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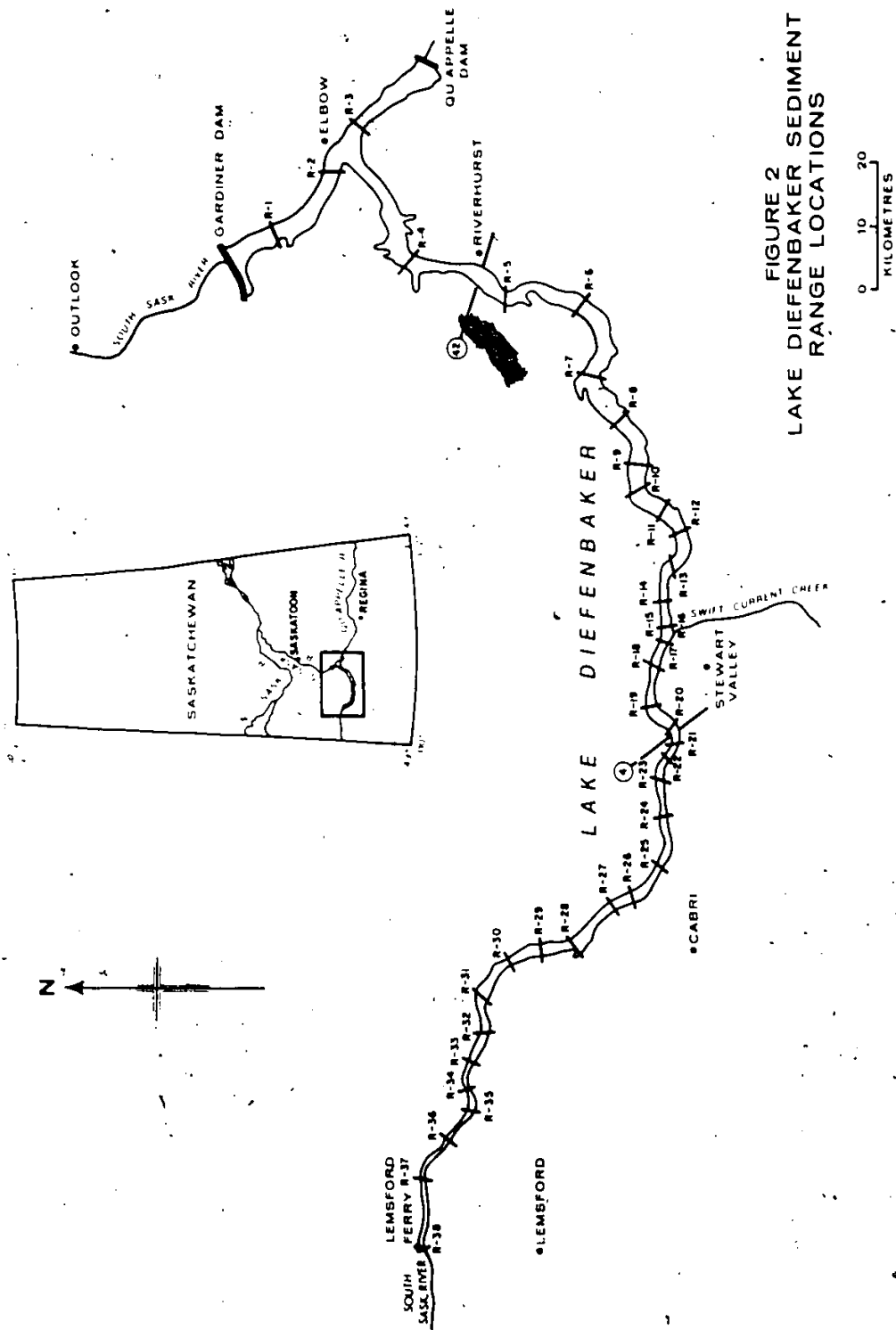


FIGURE 2
LAKE DIEFENBAKER SEDIMENT
RANGE LOCATIONS

Abstract

Based on hydrometric station data, the South Saskatchewan River transports on average 6 000 000 tonnes of sediment into Lake Diefenbaker, per year. But because of the enormous size of the reservoir, the sedimentation rate is low. Hydrographic surveys conducted between 1966 and 1978 indicate that 1.4% of the total reservoir volume has been depleted due to sedimentation. The live storage was reduced by 1.5%, while the dead storage by 1.3% of its capacity. Therefore, the impact on reservoir operations is minimal. Most of the sediment load transported was deposited between Range 32 and Range 25, the drawdown reach. The sand portion of the load settled out of suspension within this reach while beyond Range 21 mostly clays were left in suspension. The large water level drawdown inhibited the development of a classical delta structure. Swift Current Creek's sediment contribution was negligible, and locally less significant than the bank material contribution. The bank material contribution accounted for 0.5% of the 1.5% loss in the total live storage.

Résumé

Les données hydrométriques de la Rivière Sud Saskatchewan, ont démontré que la rivière a transporté, en moyenne, 6 000 000 de tonnes de sédiment annuellement dans le Lac Diefenbaker. Etant donné la vaste étendue du Lac Diefenbaker le taux de sédimentation est faible. Pour la période de 1966 à 1978, les relevés hydrographiques ont confirmé une perte de 1.4% du volume total, due à l'alluvionnement. La capacité utile du réservoir fut réduite de 1.5% et la capacité dormante de 1.3%. Pour plusieurs années encore l'alluvionnement aura un impact négligeable sur les opérations du réservoir. La sédimentation a surtout affecté la zone comprise entre les Sections 32 et 25, qui est le secteur le plus affecté par les fluctuations du réservoir. La portion sableuse de la charge des sédiments fut déposée dans ce secteur et seul les argiles demeurent en suspension en aval de la Section 21. La formation d'un delta de type classique a été grandement ralentie par les fluctuations extrêmes du niveau du réservoir. L'apport en sédiment, de la rivière Swift Current fut négligeable et, localement moins importante que la contribution due à l'érosion des berges. Cette dernière source de sédiment a contribué pour 0.5% de la perte de 1.5% de la capacité utile totale.

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Table of Contents

	Page
Abstract/Résumé.....	1
Acknowledgements.....	111
Table of Contents.....	1v
List of Figures.....	vi
List of Tables.....	viii
 Chapter	
I Introduction	
1.1 Design and Description of Lake Diefenbaker.....	1
1.2 Thesis Objectives and Hypotheses.....	4
1.3 Past Studies Concerning Sedimentation in Lake Diefenbaker.....	5
1.4 Recent Lake or Reservoir Sedimentation Studies.....	10
II Reservoir Data Collection: Methodology, Techniques and Equipment	
2.1 Cross Section (Range Line) Surveys.....	14
2.2 Area (Sector) Surveys.....	20
2.2.1 Hydrographic Data Processing.....	23
2.3 Suspended Sediment Sampling.....	29
2.4 Bed Material Sampling.....	30
2.5 Hydrometric Station Data.....	32
III Water and Sediment Sources	
3.1 Introduction.....	36
3.2 South Saskatchewan River Hydrology.....	36
3.3 Characteristics of the Sediment Loads Transported by the South Saskatchewan River.....	43
3.4 Swift Current Creek Hydrology.....	54
3.5 Characteristics of the Sediment Loads Transported by Swift Current Creek.....	57
IV Data Analyses and Results	
4.1 Introduction.....	67
4.2 Backwater Reach.....	71
4.3 Drawdown Reach.....	74
4.4 Reservoir.....	81
4.4.1 Total Storage Changes.....	81
4.4.2 Dead Storage Changes.....	85
4.4.3 Live Storage Changes.....	87

Table of Contents (Cont'd)

	Page
4.5 Sediment Sampling Analyses.....	91
4.5.1 Suspended Sediment Sampling.....	91
4.5.2 Bed Material Sampling.....	92
4.6 Delta Formation.....	99
4.7 Hydrometric Station Loads Compared to Measured Load Estimates.....	101
4.8 Swift Current Creek Area Study.....	103
V Summary and Conclusions.....	109
Bibliography.....	115
 Appendices	
A Flow Duration of Daily Discharges for the South Saskatchewan River Near Lemsford	
B Total Monthly Discharges at Lemsford, Bindloss and HWY 41, and Reconstructed Monthly Discharges for Lemsford	
C Frequency Analysis of the South Saskatchewan River Flows	
D Depth Integrating Particle Size Analysis of Suspended Sediment Collected at the Lemsford Station	
E Bed Material Particle Size Analysis of Data Collected at the Lemsford Site	
F A Review of Various Sediment Discharge Formulae	
G Monthly Suspended Sediment Loads at Lemsford, Bindloss and HWY 41, and Reconstructed Monthly Loads for Lemsford	
H Flow Duration of Daily Discharges for Swift Current Creek near the Mouth and the Leinan Stations	
I Depth Integrating Particle Size Analysis of Suspended Sediment Collected from Swift Current Creek near the Mouth Station	
J Hydrographic Data Collected from Lake Diefenbaker Between 1966 and 1978	
K Measured Bed Material Density and Particle Size for Data Collected from Lake Diefenbaker	
L 1972 and 1978 Swift Current Creek Area Elevation - Capacity Tables	

List of Figures

		Page
1.	Lake Diefenbaker.....	2
2.	Lake Diefenbaker Sediment Range Locations.....	15
3.	Hydac-200.....	21
4.	Hydra System Flowchart.....	27
5.	Elevation-Capacity Computation.....	28
6.	Hydrometric Station Locations.....	34
7.	Duration Curve of Daily Discharges at Lemsford Based on Available Discharge Data.....	38
8.	Mean of Mean Monthly Discharges for the Lemsford Station.....	39
9.	Regression Analysis of Total Monthly Discharges at Lemsford Based on Bindloss and HWY 41 Combined Discharges.....	40
10.	Total Annual Discharge Frequency Analysis for the South Saskatchewan River.....	44
11.	Mean Annual Hydrograph and Sediment Curve for the Lemsford Station Based on 1962-1970 Data.....	45
12.	Concentration Relationships to Discharge.....	47
13.	Silt and Clay as a Percent of Concentration.....	48
14.	Silt and Clay Percent Relationship to Discharge.....	48
15.	Grading in Relationship to Discharge.....	50
16.	Mean Particle Size Relationship to Discharge.....	50
17.	Grading of Sand Component in Relation to Discharge.....	51
18.	Mean Particle Size of the Sand Component in Relation to Discharge.....	51
19.	Regression Analysis of Total Monthly Sediment Loads at the Lemsford Station Based on the Combined Loads of the Bindloss and HWY 41 Stations.....	53
20.	Duration Curves of Daily Discharges for the Two Stations.....	56

List of Figures (Cont'd)

	Page
21. Mean Annual Hydrograph and Sediment Curve for the Swift Current Near the Mouth Station Data Collected from 1965-1972.....	58
22. Mean Annual Hydrograph and Sediment Curve for the Leinan Station Data Collected from 1973-1978.....	60
23. Concentration Relationships to Discharge.....	61
24. Silt and Clay as a Percent of Concentration.....	62
25. Silt and Clay Percent Relationship to Discharge.....	62
26. Grading in Relationship to Discharge.....	63
27. Mean Particle Size Relationship to Discharge.....	63
28. Grading of Sand Component in Relation to Discharge.....	64
29. Mean Particle Size of the Sand Component in Relation to Discharge.....	64
30. Bed Elevation Changes in Backwater Reach.....	72
31. Bed Elevation Changes in Drawdown Reach.....	77
32. Bed Elevation Changes in the Reservoir.....	82
33. Percentage Loss in Dead Storage Capacity.....	88
34. Measured Densities Obtained from a Phleger Corer Versus Computed Densities Based on Particle Sizes.....	94
35. Bed Material Density Relationships.....	98
36. Swift Current Creek Area 1972 Contours.....	105
37. Swift Current Creek Area 1978 Contours.....	106
38. Swift Current Creek Area 1972-1978 Contour Differences.....	107

Tables

	Page
I Cross Section (Range Line).....	19
II Area (Sector) Data.....	24
III Hydra System Procedures.....	26
IV Suspended Sediment Data.....	31
V Bed Material Data.....	33
VI Total Annual Flows (dam ³) for the Lemsford Station.....	41
VII Total Annual Flows (dam ³) at Lemsford and Saskatoon.....	42
VIII Total Annual Suspended Sediment Load (Tonnes) for the Lemsford Station.....	54
IX Total Annual Flows (dam ³) for Swift Current Creek.....	57
X Total Annual Suspended Sediment Load (Tonnes) for Swift Current Creek.....	66
XI Distance and Volume Information for Ranges.....	69
XII Mean Bed Changes (Metres) and Elevations (Metres) for Backwater Ranges.....	73
XIII Reservoir Water Level Elevation at Peak Discharges.....	76
XIV Mean Bed Changes (Metres) and Elevations (Metres) for Drawdown Ranges.....	78
XV Percentage and Volumetric Changes for Drawdown Ranges....	80
XVI Mean Bed Changes (Metres) and Elevations (Metres) for Reservoir Ranges.....	83/84
XVII Percentage and Volumetric Changes for Reservoir Ranges....	86
XVIII Percentage and Volumetric Changes in Dead Storage for Reservoir Ranges.....	89
XIX Volumetric Changes in Live Storage for Reservoir Ranges..	90

XX	Concentration and Particle Size Data for 1972 Suspended Sediment Samples.....	92
XXI	Lane and Koelzer's Deposited Density Values (Kg/m^3).....	93
XXII	Deposited Sediment Densities (Kg/m^3) Comparison.....	95
XXIII	Density (Kg/m^3) and Particle Size of the Bed.....	97
XXIV	Measured Deposited Loads.....	102

CHAPTER I

Introduction

1.1 Design and Description of Lake Diefenbaker

In 1958, an agreement was reached between the governments of Canada and Saskatchewan which outlined the basis on which the South Saskatchewan River Project would be planned, constructed and financed. A number of sites were investigated to determine the ideal location to construct the dam. Intensive geological and pedological investigations were conducted (Pollock, 1961) and the design of the reservoir was based on a detailed hydrological investigation of the South Saskatchewan River (Berry et al., 1961). These preliminary studies also provided the information for design of the dams (MacKenzie, 1960).

The reservoir was designed as a multi-purpose project with roles that included: irrigation, hydroelectric power generation, urban industrial water supply, flood control and recreational purposes.

The reservoir is located in the semi-arid grasslands of southern Saskatchewan (Figure 1). The area receives an average of less than 300 millimetres of precipitation each year, with snowfall contribution in the order of 100 centimetres. The mean daily temperature in January is -17.5°C , while in July the mean daily is 20°C (Fisheries and Environment Canada, 1978).

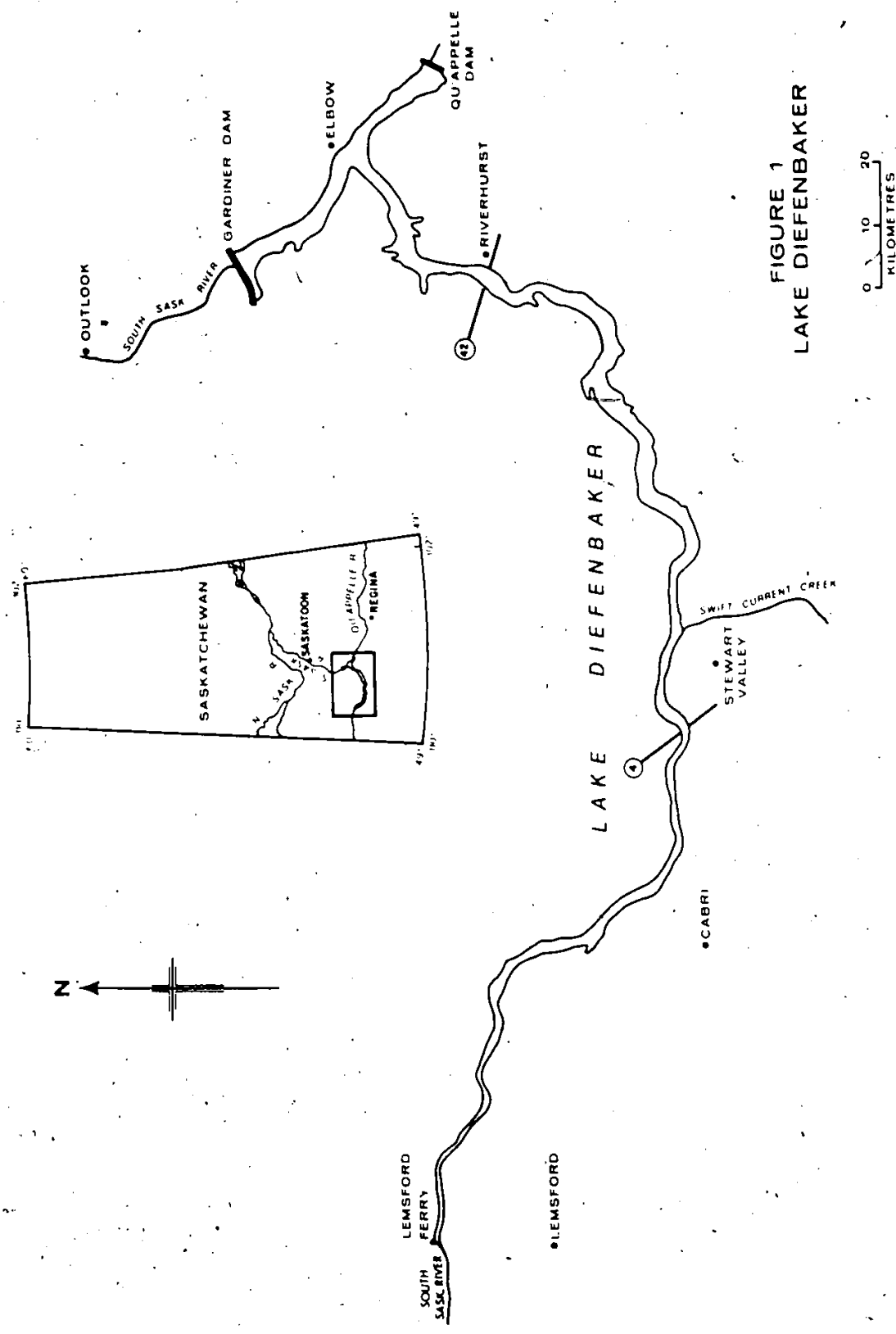


FIGURE 1
LAKE DIEFENBAKER

The reservoir required two dams to impound the water. The Gardiner Dam harnesses the South Saskatchewan River, while the Qu'Appelle Dam restrains water from flowing into the Qu'Appelle River System. The construction of the large earth-filled Gardiner Dam took nine years and was completed in 1967. The cost of impounding the South Saskatchewan River had reached one hundred and twenty million dollars by the time it was completed (Prairie Farm Rehabilitation Administration, 1980).

Filling of the reservoir was initiated in 1964 with full supply level (FSL) reached in 1968. The elevation of FSL is 556.87 metres above mean sea level and the minimum operating water level is 545.60 metres, a drawdown in excess of eleven metres. The 225 kilometre long lake reaches a maximum depth of 58.5 metres near the Gardiner Dam and has an estimated total storage capacity of 9.4 million cubic decametres (dam^3) at FSL, of which 4.0 million is useable in live storage.

The reservoir is fed by two streams, the South Saskatchewan River and the much smaller Swift Current Creek. Swift Current Creek's contribution of water amounts to less than 1.0% of that of the South Saskatchewan River. The South Saskatchewan River has had an average annual flow of 8.0 million dam^3 and transported an estimated average suspended sediment load of 6.0 million tonnes per year since the reservoir was established.

