B	305B	328B	1150B	9890B	10,900	11,100	7810	4220	1340B	721B	659B	26
27	335B	304B	329B	1200B	9430B	14,800	9310	8240	3970	1300B	719B	657B	27
28	334B	303B	330B	1260B	13,800B	19,000	8240	7530	3730	1270B	717B	655B	28
29	333B	302B	331B	1320B	18,100B	21,100	7900	8070	3530	1220B	715B	653B	29
30	332B		332B	1380B	22,500B	21,600	9580	8450	3370	1220B	713B	651B	30
31	331B		333B		26,800B		9070	8040		1200B		649B	31
TOTAL	13,254	9164	9800	20,105	178,570	747,790	287,640	294,150	212,040	64,260	23,300	21,063	TOTAL
MEAN	428	316	316	670	5760	24,900	9280	9490	7070	2070	777	679	MEAN
AC-FT.	26,300	18,200	19,400	39,900	354,000	1,480,000	571,000	583,000	421,000	127,000	46,200	41,800	AC-FT.
MAX.	555	330	333	1380	26,800	48,600	18,700	17,700	12,800	3370	1130	711	MAX.
MIN.	331	302	300	334	1430	9890	5400	6950	3370	1200	713	649	MIN.

SUMMARY FOR THE YEAR 1972

MEAN DISCHARGE: 5140
TOTAL DISCHARGE: 3,730,000
MAXIMUM DAILY DISCHARGE: 48,600
MINIMUM DAILY DISCHARGE: 300

TYPE OF GAUGE - Recording
LOCATION: LAT. 66 47' 10"
LONG. 133 6' 00"
DRAINAGE AREA: 5840 sq. miles

A - MANUAL GAUGE
B - ICE CONDITIONS
E - ESTIMATED

NATURAL FLOW

STATION NAME Firth River Near The Mouth STATION NUMBER 10MD001

Daily Discharge in Cubic Feet per second for 1972

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1							7,600	11,000	5,860	730B	450B	100B	1
2							6,670	7,780	5,020	720B	440B	90B	2
3							7,850	5,570	4,330	710B	430B	80B	3
4							7,740	4,350	3,750	700B	420B	70B	4
5							7,030	3,570	3,350	700B	410B	60B	5
6							13,400	3,080	2,970	690B	400B	50B	6
7							8,970	2,840	2,630	690B	390B	30B	7
8							6,430	3,600	2,360	680B	380B	20B	8
9							5,360	5,090	2,120	670B	370B	10B	9
10							4,660	5,500	1,970	660B	370B	0	10
11					100B		3,980	7,300	1,800	660B	360B	0	11
12							3,800	10,200	1,640	650B	350B	0	12
13							3,640	8,900	1,500	640B	350B	0	13
14							3,440	6,670	1,400	630B	340B	0	14
15							3,400	5,430	1,350	620B	330B	0	15
16							3,490	9,360	1,310	610B	320B	0	16
17							5,740	9,560	1,190	600B	300B	0	17
18							5,140	7,670	1,120	590B	290B	0	18
19							3,820	6,430	910	580B	280B	0	19
20						3,120A	4,590	5,760	890B	570B	270B	0	20
21						5,450	6,340	5,280	870B	560B	260B	0	21
22						12,900	5,930	4,570	850B	550B	240B	0	22
23						11,800	4,920	3,980	840B	540B	230B	0	23
24						11,000	3,820	4,970	830B	540B	220B	0	24
25						12,200	3,210	6,080	820B	530B	210B	0	25
26						12,700	2,660	4,880	800B	520B	200B	0	26
27						18,200	2,360	4,550	780B	510B	190B	0	27
28						14,300	2,150	4,480	760B	500B	160B	0	28
29						11,800	1,910	4,460	750B	490B	140B	0	29
30						9,480	1,760	4,390	740B	480B	120B	0	30
31							4,300	5,310		460B		0	31
TOTAL							156110	182610	55510	18780	9020	510	TOTAL
MEAN							5040	5890	1850	606	300	16.5	MEAN
AC-FT.							310000	362000	110000	37300	17900	1010	AC-FT.
MAX.							13400	11000	5860	730	450	100	MAX.
MIN.							1760	2840	740	460	120	0	MIN.

SUMMARY FOR THE YEAR 1972

MEAN DISCHARGE: 2300
TOTAL DISCHARGE:
MAXIMUM DAILY DISCHARGE:
MINIMUM DAILY DISCHARGE:

TYPE OF GAUGE - Recording
LOCATION: LAT. 69 25 N
LONG.139 30' W
DRAINAGE AREA:

A - MANUAL GAUGE
B - ICE CONDITIONS
E - ESTIMATED

NATURAL FLOW

STATION NAME Harris River near the Mouth STATION NUMBER 10GC002

Daily Discharge in Cubic Feet per second for 1972

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1											0.10 B	0	1
2											0.10 B	0	2
3											0.10 B	0	3
4											0.10 B	0	4
5							19.5 A				0.10 B	0	5
6											0.10 B	0	6
7											0.10 B	0	7
8											0.05 B	0	8
9											0	0	9
10								1.3 A			0	0	10
11								1.3			0	0	11
12								1.2			0	0	12
13								1.2			0	0	13
14								1.3			0	0	14
15								1.2			0	0	15
16								0.87			0	0	16
17								0.80			0	0	17
18								0.76			0	0	18
19								1.1		0.40 B	0	0	19
20								1.3		0.40 B	0	0	20
21						38.3 A		1.9		0.40 B	0	0	21
22								2.9		0.35 B	0	0	22
23								2.2		0.35 B	0	0	23
24								1.9		0.30 B	0	0	24
25								1.6		0.30 B	0	0	25
26								1.5		0.25 B	0	0	26
27								1.4		0.15 B	0	0	27
28								1.3		0.10 B	0	0	28
29								1.3		0.10 B	0	0	29
30								1.2		0.10 B	0	0	30
31								1.2		0.10 B		0	31
TOTAL											0.75	0	TOTAL
MEAN											0.03	0	MEAN
AC-FT.											1.49	0	AC-FT.
MAX.											0.10	0	MAX.
MIN.											0	0	MIN.

SUMMARY FOR THE YEAR 1972

MEAN DISCHARGE:
TOTAL DISCHARGE:
MAXIMUM DAILY DISCHARGE:
MINIMUM DAILY DISCHARGE:

TYPE OF GAUGE - Recording
LOCATION: LAT.
LONG.
DRAINAGE AREA:

A - MANUAL GAUGE
B - ICE CONDITIONS
E - ESTIMATED

NATURAL FLOW

STATION NAME Hay River near Hay River STATION NUMBER 070B001

Daily Discharge in Cubic Feet per second for 1972

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1	154 B	80 B	55 B	53 B	138 B	10,400	4,550	2,900	1,350	535	362 B	176 B	1
2	146 B	83 B	51 B	52 B	120 B	9,870	4,750	2,750	1,270	515	311 B	176 B	2
3	140 B	84 B	46 B	51 B	126 B	9,230	5,120	2,630	1,210	515	302 B	176 B	3
4	138 B	86 B	45 B	50 B	358 B	8,700	5,950	2,620	1,150	535	332 B	174 B	4
5	136 B	87 B	44 B	47 B	462 B	8,300	6,820	2,620	1,110	540	344 B	174 B	5
6	136 B	85 B	41 B	43 B	500 B	7,910	6,910	2,610	1,080	525	329 B	170 B	6
7	134 B	85 B	39 B	40 B	7,500 B	7,690	6,670	2,600	1,050	510	305 B	176 B	7
8	134 B	85 B	37 B	34 B	20,000 B	7,490	6,350	2,520	1,010	505	302 B	178 B	8
9	128 B	78 B	32 B	28 B	36,000 B	7,160	5,970	2,480	960	530	302 B	172 B	9
10	124 B	76 B	28 B	25 B	35,700 B	6,930	5,630	2,310	912	350 B	296 B	172 B	10
11	116 B	76 B	29 B	25 B	35,000	6,650	5,460	2,390	852	466 B	278 B	180 B	11
12	112 B	76 B	30 B	23 B	34,900	6,350	5,350	2,380	831	414 B	251 B	172 B	12
13	102 B	77 B	44 B	20 B	34,500	6,140	5,180	2,390	796	545 B	239 B	168 B	13
14	96 B	78 B	49 B	18 B	34,300	5,990	4,990	2,440	761	466 B	236 B	166 B	14
15	88 B	83 B	51 B	16 B	34,100	5,930	4,850	2,500	754	434 B	230 B	162 B	15
16	89 B	85 B	54 B	15 B	33,800	5,760	4,760	2,560	747	466 B	214 B	158 B	16
17	88 B	89 B	56 B	14 B	33,800	5,510	5,990	2,560	782	434 B	214 B	160 B	17
18	83 B	92 B	53 B	13 B	33,600	5,320	7,830	2,420	704	430 B	212 B	154 B	18
19	82 B	90 B	51 B	12 B	33,100	5,230	7,710	2,340	674	430 B	206 B	153 B	19
20	80 B	89 B	48 B	15 B	31,700	5,150	7,050	2,210	656	394 B	200 B	150 B	20
21	85 B	85 B	49 B	16 B	29,400	5,000	6,370	2,090	620	347 B	200 B	147 B	21
22	88 B	78 B	56 B	14 B	26,600	4,900	5,710	1,980	605	344 B	200 B	143 B	22
23	96 B	71 B	62 B	14 B	23,700	4,810	5,110	1,890	585	354 B	198 B	140 B	23
24	94 B	69 B	64 B	16 B	20,900	4,730	4,680	1,830	575	344 B	196 B	137 B	24
25	94 B	70 B	59 B	20 B	18,600	4,680	4,330	1,790	560	362 B	188 B	134 B	25
26	90 B	69 B	56 B	31 B	16,700	4,650	4,000	1,710	550	281 B	186 B	131 B	26
27	82 B	64 B	53 B	48 B	15,200	4,660	3,770	1,610	545	248 B	186 B	129 B	27
28	78 B	57 B	52 B	77 B	13,900	4,590	3,500	1,520	545	230 B	184 B	126 B	28
29	76 B	57 B	51 B	122 B	13,000	4,550	3,250	1,460	545	414 B	182 B	123 B	29
30	72 B		51 B	144 B	12,000	4,550	3,050	1,440	530	335 B	178 B	120 B	30
31	77 B		51 B		11,100		3,010	1,380		378 B		117 B	31
TOTAL	3,238	2,284	1,487	1,096	640,804	188,830	164,670	68,930	24,319	13,176	7,364	4,814	TOTAL
MEAN	104	79	48	37	20,700	6,290	5,310	2,220	810	425	245	155	MEAN
AC-FT.	6,420	4,530	2,950	2,170	1,270,000	375,000	327,000	137,000	48,200	26,100	14,600	9,550	AC-FT.
MAX.	154	90	64	144	36,000	10,400	7,830	2,900	1,350	545	362	178	MAX.
MIN.	72	57	28	12	120	4,550	3,010	1,380	530	230	178	117	MIN.

SUMMARY FOR THE YEAR 1972

MEAN DISCHARGE: 3,060 cfs.
TOTAL DISCHARGE: 2,220,000 ac-ft.
MAXIMUM DAILY DISCHARGE: 36,000 cfs.
MINIMUM DAILY DISCHARGE: 12 cfs.

TYPE OF GAUGE - Recording
LOCATION: LAT. 60 44 45 N
LONG. 115 51 20 W
DRAINAGE AREA: 18,500 sq. miles

A - MANUAL GAUGE
B - ICE CONDITIONS
E - ESTIMATED

NATURAL FLOW

STATION NAME Kakisa River at Outlet of Kakisa Lake STATION NUMBER 07UC001

Daily Discharge in Cubic Feet per second for 1972

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1	224 B	147 B	108 B	118 B	260 B	2,850	3,400	1,760	1,170	794	659 B	578 B	1
2	216 B	146 B	108 B	124 B	264 B	3,060	3,320	1,450	1,220	880	668 B	586 B	2
3	212 B	140 B	106 B	126 B	268 B	3,300	3,210	1,760	1,200	1,170	686 B	586 B	3
4	216 B	138 B	104 B	126 B	272 B	3,380	3,130	1,620	1,050	960	704 B	578 B	4
5	200 B	138 B	102 B	132 B	276 B	3,430	3,090	1,590	1,030	910	704 B	578 B	5
6	197 B	138 B	100 B	134 B	285 B	3,490	2,980	1,600	1,030	840	695 B	556 B	6
7	194 B	134 B	94 B	138 B	290 B	3,620	2,930	1,600	1,010	840	695 B	549 B	7
8	194 B	136 B	94 B	140 B	295 B	3,600	2,820	1,540	990	880	677 B	549 B	8
9	194 B	134 B	90 B	143 B	300 B	3,920	2,610	1,550	990	920	677 B	556 B	9
10	185 B	134 B	88 B	146 B	320	4,020	2,680	1,510	980	860	677 B	549 B	10
11	182 B	132 B	88 B	155 B	350	4,120	2,620	1,470	950	850	668 B	542 B	11
12	179 B	128 B	88 B	161 B	386	4,200	2,790	1,410	950	776	668 B	535 B	12
13	178 B	126 B	86 B	167 B	446	4,100	2,450	1,380	920	785	650 B	528 B	13
14	176 B	124 B	84 B	173 B	507	4,140	2,490	1,360	920	758	650 B	521 B	14
15	175 B	122 B	80 B	170 B	578	4,240	2,610	1,350	960	749	659 B	521 B	15
16	174 B	122 B	80 B	173 B	650	4,260	2,490	1,320	980	659	634 B	521 B	16
17	172 B	118 B	80 B	182 B	767	4,120	2,330	1,290	950	626	634 B	514 B	17
18	171 B	118 B	80 B	188 B	880	4,120	2,320	1,240	900	713	634 B	514 B	18
19	169 B	120 B	80 B	194 B	1,010	4,200	2,250	1,270	880	785	634 B	507 B	19
20	168 B	118 B	80 B	208 B	1,130	4,160	2,230	1,250	890	749	626 B	500 B	20
21	167 B	116 B	84 B	212 B	1,180	4,180	2,150	1,260	776	767	626 B	500 B	21
22	165 B	114 B	86 B	220 B	1,350	3,880	2,090	1,260	812	713 B	602 B	500 B	22
23	163 B	114 B	88 B	220 B	1,470	3,960	2,130	1,240	890	731 B	602 B	494 B	23
24	161 B	108 B	92 B	228 B	1,620	3,880	2,090	1,240	930	749 B	602 B	494 B	24
25	159 B	116 B	96 B	232 B	1,760	3,720	1,920	1,300	910	704 B	602 B	488 B	25
26	157 B	114 B	100 B	244 B	1,940	3,800	1,970	1,320	890	686 B	586 B	482 B	26
27	155 B	114 B	104 B	244 B	2,100	3,720	2,090	1,230	910	668 B	594 B	476 B	27
28	153 B	112 B	106 B	244 B	2,180	3,680	2,030	1,170	850	668 B	586 B	476 B	28
29	151 B	112 B	108 B	256 B	2,430	3,620	1,980	1,230	840	659 B	586 B	476 B	29
30	149 B		110 B	256 B	2,540	3,380	1,910	1,210	794	668 B	578 B	464 B	30
31	148 B		116 B		2,680		1,880	1,200		659 B		464 B	31
TOTAL	5,504	3,633	2,910	5,454	30,784	114,150	76,990	42,980	28,572	24,176	19,263	16,182	TOTAL
MEAN	178	125	94	182	993	3,810	2,480	1,390	922	780	642	522	MEAN
AC-FT.	1,090	7,210	5,770	10,800	61,100	226,000	153,000	85,300	56,700	48,000	38,200	32,100	AC-FT.
MAX.	224	147	116	256	2,680	4,260	3,400	1,760	1,170	1,170	704	586	MAX.
MIN.	148	112	80	118	260	2,850	1,880	1,170	776	626	578	464	MIN.

SUMMARY FOR THE YEAR 1972

MEAN DISCHARGE: 1,010 cfs .
TOTAL DISCHARGE: 735,000 ac-ft.
MAXIMUM DAILY DISCHARGE: 4,260 cfs.
MINIMUM DAILY DISCHARGE: 80 cfs.

TYPE OF GAUGE - Recording
LOCATION: LAT. 60 55 00 N
LONG. 117 25 00 W
DRAINAGE AREA: 5,770 sq. miles

A - MANUAL GAUGE
B - ICE CONDITIONS
E - ESTIMATED

NATURAL FLOW

STATION NAME Liard River at Fort Liard STATION NUMBER 10ED001

Daily Discharge in Cubic Feet per second for 1972

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1	9,050 B	7,040 B	6,450 B	7,050 B	16,000 B	290,000	193,000	145,000	70,100	52,400	32,500 B	17,200 B	1
2	9,000 B	6,950 B	6,420 B	7,100 B	18,000 B	345,000	175,000	135,000	67,800	56,600	30,000 B	17,400 B	2
3	8,950 B	6,910 B	6,410 B	7,200 B	21,500 B	353,000	159,000	135,000	65,400	63,300	28,000 B	17,600 B	3
4	8,900 B	6,820 B	6,400 B	7,250 B	25,000 B	349,000	148,000	133,000	63,100	71,700	26,500 B	17,600 B	4
5	8,850 B	6,730 B	6,400 B	7,350 B	27,500 B	313,000	142,000	128,000	61,000	75,000	25,000 B	17,500 B	5
6	8,800 B	6,640 B	6,350 B	7,400 B	32,000 B	254,000	140,000	123,000	60,800	73,900	23,500 B	17,400 B	6
7	8,750 B	6,590 B	6,300 B	7,500 B	36,000 B	214,000	137,000	121,000	60,000	73,500	22,200 B	17,200 B	7
8	8,650 B	6,550 B	6,300 B	7,600 B	42,000 B	196,000	134,000	122,000	61,000	74,700	21,100 B	17,000 B	8
9	8,550 B	6,500 B	6,270 B	7,790 B	48,000 B	195,000	130,000	119,000	63,100	74,200	20,500 B	16,800 B	9
10	8,450 B	6,460 B	6,250 B	7,900 B	53,000 B	190,000	127,000	114,000	63,400	74,600	19,800 B	16,600 B	10
11	8,400 B	6,410 B	6,260 B	8,000 B	60,000 B	195,000	124,000	111,000	62,400	70,800	19,100 B	16,400 B	11
12	8,350 B	6,380 B	6,270 B	8,100 B	69,000 B	219,000	125,000	109,000	61,200	65,200	18,700 B	16,200 B	12
13	8,300 B	6,320 B	6,280 B	8,200 B	79,000 B	247,000	123,000	108,000	60,100	61,200	18,200 B	16,000 B	13
14	8,250 B	6,280 B	6,290 B	8,300 B	90,000 B	264,000	115,000	109,000	59,600	59,400	17,900 B	15,700 B	14
15	8,150 B	6,240 B	6,300 B	8,400 B	100,000 B	274,000	107,000	107,000	59,500	59,200	17,700 B	15,400 B	15
16	8,050 B	6,190 B	6,330 B	8,600 B	112,000 E	277,000	104,000	98,900	59,200	58,500	17,400 B	15,200 B	16
17	7,950 B	6,150 B	6,360 B	8,800 B	125,000 E	280,000	102,000	92,700	59,300	57,200	17,000 B	15,000 B	17
18	7,850 B	6,100 B	6,390 B	9,000 B	140,000 E	301,000	98,800	88,800	61,600	55,400	16,800 B	14,700 B	18
19	7,750 B	6,080 B	6,400 B	9,200 B	155,000 E	290,000	95,200	88,900	66,300	54,100	16,600 B	14,400 B	19
20	7,650 B	6,100 B	6,420 B	9,400 B	170,000 E	262,000	92,500	96,300	68,200	53,200	16,500 B	14,200 B	20
21	7,600 B	6,110 B	6,450 B	9,700 B	190,000 E	236,000	92,700	122,000	66,400	52,100	16,400 B	14,000 B	21
22	7,550 B	6,150 B	6,500 B	10,000 B	210,000 E	214,000	93,300	139,000	65,000	51,000	16,300 B	13,800 B	22
23	7,500 B	6,200 B	6,550 B	10,400 B	228,000 E	206,000	109,000	126,000	62,700	49,600	16,200 B	13,600 B	23
24	7,450 B	6,250 B	6,600 B	10,800 B	223,000 A	237,000	119,000	110,000	60,400	48,200	16,100 B	13,300 B	24
25	7,400 B	6,300 B	6,650 B	11,200 B	212,000	242,000	129,000	99,800	58,200	47,600	16,100 B	13,000 B	25
26	7,360 B	6,350 B	6,700 B	11,800 B	178,000	234,000	151,000	92,700	56,000	47,000B	16,300 B	12,800 B	26
27	7,270 B	6,400 B	6,800 B	12,400 B	154,000	231,000	183,000	87,300	53,800	45,000B	16,500 B	12,600 B	27
28	7,220 B	6,400 B	6,850 B	13,000 B	146,000	228,000	195,000	83,100	52,800	42,500B	16,700 B	12,400 B	28
29	7,180 B	6,400 B	6,900 B	13,800 B	155,000	222,000	190,000	79,100	51,600	40,000B	16,800 B	12,200 B	29
30	7,130 B		6,950 B	14,600 B	186,000	212,000	175,000	75,500	50,900	37,500B	17,000 B	11,900 B	30
31	7,090 B		7,000 B		235,000		161,000	72,400		35,000B		11,700 B	31
TOTAL													TOTAL
MEAN													MEAN
AC-FT.													AC-FT.
MAX.													MAX.
MIN.													MIN.