1.2 Thesis Objectives and Hypotheses

Lake Diefenbaker is the only reservoir in Canada that has had an extensive data collection program spanning pre-reservoir to present conditions. This project provides the unique opportunity to study sedimentation in a large body of water which is subjected to a large range of water level fluctuations, conditions not present in other sedimentation studies. This study has many years of hydrometric and sediment data from which to draw conclusions and furthermore, the project has been responsible for some innovative equipment development over its lifespan. This has provided the opportunity to document changing methodologies and technological progress in reservoir studies. Since most of the data had never been analyzed, few changes were ever made to the data collection program, and it will be worthwhile to evaluate the effectiveness of the program.

The following hypotheses are addressed in this thesis:

1. Sedimentation has a minimal impact on the total storage capacity of Lake Diefenbaker;
2. The sediment load transported by the South Saskatchewan River is not transported for any great distance into the reservoir;

3. Reservoirs with a large water level drawdown do not develop classical sedimentary structures;
4. Bank erosion will not greatly increase the live storage capacity;
5. Swift Current Creek's sediment contribution is so small that the effects on the reservoir are negligible.

1.3 Past Studies Concerning Sedimentation in Lake Diefenbaker

The Prairie Farm Rehabilitation Administration (PFRA) was concerned that sedimentation of the proposed reservoir could be a potential problem to its successful operation. So in 1947, they established a hydrometric station at Outlook to collect data on sediment transport by the South Saskatchewan River. Computations based on the average annual sediment load indicated that only 0.1% of the proposed total storage capacity would be lost to sedimentation each year (PFRA, 1952). This value was considered to be minor and no further concern was given to sedimentation.

In 1959, a study was initiated to formulate a master plan for the recreational development and use of the proposed reservoir (Baker, 1960). This report identified three areas for concern which could greatly affect development, and for which limited or no information was available. The areas of concern were: the extent and effects of bank erosion; the sediment contribution by Swift Current Creek; the extent of the deposition of sediment

from the South Saskatchewan River. The findings of this study elucidated the complexities of studying sedimentation in a proposed reservoir and led to further studies.

A study was conducted to assess the extent and problems of bank erosion (Molard, 1961). The report identified areas along the proposed shoreline that would be prone to slumping and bank erosion. No quantitative estimates were made however, because of insufficient data. The report indicated that further work would have to be undertaken, after the reservoir had been in operation for a few years, to properly assess the problem.

A sedimentation study (Kuiper, 1962) forecasted 'delta' formation in the reservoir. Based on sediment data from the South Saskatchewan River it was estimated that on average 7 400 dam³ of sediment would be transported annually into the reservoir. This amounted to an annual decrease of 0.1% of the total reservoir capacity. The report also projected changes to the longitudinal profile of the reservoir after 10, 50 and 100 years, based on the average sediment load. This study had limited data from which to work and data from existing reservoirs had to be used to assess the problems. The study also did not have information on how the reservoir would be operated, in terms of regulating water levels, which of course would greatly affect predicted profile changes over time.

These studies made it evident that the sediment problem was not one of magnitude but rather of distribution in the reservoir. Although they

provided some insight into sedimentation in Lake Diefenbaker they also made it clear that the processes they were predicting were complex and further data would be needed to fully understand them.

In 1963, the Saskatchewan government implemented a survey program of selected cross sections in the reservoir to study the progress and configuration of sedimentation in Lake Diefenbaker. Because the project provided the opportunity to study sedimentation in a large, newly formed reservoir and because of its significance, the federal government established the project as an International Hydrological Decade Project in 1964. The project was entitled, "Delta Formation and Sedimentation in Lake Diefenbaker" and involved an extensive data collection program.

The objectives of the reservoir survey program were listed in the "IHD Project Saskatchewan-2: Progress Report, 1964-67" as:

1. to provide information that will aid in planning future improvements and developments at Lake Diefenbaker;
2. to provide information relative to the effect of aggradation on structures as the Saskatchewan Landing Bridge (Hwy. 4), ferry approaches, water supply intake works, and recreational and other developments;

3. to provide information for operational purposes, such as the effect of sediment accumulation on the reservoir capacity relationship and evaporation.
4. to provide factual data for possible litigation;
5. to provide information that will aid in future planning of other projects."

A further study to determine the possible effects of bank erosion on the storage capacity was conducted after the reservoir had been in operation for a few years. This study (Van Everdingen, 1968), taking into account water level drawdown, soil and slope stability theories, calculated the extent to which the banks might be eroded based on cross-sectional data. It concluded that the live storage could be increased by as much as 7.4% due to bank erosion. The bank material would be transported into the dead storage causing a loss in capacity of 4.0% of the dead storage. This change was to come about within the first ten years of the reservoir life. A weakness in the study was that it only used cross-sectional data from one reach of the reservoir, and considered it to be indicative of conditions along all the shoreline. This particular reach has steep banks which would produce a high, overestimated, rate of bank erosion.

Further research was conducted on bank erosion and sedimentation during 1969 in the vicinity of Elbow. After a brief field season, the study

only provided some general statements concerning the processes involved (Coakley and Hamblin, 1969). It stated that most of the bank erosion was due to gravity slumping of structurally weakened banks and that the material was then transported towards the central portions of the reservoir. This was attributed to the fact that the nearshore currents that were measured were too weak to transport material along the shoreline. Local sedimentation was due to material being transported downwards because of the steep bank gradients, which also explained why no shoreline depositional features were observed. No estimates of the extent of bank erosion or the rate of sedimentation were obtained from this study.

An analysis of the hydrographic data collected from 1965 to 1972 on Lake Diefenbaker was conducted by Wiebe and Drennan (1973). In this paper, changes to the longitudinal profile of the reservoir were depicted. Deposition was calculated to have occurred at most of the cross sections except those in the backwater region which had undergone degradation due to ice scouring. Increases in the cross-sectional areas near the main dam were attributed to hydrostatic loading. Analysis of suspended sediment data revealed that 85% of the load settled out before it reached the location where Highway 4 crosses the reservoir, with the sand portion of the load being deposited further upstream. In this upper reach the sand was found to have been deposited in the river channel, while silt and clay settled relatively uniformly across the whole bed.

Rasid (1979) discussed primarily the effects that the reservoir would have on the downstream regime, as well as sedimentation in the reservoir. An analysis of sediment loads at Lemford Ferry and Saskatoon from pre-dam to the post-dam period revealed that better than 97% of the sediment load carried by the South Saskatchewan River was being trapped in Lake Diefenbaker. However considering the length of Lake Diefenbaker, it is highly unlikely that any of the sediment load carried by the South Saskatchewan River passes through the reservoir.

1.4 Recent Lake or Reservoir Sedimentation Studies

From a global perspective, lake and reservoir sedimentation studies have been carried on for a long time, but in Canada these studies are relatively new. A review of the literature revealed that few published papers exist on current sedimentation in lakes and reservoirs in Canada.

One of the first documented studies was on the Arrow Lake in British Columbia (Fulton and Pullen, 1969). Echo sounding charts of the lake bottom provided the data for the morphological study. The study identified a classical delta and distinguished the different beds. No attempt was made to determine the sedimentation rate.

One of the few reservoir sedimentation studies was conducted on Glenmore Reservoir in Alberta (Hollingshead et al., 1972). This small water supply reservoir, with 28 000 dam³ of storage lost 10% of its capacity in

36 years of operation. The study compared the estimated sediment inflow to the measured trapped load and found the values to be relatively close.

The most significant documented case of reservoir sedimentation in Canada was the Bassano Reservoir, Alberta. A 1970 survey of the reservoir by provincial authorities revealed that the original 1911 storage capacity of 34 000 dam³ had been reduced to 12 000 (Wiebe and Drennan, 1973). This amounted to a capacity loss of 66 percent in 59 years.

Gilbert (1975) conducted a sedimentation study of Lillooet Lake, British Columbia. This is one of the first comprehensive studies of processes and variables which affect suspended sediment deposition. Flow and temperature data were used to understand the sediment distribution patterns. Delta beds were identified in the study and the delta was determined to have advanced nearly one kilometre over a 110 year period. Further redistribution of sediment occurred by frequent slumping of the foreset beds.

Smith (1978) examined the sedimentation process in glacier-fed Hector Lake, Alberta. The sedimentation rate was calculated to be very low. The distribution of suspended sediment was determined to be affected by currents that were wind generated. The Bow River inflows affected only the extremity where it entered the lake.

A study of sedimentation in a small prairie reservoir also revealed an extremely low sedimentation rate. Avonlea Reservoir, which is located in southern Saskatchewan was calculated to have lost less than one percent of its storage of 6 000 dam³, in its eleven years of operation (Yuzyk, 1978).

Gilbert and Shaw's (1980) study of sedimentation in the small proglacial Sunwapta Lake in Alberta also showed a low sedimentation rate. Cores revealed the accumulation rates for different areas of the lake dating back to deglaciation. Recently measured rates from installed sediment pans were found to be considerably lower than the historic rates. Subaqueous slumping deformed the beds, making correlation between cores impossible, and limited the ability to reconstruct the sedimentary history of the lake.

From these few studies it became apparent that sedimentation in lakes and reservoirs was not a significant problem in Canada, however, that sedimentation processes are complex and require further research. All of these studies were of little comparative value because none came close to representing conditions similar to those of Lake Diefenbaker. Furthermore, these studies were all conducted on considerably smaller lakes and reservoirs, none of which were exposed to such a large range in fluctuating water levels, or even to such unstable bank conditions. Finally, the drainage basin area for all of them are dwarfed in comparison to Lake Diefenbaker's watershed. In the Canadian context, this study is unique in that it provides the opportunity to examine sedimentation in a large, newly formed reservoir.

Unlike Canada, reservoir studies have been extensive in many areas of the world. In the United States, the findings from 1 105 reservoir sedimentation studies have been summarized (Dendy et al., 1971). In the twenty-three larger reservoirs (greater than 1.2 million dam³ in capacity) the average annual loss in storage due to sedimentation was calculated to be 0.2%. However, in the smaller reservoirs sedimentation had decreased the capacity between 1.0-3.0% per annum. In India, sedimentation was determined to have reduced the storage of twenty reservoirs, by 0.5-1.0% a year, even in the large reservoirs (Pais-Cuddoue and Rawal, 1969). A more recent study by Chaturvedi (1981) of twenty reservoirs in India revealed that the annual sedimentation rate to be less than 1.0%. In Columbia, Taiwan and the Philippines sedimentation has been recorded to have severely reduced the life expectancy of many reservoirs (Lopez, 1978).

In the past ten years, much literature has been written explaining in great detail the mechanics and processes affecting sedimentation (Allen, 1970; Graf, 1971; Yalin, 1972; Vanoni, 1975; Reineck and Singh, 1980). More recent case studies of reservoir sedimentation have concentrated on providing a complete analysis of the processes affecting sedimentation rather than just the effects of sedimentation (Szechowycz and Qureshi, 1973; Focsa, 1980). Increased knowledge of how these processes interact have led to major advances in the mathematical modelling of reservoir sedimentation (Thomas and Prasuhn, 1977; Lopez, 1978; Chen, 1978). Delta formation is thoroughly discussed in many current texts (Walker, 1979; Reineck and Singh, 1980) and many well documented case studies have been published (Shirley and Ragsdale, 1966; Axelsson, 1967).

CHAPTER II

Reservoir Data Collection: Methodology, Techniques and Equipment

2.1 Cross Section (Range Line) Surveys

The IHD program involved the establishment of 38 cross sections, commonly referred to as ranges, spaced in an ascending numerical order from Gardiner Dam to the Lemsford Ferry (Figure 2). The locations of the ranges were chosen on the basis of the following criteria: they were representative of the geometry of the reservoir in a particular reach; that they were easily accessible and that they would reflect anticipated deposition or erosion (IHD Project Saskatchewan-2: Progress Report 1964-67).

Through an open control system of surveying, permanent bench marks were located for each range. A total of four bench marks were installed at each range, two on each bank. The upper bench marks, on both sides of the reservoir, were located so that they would not be affected by unstable ground conditions brought about by the newly established reservoir. The lower bench marks were located closer to the reservoir shoreline, to minimize the land surveying involved each time the cross sections were surveyed. A level circuit was then run to establish the geodetic elevation of each of these bench marks. The distance across the reservoir between lower bench marks was obtained through the use of a tellurometer and a station was assigned to the bench marks.

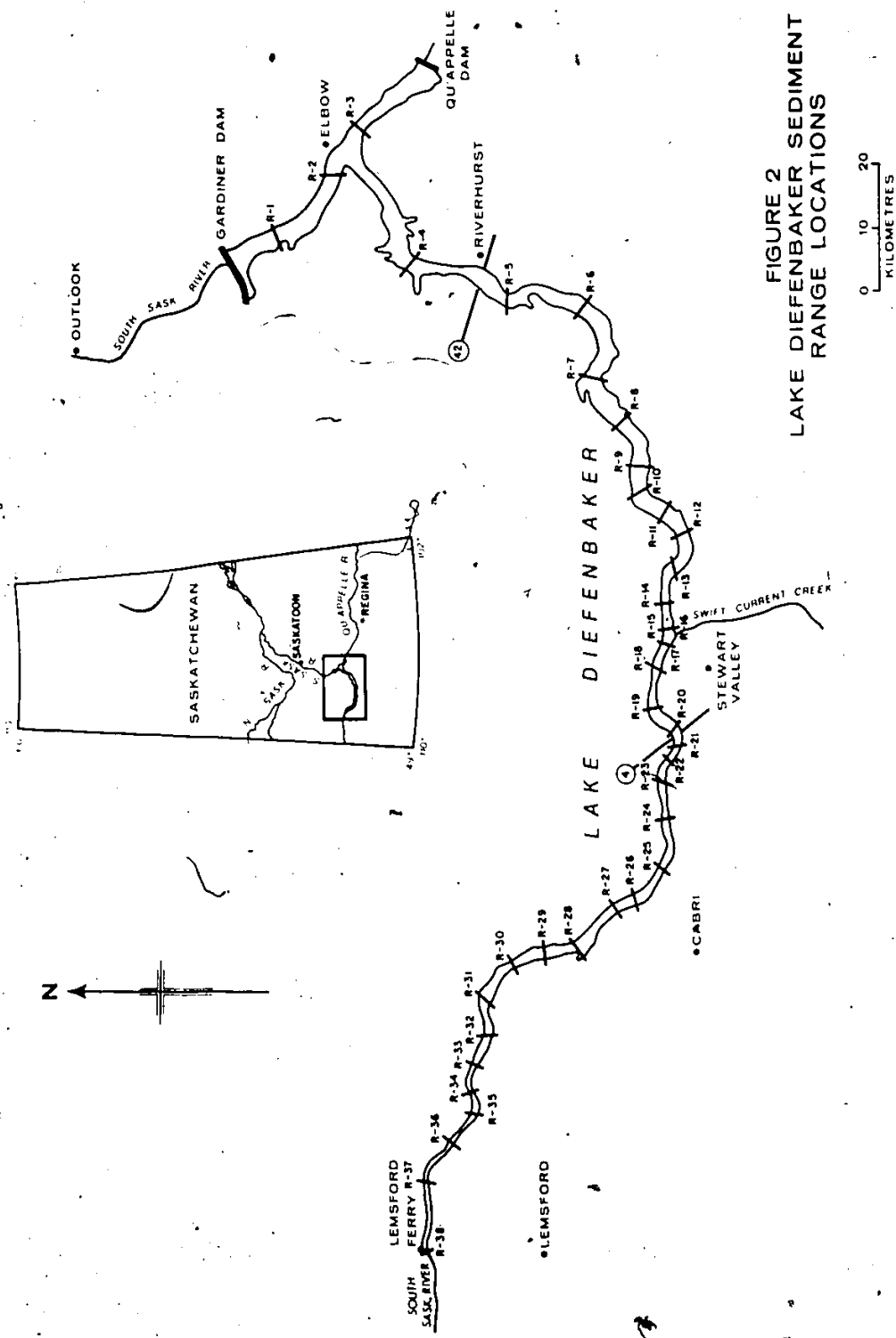


FIGURE 2
LAKE DIEFENBAKER SEDIMENT
RANGE LOCATIONS

Profiling of each range first involved the surveying of the land portion of the cross section by means of a surveyor chain and level. A point was chosen whenever there was a break in slope or the end of the tape was reached. Proceeding from the bench mark to the water's edge the station and elevation of each point were recorded. This procedure was conducted on both banks at each range. The water level elevations obtained from each side were then compared to make sure they compared to the nearest tenth of a foot. In some cases a discrepancy could be accounted for, such as the effects from wind build up. If there were no logical reasons, then the levelling work was redone.

Once the water level elevation had been obtained, the hydrographic data were collected using an echo sounder mounted in a boat. A continuous profile was obtained along the range line. The water depths were extracted whenever there was a break in profile and the depths converted to bed elevations by subtracting them from the known water level elevation.

To keep the boat on line, two methods or aids were employed. The first involved the installation of two highly visible range markers on each bank, this provided the visual assistance for the operator to keep the boat on line. The second involved setting up a transit on the bench mark and sighting across to the other bench mark, if the boat drifted off the line then the instrument man would give directions to the boat operator by means of a two-way radio.

The horizontal distance the boat travelled was determined by triangulation. A measured baseline was laid out perpendicular to the range line with the transit situated at the end of the baseline. As the boat moved across the reservoir, a signal was given periodically from the boat. An angle was then read and recorded, while simultaneously in the boat the echo sounding chart was marked. Another method used occasionally in the early surveys involved the use of a rangefinder. The rangefinder was set up on the range line and sightings made on the boat as the echo sounder chart was marked. However, the rangefinder was only calibrated for sighting distances greater than 300 metres, which severely restricted its use.

In the upper ranges, where river conditions prevail, different techniques and equipment had to be applied. In this case a tag line was stretched across the channel, which had horizontal distances marked, and a sounding rod used from a boat, or by wading, provided depths at the fixed intervals.

In 1970, some testing was undertaken to determine the reproducibility of profiles (IHD Annual Project Report, 1970). Based on different triangulation arrangements, a maximum distance measurement discrepancy was calculated to be 20 metres. Boat drifting, and to a lesser extent instrument reading were found to affect the results. The depth data were found to be precise, as long as the echo sounder had been properly calibrated for temperature and salinity conditions. However, it was determined that if the recorder was not adjusted when there was a change in

these conditions, erroneous readings would be obtained. In fact, recent replotting of the 1970 hydrographic data collected from the reservoir revealed that the echo sounder had not been properly calibrated that year, making those results worthless.

In 1971, a distance positioning system was adopted which consisted of a master and slave tellurometer, a printer and a synchronizing component to measure distances (IHD Annual Project Report, 1971). The slave which was set up at a known position, would transmit to the master unit in the boat. This made it possible to simultaneously record distance and depth. The tellurometer, which was accurate to ± 1.5 metres proved more reliable than the triangulation method.

In 1972, an automated hydrographic system, Hydac-100, was developed and tested on Lake Diefenbaker. The results of the testings were favourable and the system was adopted for use on the Lake Diefenbaker surveys (IHD Annual Project Report, 1972). Instead of collecting a single line of data at each range as was done before, a collection of lines transecting an area were collected. This area or sector method of surveying at each range was incorporated into the program in 1974. Because this system could not be employed in the shallow areas, such as upstream of Range 27, those upstream ranges remained to be surveyed as range lines. To compare the two survey methods, range data were still collected as part of the area survey for the ranges downstream of Range 27. Table I indicates all the cross-sectional data that have been collected since the beginning of the study.

J

TABLE I
CROSS SECTION (RANGE LINE)

RANGE NO.	YEAR														
	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
1	X		X	X			X			X					
2	X				X		X							X	
3	X						X								
4	X		X	X			X			X				X	
5	X						X								
6	X		X	X				X			X				
7		X					X							X	
8		X			X		X						X		
9			X					X			X				
10			X				X								
11		X	X					X			X				
12		X					X								
13		X					X						X		
14		X						X			X				
15		X					X						X		
16		X					X						X		
17		X	X								X			X	
18		X					X			X			X		
19		X					X						X		
20		X						X			X			X	
21		X	X					X			X			X	
22		X					X								
23		X		X				X			X			X	
24		X						X			X				
25		X					X						X		
26		X		X				X			X			X	
27		X			X			X			X			X	
28		X		X			X						X		
29		X	X		X									X	
30		X	X			X		X			X			X	
31		X	X		X		X								
32		X	X			X		X			X			X	
33		X		X				X			X			X	
34		X					X						X		
35		X			X			X			X			X	
36		X						X			X			X	
37		X				X		X			X			X	
38		X						X			X			X	

NOTE: X - CROSS-SECTIONAL DATA

2.2 Area (Sector) Surveys

A detailed description of the Hydac-100 System and the survey practices used in collecting sector data are available in a technical bulletin written by Durette and Zrymiak (1978). However, in 1978 the system was updated because of the technological advances and became known as the Hydac-200. Since many changes have been made to the prototype, a description of the system has been included in this thesis.

The data collection system (figure 3) can be divided into four sub-systems: positioning; depth sounding, data processing with survey control and data logging. The working relationship of the individual components has also been outlined in the block diagram.

The dynamic positioning of the approximately 10 metre long vessel is accomplished by means of two remote tellurometers positioned on shore. The tellurometer locations are fixed by tying them into the network of established bench marks. The master tellurometer on the boat measures the distance to the remote to within ± 1.0 metre for a single range accuracy under dynamic conditions. This positioning system was updated in 1978 with the most currently developed MRD 1 tellurometers. The original MRB 201 tellurometers were less reliable and only had an accuracy of ± 1.5 metre.

The depth sounding sub-system is considered to be accurate to within 5 centimetres, up to a depth of 100 metres. There are two transducers. The

210 KHz frequency detects low density deposits, while the 33 KHz distinguishes material of higher densities. This particular sub-system has not undergone any component changes since it was originally installed.

The sub-system concerned with data processing and survey control functions to efficiently monitor the measuring instruments. The quality of the data collection can be controlled through the choice of data acquisition rates and coverage density. This is all accomplished by a software package, consisting of four main programs: a driver; a preplot; an on-line and a data dumping program. A point, which is made up of two distances, depth and time, is capable of being collected by the system every two seconds. The addition of an onboard plotter to the system in 1977 greatly improved the coverage, which up until then was uncontrolled.

The last stage of the data collection involves storing the data. The data are stored on two outputs: a seven track magnetic tape and a hard copy printout. The reason for two outputs is to safeguard against data being lost.

The first step in collecting sector data involved land surveying. Profiling was done from the bench mark to the water's edge and the water elevation obtained. The second step involved locating the tellurometers where they had a good line of sight and to tie them into the bench mark network. In most cases a tellurometer was located on each bank and on the range line. This tellurometer configuration had a weakness, in that the

trigonometric arrangement provided the least accurate data on the range line. Thirdly, the distance between the remote tellurometers was measured by means of a CA 1000 electronic distance measuring device. This distance, known as the baseline length, was then fed into the HP 9825A programmable calculator along with a suitable scale. A bearing was then given with the line interval spacing, and a preplot was produced on the onboard plotter, which the driver would follow. On Lake Diefenbaker, the line spacing was a standard 50 metres apart and approximately 600 metres of reservoir length were surveyed for each sector. At this point, as a check, the boat transected the baseline and tellurometer distances were summed to ensure that the value matched that of the baseline. Data would first be collected along the range line, then along the perimeter of the area and finally along the line spacing to complete the coverage.

The sector data which have been collected on Lake Diefenbaker since 1974 has been noted in Table II. The author became involved in the program during the 1978 field season. The return period for each sector was designed to be three years. The pattern, however, was upset in some years due to equipment failures.

2.2.1 Hydrographic Data Processing

To process this hydrographic data, an automated data reduction and analysis system (HYDRA) was developed by personnel of the Sediment Survey Section of Environment Canada. The author was involved in the development

TABLE II
AREA (SECTOR) DATA

RANGE NO.	YEAR														
	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
1										S				S	
2										S				S	
3										S				S	
4										S				S	
5										S				S	
6											S			S	
7										S				S	
8										S			S		
9											S				
10													S		
11											S				
12										S			S		
13										S			S		
14											S			S	
15										S			S		
16										S					
17											S			S	
18										S			S		
19										S			S		
20											S			S	
21											S			S	
22										S			S		
23											S			S	
24											S				
25										S			S		
26											S			S	
27											S			S	
28															
29															
30															
31															
32															
33															
34															
35															
36															
37															
38															

NOTE: S - SECTORS

and testing of the many routines required to process the data. And all the hydrographic data collected on Lake Diefenbaker have been processed by the author, over a five year period.

The Hydra system is comprised of twenty computer routines or procedures written in the Fortran language. Table III outlines the twenty procedures and their respective functions. The actual software package used to generate the contours is the General Purpose Contour Program (GPCP) available from the Computer Science Centre of Energy, Mines and Resources.

There are five basic steps to processing the data after it has been collected (Figure 4). The first step is to prepare the data into standard formats and to input the necessary information, such as, water level elevation, tellurometer coordinates and desired scale. Each data point is then converted to x and y coordinates and an elevation. The points are then plotted, visually examined and any erroneous data corrected or edited out. Once there are no more corrections and the boundary conditions have been set, the data are gridded and run through GPCP to generate contours. A grid point is a weighted point, calculated from surrounding data points. For Lake Diefenbaker, the contours were based on a thirty by thirty metre gridded array. The three-dimensional plots are generated from the same array. A capacity table and plot can then be obtained. Capacities were computed by dividing the module into horizontal slices, with the thickness of slice being selectable. Figure 5 illustrates this approach, the mathematical formulation for obtaining the volume of a slice (Equation 1), and subsequently the total capacity (Equation 2).

TABLE III
HYDRA SYSTEM PROCEDURES

PROC. NO.	PFN	MEANING	PURPOSE
1.	HD	HYDAC DUMP	To dump and convert the Field Tape Data from ASCII to BCD
2.	TP	TRANS PROCESS	To re-format the DUMPPFN Data Records to card images
3.	CS	CONVER SECTOR	To convert the PCATDPFN Data of selected sectors to XYZ Coord.
4.	EP	EDIT POINTPLOT	To produce a TAPE30 Point Plot of the CNTLEDPFN
5.	PP	POINT PLOT	To produce a TAPE30 Point Plot of the CNTLPFN
6.	DR	DUPLICATE REMOVAL	To remove any consecutive duplicate XY Coord. in CNTLPFN
7.	PX	PROFILE	To plot X-section from CNTLPFN
8.	NO	NEWORIGIN	To reset a new origin.
9.	MC	MODULE CREATION	To sort CNTLPFN into modules and select BND for Plotting
10.	MS	MODULE SCREEN	To screen MODPFN so as to reduce linear overkill
11.	CP	CONTOUR PLOT	To produce a contour plot of a MODDECK in the MODPFN
12.	BP	BOUNDARY PLOT	To plot the BND Coord. with ten X-section flags
13.	PC	PROFILE CONTOUR	To plot X-sections from the contour plot
14.	AD	ARRAY DIFFERENCE	To prepare an array of the difference of the overlap of two arrays
15.	AC	ARRAYDIF CONTOUR	To plot a contour map of the array of differences
16.	BC	BINARY CONTOUR	To plot a contour map using the binary array of contours
17.	NC	NEWBND CONTOUR	To plot a contour map using new BND (Common) Coord. stored on SURIPF
18.	AP	CONTOUR APPLICON	To plot a color contour map using the Applicon Plotter
19.	D3	3 DIMENSION	To plot a three dimension block with BND cut off option
20.	CC	CAPACITY CURVE	To calculate and plot a capacity curve

PFN = Permanent File Name
 CNTLPFN = Converted Data (XYZ)
 CNTLEDPFN = Data File used to produce
 a plot to edit PCATDPFN

MODPFN = CNTL Data split into modules
 MODDECK = Module Deck Name on MODPFN
 SURIPF = Survey Indirect Permanent File
 PCATDPFN = Pre Edited Data from Trans (TP)
 DUMPPFN = Output Data from Hydac Dump (HD)

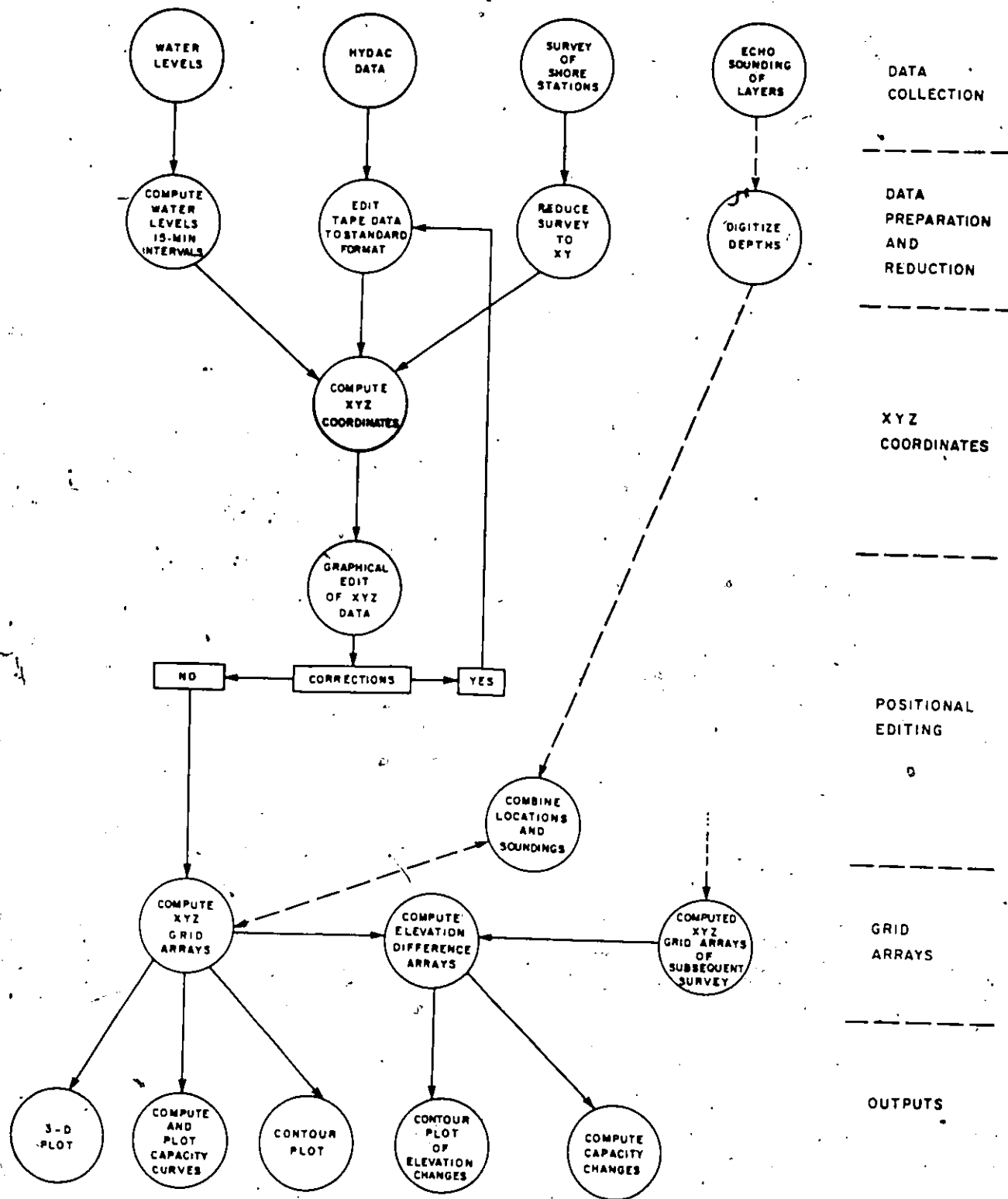


FIGURE 4
HYDRA SYSTEM FLOWCHART
 HYDROGRAPHIC DATA REDUCTION AND ANALYSIS

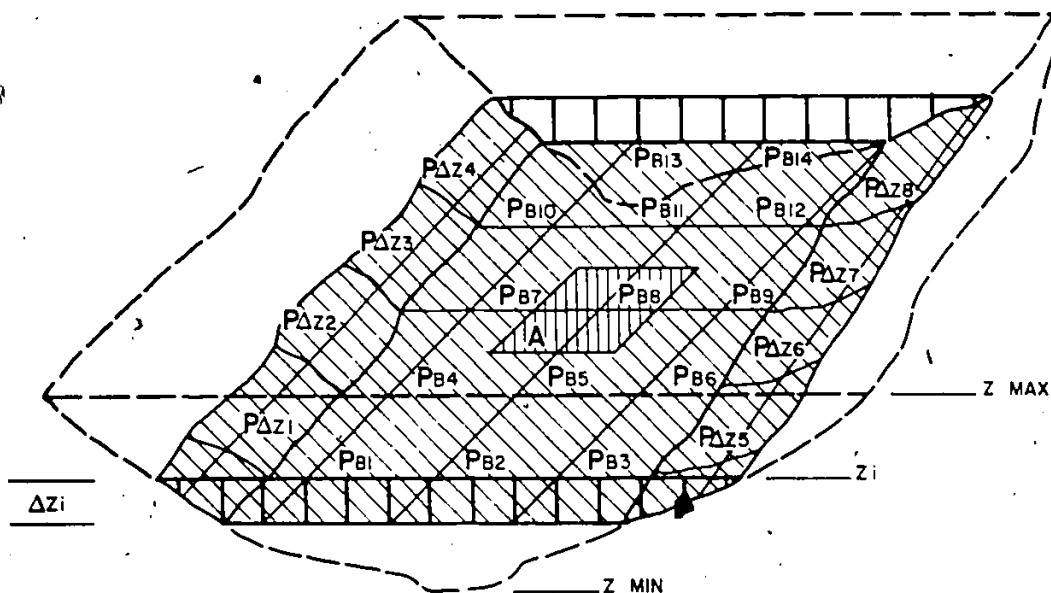


FIGURE 5
ELEVATION-CAPACITY COMPUTATION

$$V_{\Delta z_i} = \frac{1}{2} \Delta z_i \left(\sum_{Z_i - \Delta z_i}^{Z_i} A P_{\Delta z_i} \right) + \Delta z_i \left(\sum_{Z_{\text{MIN}}}^{Z_i - \Delta z_i} A P_B \right) \quad (1)$$

$$\text{and } V_{\text{TOT}} = \sum_{Z_{\text{MIN}}}^{Z_{\text{MAX}}} V_{\Delta z_i} \quad (2)$$

where $V_{\Delta z_i}$ — the volume of the horizontal slice under consideration.

Δz_i — elevation increment defined by the user.

A — Area assigned to each elevation point.

$P_{\Delta z_i}$ — elevation point residing within the elevation increment under consideration.

P_B — elevation points below the elevation $z_i - \Delta z$

V_{TOT} — total volume of water beneath the surveyed area considered.

2.3 Suspended Sediment Sampling

After the hydrographic data were collected at each range, suspended sediment samples were collected. Three verticals in each cross section were sampled. They were located at one-sixth, one-half and five-sixth of the distance between the banks. Three samples were obtained from each of the three verticals for a total of nine. In each vertical, a sample was collected near the water surface, one at mid-depth and one near the bed, using an Instantaneous Horizontal suspended sediment sampler. In the upper ranges where there are many channels, a sample was collected from each channel using the Instantaneous Horizontal sampler or a US D-49 depth-integrating suspended sediment sampler.

These data provided information on the distribution of suspended sediment within a cross section as well as longitudinally in the reservoir. The sediment samples were analyzed in the laboratory using the evaporation and filtration methods of analyses to determine concentrations, and the bottom withdrawal method to determine particle-size distributions (Guy, 1969).

These sampling procedures, which were implemented in the beginning of the program, have never been changed. To collect hydrographic data the most optimum time is when the reservoir is at FSL, therefore ensuring maximum area coverage, but by this time either most of the suspended sediment has settled out of suspension or mixing of the reservoir water has occurred. The major weakness with the suspended sediment sampling program was that it was

tion in with hydrographic data collection program and explains why this portion of the program has been ineffective.

In 1972 suspended sampling was conducted while the reservoir was filling and this was the only time when suspended sediment samples were of sufficient concentration to determine particle-size distributions. To obtain particle size information, concentrations have to be greater than 300 mg/L (Guy, 1969).

All the concentration and particle size information that has been collected since the beginning of the project is noted in Table IV.

2.4 Bed Material Sampling

A bed material sample was collected at the same location as each of the three verticals used to obtain the suspended sediment samples. In the upper ranges where there are multiple channels, samples were collected in each channel. In most cases samples were collected using a US BM 54 bed material sampler and occasionally the Canadian Drag Bucket (Lane) bed material sampler. As infilling of the reservoir proceeded, the bed material became comprised of loosely deposited silts and clays making this sampling equipment no longer effective. In 1971, the Phleger 840-A Bottom Corer sampler was introduced into the program for sampling low density deposits.

TABLE IV
SUSPENDED SEDIMENT DATA

RANGE NO.	YEAR														
	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
1	C	C	C				C			C				C	
2	C	C		C	C		C			C				C	
3		C				C				C				C	
4		C	C							C				C	
5		C				C				C				C	
6		C	C								C			C	
7										C				C	
8					C					C			C		
9								C			C			C	
10			C				C			C			C		
11		C									C			C	
12					C					C			C		
13										C			C		
14								C			C			C	
15							C			C			C		
16										C					
17			C					C						C	
18							C				C		C		
19													C		
20					C									C	
21								C			C			C	
22										C			C		
23											C			C	
24			C				C				C			C	
25										C			C		
26				C				CP			C			C	
27					C						C			C	
28										C					
29				C	C			CP							
30			C				C	CP							
31					C					C					
32							C								
33								CP							
34										C					
35					C										
36								CP							
37							C								
38															

NOTE: C - CONCENTRATION DATA
P - PARTICLE SIZE DATA

Particle-size distributions are measured by means of sieve analysis for particles larger than 62 microns, and by a hydrometer for particles less than 62 microns (Guy , 1969). The core length was measured as soon as the sample was collected and the volume of the sample was derived. The dry weight of the whole sample divided by the volume provided the in situ density of the deposited material.

All the bed material samples that have been collected over the years have been identified in Table V, along with the type of information that is available.