SUMMARY FOR THE YEAR 1972

MEAN DISCHARGE: 66,200 cfs.
TOTAL DISCHARGE: 48,000,000 ac-ft.
MAXIMUM DAILY DISCHARGE:
MINIMUM DAILY DISCHARGE:

TYPE OF GAUGE - Recording
LOCATION: LAT. 60 14 35 N
LONG. 123 28 45 W
DRAINAGE AREA: 85,700 square miles

A - MANUAL GAUGE
B - ICE CONDITIONS
E - ESTIMATED

NATURAL FLOW

STATION NAME Liard River near the Mouth STATION NUMBER 10ED002

Daily Discharge in Cubic Feet per second for 1972

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1						312	270	253	92.4	61.9	38.5 B	25.1 B	1
2						396	245	223	88.8	61.5	37.0 B	25.4 B	2
3						473	223	198	86.1	63.0	35.5 B	25.8 B	3
4						482	213	184	83.2	66.5	34.0 B	25.9 B	4
5						456	201	184	80.8	72.6	31.0 B	26.0 B	5
6						408	185	178	79.4	79.2	28.0 B	25.9 B	6
7						348	176	166	77.3	81.4	25.0 B	25.8 B	7
8						318 A	169	158	75.8	80.8	23.0 B	25.5 B	8
9						313 E	168	158	75.4	80.4	22.0 B	25.1 B	9
10						309 E	177	158	75.6	80.4	21.2 B	24.8 B	10
11						305 E	168	151	76.7	80.0	21.0 B	24.5 B	11
12						301 E	158	145	76.5	78.2	20.5 B	24.0 B	12
13						296 A	153	141	75.2	74.6	20.4 B	23.7 B	13
14						308	150	137	73.9	70.6	20.2 B	23.3 B	14
15						327	146	135	72.8	67.5	20.0 B	23.0 B	15
16						340	139	133	72.2	66.5	20.0 B	23.6 B	16
17						342	135	128	72.6	66.3	20.2 B	22.0 B	17
18						337	137	121	73.1	65.6	20.4 B	21.7 B	18
19						348	133	116	73.1	64.6	20.5 B	21.2 B	19
20						360	127	114	75.2	62.7	20.8 B	21.0 B	20
21						336	122	120	77.7	61.7	21.0 B	20.6 B	21
22						313	123	134	78.6	61.0	21.3 B	20.4 B	22
23						286	182	153	77.1	60.0	21.8 B	20.2 B	23
24						259	254	153	75.4	58.9	22.2 B	20.0 B	24
25						259	253	139	73.1	56.0 B	22.8 B	19.9 B	25
26						279	244	126	70.4	54.0 B	23.2 B	19.8 B	26
27					217 A	284	288	118	68.1	49.0 B	23.5 B	19.7 B	27
28					206	308	357	111	66.3	45.0 B	24.0 B	19.5 B	28
29					197	312	347	105	64.4	43.0 B	24.5 B	19.4 B	29
30					213	293	298	100	63.0	41.0 B	25.0 B	19.2 B	30
31					257		276	96.4		40.0 B		19.0 B	31
TOTAL						10008000	6217000	4536400	2270200	1993900	228500	701000	TOTAL
MEAN						334000	201000	146000	75700	64300	24300	22600	MEAN
AC-FT.						19900000	12300000	9000000	4500000	3950000	1440000	1390000	AC-FT.
MAX.						482000	357000	253000	92400	81400	38500	26000	MAX.
MIN.						259000	122000	96400	63000	40,000	20000	19000	MIN.

SUMMARY FOR THE YEAR 1972

MEAN DISCHARGE:
TOTAL DISCHARGE:
MAXIMUM DAILY DISCHARGE:
MINIMUM DAILY DISCHARGE:

TYPE OF GAUGE - Recording
LOCATION: LAT.
LONG.
DRAINAGE AREA:

A - MANUAL GAUGE
B - ICE CONDITIONS
E - ESTIMATED

NATURAL FLOW

DEPARTMENT OF THE ENVIRONMENT
WATER RESOURCES BRANCH – WATER SURVEY OF CANADA

DAILY GAUGE HEIGHTS

Station Name Mackenzie River below Blackwater River Station No 10HC002

Daily Elevations or Gauge Heights in Feet for the Year 19 72

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1						76.97E	77.87E	77.32E	68.94				1
2						77.50E	77.38E	76.27E	68.71				2
3						78.82E	76.73E	76.08	68.60				3
4						80.40E	76.12E	75.30	68.38				4
5						81.69E	74.73E	74.52	68.11				5
6						81.30E	74.00E	73.81	67.89				6
7						80.50E	73.25E	73.35	67.69				7
8						79.45A	72.85E	72.98	67.42				8
9						78.50E	72.64E	72.52	67.34				9
10						77.00E	72.55E	72.19	67.27				10
11						76.74E	72.49E	72.00	67.23				11
12						76.44E	72.38E	71.89	67.22				12
13						76.15E	72.05E	71.66	67.23				13
14						76.32E	71.80E	71.34	67.20				14
15						76.70E	71.60E	71.11	67.15				15
16						77.35E	71.42E	70.90	67.08				16
17						77.70E	71.25A	70.74	67.02				17
18						77.82E	71.09	70.58	66.98				18
19						77.96E	70.93	70.42	67.02				19
20						78.20E	70.83	70.36	67.03				20
21						79.29E	70.76	70.48	67.04				21
22						79.49E	71.19	70.21	67.13				22
23						78.50E	76.24	70.13	67.25				23
24						77.22E	79.40	70.45	67.35				24
25						75.55E	78.30	70.98					25
26						75.55E	77.93	71.11					26
27						76.10E	77.82	70.73					27
28						77.21E	78.15	70.18					28
29						77.52E	78.26	69.70					29
30						77.83E	78.88	69.46					30
31							78.39E	69.21					31

Summary

For the Period (June 1 to Sept. 24)

Maximum daily elevation, gauge height, Not Determined ft at on

Minimum daily elevation, 66.98 ft at on Sept. 18/72

Computed by

Date

Checked by

Date

R43 (Dec 72)

DEPARTMENT OF THE ENVIRONMENT
WATER RESOURCES BRANCH – WATER SURVEY OF CANADA

DAILY GAUGE HEIGHTS

Station Name Mackenzie River at Camsell Bend Station No 10GB002

Daily Elevations or Gauge Heights in Feet for the Year 19 72

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1							81.72	81.53	75.40	73.23	72.66		1
2							81.23	80.84	75.30	73.15	72.45		2
3							80.52	80.17	75.11	73.11	72.39A		3
4							79.90	79.59	74.93	73.10			4
5							79.51	79.07	74.76	73.08			5
6						83.77A	79.20	78.81	74.58	73.16			6
7						83.27	78.76	78.56	74.46	73.29			7
8						82.34	78.43	78.20	74.38	73.47			8
9						81.62	78.31	77.92	74.35	73.50			9
10						81.11	78.29	77.79	74.32	73.49			10
11						80.94	78.37	77.75	74.33	73.49			11
12						80.82	78.21	77.60	74.34	73.45			12
13						80.72	77.96	77.38	74.32	73.41			13
14						81.01	77.73	77.23	74.27	73.24			14
15						81.35	77.62	77.08	74.22	73.10			15
16						81.73	77.50	76.97	74.16	72.96			16
17						82.04	77.32	76.87	74.17	72.86			17
18						82.10	77.17	76.75	74.20	72.85			18
19						82.04	77.12	76.64	74.19	72.84			19
20						82.27	77.02	76.70	74.21	72.81			20
21						83.13	76.90	76.51	74.30	72.73			21
22						82.49	78.72	76.50	74.39	72.64			22
23						81.74	81.94	76.79	74.45	72.59			23
24						81.06	81.71	77.26	74.42	72.58			24
25						80.41	81.98	77.38	74.30	72.56			25
26						80.38	82.02	77.01	74.16	72.42			26
27						80.99	82.42	76.57	73.91	72.37			27
28						81.48	82.59	76.22	73.70	72.59			28
29						81.65	83.42	75.96	73.52	72.69			29
30						81.84	83.35	75.73	73.36	72.71			30
31							82.40	75.55		72.70			31

Summary For the Year / For the Period (to)

Maximum instantaneous elevation, / daily gauge height, 83.85 ft at 1845 MST on June 6

Minimum instantaneous elevation, / daily gauge height, 72.29 ft at 1025 MST on November 3

Computed by Date

Checked by Date

R43 (Dec 72)

A - Partial Day Record

DEPARTMENT OF THE ENVIRONMENT
WATER RESOURCES BRANCH – WATER SURVEY OF CANADA

DAILY GAUGE HEIGHTS

Station Name Mackenzie River at Fort Good Hope Station No. 10LD001

Daily Elevations or Gauge Heights in Feet for the Year 19 72

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1							20.99	22.14	9.50	5.45			1
2							21.18	21.41	9.17	5.14			2
3							21.01	20.32	8.80	4.85			3
4							20.53	19.32	8.75	4.52			4
5							19.62	18.29	8.46	4.52			5
6							18.44	17.25	8.23	4.26			6
7							17.11	16.20	7.92	4.17			7
8							16.23	15.22	7.57	4.15			8
9							15.55	14.44	7.31	4.14			9
10							14.83	14.00	7.07	4.17B			10
11							14.18	13.62	6.91	4.23B			11
12							13.61	13.12	6.75	4.37B			12
13							13.25	12.75	6.66	4.40B			13
14							12.95	12.40	6.66	4.42B			14
15							12.68	12.11	6.70	4.37B			15
16						19.38A	12.40	11.74	6.69	4.55B			16
17						19.34	12.24	11.42	6.72	4.22B			17
18						19.16	12.05	11.14	6.74	4.18B			18
19						19.12	11.88	10.99	6.72	4.42B			19
20						19.43	11.65	10.88	6.56	4.55B			20
21						19.66	11.37	10.84	6.45	4.75B			21
22						20.35	11.38	10.95	6.39	4.90B			22
23						21.66	11.90	10.91	6.28				23
24						21.34	14.29	10.61	6.20				24
25						20.32	18.82	10.29	6.18				25
26						19.20	21.57	10.26	6.31				26
27						18.54	21.55	10.49	6.25				27
28						18.34	20.67	10.71	6.15				28
29						19.43	20.82	10.66	6.02				29
30						20.62	21.46	10.29	5.78				30
31							22.10	9.83					31

Summary						Computed by	Checked by
For the Period (June 16 to Oct. 22)	Maximum instantaneous gauge height,	22.28	ft at	22:30	on July 31/72	Date	Date
	Minimum daily gauge height,	4.14	ft at		on Oct. 9/72		

R43 (Dec 72)