2.5 Hydrometric Station Data

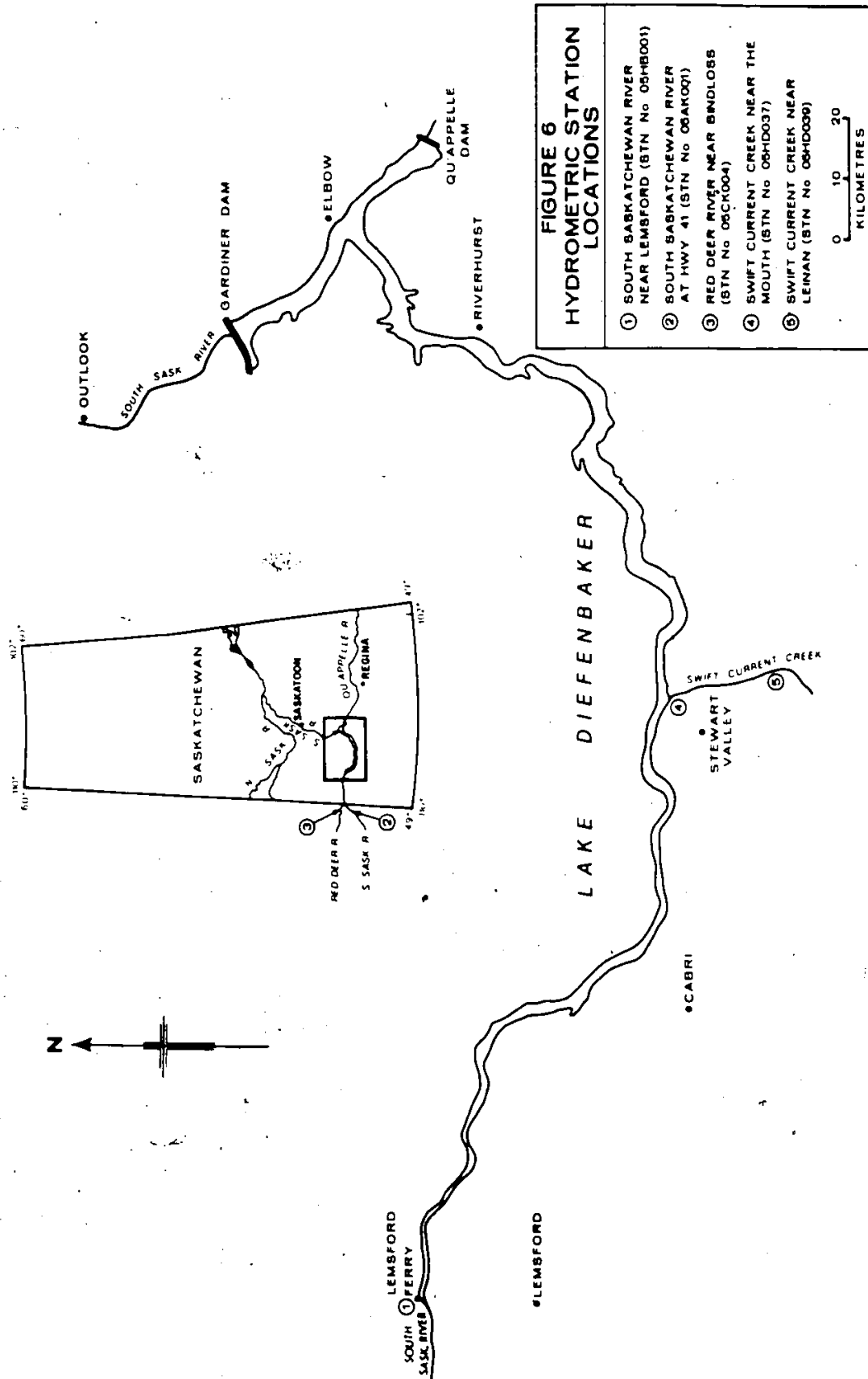
There are basically two tributaries that drain into Lake Diefenbaker, the major one being the South Saskatchewan River, and the other being Swift Current Creek. To measure their contribution in terms of flow and sediment, Water Survey of Canada, Environment Canada established hydrometric stations on both of them (Figure 6).

A hydrometric station was established on the South Saskatchewan River at Lemsford Ferry (STN. NO. 05HB001) in 1958, to collect discharge data, and by 1961, sediment data were being collected at the station as well. However, in 1970 the station was discontinued due to maintenance problems, and also because there was concern that the accuracy of data was reduced because of the backwater effects. Fortunately, another station

TABLE V
BED MATERIAL DATA

RANGE NO.	YEAR														
	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
1		P	P				P			PD				P	
2		P		P	P		P			PD				P	
3		P	P			P								P	
4		P								P				P	
5		P				P				P				PD	
6		P	P								P			PD	
7							P			P			PD	PD	
8		P			P					P					
9			P			P		PD			P			PD	
10			P							P			PD		
11		P	P								P				
12					P					P			PD		
13				P			P			P			PD		
14								PD			P			PD	
15										P			PD		
16							P			P					
17			P					PD			P			PD	
18						P				P			P		
19				P			P			P			PD		
20					P						P			PD	
21			P					P			P			PD	
22							P			P			PD		
23				P							P			PD	
24						P					P			PD	
25							P			P			PD		
26			P	P				PD			P			PD	
27					P						P			PD	
28			P				P			P			P		
29				P	P			P						P	
30						P		P			P			P	
31					P		P			P			P		
32			P			P					P			P	
33				P							P			P	
34							P			P			P		
35					P			P			P			P	
36			P								P			P	
37						P					P				
38											P				

NOTE: P - PARTICLE SIZE DATA
D - DENSITY DATA



was installed further upstream near HWY 41 (STN. NO. 05AK001) in 1960. This station and the station near Bindloss on the Red Deer River (STN. NO. 05CK004) installed in 1966, provided continued information on flow and sediment.

In 1965, a station was set-up near the mouth of Swift Current Creek (STN. NO. 05HD037). This station, which was not easily accessible, was discontinued in 1972. In its place, a station was installed further upstream near Leinan (STN. NO. 05HD039) in 1973, ensuring an unbroken record of data.

The type of hydrometric information collected includes: velocity, stage and discharge. The equipment and techniques used in obtaining this information are available in a recent publication (Terzi, 1981). The sediment data are collected according to the procedures of Porterfield (1972) and computed as outlined by Guy and Norman (1970). Laboratory procedures used to derive the information are available from Guy (1969). The data collected are concentrations, from which sediment discharges are then computed, as well as particle-size distributions for both suspended sediment and bed material.

CHAPTER III

Water and Sediment Sources

3.1 Introduction

Data collected from the South Saskatchewan River and Swift Current Creek have been analyzed to provide insight into the hydrological and sediment transport relationships that exist. Duration, variation, magnitude and extremes in discharges are studied to provide an understanding of the flow regime on these two streams. Sediment data, such as concentration, particle size and loads, are examined to assess these sources of sediment, understand their transport capabilities and the factors that affect them. This information, when combined with the hydrographic data findings, will allow for a comprehensive evaluation of sedimentation in Lake Diefenbaker.

3.2 South Saskatchewan River Hydrology

The South Saskatchewan River entering Lake Diefenbaker drains an area of approximately 120 000 km². This basin can be divided into three distinct parts on the basis of contribution to flow (Berry et al., 1961). The first, the eastern slopes of the Rockies, and the second, the foothills area east of the mountains, contribute 92% of the total flow carried by the South Saskatchewan River. The third part of the drainage basin is the prairies, which is the largest in area, but contributes little

to the flow due to: high moisture deficiency, poorly developed drainage patterns and the fact that much of the snowmelt runoff goes into depressional storage (Stichling and Blackwell, 1957).

Flow duration is important in defining the river flow regime and understanding its capacity to transport sediment. Discharge data collected at the Lemsford station showed a maximum daily discharge of $2\,890.8\text{ m}^3/\text{s}$, and a minimum daily discharge of $23.2\text{ m}^3/\text{s}$. Flow durations (appendix A) for daily discharges revealed that the median flow was $146\text{ m}^3/\text{s}$, discharges greater than $579\text{ m}^3/\text{s}$ were only exceeded 10% of the time and discharges over $1\,490\text{ m}^3/\text{s}$ only 1% of the total time (Figure 7).

The mean of the mean monthly discharges for the period of record shows June as the month having the greatest amount of flow, with a value of $754\text{ m}^3/\text{s}$ (Figure 8). It is also the month in which there is the greatest variation in discharges with a standard deviation of $305\text{ m}^3/\text{s}$. In most years, the mountain runoff reached the Lemsford station in June, but occasionally the peak discharge occurred early in July.

Although the Lemsford station was discontinued in 1970, the continuing hydrometric stations located further upstream made it possible, through regression, to construct the flow at the Lemsford site. Regression analysis (Figure 9) of the total monthly flows for Lemsford and the combined flows for the Bindloss and Hwy. 41 stations, available in Appendix B, revealed a high statistical correlation. This regression equation was then

SOUTH SASKATCHEWAN RIVER NEAR LEMS FORD

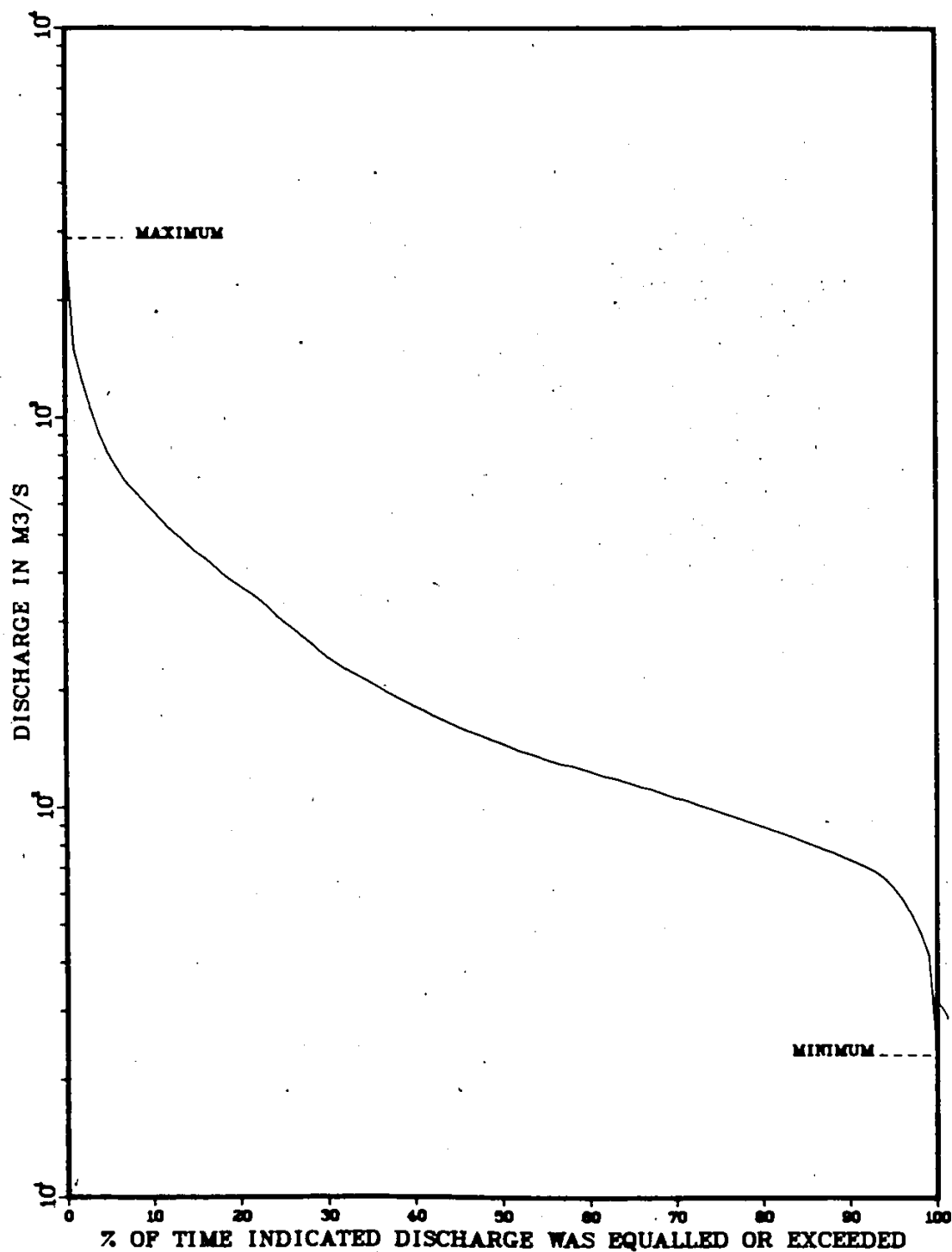


Figure 7
DURATION CURVE OF DAILY
DISCHARGES AT LEMS FORD BASED
ON AVAILABLE DISCHARGE DATA

SOUTH SASKATCHEWAN RIVER NEAR LEMSFORD

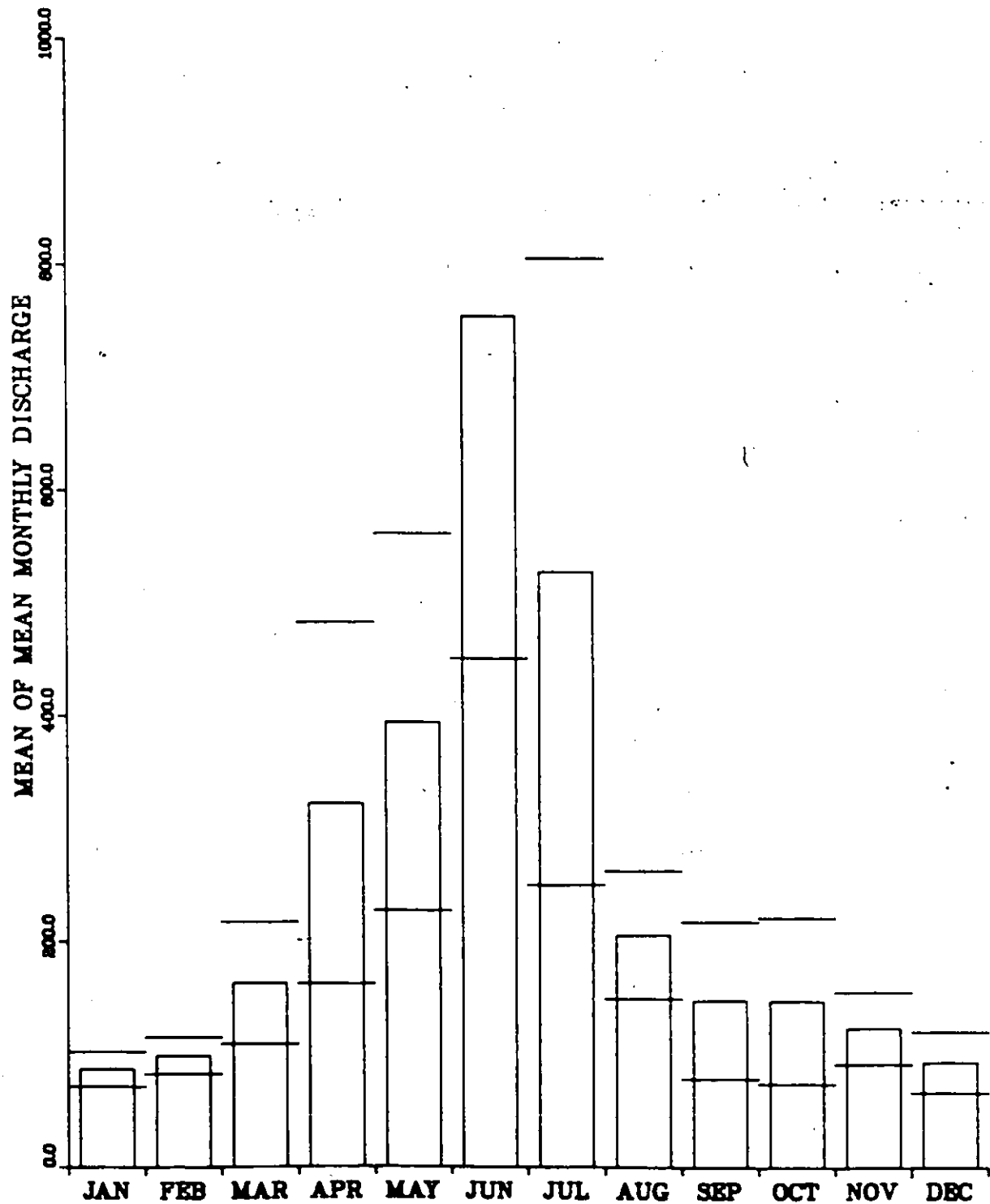


Figure 8
MEAN OF MEAN MONTHLY DISCHARGES
FOR THE LEMSFORD STATION

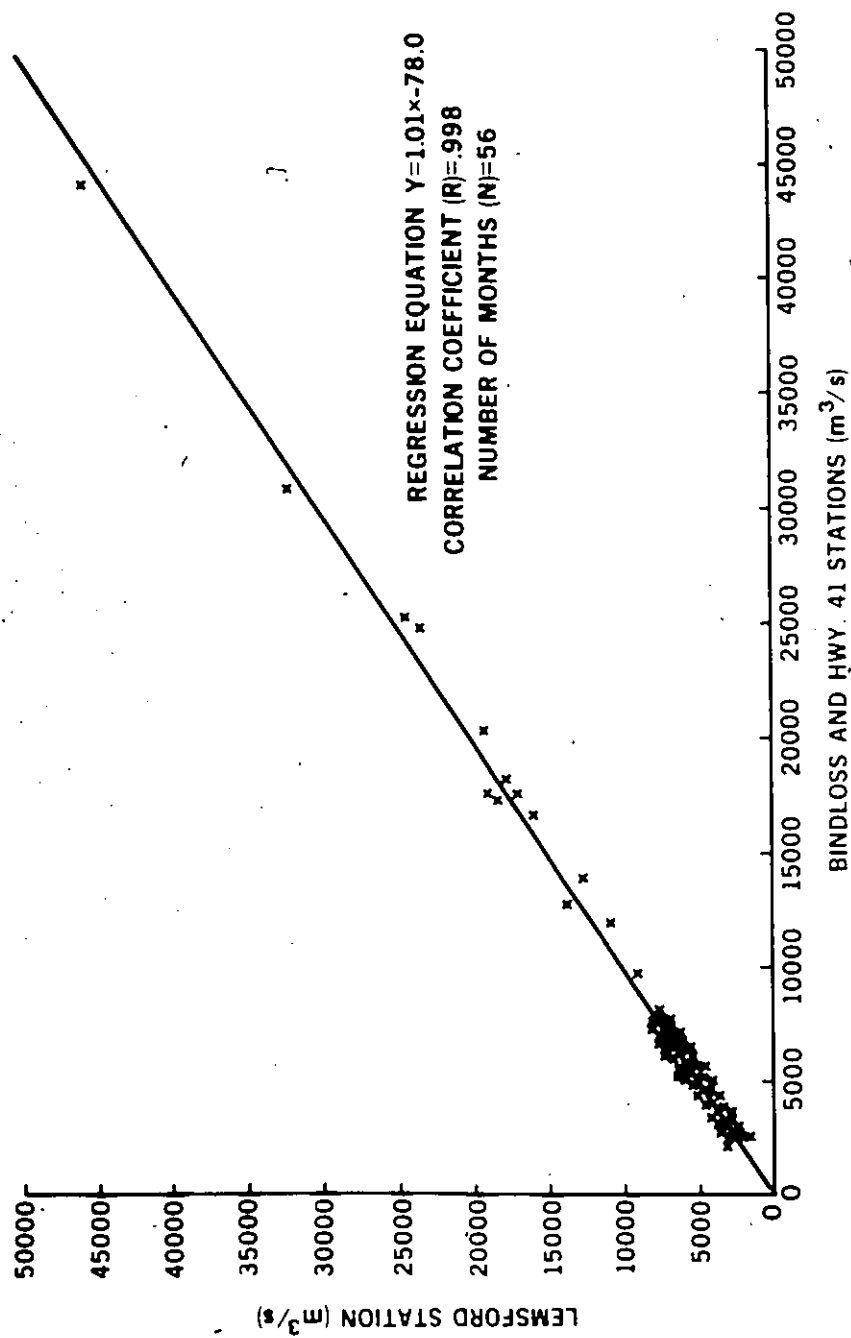


Figure 9
REGRESSION ANALYSIS
OF TOTAL MONTHLY DISCHARGES
AT LEMS FORD BASED ON BINDLOSS
AND HWY 41 COMBINED DISCHARGES

used to reconstruct total monthly discharges at Lemsford, so as to fill in the period from 1971-1978 (Appendix B).