STATION NAME Mackenzie River near Fort Providence STATION NUMBER 10FB001

Daily Discharge in Cubic Feet per second for 1972

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1	78,600 B	66,900 B	59,600 B	56,100 B	63,900 B	189,000A	226,000 E	225,000	213,000	191,000	132,000B	95,000 B	1
2	78,200 B	66,600 B	59,400 B	56,100 B	65,600 B	193,000	229,000	228,000	209,000	187,000	128,000B	93,000 B	2
3	77,800 B	66,200 B	59,200 B	56,000 B	66,900 B	189,000	228,000	221,000	195,000	155,000	122,000B	91,000 B	3
4	77,300 B	66,000 B	59,000 B	56,000 B	70,300 B	195,000	228,000	223,000	198,000	155,000	119,000B	89,000 B	4
5	76,800 B	65,800 B	58,800 B	56,000 B	72,600 B	204,000	229,000	225,000	205,000	172,000	116,000B	87,500 B	5
6	76,200 B	65,600 B	58,600 B	56,000 B	74,500 B	210,000	231,000	224,000	207,000	176,000	112,000B	85,500 B	6
7	75,800 B	65,200 B	58,400 B	56,100 B	77,700 B	209,000	232,000	222,000	207,000	177,000	110,000B	83,000 B	7
8	75,400 B	65,000 B	58,200 B	56,200 B	80,600 B	212,000	231,000	222,000	207,000	178,000	108,000B	81,000 B	8
9	75,000 B	64,800 B	58,000 B	56,300 B	83,700 B	210,000	234,000	218,000	205,000	175,000	105,000B	79,000 B	9
10	74,600 B	64,500 B	57,800 B	56,400 B	87,300 B	206,000	235,000	218,000	202,000	179,000	103,000B	77,000 B	10
11	74,200 B	64,000 B	57,600 B	56,500 B	90,800 B	208,000	233,000	221,000	201,000	171,000	100,000B	76,000 B	11
12	73,800 B	63,800 B	57,400 B	56,600 B	93,500 B	206,000	231,000	222,000	201,000	170,000	99,000B	74,000 B	12
13	73,400 B	63,600 B	57,200 B	56,700 B	102,000B	215,000	232,000	222,000	201,000	168,000	97,000B	73,000 B	13
14	73,000 B	63,400 B	57,100 B	56,800 B	110,000B	219,000	232,000	221,000	205,000	171,000	96,000B	71,000 B	14
15	72,600 B	63,200 B	57,000 B	56,900 B	116,000B	217,000	231,000	219,000	213,000	172,000	95,000B	70,000 B	15
16	72,200 B	63,000 B	56,900 B	57,000 B	121,000B	216,000	231,000	217,000	203,000	176,000	94,000B	69,800 B	16
17	72,000 B	62,800 B	56,900 B	57,100 B	145,000B	219,000	232,000	216,000	204,000	177,000	93,500B	69,500 B	17
18	71,800 B	62,400 B	56,800 B	57,200 B	165,000B	220,000	229,000	217,000	205,000	173,000	93,000B	69,800 B	18
19	71,000 B	62,000 B	56,800 B	57,300 B	195,000B	220,000	230,000	219,000	208,000	169,000	93,500B	70,000 B	19
20	70,800 B	61,800 B	56,700 B	57,400 B	218,000B	218,000	229,000	219,000	207,000	168,000	94,000B	70,500 B	20
21	70,400 B	61,600 B	56,700 B	57,500 B	224,000B	216,000	230,000	219,000	208,000	172,000	95,000B	71,500 B	21
22	70,000 B	61,400 B	56,600 B	57,700 B	214,000B	216,000	232,000	218,000	213,000	176,000	95,500B	72,000 B	22
23	69,800 B	61,000 B	56,600 B	57,900 B	206,000B	219,000	232,000	216,000	208,000	173,000	96,000B	73,000 B	23
24	69,600 B	60,800 B	56,500 B	58,100 B	199,000B	220,000	232,000	215,000	191,000	173,000	96,000B	74,000 B	24
25	69,200 B	60,600 B	56,500 B	58,300 B	194,000B	222,000	234,000	215,000	184,000	172,000	96,500B	76,000 B	25
26	68,800 B	60,400 B	56,400 B	58,500 B	190,000E	222,000	235,000	209,000	184,000	160,000B	96,500B	77,000 B	26
27	68,400 B	60,200 B	56,400 B	59,000 B	188,000E	221,000	233,000	204,000	182,000	154,000B	97,000B	78,000 B	27
28	68,000 B	60,000 B	56,300 B	59,500 B	188,000E	222,000	228,000	206,000	178,000	150,000B	97,000B	79,000 B	28
29	67,800 B	59,800 B	56,300 B	61,000 B	186,000E	220,000A	223,000	210,000	183,000	146,000B	96,500B	80,000 B	29
30	67,600 B		56,200 B	62,300 B	188,000E	223,000E	229,000	214,000	189,000	141,000B	96,000B	81,000 B	30
31	67,400 B		56,200 B		189,000E		224,000	216,000		138,000B		82,000 B	31
TOTAL	2247500	1832400	1778100	1720500	4265400	6376000	7145000	6761000	6016000	5215000	3072000	2418100	TOTAL
MEAN	72500	63200	57400	57400	138000	213000	230000	218000	201000	168000	102000	78000	MEAN
AC-FT.	4460000	3630000	3530000	3410000	8460000	12600000	14200000	13400000	11900000	10300000	6090000	4800000	AC-FT.
MAX.	78600	66900	59600	62300	224000	223000	235000	228000	213000	191000	132000	95000	MAX.
MIN.	67400	59800	56200	56000	63900	189000	223000	204000	178000	138000	93000	69500	MIN.

SUMMARY FOR THE YEAR 1972

MEAN DISCHARGE: 133,000 cfs
TOTAL DISCHARGE: 96,800,000 ac-ft.
MAXIMUM DAILY DISCHARGE: 235,000 on July 10 & 26
MINIMUM DAILY DISCHARGE: 56,000 cfs on Apr. 3-6

TYPE OF GAUGE - Recording
LOCATION: LAT. 61 15 04 N
LONG. 117 29 48 W
DRAINAGE AREA: 375,000 sq. Miles

A - MANUAL GAUGE
B - ICE CONDITIONS
E - ESTIMATED

NATURAL FLOW

STATION NAME Mackenzie River at Fort Simpson STATION NUMBER 10GC001

Daily Discharge in Cubic Feet per second for 1972

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1	87,300 B	74,300 B	65,900 B	65,300 B	67,000 B	512,000	513,000	485,000	304,000	243,000	190,000B	125,000B	1
2	86,500 B	73,800 B	65,700 B	65,400 B	68,000 B	562,000	493,000	462,000	299,000	242,000	182,000B	124,000B	2
3	85,800 B	73,500 B	65,600 B	65,500 B	69,000 B	619,000	472,000	436,000	293,000	242,000	177,000B	123,000B	3
4	85,400 B	73,200 B	65,500 B	65,600 B	70,000 B	632,000	462,000	418,000	288,000	240,000	167,000B	122,000B	4
5	84,800 B	72,900 B	65,400 B	65,700 B	74,000 B	623,000	454,000	414,000	284,000	243,000	158,000B	121,000B	5
6	84,400 B	72,600 B	65,300 B	65,800 B	80,000 B	599,000	440,000	411,000	280,000	248,000	145,000B	120,000B	6
7	83,900 B	72,300 B	65,200 B	65,900 B	88,000 B	560,000	431,000	401,000	278,000	252,000	130,000B	119,000B	7
8	83,600 B	71,900 B	65,100 B	66,000 B	96,000 B	533,000	425,000	392,000	277,000	254,000	124,000B	117,000B	8
9	83,300 B	71,500 B	65,000 B	66,100 B	108,000 B	510,000	422,000	388,000	276,000	254,000	120,000B	115,000B	9
10	82,900 B	71,200 B	64,900 B	66,200 B	120,000 B	502,000	429,000	387,000	276,000	253,000	118,000B	112,000B	10
11	82,400 B	70,900 B	64,800 B	66,300 B	130,000 B	500,000	426,000	383,000	277,000	253,000	114,000B	110,000B	11
12	81,900 B	70,600 B	64,700 B	66,400 B	144,000 B	499,000	417,000	374,000	277,000	252,000	111,000B	108,000B	12
13	81,600 B	70,300 B	64,600 B	66,500 B	158,000 B	510,000	410,000	370,000	275,000	247,000	110,000B	106,000B	13
14	81,300 B	70,000 B	64,500 B	66,600 B	180,000 B	524,000	406,000	366,000	273,000	241,000	108,000B	103,000B	14
15	80,800 B	69,700 B	64,400 B	66,700 B	200,000 B	539,000	403,000	362,000	272,000	237,000	107,000B	101,000B	15
16	80,400 B	69,400 B	64,300 B	66,800 B	230,000 B	552,000	395,000	359,000	273,000	234,000	106,000B	99,000B	16
17	79,800 B	69,100 B	64,200 B	66,900 B	280,000 B	557,000	388,000	355,000	273,000	233,000	105,000B	97,500B	17
18	79,400 B	68,800 B	64,100 B	67,000 B	305,000 B	554,000	387,000	348,000	274,000	234,000	104,000B	94,500B	18
19	78,800 B	68,600 B	64,000 B	67,000 B	350,000 B	557,000	386,000	342,000	274,000	234,000	105,000B	93,000B	19
20	78,400 B	68,400 B	64,100 B	66,000 B	390,000 B	570,000	379,000	336,000	276,000	230,000	106,000B	91,700B	20
21	77,900 B	68,200 B	64,200 B	66,200 B	405,000 E	559,000	373,000	338,000	279,000	228,000	107,000B	91,000B	21
22	77,600 B	67,800 B	64,300 B	66,300 B	430,000 E	542,000	372,000	348,000	288,000	228,000	108,000B	91,000B	22
23	77,300 B	67,600 B	64,400 B	66,000 B	440,000 E	522,000	399,000	367,000	283,000	226,000	110,000B	92,000B	23
24	76,900 B	67,400 B	64,500 B	66,000 B	445,000 E	499,000	469,000	374,000	279,000	226,000	112,000B	92,000B	24
25	76,600 B	67,200 B	64,600 B	66,000 B	450,000 E	490,000	489,000	362,000	275,000	225,000	115,000B	93,000B	25
26	76,300 B	66,800 B	64,700 B	66,000 B	445,000 E	507,000	478,000	346,000	267,000	220,000 B	117,000B	94,000B	26
27	75,900 B	66,500 B	64,800 B	66,200 B	440,000 E	513,000	497,000	333,000	261,000	215,000 B	120,000B	94,000B	27
28	75,600 B	66,300 B	64,900 B	66,400 B	438,000 E	528,000	548,000	325,000	254,000	208,000 B	122,000B	95,000B	28
29	75,300 B	66,100 B	65,000 B	67,000 B	439,000 A	540,000	563,000	318,000	249,000	202,000 B	124,000B	97,000B	29
30	74,900 B		65,100 B	67,000 B	444,000	530,000	528,000	311,000	246,000	200,000 B	125,000B	99,000B	30
31	74,600 B		65,200 B		471,000		502,000	307,000		195,000 B		100,000B	31
TOTAL	2491600	2026900	2009000	1986800	8054000	16,244000	13756000	11518000	8280000	7239000	3747000	3239700	TOTAL
MEAN	80400	69900	64800	66200	260000	541000	444000	372000	276000	234000	125000	105000	MEAN
AC-FT.	4940000	4020000	3980000	3940000	16000000	32200000	27300000	22300000	16400000	14400000	7430000	6430000	AC-FT.
MAX.	87300	74300	65900	67000	471000	632000	563000	485000	304000	254000	190000	125000	MAX.
MIN.	74600	66100	64900	65300	67000	490000	372000	307000	246000	195000	104000	91000	MIN.