By using the regression equation to compute total annual flow, the record was extended to 1978. During this 20-year period (Table VI), the South Saskatchewan River had an average annual flow of 7 888 922 dam³. The highest year was 1965, with a 12 000 872 dam³ discharge, while the lowest year was 1977, with only 3 289 421 dam³ of flow. Based on the average inflow this reservoir has a capacity-inflow ratio of 1.2 and should be considered as a hold-over storage reservoir (Brune, 1953).

Table VI

Total Annual Flows (dam³) for the Lemsford Station

Year	Total Annual Flow	Year	Total Annual Flow
1959	8 153 435	1969	10 235 462
1960	6 710 240	1970	6 943 363
1961	5 723 440	1971	8 075 635
1962	5 723 440	1972	10 229 069
1963	6 615 994	1973	6 328 973
1964	7 889 789	1974	9 713 347
1965	12 007 872	1975	8 501 760
1966	8 979 466	1976	6 754 666
1967	11 346 394	1977	3 289 421
1968	6 541 776	1978	8 014 896

MEAN 7 888 922

Because the South Saskatchewan River is regulated, the total annual flow was considered a better parameter than the peak flood for the frequency study. Since regulation would tend to affect the peak flood more than it would the total annual flow values.

Frequency analysis is dependent on the number of years, and the more years of data, the more representative the distribution will be (Kite, 1976). Therefore, to increase the number of years of record, flows at Saskatoon (STN. NO. 05HG001) were analyzed. Prior to the start of filling of Lake Diefenbaker, which began late in 1964, total annual flows at Saskatoon were similar to those at Lemsford (Table VII). For the six-year period the difference between the two sites was only 0.5%. This indicated that the flow data collected at Saskatoon, which dated back to 1912, would be acceptable for the frequency analysis on the South Saskatchewan River.

Table VII
Total Annual Flows (dam³) at Lemsford and Saskatoon

Year	Lemsford Annual Flow	Saskatoon Annual Flow	Difference (%)
1959	8 153 435	8 293 968	-1.7
1960	6 710 240	6 906 384	-2.9
1961	5 723 440	5 644 944	+1.4
1962	5 723 440	5 865 696	-2.5
1963	6 615 994	6 622 560	-0.1
1964	7 889 789	7 694 784	+2.5
MEAN	6 802 723	6 838 056	-0.5

Source: Environment Canada, Historical Streamflow Summary, Saskatchewan, 1979

Of the five more commonly used distributions (Condle et al., 1981), the one that produced the best fit, based on the coefficients of skewness, kurtosis and the standard error (Appendix C) was the three parameter log-normal distribution. Figure 10, depicts just how well the distribution fit the data. Since filling of the reservoir began in 1964, the greatest return period was six years, which was the 1965 flow. For a 100-year return the flow would be in the order of 18 800 000 dam³, while a 500-year return would require 23 000 000 dam³ of flow.

3.3 Characteristics of the Sediment Loads Transported by the South Saskatchewan River

Suspended sediment sampling records for Lemsford showed that the minimum daily concentration was recorded to be 1 mg/L, while the maximum reached a high of 7 220 mg/L. For 50% of the time concentrations were found to be less than 100 mg/L.

A mean annual hydrograph and sediment curve, based on the nine years of data, depicts the sediment transport regime (Figure 11). In any one year there are three periods of high sediment transport. The first is in early spring, when snowmelt generates the local runoff. The second, and the most significant period, is when the mountain runoff reaches the site. The third, which is in September, appears not to be associated with increasing discharges. This increase in concentration can probably be attributed to higher concentrations carried by return flows from irrigation.

SOUTH SASKATCHEWAN RIVER (1912 - 1978)
 THREE PARAMETER LOG-NORMAL DISTRIBUTION
 PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD

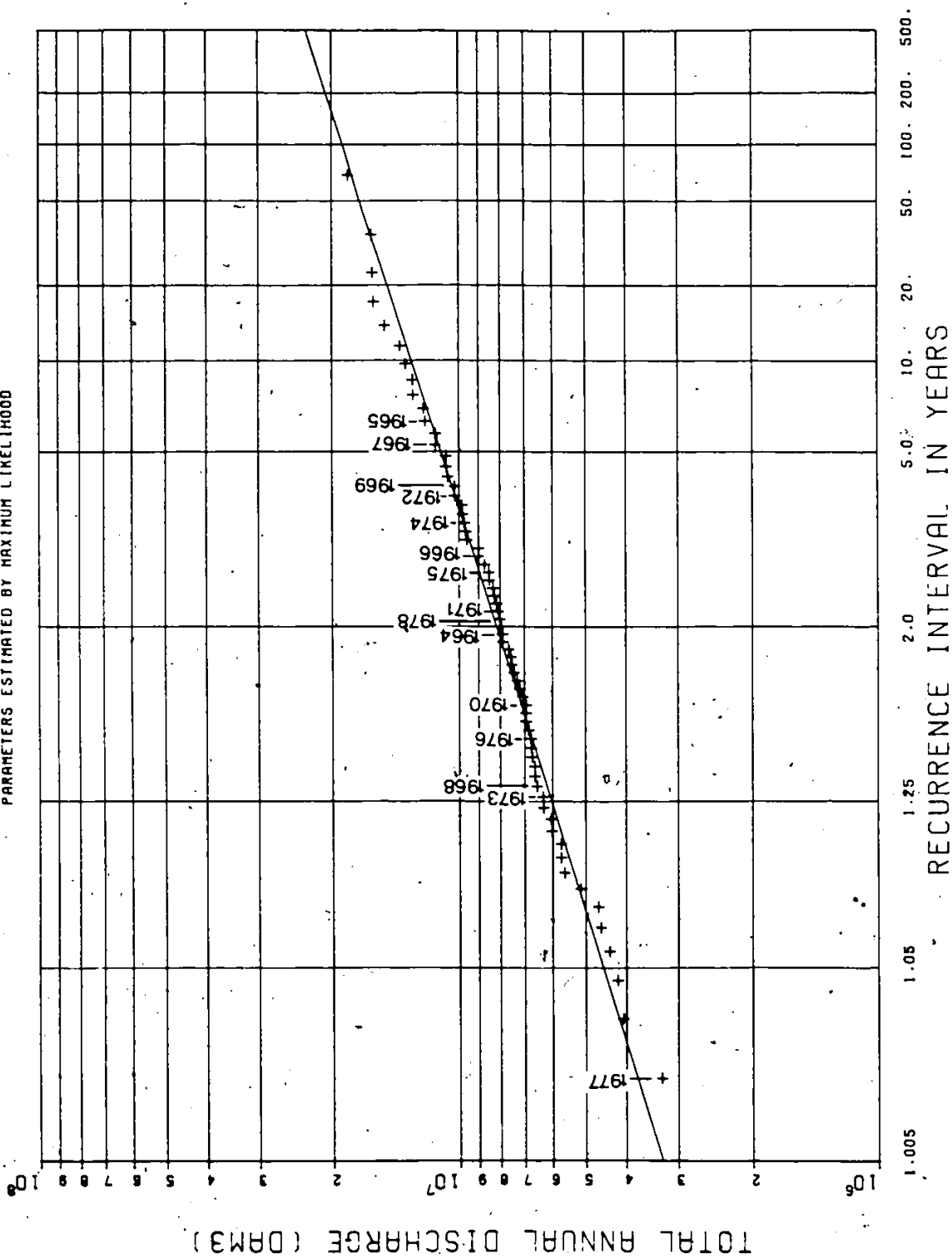


Figure 10
 TOTAL ANNUAL DISCHARGE FREQUENCY ANALYSIS
 FOR THE SOUTH SASKATCHEWAN RIVER

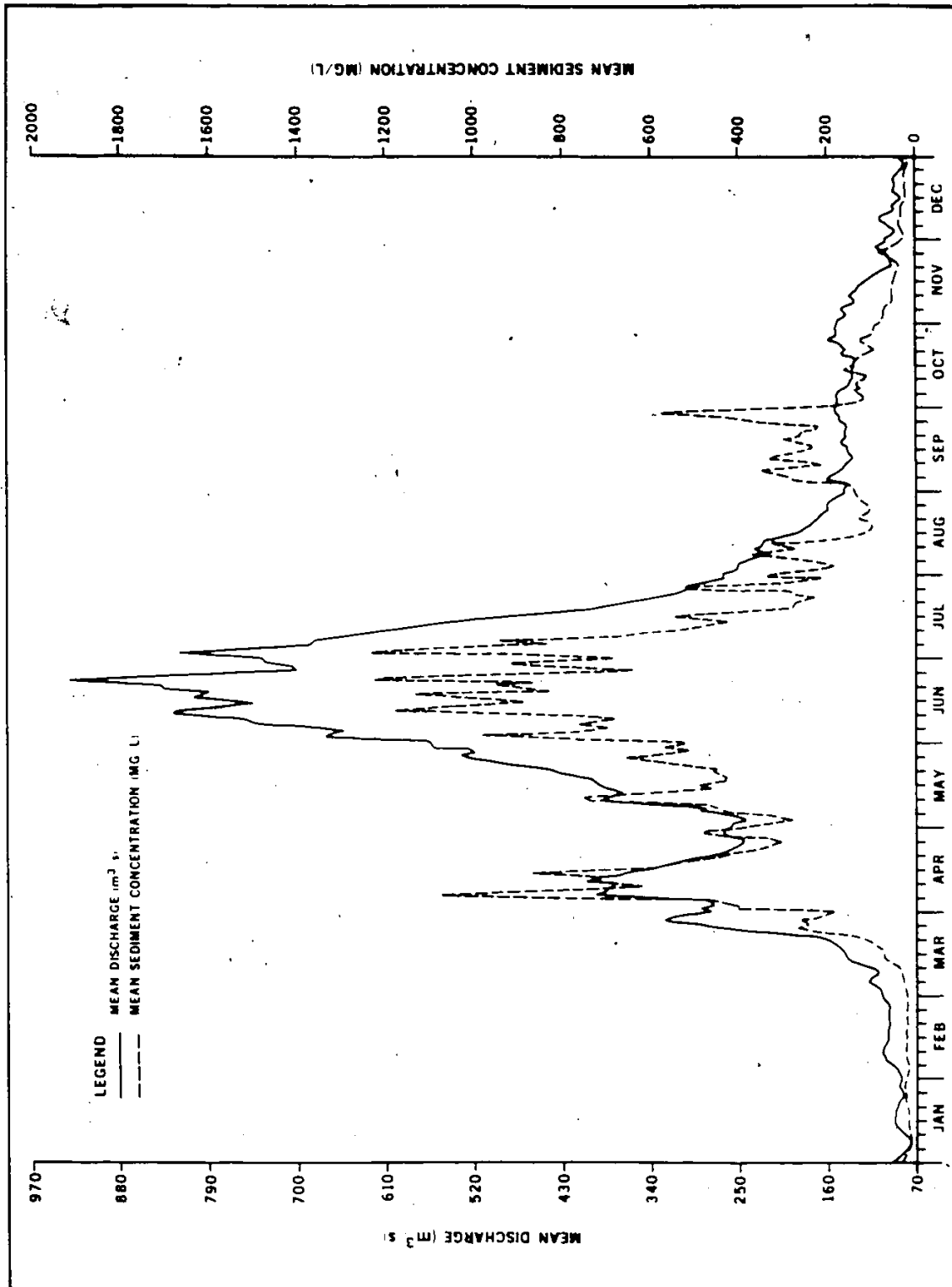


Figure 11
MEAN ANNUAL HYDROGRAPH AND
SEDIMENT CURVE FOR THE LENSFORD STATION
BASED ON 1962-1970 DATA

Particle-size distributions are important in understanding the composition of the suspended sediment loads. From the 195 depth integrating samples (Appendix D) collected at Lemsford, it was revealed that on average clay made up 38%, silt 41% and sand 21% of the suspended sediment load.

Only general relationships are examined here due to concern over seasonality and spurious correlation associated with sediment data, therefore limiting the use of extensive statistical testing. Furthermore, the reservoir data are not sensitive enough to depict such intricate relationships.

To illustrate the relationship between discharge and suspended sediment, the concentrations from the depth integrating samples were plotted against discharge (Figure 12). Total concentrations showed considerable scatter - in most cases, in the order of one magnitude. The sand component was better defined, especially when discharges were greater than $400 \text{ m}^3/\text{s}$. Most of the samples were collected from the upper median of flow (Q_{50}) because of sampling practices. This provides a good definition of the upper limits of sediment transport.

Wash load is commonly defined as that part of the sediment material transport which is composed of particles not found in significant quantities in the bed (Vanoni, 1975; Tywoniuk, 1972). An analysis of the 49 bed samples (Appendix E) from the Lemsford site, indicate silt and clay comprised less than 5% of the bed material. Wash load, which in this case is the silt and clay component, is controlled more by basin sediment supply than by hydraulics (Kellerhals et al., 1974), therefore explaining the poor relationship to discharge.

SOUTH SASKATCHEWAN RIVER NEAR LEMSFORD

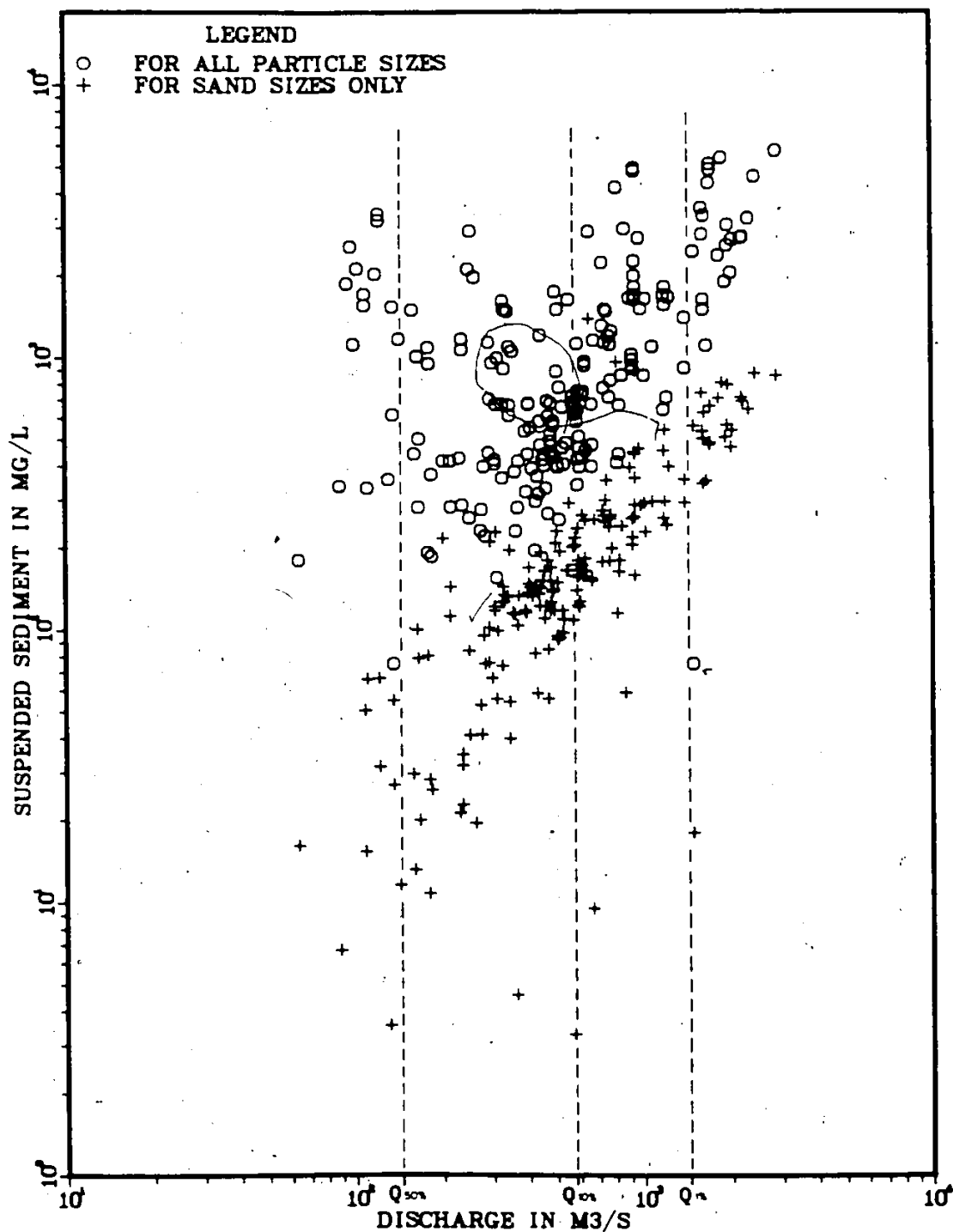
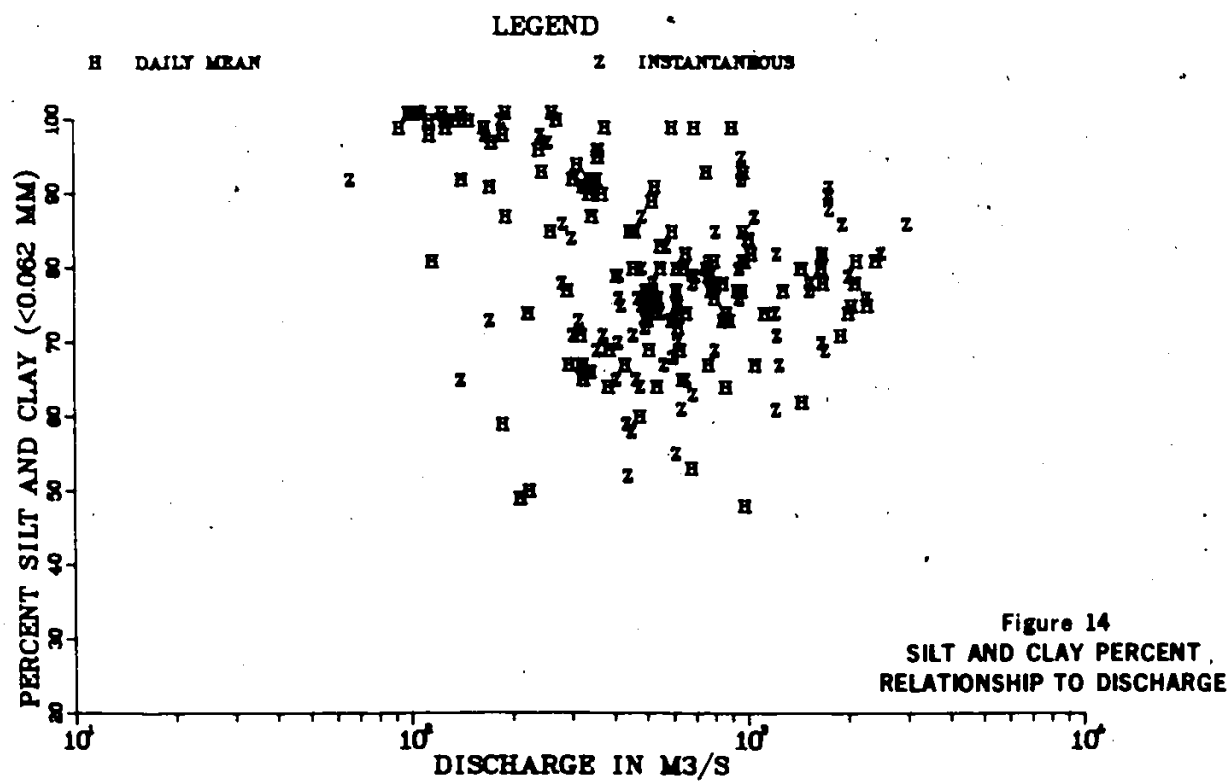
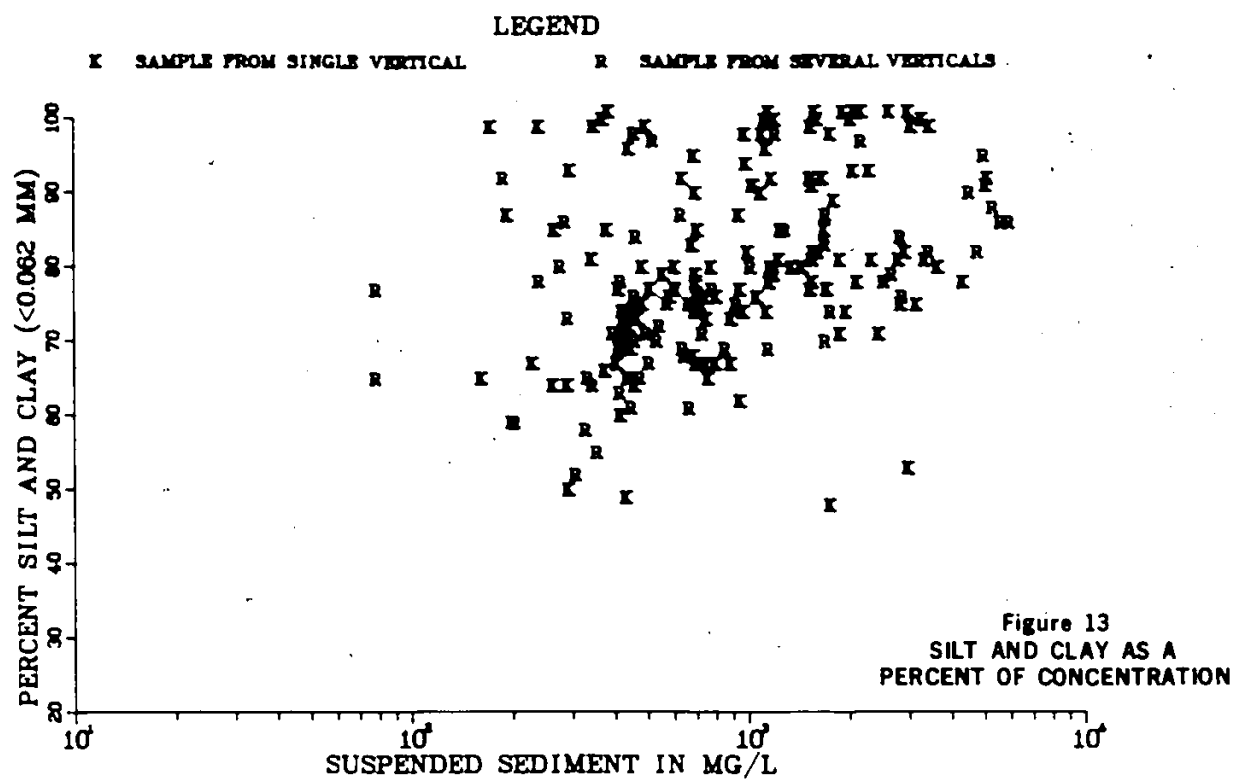


Figure 12
CONCENTRATION RELATIONSHIPS
TO DISCHARGE

SOUTH SASKATCHEWAN RIVER NEAR LEMSFORD

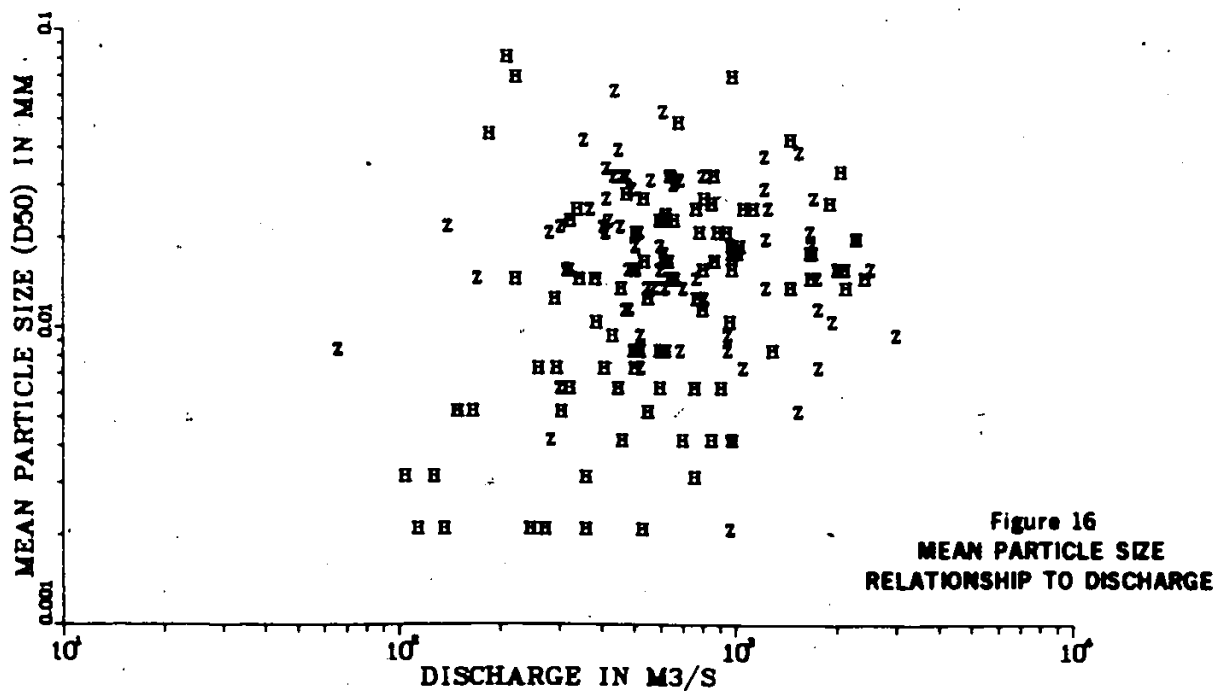
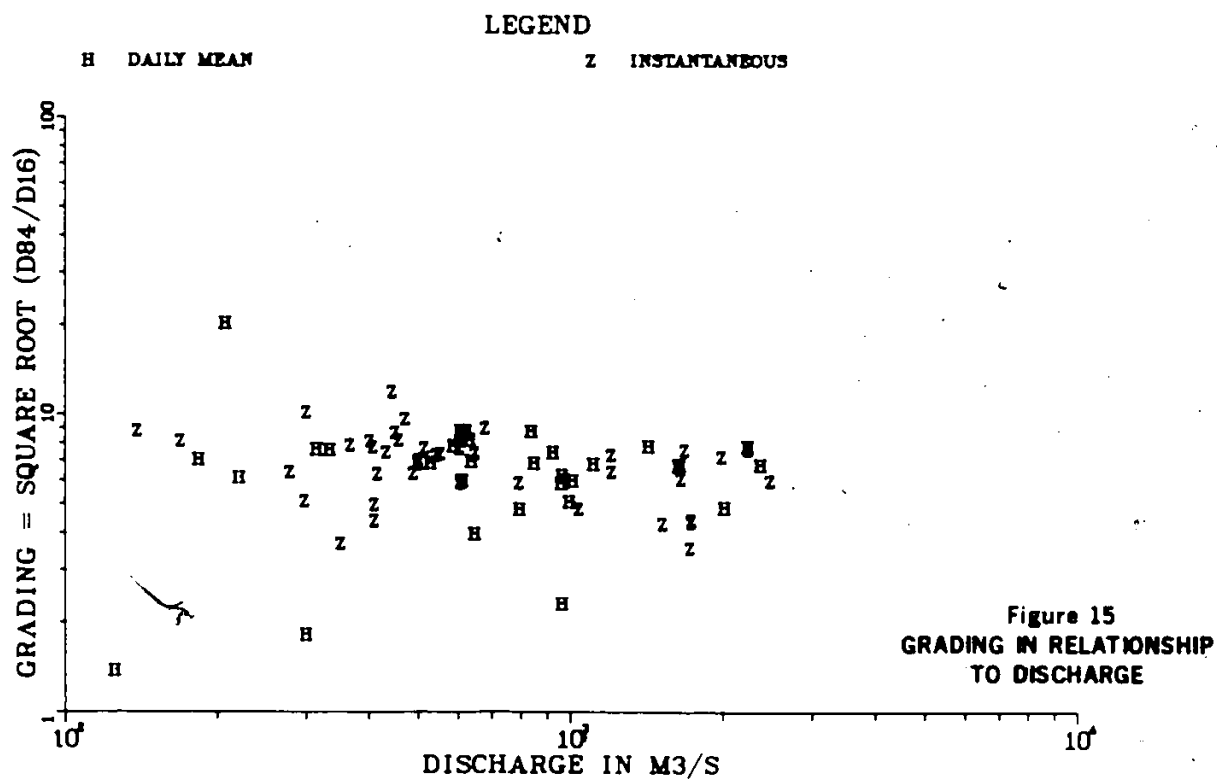


Wash load was found to make up a greater portion of the load as concentration increased (Figure 13) suggesting there is an adequate supply of sediment from the basin. However, as discharge increased, there was a marked decline in the wash load contribution (Figure 14). This is probably due to the fact that the stream's energy is being expended on bed material transport, which in the case of the South Saskatchewan River would be mostly sand, therefore proportionally lowering the wash load contribution being transported.

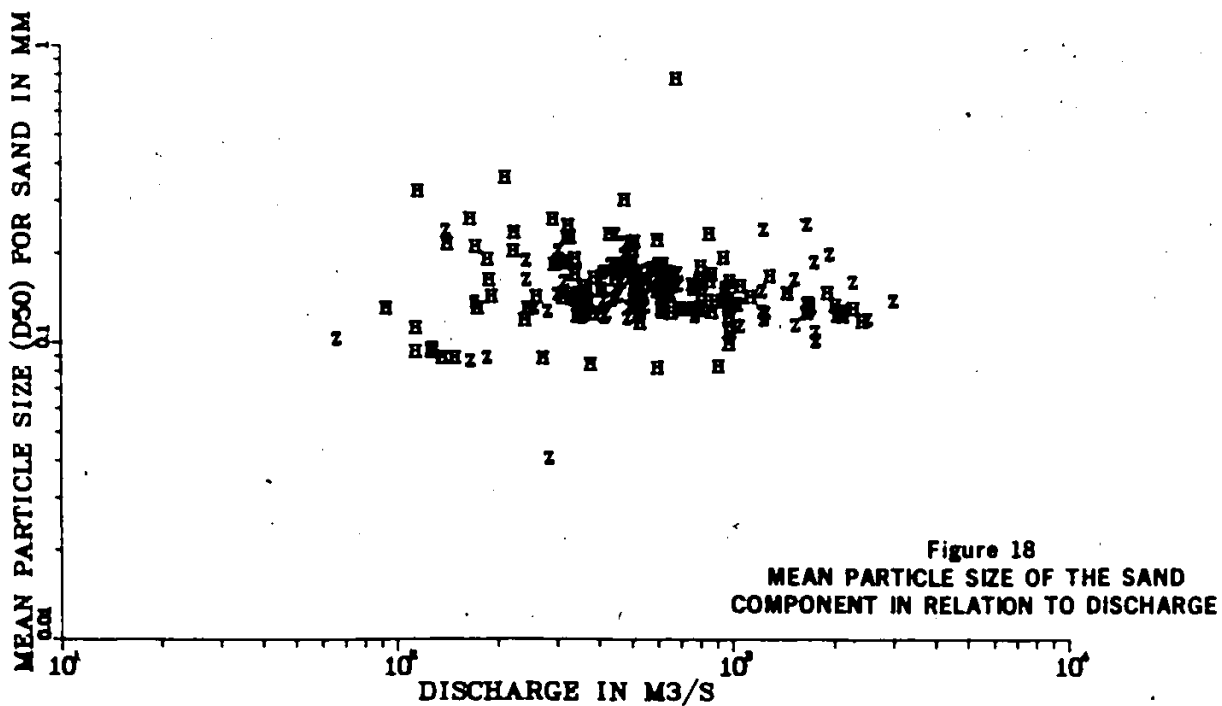
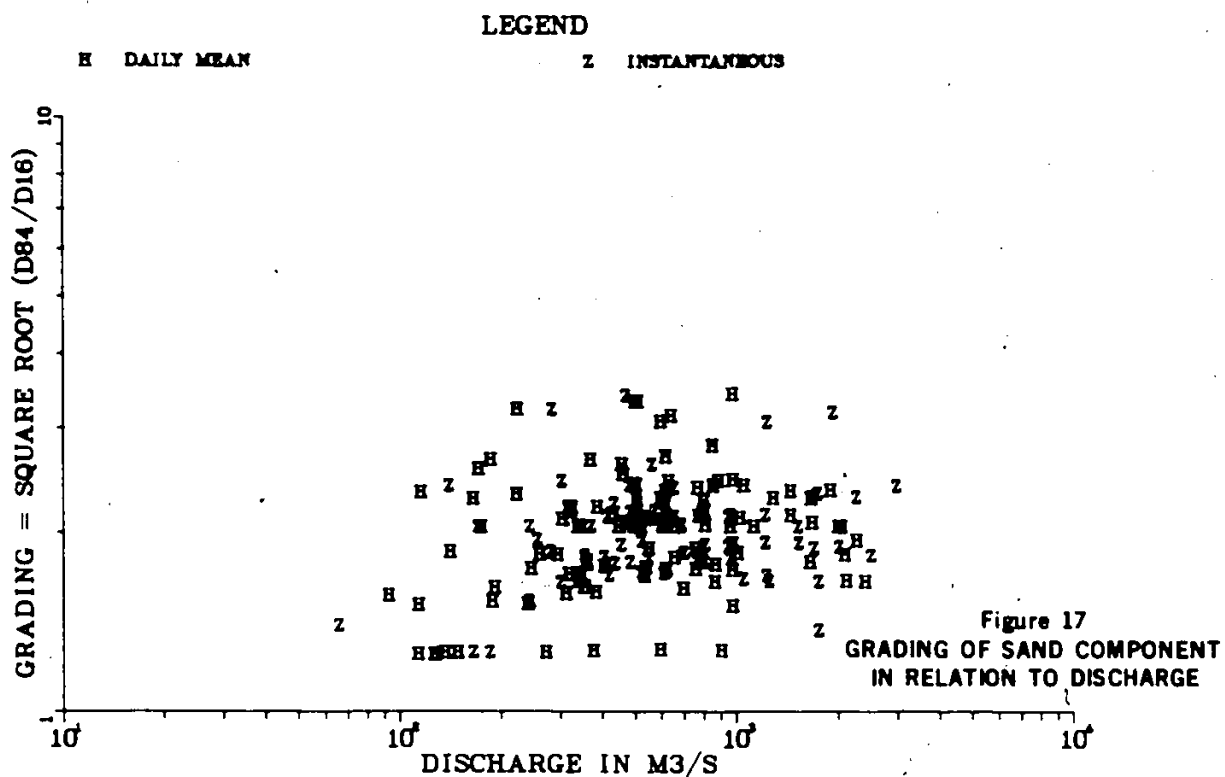
To illustrate the sorting characteristics of the South Saskatchewan River, the samples' gradings were plotted against discharge (Figure 15). The suspended load appears to be widely graded, as would be expected from a river with a high wash load component. The gradings did not change significantly even as discharge increased. The mean particle size showed the variability attributed to the wash load component. No obvious trend appears over the range of discharges (Figure 16). The mean particle size were all in the coarse clay to very fine sand range. Further analysis of the sand component of the suspended sediment load indicated that it was narrowly graded, with no apparent change with discharge (Figure 17). Mean particle size appears to remain constant over the range of discharge. The median particle size was mostly in the very fine to fine sand range (Figure 18).

Bed material sampling results (Appendix E) revealed that on average silt and clay comprised 5% of the sample, sand 87% and gravel the remaining 8%. The median size in the bed in most cases was found to be within fine to medium sand range. The gradings show that the bed has remained fairly homogeneous over the years that it was sampled.

SOUTH SASKATCHEWAN RIVER NEAR LEMSFORD



SOUTH SASKATCHEWAN RIVER NEAR LEMSFORD



There has never been any bed load sampling conducted on the South Saskatchewan River because bed load sampler efficiencies are questionable, and the sampling is difficult and expensive (Hubbell, 1964). There has been some success in the United States with bed load sampling (Leopold and Emmett, 1976; Emmett 1980), but this success has been restricted to streams with beds of coarse sand and gravel (Nordin, 1981). The South Saskatchewan River's bed which is made up of mostly fine to medium sand, would not be very suitable for sampling. A review of bed load equations (Appendix F) indicates that none are considered very reliable and that they should only be used to provide estimates. Bed load has been found in most cases to make up only 5-20% of the total sediment load (Tywoniuk, 1972), and therefore in many studies it is not considered significant. Kuiper (1962), using the Einstein method estimated that bed load made up 5% of the total load transported by the South Saskatchewan River. Since, in this study, the suspended loads have been extrapolated, adding a small bed load contribution would not significantly affect the results.

A comparison of the monthly suspended sediment loads at Lemsford to the combined loads of Bindloss and Hwy. 41 (Appendix G) provided a strong correlation (Figure 19). This regression equation was then used to reconstruct monthly loads at Lemsford (Appendix G) and continue the records to 1978.