SUMMARY FOR THE YEAR 1972

MEAN DISCHARGE: 220,000 cfs.
TOTAL DISCHARGE: 159,000,000 ac-ft.
MAXIMUM DAILY DISCHARGE: 632,000 cfs.
MINIMUM DAILY DISCHARGE: 64,000 cfs.

TYPE OF GAUGE - Recording
LOCATION: LAT. 61 52 28 N
LONG. 121 20 08 W
DRAINAGE AREA: 491,000 sq. miles

A - MANUAL GAUGE
B - ICE CONDITIONS
E - ESTIMATED

NATURAL FLOW

STATION NAME Mackenzie River at Norman Wells STATION NUMBER 10KA001

Daily Discharge in Cubic Feet per second for 1972

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1	108,000B	95,300B	89,200 B	86,200 B	96,000B	810,000E	802,000	816,000	429,000	335,000	247,000B	155,000B	1
2	107,000B	94,900B	89,100 B	86,100 B	100,000B	815,000E	796,000	760,000	420,000	327,000	240,000B	158,000B	2
3	107,000B	94,600B	89,000 B	86,100 B	103,000B	820,000E	778,000	718,000	415,000	326,000	235,000B	159,000B	3
4	107,000B	94,300B	88,900 B	86,000 B	109,000B	830,000E	740,000	686,000	407,000	323,000	229,000B	161,000B	4
5	106,000B	93,700B	88,800 B	86,000 B	115,000B	850,000E	696,000	655,000	403,000	317,000	223,000B	157,000B	5
6	106,000B	93,300B	88,700 B	85,900 B	121,000B	865,000E	661,000	623,000	393,000	316,000	217,000B	154,000B	6
7	106,000B	93,000B	88,600 B	85,800 B	130,000B	870,000E	629,000	592,000	388,000	315,000	210,000B	151,000B	7
8	105,000B	92,800B	88,500 B	85,700 B	139,000B	860,000E	606,000	571,000	383,000	315,000B	204,000B	149,000B	8
9	105,000B	92,600B	88,400 B	85,600 B	150,000B	830,000E	588,000	562,000	377,000	317,000B	196,000B	147,000B	9
10	105,000B	92,400B	88,300 B	85,500 B	161,000B	790,000E	572,000	546,000	373,000	320,000B	185,000B	145,000B	10
11	104,000B	92,200B	88,200 B	85,400 B	175,000B	755,000E	558,000	533,000	370,000	320,000B	172,000B	141,000B	11
12	104,000B	92,000B	88,100 B	85,300 B	207,000B	740,000E	550,000	524,000	369,000	319,000B	161,000B	138,000B	12
13	103,000B	91,800B	88,000 B	85,200 B	230,000B	730,000E	543,000	517,000	369,000	317,000B	152,000B	135,000B	13
14	103,000B	91,600B	87,900 B	85,100 B	249,000B	720,000E	536,000	506,000	370,000	315,000B	147,000B	131,000B	14
15	102,000B	91,400B	87,800 B	85,000 B	272,000B	714,000	524,000	496,000	369,000	312,000B	141,000B	129,000B	15
16	102,000B	91,200B	87,700 B	84,900 B	310,000B	717,000	517,000	489,000	369,000	307,000B	138,000B	128,000B	16
17	101,000B	91,000B	87,600 B	84,800 B	340,000B	715,000	511,000	481,000	368,000	300,000B	134,000B	126,000B	17
18	101,000B	90,800B	87,500 B	84,700 B	375,000B	722,000	508,000	476,000	366,000	298,000B	133,000B	124,000B	18
19	100,000B	90,600B	87,400 B	84,600 B	412,000B	732,000	498,000	468,000	364,000	290,000B	133,000B	122,000B	19
20	100,000B	90,400B	87,300 B	84,500 B	440,000B	742,900	490,000	470,000	363,000	288,000B	133,000B	120,000B	20
21	100,000B	90,200B	87,200 B	84,400 B	520,000B	780,000	486,000	477,000	362,000	285,000B	134,000B	119,000B	21
22	99,800B	90,000B	87,100 B	84,300 B	560,000B	844,000	497,000	474,000	361,000	281,000B	135,000B	118,000B	22
23	99,400B	89,900B	87,000 B	84,500 B	610,000B	813,000	602,000A	465,000	361,000	279,000B	137,000B	117,000B	23
24	98,900B	89,800B	86,900 B	84,800 B	680,000B	772,000	754,000E	458,000	363,000	275,000B	138,000B	117,000B	24
25	98,400B	89,700B	86,800 B	85,000 B	750,000B	730,000	900,000E	460,000	366,000	272,000B	139,000B	118,000B	25
26	97,900B	89,600B	86,700 B	85,500 B	820,000B	699,000	812,000A	472,000	365,000	270,000B	141,000B	119,000B	26
27	97,400B	89,500B	86,600 B	86,000 B	880,000B	691,000	797,000	479,000	365,000	268,000B	143,000B	120,000B	27
28	96,900B	89,400B	86,500 B	88,000 B	860,000E	755,000	814,000	471,000	358,000	265,000B	145,000B	121,000B	28
29	96,400B	89,300B	86,400 B	90,000 B	845,000E	789,000	823,000	455,000	350,000	260,000B	148,000B	122,000B	29
30	95,900B		86,300 B	92,000B	830,000E	793,000	843,000	443,000	340,000	256,000B	151,000B	123,000B	30
31	95,600B		86,200 B		815,000E		847,000	436,000		253,000B		124,000B	31
TOTAL	3158600	2657300	2718700	2572000	12404000	23293000	20278000	16579000	11256000	9241000	5041000	4148000	TOTAL
MEAN	102000	91600	87700	85700	400000	776000	654000	535000	375000	298000	168000	134000	MEAN
AC-FT.	6270000	5270000	5390000	5100000	24600000	46200000	40200000	32900000	22300000	18300000	10000000	8230000	AC-FT.
MAX.	108000	95300	89200	92000	880000	870000	900000	816000	429000	335000	247000	161000	MAX.
MIN.	95600	89300	86200	84300	96000	691000	486000	436000	340000	253000	133000	117000	MIN.

SUMMARY FOR THE YEAR 1972

MEAN DISCHARGE: 310,000 cfs.
TOTAL DISCHARGE: 225,000,000 ac-ft.
MAXIMUM DAILY DISCHARGE: 920,000 cfs.
MINIMUM DAILY DISCHARGE: 84,300 cfs.

TYPE OF GAUGE - Recording
LOCATION: LAT. 65 16 54 N
LONG.126 50 58 W
DRAINAGE AREA: 606,000 sq. miles

A - MANUAL GAUGE
B - ICE CONDITIONS
E - ESTIMATED

NATURAL FLOW

DEPARTMENT OF THE ENVIRONMENT
WATER RESOURCES BRANCH – WATER SURVEY OF CANADA

DAILY GAUGE HEIGHTS

Station Name Mackenzie River at McGern Island Station No 10GB003

Daily Elevations or Gauge Heights in Feet for the Year 19 72

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1									74.68	72.60			1
2									74.55	72.51			2
3									74.40	72.47	72.50A		3
4									74.22	72.45			4
5									74.05	72.40			5
6									73.88	72.44			6
7									73.76	72.55			7
8									73.67	72.70			8
9									73.62	72.76			9
10									73.60	72.76			10
11									73.58	72.74			11
12									73.59	72.73			12
13									73.58	72.72			13
14									73.55	72.61			14
15									73.50	72.45			15
16									73.45	72.32			16
17									73.42	72.22			17
18									73.43	72.18			18
19									73.44	72.19			19
20									73.44	72.17			20
21									73.49	72.11			21
22									73.58	72.04			22
23									73.69	71.99			23
24								76.42A	73.67	71.96			24
25								76.60	73.59	71.95			25
26								76.40	73.47	71.89			26
27								75.93	73.28	72.10			27
28								75.52	73.07	72.51			28
29								75.25	72.85	72.84			29
30								75.03	72.72	72.90A			30
31								74.84					31

Summary				Computed by	Checked by
For the Period (Aug. 24 to Nov. 3)	Maximum instantaneous elevation,	76.63	ft at 15:00 M.S.T. on Aug. 25/72	Date	Date
	Minimum instantaneous elevation,	71.80	ft at 17:00 M.S.T. on Oct. 26/72		

A - Partial days record

R43 (Dec 72)

DEPARTMENT OF THE ENVIRONMENT
WATER RESOURCES BRANCH – WATER SURVEY OF CANADA

DAILY GAUGE HEIGHTS

Station Name Mackenzie River at Old Fort Point Station No 10HA001

Daily Elevations or Gauge Heights in Feet for the Year 19 72

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1							74.55	74.11	64.77	61.53	60.08B		1
2							74.31	72.88	64.54	61.33	59.77B		2
3							73.64	72.08	64.35	61.24			3
4							72.71	71.36	64.24	61.10			4
5							71.66	70.58	63.99	61.00			5
6							70.95E	69.75	63.70	60.94			6
7							70.59E	69.11	63.46	60.96B			7
8						74.48A	70.10E	68.79	63.24	61.08B			8
9						73.90	69.60E	68.47	63.07	61.20B			9
10						73.44	69.10E	68.04	62.97	61.26B			10
11						73.50	68.70E	67.76	62.91	61.25B			11
12						72.94	68.37E	67.59	62.83	61.29B			12
13						72.37	67.96E	67.36	62.85	61.30B			13
14						72.32	67.70E	67.04	62.85	61.30B			14
15						72.41	67.50E	66.79	62.83	61.22B			15
16						72.45	67.30E	66.59	62.82	61.00B			16
17						72.58	67.11A	66.37	62.76	60.79B			17
18						72.84	66.90	66.20	62.68	60.63B			18
19						73.06	66.64	66.16	62.63	60.57B			19
20						73.33	66.52	66.40	62.60	60.58B			20
21						75.18	66.61	66.45	62.55	60.53B			21
22						75.19	68.16	66.23	62.55	60.51B			22
23						74.35	71.75	65.94	62.61	60.70B			23
24						73.31	75.70	65.92	62.73	60.79B			24
25						72.46	75.53	66.24	62.75	60.86B			25
26						71.81	74.64	66.54	62.62	60.81B			26
27						72.68	74.72	66.41	62.52	60.30B			27
28						74.10	74.94	65.97	62.24	60.70B			28
29						74.37	75.21	65.53	62.00	60.78B			29
30						74.50	75.54	65.24	61.73	60.78B			30
31							75.33	65.04		60.64B			31