During these 17 years, the South Saskatchewan River transported an average annual suspended sediment load of 5 709 579 tonnes. The maximum

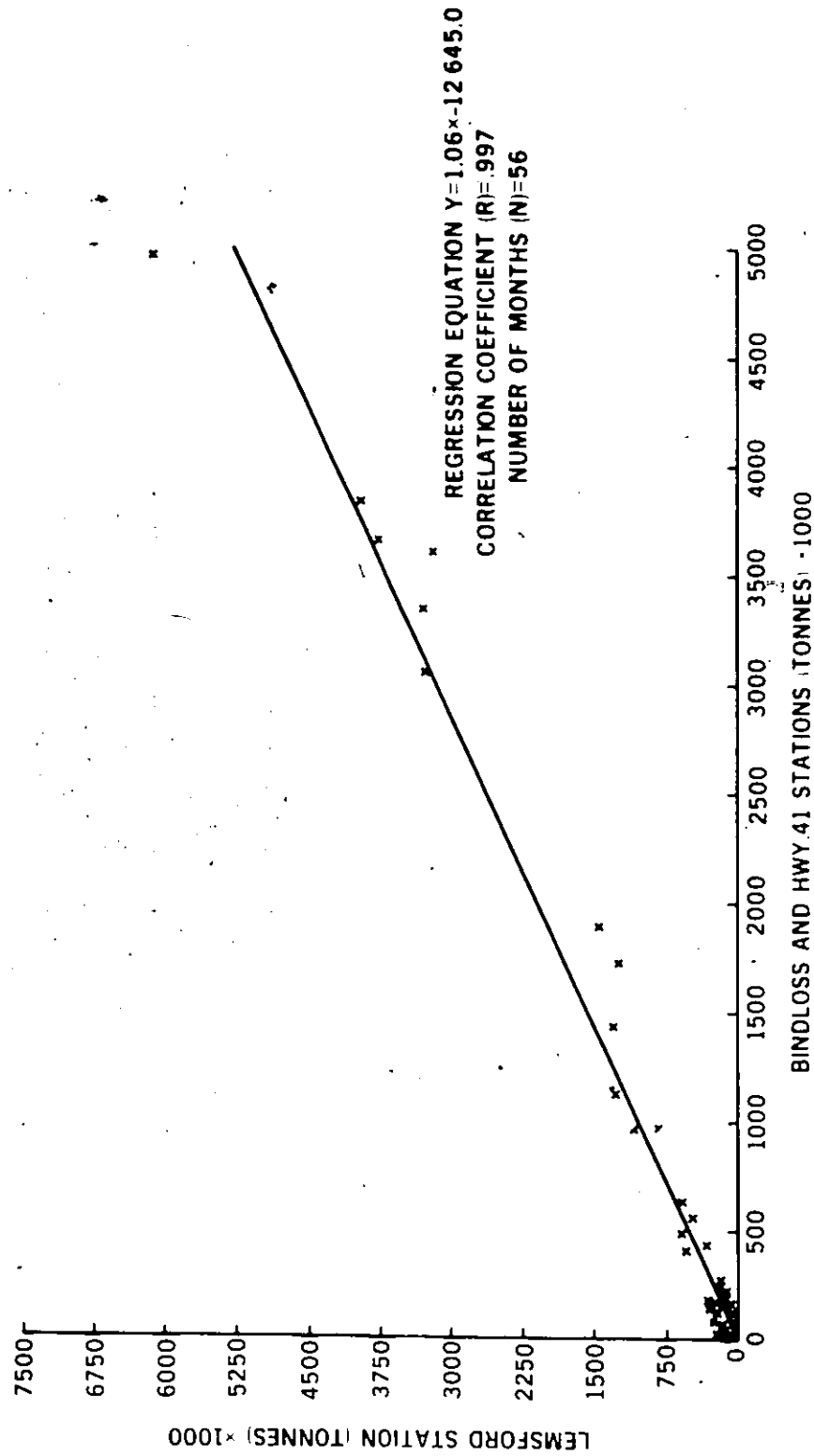


Figure 19
 REGRESSION ANALYSIS OF TOTAL MONTHLY
 SEDIMENT LOADS AT THE LEMSFORD STATION
 BASED ON THE COMBINED LOADS OF THE
 BINDLOSS AND HWY 41 STATIONS

sediment load transported was 11 438 266 tonnes in 1967 and the minimum load was 633 963 tonnes in 1977 (Table VIII).

Table VIII

Total Annual Suspended Sediment Load (Tonnes) for the Lemsford Station

Year	Annual Suspended Sediment Load	Year	Annual Suspended Sediment Load
1962	1 643 330	1971	7 233 764
1963	4 433 330	1972	6 560 327
1964	6 989 409	1973	2 312 512
1965	8 818 661	1974	9 793 671
1966	4 738 083	1975	8 974 955
1967	11 438 266	1976	2 188 859
1968	2 410 830	1977	633 963
1969	9 576 518	1978	4 204 436
1970	5 111 928	MEAN	5 709 709

Source: Environment Canada, Sediment Data Publications

3.4 Swift Current Creek Hydrology

Swift Current Creek drains an area of 3 910 km² and has been regulated by Reid Lake since 1942. Swift Current Creek Station near the Mouth (STN. NO. 05HD037) operated from 1965 to 1972, but was moved eight

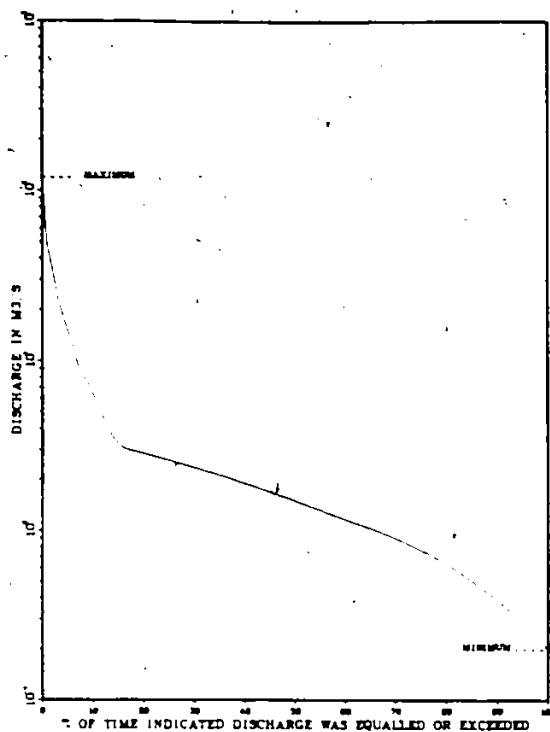
kilometres upstream to the current site at Leinan (STN. NO. 05HD039) in 1973. Initially, the station was operated on a eight-month basis - March to October, but since 1973, discharge data have been collected all year round. Sediment data have always been collected only for the eight-month period.

The winter months do not contribute much towards total annual flow. In fact, based on Leinan data, less than 12% of the total flow was contributed from this four-month period. Since only the eight-month period was common to both sites, it has been used for comparison purposes exclusively.

During the period from 1966 to 1978, a maximum daily discharge of $119 \text{ m}^3/\text{s}$ and a minimum of $.027 \text{ m}^3/\text{s}$ were recorded for Swift Current Creek. Discharges were significantly less for the period of 1973 to 1978 (Figure 20). Flow durations for the two sites (Appendix H), revealed that the flow regime had changed significantly. A comparison of median flows showed a reduction of almost 60% in the discharge. This reduction was not man induced but a natural dry period that dominated the 1970's on the prairies. This period from 1973-1978 is important for this study since the hydrographic survey of the mouth region was conducted in 1972 and again in 1978.

Table IX lists the total annual flows for the complete period, of which the maximum annual flow was $121\,046 \text{ dam}^3$ in 1967, a minimum of $13\,910$ in 1977, and a mean flow of $58\,606 \text{ dam}^3$.

SWIFT CURRENT CREEK NEAR THE MOUTH



SWIFT CURRENT CREEK NEAR LEINAN

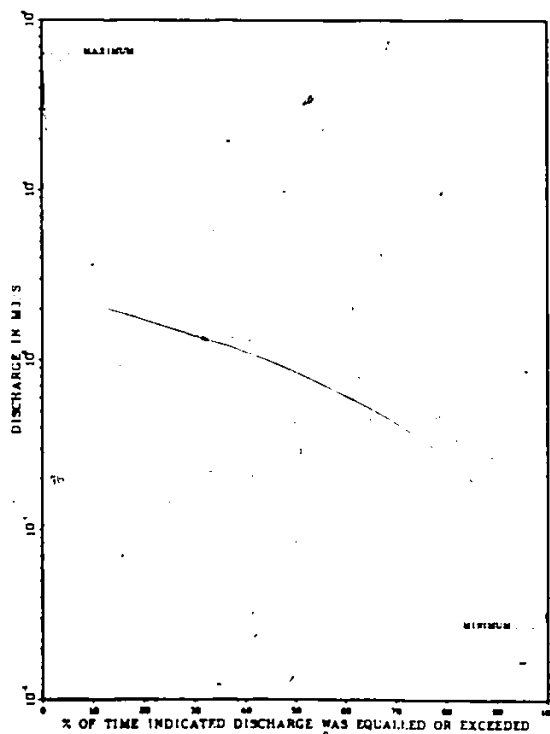


Figure 20
DURATION CURVES OF DAILY
DISCHARGES FOR THE TWO STATIONS

Table IX

Total Annual Flows (dam³) for Swift Current Creek

Year	Total Annual Flow	Year	Total Annual Flow
1966	77 501	1973	10 195
1967	121 046	1974	44 323
1968	37 843	1975	44 582
1969	80 265	1976	66 701
1970	119 318	1977	13 910
1971	99 446	1978	21 859
1972	24 883	MEAN	58 606

Source: Environment Canada, Surface Water Data Publications

3.5 Characteristics of the Sediment Loads Transported by Swift Current Creek

The suspended sediment collected from Swift Current Creek had a minimum daily concentration of 1 mg/L, and a maximum of 4 340 mg/L. At Leinam, the concentrations were less than 18 mg/L 50% of the time.

From 1965-1972, (Figure 21) there was a distinct freshet flow accounting for most of the sediment transport. More than 90% of the total suspended load carried by the creek was during the month of April. However, from 1973 to 1978 the sediment loads were significantly less due to

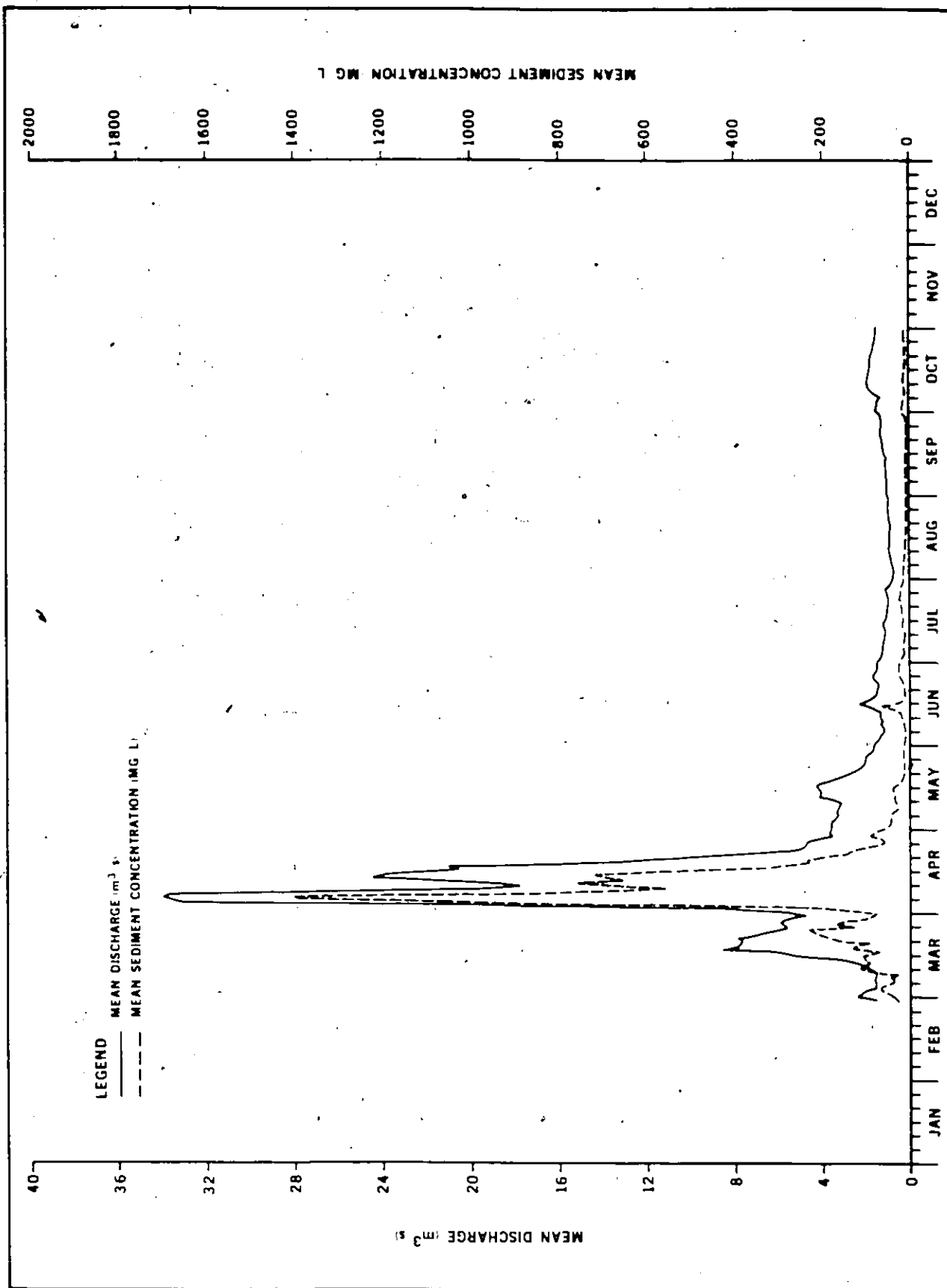


Figure 21

MEAN ANNUAL HYDROGRAPH AND
SEDIMENT CURVE FOR THE SWIFT CURRENT
NEAR THE MOUTH STATION
DATA COLLECTED FROM 1965 - 1972

the dramatic decrease in the magnitude of the freshet (Figure 22). The mean peak concentration was reduced to 25% of what it had been during the previous years.

There were 77 depth integrating samples analyzed for particle size (Appendix I) for the station near the mouth. The results show that on average a sample was made up of 19% clay, 53% silt and 28% sand. Unfortunately, only one sample was collected and analyzed for its particle-size distribution at the Leinan site. Almost all the samples were collected in the upper 10% of the flow range. Total concentration varied an order of magnitude, while the sand component concentration showed even greater variation (Figure 23). This is considered to be common in flashy streams such as Swift Current Creek. The silt and clay fraction showed a marked decline with increasing discharge, which suggests the sediment supply is limited. There was a decrease from approximately 90% at 200 mg/L to 50% around 4 000 mg/L (Figure 24). The silt and clay as a percentage of the sample were reduced significantly as discharges increased (Figure 25). This was similar to what occurred on the South Saskatchewan River.

The gradings show (Figure 26) that the suspended sediment load becomes more widely graded with increasing discharge. The mean particle size increased significantly from fine silt to the very fine sand class (Figure 27). The sand component of the load was found to have been relatively homogeneous over the range of discharges (Figure 28). Furthermore, the mean particle size of the sand fraction did not vary significantly with discharge and was within the very fine to fine sand range (Figure 29).