Summary
For the Period (June 8 to Nov. 2)

Maximum instantaneous elevation, 76.17 ft at 17:00 on July 24/72

Minimum daily elevation, 59.77 ft at on Nov. 2/72

Computed by
Date

Checked by
Date

R43 (Dec 72)

DEPARTMENT OF THE ENVIRONMENT
WATER RESOURCES BRANCH – WATER SURVEY OF CANADA

DAILY GAUGE HEIGHTS

Station Name Mackenzie River above the Ramparts Station No 10KD002

Daily Elevations or Gauge Heights in Feet for the Year 19 72

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1									9.11				1
2									8.69				2
3									8.62				3
4									8.43				4
5									8.11				5
6									7.83E				6
7									7.60E				7
8									7.35E				8
9									7.14E				9
10									6.95E				10
11									6.78E				11
12									6.62E				12
13									6.50E				13
14									6.35E				14
15									6.20E				15
16									6.09A				16
17													17
18													18
19													19
20													20
21													21
22													22
23													23
24								10.41					24
25								10.02					25
26								10.05					26
27								10.33					27
28								10.56					28
29								10.30					29
30								9.79					30
31								9.38					31

Summary				
For the Period (Aug. 24 to Sept. 16)	Maximum instantaneous elevation, daily gauge height,	ft at Not Determined	on	Computed by Date
	Minimum instantaneous elevation, daily gauge height,	ft at	on	Checked by Date

R43 (Dec 72)

DEPARTMENT OF THE ENVIRONMENT
WATER RESOURCES BRANCH – WATER SURVEY OF CANADA

DAILY GAUGE HEIGHTS

Station Name Mackenzie River at Sans Sault Rapids Station No 10KD001

Daily Elevations or Gauge Heights in Feet for the Year 1972

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1							23.85	24.40	15.93	13.47E			1
2							23.85	23.57	15.68	13.34E			2
3							23.59	22.80	15.62	13.20E			3
4							23.03	22.08	15.49	13.10A			4
5							22.22	21.35	15.29E	12.97			5
6							21.28	20.65	15.15E	12.84			6
7							20.48	19.95	15.05E	12.79			7
8							20.19	19.37	14.97E	12.75			8
9							19.67	19.01	14.85E	12.81B			9
10							19.22	18.83	14.80E	12.85B			10
11							18.86	18.51	14.70E	12.93B			11
12							18.58	18.20	14.61E	12.97B			12
13							18.37	17.97	14.50E	12.98B			13
14							18.21	17.80	14.45E	12.99B			14
15							18.06	17.58	14.38E	13.00B			15
16						22.40	17.92	17.35	14.30A	13.03B			16
17						22.33	17.81	17.20	14.28	12.79B			17
18						22.25	17.67	17.04	14.25	12.67B			18
19						22.36	17.55	16.98	14.20	12.55B			19
20						22.70	17.35	16.91	14.15	12.45B			20
21						22.83	17.24	16.97	14.09	12.25B			21
22						23.91	17.38	17.04	14.06	12.00B			22
23						24.30	18.12	16.93	14.02	11.89B			23
24						23.57	20.84	16.68	14.00	11.59B			24
25						22.78	23.99	16.55	14.04	11.76B			25
26						22.07	24.65	16.65	14.14	11.97B			26
27						21.82	23.81	16.86	14.00E	12.10B			27
28						22.13	23.54	16.94	13.87E	12.09B			28
29						23.32	23.93	16.73	13.74E	12.58B			29
30						23.65	24.47	16.36	13.61E	12.85B			30
31							24.75	16.11		12.62B			31

Summary

For the Period (June 16 to Oct. 31)

Maximum instantaneous gauge height, 24.81 ft at 15:10 on July 31/72

Minimum daily gauge height, 11.59 ft at an Oct. 24/72

Computed by

Date

Checked by

Date

R43 (Dec 72)

DEPARTMENT OF THE ENVIRONMENT
WATER RESOURCES BRANCH – WATER SURVEY OF CANADA

DAILY GAUGE HEIGHTS

Station Name Mackenzie River near Wrigley Station No 10HC001

Daily Elevations or Gauge Heights in Feet for the Year 19 72

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1						31.73	32.86		23.05	20.50			1
2						32.49	32.64		23.26	20.37			2
3						33.91	31.72	30.43A	23.31	20.33A	17.93A		3
4						35.77	30.59	29.84	23.05				4
5						36.64	29.66	29.00	22.77				5
6						36.40	29.08	28.35	22.53				6
7						35.59	28.55	27.91	22.30				7
8						34.31	27.93	27.47	22.18				8
9						33.12	27.52	26.96	22.08				9
10						32.19	27.38	26.59	22.00				10
11						31.61	27.37	26.44	21.98				11
12						31.34	27.35	26.31	21.96				12
13						31.03	27.04	26.02	21.96				13
14						31.03	26.66	25.73	21.89				14
15						31.45	26.41	25.47	21.84	20.87			15
16						31.93	26.23	25.25	21.78	20.56A			16
17						32.40	25.99	25.09	21.71				17
18						32.68	25.76	24.92	21.72				18
19						32.81	25.58	24.72	21.73				19
20						32.82	25.53	24.73	21.74	20.28			20
21						33.88	25.37	24.76	21.79	20.19			21
22						34.34	25.98	24.47	21.90	20.12			22
23						33.11	32.88	24.52	22.04	20.01A			23
24						32.08	34.78	24.96	22.13				24
25						31.07	33.96	25.54	22.05				25
26						30.35		25.53	21.84				26
27						30.61		25.00	21.61				27
28					32.54A	31.89		24.40	21.33				28
29					32.15	32.23	35.03A	23.96	21.01				29
30					31.99	32.59	35.35A	23.61	20.71				30
31					32.05			23.30					31

Summary

For the Period (May 28 to Nov. 3)

Maximum instantaneous gouge height, 36.72 ft at 17:00 M.S.T. on June 5

Minimum instantaneous elevation, daily gauge height, Not Determined ft at on

Computed by

Date

Checked by

Date

R43 (Dec 72)

A - Partial Day Record

STATION NAME Martin River near the Mouth STATION NUMBER 10GC003

Daily Discharge in Cubic Feet per second for 1972

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1								453 A		50.0 E	28.0 B	13.8 B	1
2										49.0 E	26.0 B	13.7 B	2
3							92.5 A			40.0 E	24.0 B	13.7 B	3
4										47.8 A	23.0 B	13.7 B	4
5										47.0	22.0 B	13.6 B	5
6										47.0 B	21.0 B	13.6 B	6
7										46.5 B	19.0 B	13.6 B	7
8										46.0 B	19.0 B	13.5 B	8
9										45.5 B	18.0 B	13.5 B	9
10										44.0 B	17.5 B	13.4 B	10
11										43.0 B	17.0 B	13.4 B	11
12									81.6 A	43.0 B	16.5 B	13.3 B	12
13										42.5 B	16.5 B	13.2 B	13
14									84.4 A	42.5 B	16.0 B	13.1 B	14
15						378 A		134 A		42.0 B	16.0 B	13.0 B	15
16										42.0 B	15.5 B	12.5 B	16
17								134 A		42.0 B	15.0 B	12.0 B	17
18										42.0 B	15.0 B	11.5 B	18
19										42.0 B	15.0 B	11.0 B	19
20							54.4 A			42.0 B	14.5 B	10.5 B	20
21							44.2 A			41.5 B	14.5 B	10.2 B	21
22						219 A				41.5 B	14.0 B	9.8 B	22
23										41.5 B	14.0 B	9.4 B	23
24										41.0 B	14.0 B	9.0 B	24
25										39.0 B	14.0 B	8.5 B	25
26										38.0 B	13.9 B	8.0 B	26
27										36.0 B	13.9 B	7.8 B	27
28							611 A	118 A	145 A	34.0 B	13.9 B	7.6 B	28
29										33.0 B	13.8 B	7.4 B	29
30										31.0 B	13.8 B	7.2 B	30
31					1,670 A					29.0 B		7.0 B	31
TOTAL										1,299.3	514.3	351.5	TOTAL
MEAN										41.9	17.1	11.3	MEAN
AC-FT.										2,580	1,020	697	AC-FT.
MAX.										50.0	28.0	13.8	MAX.
MIN.										29.0	13.8	7.0	MIN.

SUMMARY FOR THE YEAR 1972

MEAN DISCHARGE:
TOTAL DISCHARGE:
MAXIMUM DAILY DISCHARGE:
MINIMUM DAILY DISCHARGE:

TYPE OF GAUGE - Recording
LOCATION: LAT.
LONG.
DRAINAGE AREA:

A - MANUAL GAUGE
B - ICE CONDITIONS
E - ESTIMATED

NATURAL FLOW

STATION NAME Peel River above Fort McPherson STATION NUMBER 10MC002

Daily Discharge in Cubic Feet per second for 1972

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1	3,160 B	2,640 B	2,320 B	1,850 B	3,300 B		100,000	22,800	31,900	18,100	5,720 B	3,300 B	1
2	3,130 B	2,630 B	2,310 B	1,840 B	3,550 B		76,200	23,700	33,800	17,800	5,480 B	3,270 B	2
3	3,100 B	2,610 B	2,300 B	1,820 B	3,800 B		61,000	25,200	33,600	17,100 B	5,360 B	3,230 B	3
4	3,070 B	2,600 B	2,290 B	1,800 B	4,080 B		51,300	36,500	39,900	16,500 B	5,210 B	3,200 B	4
5	3,040 B	2,590 B	2,280 B	1,790 B	4,400 B		43,000	39,800	47,000	15,900B	5,080 B	3,190 B	5
6	3,020 B	2,580 B	2,270 B	1,770 B	4,730 B		37,200	34,600	44,300	15,400B	4,960 B	3,180 B	6
7	3,000 B	2,570 B	2,250 B	1,750 B	5,100 B		32,400	29,700	40,500	14,800B	4,830 B	3,150 B	7
8	2,980 B	2,560 B	2,240 B	1,740 B	5,490 B		28,800	26,100	36,600	14,200B	4,720 B	3,110 B	8
9	2,970 B	2,550 B	2,230 B	1,720 B	5,940 B	154,000	26,400	24,400	33,400	13,700B	4,610 B	3,090 B	9
10	2,950 B	2,540 B	2,220 B	1,700 B	6,400 B	149,000	24,800	25,200	31,700	13,200B	4,510 B	3,070 B	10
11	2,920 B	2,530 B	2,200 B	1,690 B	6,920 B	150,000	23,000	28,000	30,900	12,700B	4,410 B	3,050 B	11
12	2,900 B	2,520 B	2,190 B	1,670 B	7,550 B	152,000	21,300	29,400	30,100	12,200B	4,320 B	3,030 B	12
13	2,880 B	2,510 B	2,170 B	1,650 B	8,210 B	153,000	19,700	28,100	29,700	11,800B	4,230 B	3,020 B	13
14	2,860 B	2,490 B	2,150 B	1,630 B	9,000 B	132,000	18,400	26,000	29,900	11,400B	4,190 B	3,020 B	14
15	2,840 B	2,480 B	2,140 B	1,620 B	9,960 B	120,000	17,800	24,500	32,800	11,000B	4,090 B	3,000 B	15
16	2,830 B	2,470 B	2,120 B	1,630 B	11,000 B	113,000	17,500	24,300	41,800	10,600B	4,010 B	3,000 B	16
17	2,810 B	2,460 B	2,100 B	1,670 B	12,200 B	101,000	17,500	24,300	54,600	10,200B	3,980 B	2,990 B	17
18	2,800 B	2,450 B	2,090 B	1,700 B	13,600 B	89,400	17,800	24,700	61,000	9,800B	3,890 B	2,980 B	18
19	2,790 B	2,440 B	2,070 B	1,740 B	13,600 B	75,700	18,600	26,100	56,700	9,450B	3,810 B	2,980 B	19
20	2,780 B	2,430 B	2,050 B	1,790 B	13,600 B	65,000	21,000	31,300	48,200	9,030B	3,780 B	2,970 B	20
21	2,760 B	2,420 B	2,040 B	1,830 B	13,800 B	58,600	22,300	39,300	41,100	8,780B	3,710 B	2,960 B	21
22	2,740 B	2,410 B	2,020 B	1,920 B		49,200	22,300	37,800	35,700	8,420B	3,650 B	2,950 B	22
23	2,730 B	2,400 B	2,000 B	2,010 B		40,400	27,000	33,300	31,200	8,130B	3,600 B	2,950 B	23
24	2,720 B	2,390 B	1,990 B	2,120 B		35,200	31,500	30,300	27,600	7,800B	3,580 B	2,950 B	24
25	2,710 B	2,370 B	1,970 B	2,240 B		36,600	29,500	28,700	24,900	7,530B	3,520 B	2,940 B	25
26	2,700 B	2,360 B	1,950 B	2,390 B		45,100	26,500	29,300	23,100	7,280B	3,480 B	2,940 B	26
27	2,690 B	2,350 B	1,940 B	2,540 B		70,700	24,200	29,900	22,000	7,000B	3,420 B	2,940 B	27
28	2,680 B	2,340 B	1,920 B	2,700 B		120,000	22,200	31,900	20,700	6,700B	3,390 B	2,930 B	28
29	2,670 B	2,330 B	1,900 B	2,880 B		138,000	21,200	32,400	19,600	6,460B	3,380 B	2,930 B	29
30	2,660 B		1,890 B	3,090 B		125,000	21,200	32,800	19,000	6,200B	3,330 B	2,930 B	30
31	2,650 B		1,870 B				21,900	33,100		5,980B		2,920 B	31
TOTAL				58,290			943,500	913,500	1,053,300	345,160	126,250	94,170	TOTAL
MEAN	2,860	2,480	2,110	1,940			30,400	29,500	35,100	11,100	4,210	3,040	MEAN
AC-FT.	176,000	143,000	130,000	116,000			1,870,000	1,810,000	2,090,000	685,000	250,000	187,000	AC-FT.
MAX.	3,160	2,640	2,320	3,090			100,000	39,800	61,000	18,100	5,720	3,300	MAX.
MIN.	2,650	2,330	1,870	1,620			17,500	22,800	19,000	5,980	3,330	2,920	MIN.

SUMMARY FOR THE YEAR 1972

MEAN DISCHARGE:
TOTAL DISCHARGE:
MAXIMUM DAILY DISCHARGE:
MINIMUM DAILY DISCHARGE:

TYPE OF GAUGE - Recording
LOCATION: LAT. 67 13 15 N
LONG.134 56 45 W
DRAINAGE AREA: 27,300 sq. miles

A - MANUAL GAUGE
B - ICE CONDITIONS
E - ESTIMATED

NATURAL FLOW

STATION NAME South Nahanni River above Clausen Creek STATION NUMBER 10EC001

Daily Discharge in Cubic Feet per second for 1972

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1	1,870 B	1,790 B	1,690 B	1,530 B		69,500		60,700	16,200	9,180	4,600 B	2,950 B	1
2	1,860 B	1,790 B	1,690 B	1,590 B		70,900		50,400	15,900	9,150	4,500 B	2,950 B	2
3	1,860 B	1,790 B	1,680 B	1,620 B		60,200		45,900	15,400	9,070	4,400 B	2,900 B	3
4	1,850 B	1,790 B	1,670 B	1,680 B		46,900		46,800	15,500	9,000	4,200 B	2,900 B	4
5	1,850 B	1,790 B	1,650 B	1,720 B		36,700		43,000	15,900	8,610	4,000 B	2,850 B	5
6	1,850 B	1,780 B	1,640 B	1,800 B		34,400		37,400	15,100	8,440	3,900 B	2,850 B	6
7	1,840 B	1,780 B	1,630 B	1,840 B		48,600		35,000	14,700	8,470	3,800 B	2,800 B	7
8	1,840 B	1,780 B	1,620 B			51,000		36,900	14,400	8,300	3,600 B	2,800 B	8
9	1,840 B	1,780 B	1,610 B			55,000		36,700	13,700	7,990	3,500 B	2,800 B	9
10	1,840 B	1,780 B	1,600 B			56,100		33,400	13,200	6,740	3,450 B	2,750 B	10
11	1,840 B	1,770 B	1,590 B			63,400		31,800	12,900	5,090	3,400 B	2,750 B	11
12	1,830 B	1,770 B	1,580 B			64,800		30,100	12,600	5,800	3,350 B	2,750 B	12
13	1,830 B	1,770 B	1,570 B			58,400		28,200	12,200	6,220	3,300 B	2,700 B	13
14	1,830 B	1,770 B	1,560 B			55,200		26,300	12,000	6,680	3,300 B	2,700 B	14
15	1,830 B	1,770 B	1,550 B			55,500		25,100	12,100	7,070	3,250 B	2,650 B	15
16	1,830 B	1,760 B	1,540 B			52,700		24,100	13,600	7,190	3,250 B	2,600 B	16
17	1,820 B	1,760 B	1,530 B			47,300		23,300	14,000	7,040	3,200 B	2,550 B	17
18	1,820 B	1,760 B	1,520 B			46,200		23,300	13,500	6,800	3,150 B	2,500 B	18
19	1,820 B	1,760 B	1,510 B			47,900		25,000	12,900	6,700	3,150 B	2,400 B	19
20	1,820 B	1,760 B	1,500 B			50,100		30,600	12,300	7,070	3,100 B	2,300 B	20
21	1,820 B	1,750 B	1,490 B			55,400		28,900	11,800	7,160	3,100 B	2,250 B	21
22	1,810 B	1,750 B	1,480 B			55,000		26,200	11,400	6,950	3,050 B	2,200 B	22
23	1,810 B	1,740 B	1,470 B			47,300		24,600	11,000	6,600	3,050 B	2,150 B	23
24	1,810 B	1,740 B	1,460 B			43,100		23,100	10,400	5,830	3,050 B	2,100 B	24
25	1,810 B	1,730 B	1,450 B			41,600		22,100	9,980	5,500	3,000 B	2,050 B	25
26	1,810 B	1,720 B	1,440 B			45,500		21,200	9,750	5,200 B	3,000 B	2,000 B	26
27	1,800 B	1,710 B	1,430 B			68,200		20,000	9,520	5,100 B	3,000 B	1,980 B	27
28	1,800 B	1,700 B	1,460 B			68,500		18,700	9,370	5,000 B	3,000 B	1,920 B	28
29	1,800 B	1,700 B	1,480 B			60,900 A		17,900	9,070	4,900 B	2,950 B	1,900 B	29
30	1,800 B		1,500 B		70,300A	60,900 E		17,700	9,220	4,800 B	2,950 B	1,880 B	30
31							71,100A	17,000		4,700 B		1,820 B	31
TOTAL	56,640	51,040	48,100			1,617,200		931,400	379,610	212,420	102,550	76,700	TOTAL
MEAN	1,830	1,760	1,550			53,900		30,000	12,700	6,850	3,420	2,470	MEAN
AC-FT.	112,000	101,000	95,400			3,210,000		1,850,000	753,000	421,000	203,000	152,000	AC-FT.
MAX.	1,870	1,790	1,690			70,900		60,700	16,200	9,180	4,600	2,950	MAX.
MIN.	1,800	1,700	1,430			34,400		17,000	9,070	4,700	2,950	1,820	MIN.

SUMMARY FOR THE YEAR 1972

MEAN DISCHARGE:
TOTAL DISCHARGE:
MAXIMUM DAILY DISCHARGE:
MINIMUM DAILY DISCHARGE:

TYPE OF GAUGE - Recording
LOCATION: LAT. 61 15 10 N
LONG. 124 02 10 W
DRAINAGE AREA: 12,900 sq. miles

A - MANUAL GAUGE
B - ICE CONDITIONS
E - ESTIMATED

NATURAL FLOW

STATION NAME Trout River at Fort Simpson Highway STATION NUMBER 10FA002

Daily Discharge in Cubic Feet per second for 1972

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1	4.3 B	2.5 B	0.30 B	0	80 B	5,310	2,880	1,370	666	318	130 B	19.0 B	1
2	4.3 B	2.4 B	0.30 B	0	160 B	6,920	2,850	1,400	645	314	128 B	18.0 B	2
3	4.3 B	2.3 B	0.20 B	0	300 B	7,180	2,770	1,300	604	330	124 B	17.0 B	3
4	4.2 B	2.2 B	0.10 B	0	800 B	7,350	2,680	1,210	514	544	112 B	16.0 B	4
5	4.2 B	2.2 B	0.10 B	0	1,100 B	7,030	2,630	1,240	532	378	100 B	15.5 B	5
6	4.2 B	2.1 B	0	0	2,000 B	6,890	2,530	1,330	490	274	86.0B	15.0 B	6
7	4.1 B	2.0 B	0	0	3,000 B	7,560	2,490	1,220	490	390	72.0B	14.5 B	7
8	4.1 B	2.0 B	0	0	4,000 B	7,800	2,390	1,150	532	322 A	62.0B	14.0 B	8
9	4.1 B	1.9 B	0	0	5,000 B	7,740	2,210	1,110	526	288 B	58.0B	13.5 B	9
10	4.0 B	1.8 B	0	0	7,000 E	7,410	2,200	1,010	485	244 B	50.0B	13.0 B	10
11	4.0 B	1.7 B	0	0	8,000 E	7,150	2,150	954	430	220 B	48.0B	12.8 B	11
12	3.9 B	1.7 B	0	0	9,000 E	6,640	2,100	978	470	208 B	46.0B	12.6 B	12
13	3.9 B	1.6 B	0	0	9,300 E	6,180	2,010	970	420	200 B	44.0B	12.4 B	13
14	3.8 B	1.5 B	0	0	9,300 E	6,010	1,890	954	480	192 B	42.0B	12.2 B	14
15	3.7 B	1.4 B	0	0	9,000 E	5,830	1,910	922	465	186 B	41.0B	12.0 B	15
16	3.6 B	1.4 B	0	0	8,800 E	5,550	1,890	930	440	180 B	40.0B	11.6 B	16
17	3.6 B	1.3 B	0	0	8,500 E	5,230	1,780 A	869	374	174 B	38.0B	11.2 B	17
18	3.5 B	1.2 B	0	0	8,290 A	5,000	1,520 A	827	378	168 B	37.0B	10.8 B	18
19	3.4 B	1.2 B	0	0	7,920	4,890	1,510	778	386	164 B	36.0B	10.4 B	19
20	3.3 B	1.1 B	0	0	7,560	4,630	1,450	778	366	160 B	34.0B	10.0 B	20
21	3.3 B	1.0 B	0	0	7,230	4,350	1,400	827	354	158 B	32.0B	9.8 B	21
22	3.2 B	0.90B	0	0	6,920	4,170	1,400	834	374	156 B	31.0B	9.6 B	22
23	3.1 B	0.90B	0	0	6,780	3,990	1,330	820	314 A	152 B	30.0B	9.4 B	23
24	3.1 B	0.80B	0	0	6,670	3,910	1,320	799	294 A	150 B	28.0B	9.2 B	24
25	3.0 B	0.70B	0	0	6,580	3,720	1,260	764	415	148 B	27.0B	9.0 B	25
26	2.9 B	0.60B	0	1 B	6,390	3,670	1,350	827	350	144 B	26.0B	8.8 B	26
27	2.8 B	0.60B	0	2 B	6,120	3,650	1,410	806	302	142 B	24.0B	8.6 B	27
28	2.8 B	0.50B	0	4 B	5,880	3,430	1,410	736	470	140 B	23.0B	8.4 B	28
29	2.7 B	0.40B	0	10 B	5,750	3,330	1,470	680	310 A	138 B	21.0B	8.2 B	29
30	2.6 B		0	50 B	5,580	3,070	1,350	638	366	136 B	20.0B	8.1 B	30
31	2.5 B		0		5,450		1,390	645		132 B		8.0 B	31
TOTAL	110.5	41.90	1.00	67.0	178,460	165,590	58,930	29,676	13,242	6,850	1,590.0	368.6	TOTAL
MEAN	3.6	1.44	0.03	2.2	5,760	5,520	1,900	957	441	221	53.0	11.9	MEAN
AC-FT.	219	83.1	1.98	33.8	354,000	328,000	117,000	58,900	26,300	13,600	3,150	730	AC-FT.
MAX.	4.3	2.5	0.30	50	9,300	7,800	2,880	1,400	666	544	130	19.0	MAX.
MIN.	2.5	0.40	0	0	80	3,070	1,260	638	294	132	20.0	8.0	MIN.

SUMMARY FOR THE YEAR 1972

MEAN DISCHARGE:
TOTAL DISCHARGE:
MAXIMUM DAILY DISCHARGE: 9,300 cfs.
MINIMUM DAILY DISCHARGE: 0 cfs.

TYPE OF GAUGE - Recording
LOCATION: LAT. 61 08 00 N
LONG. 119 49 30 W
DRAINAGE AREA: 3,510 sq. miles

A - MANUAL GAUGE
B - ICE CONDITIONS
E - ESTIMATED

NATURAL FLOW

STATION NAME Willowlake River near the Mouth STATION NUMBER 10GB001

Daily Discharge in Cubic Feet per second for 1972

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1	163 B	156 B	143 B	129 B	160 B	15,900	6,120	2,730	755	734	495 B	314 B	1
2	163 B	156 B	143 B	128 B	180 B	14,700	6,570	2,560	932	702	485 B	310 B	2
3	163 B	156 B	142 B	128 B	200 B	13,500	6,460	2,560	1,400	696	479 B	306 B	3
4	163 B	156 B	142 B	127 B	220 B	12,600	5,870	2,500	1,320	690	465 B	301 B	4
5	163 B	155 B	141 B	127 B	250 B	11,600	5,230	2,370	1,230	672	460 B	299 B	5
6	162 B	155 B	141 B	126 B	300 B	10,700	4,630	2,280	1,150	678	453 B	295 B	6
7	162 B	154 B	140 B	126 B	350 B	9,940	4,140	2,220	1,060	650	445 B	290 B	7
8	162 B	154 B	140 B	125 B	400 B	9,200	3,870	2,070	1,000	530	440 B	287 B	8
9	162 B	153 B	140 B	125 B	460 B	8,540	3,620	1,950	972	420 A	430 B	282 B	9
10	162 B	153 B	139 B	125 B	560 B	8,000	3,350	1,900	932	405 B	425 B	279 B	10
11	161 B	152 B	139 B	125 B	700 B	7,430	3,090	1,880	900	395 B	418 B	274 B	11
12	161 B	152 B	138 B	125 B	900 B	7,000	2,890	1,880	860	390 B	410 B	272 B	12
13	161 B	151 B	138 B	125 B	1,200 B	6,570	2,670	1,870	846	390 B	402 B	269 B	13
14	161 B	151 B	137 B	125 B	1,500 B	6,170	2,450	1,780	818	390 B	399 B	266 B	14
15	160 B	150 B	137 B	125 B	2,000 B	5,770	2,270	1,650	818	395 B	392 B	263 B	15
16	160B	150 B	136 B	125 B	3,000 B	5,410	2,150	1,520	818	400 B	388 B	260 B	16
17	160 B	149 B	136 B	125 B	4,000 B	5,120	2,010	1,390	839	405 B	381 B	257 B	17
18	160 B	149 B	135 B	125 B	5,000 B	4,800	1,900	1,280	908	415 B	378 B	254 B	18
19	159 B	148 B	135 B	125 B	6,000 B	4,500	1,760	1,220	956	420 B	370 B	252 B	19
20	159 B	148 B	134 B	125 B	7,000 B	4,250	1,760	1,170	956	440 B	367 B	250 B	20
21	159 B	148 B	134 B	125 B	9,000 B	4,020	1,610	1,120	964	445 B	360 B	248 B	21
22	159 B	147 B	133 B	125 B	12,000 B	3,830	2,010	1,060	972	460 B	356 B	245 B	22
23	158 B	147 B	133 B	125 B	15,000 B	3,630	3,220	1,020	972	475 B	350 B	241 B	23
24	158 B	146 B	133 B	125 B	18,000 E	3,460	4,500	964	948	490 B	346 B	238 B	24
25	158 B	146 B	132 B	125 B	20,000 E	3,320	4,890	892	916	500 B	340 B	235 B	25
26	158 B	145 B	132 B	130 B	20,500 E	3,210	4,370	832	892	510 B	336 B	232 B	26
27	157 B	145 B	131 B	135 B	21,000 E	3,290	4,020	790	839	512 B	331 B	230 B	27
28	157 B	144 B	131 B	140 B	20,000 E	3,440	3,840	769	818	515 B	328 B	226 B	28
29	157 B	144 B	130 B	145 B	19,400 A	3,450	3,750	748	783	512 B	322 B	223 B	29
30	157 B		130 B	150 B	18,300	4,650	3,510	741	748	510 B	319 B	220 B	30
31	156 B		129 B		17,100		3,080	734		500 B		218 B	31
TOTAL	4,961	4,360	4,224	3,841	224,680	208,000	111,610	48,450	28,322	15,646	11,870	8,136	TOTAL
MEAN	160	150	136	128	7,250	6,930	3,600	1,560	944	505	396	262	MEAN
AC-FT.	9,840	8,650	8,380	7,620	446,000	413,000	221,000	96,100	56,200	31,000	23,500	16,100	AC-FT.
MAX.	163	156	143	150	21,000	15,900	6,570	2,730	1,400	734	495	314	MAX.
MIN.	156	144	129	125	160	3,210	1,610	734	748	390	319	218	MIN.

SUMMARY FOR THE YEAR 1972

MEAN DISCHARGE:
TOTAL DISCHARGE:
MAXIMUM DAILY DISCHARGE: 21,000 cfs.
MINIMUM DAILY DISCHARGE: 125 cfs.

TYPE OF GAUGE - Recording
LOCATION: LAT. 62 39 10 N
LONG. 122 54 50 W
DRAINAGE AREA: 8,330 sq/ miles

A - MANUAL GAUGE
B - ICE CONDITIONS
E - ESTIMATED

NATURAL FLOW

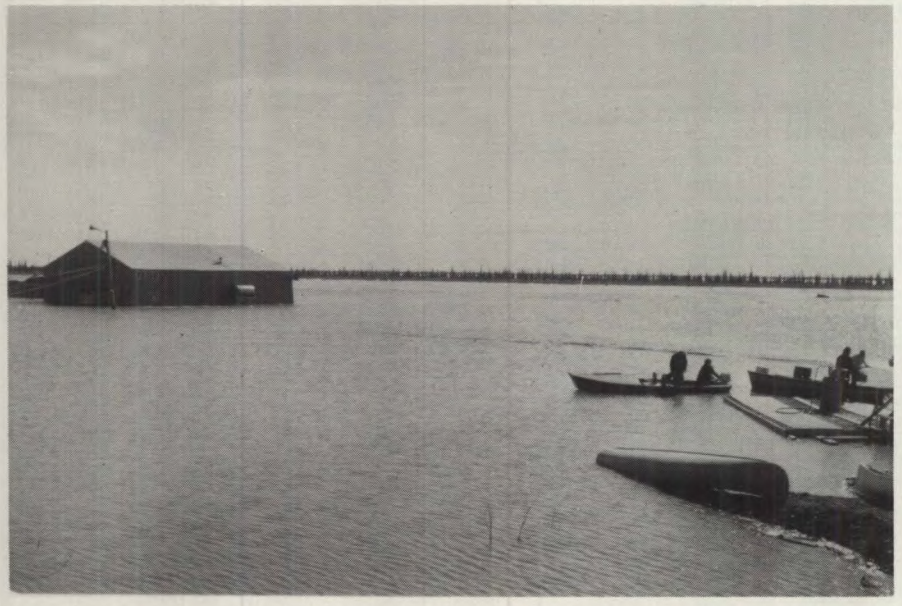
Firth River at Gauging Site, Lat. 69°25', Long. 139°30'

Sediment Pumping Sampler in Portable Shelter — Firth River

Water Survey of Canada Catamarans
Niska and *Nanook* at Inuvik, Fall 1972

Preparing for Winter Storage

Mackenzie River East Channel at Inuvik
Flooding in Spring of 1972 due to Ice Jam Downstream



TD 195 .P5 C3213 no. 73-5 Hydrometric data collection in the Mackenzie river basin / K.F. Davis