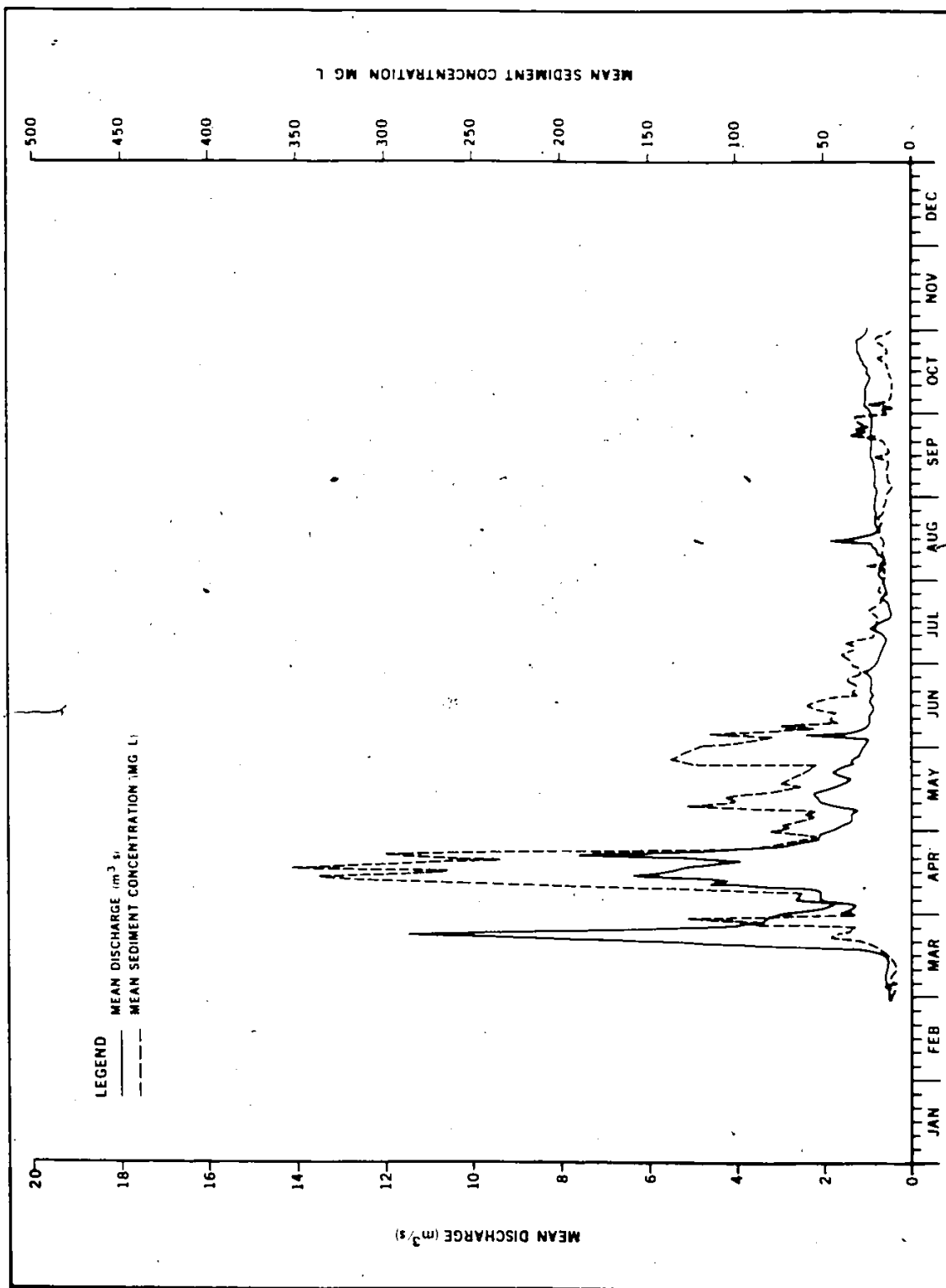


Figure 22
 MEAN ANNUAL HYDROGRAPH AND
 SEDIMENT CURVE FOR THE LEINAN STATION
 DATA COLLECTED FROM 1973 - 1978

SWIFT CURRENT CREEK NEAR THE MOUTH

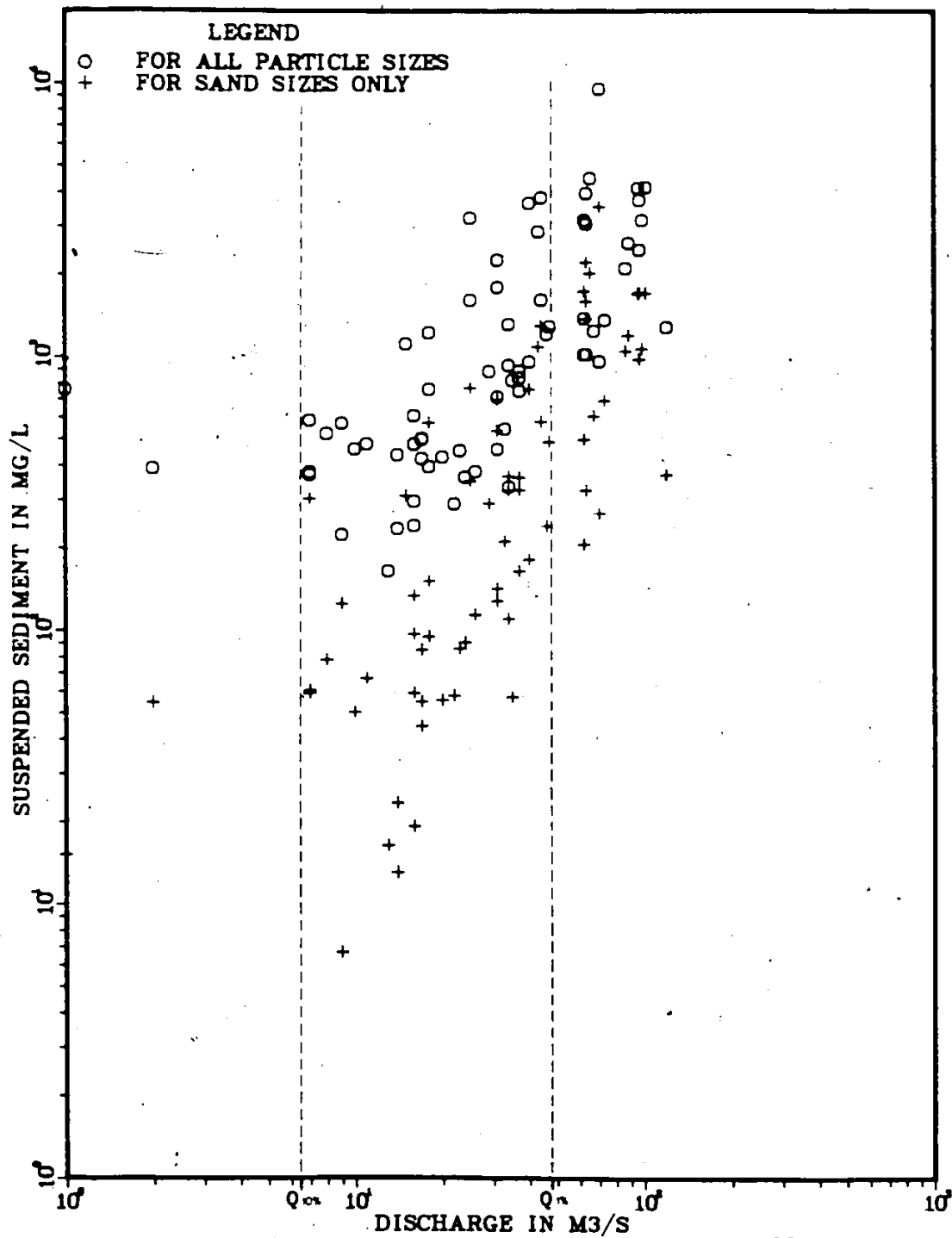
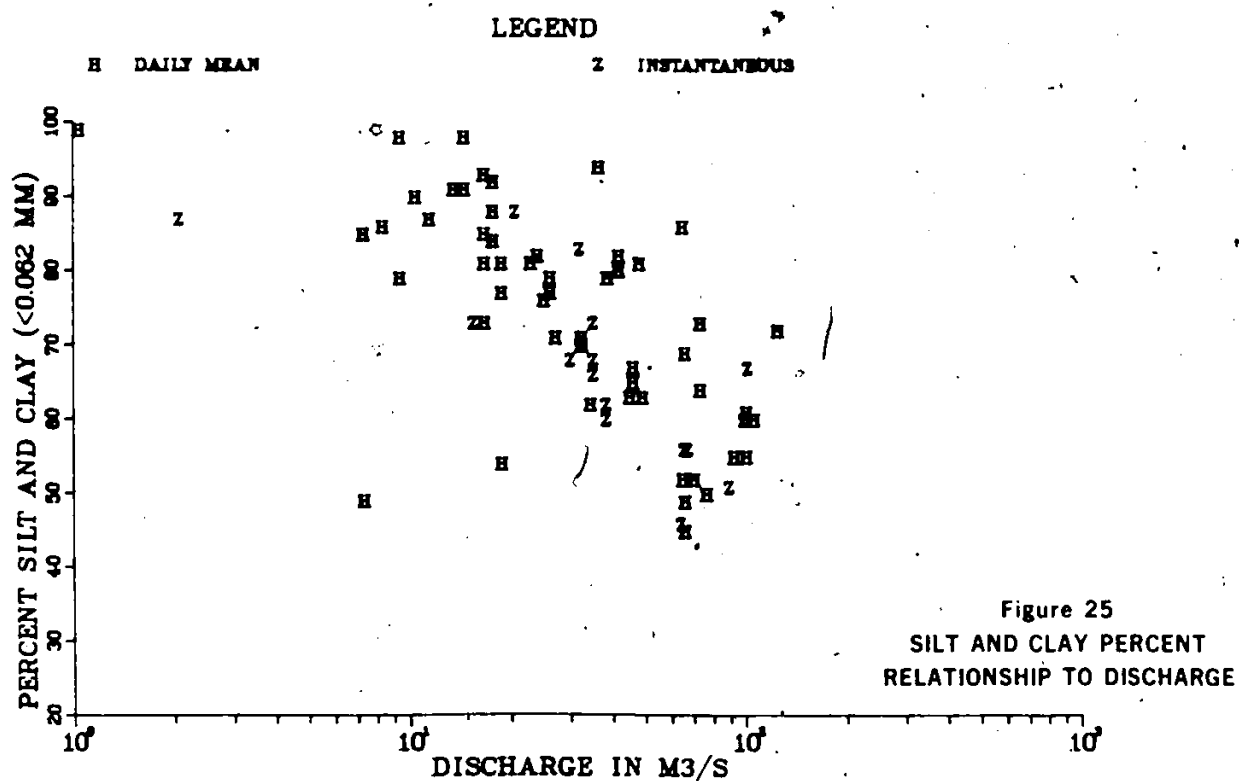
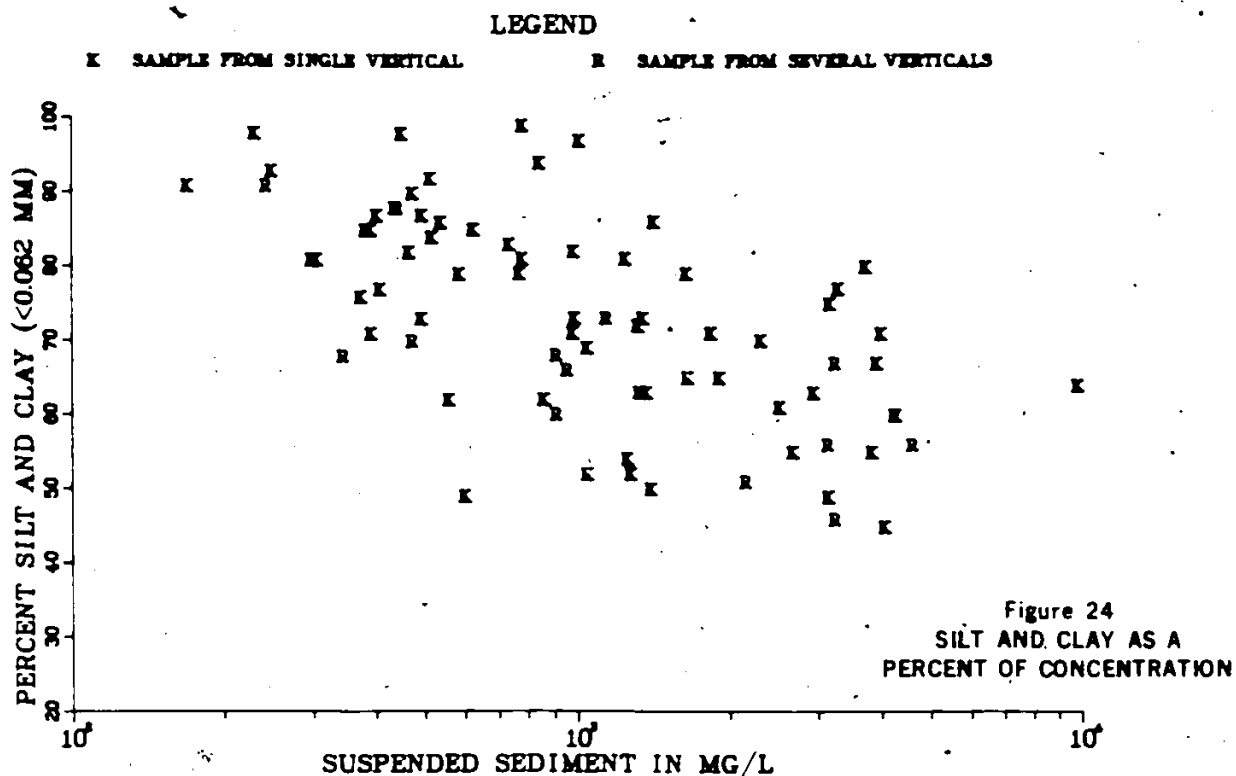


Figure 23
CONCENTRATION RELATIONSHIPS
TO DISCHARGE

SWIFT CURRENT CREEK NEAR THE MOUTH



SWIFT CURRENT CREEK NEAR THE MOUTH

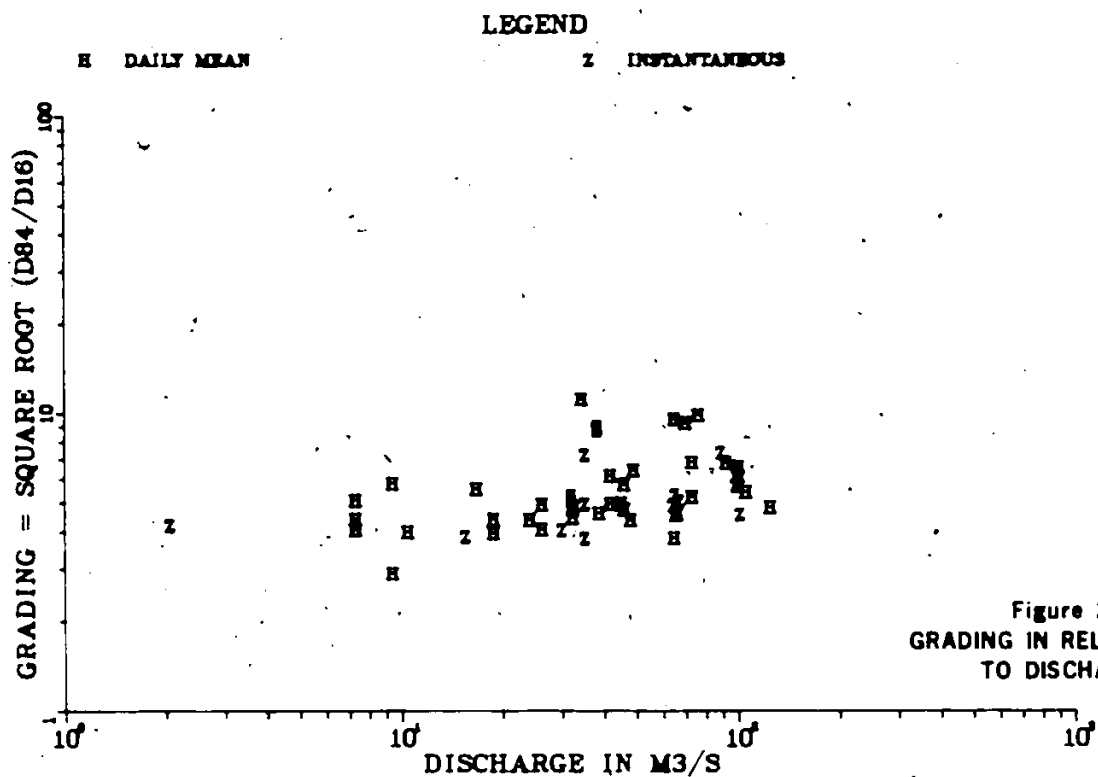


Figure 26
GRADING IN RELATIONSHIP
TO DISCHARGE

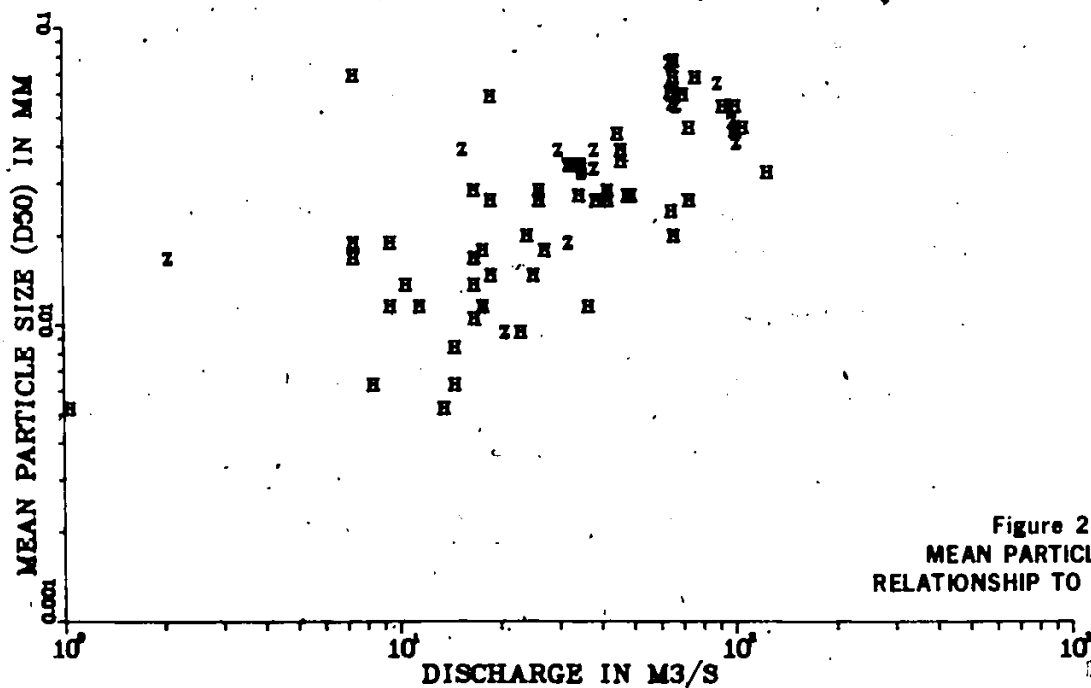


Figure 27
MEAN PARTICLE SIZE
RELATIONSHIP TO DISCHARGE

SWIFT CURRENT CREEK NEAR THE MOUTH

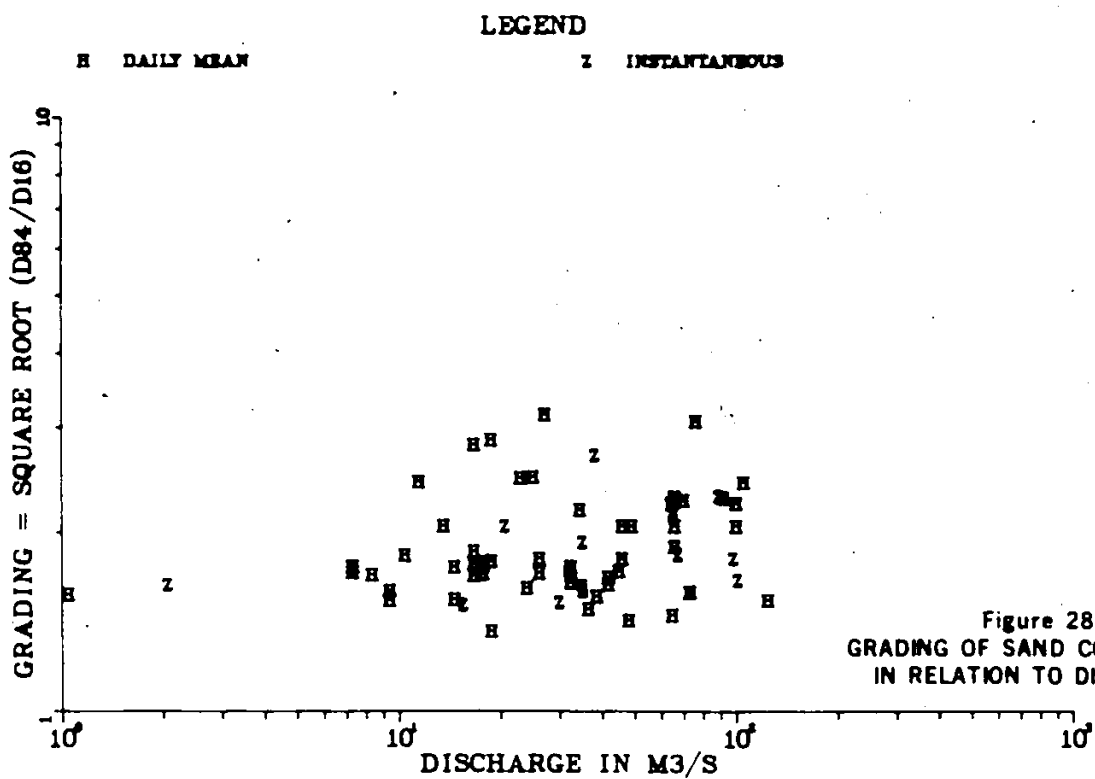


Figure 28
GRADING OF SAND COMPONENT
IN RELATION TO DISCHARGE

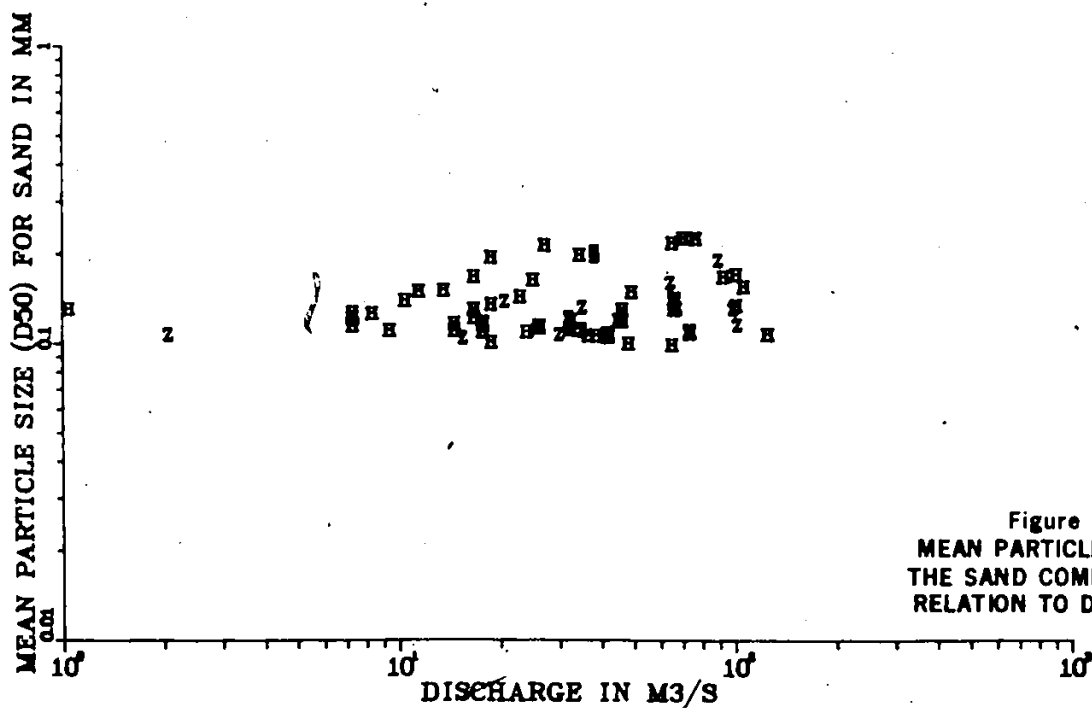


Figure 29
MEAN PARTICLE SIZE OF
THE SAND COMPONENT IN
RELATION TO DISCHARGE

Only one bed material sample was collected from Swift Current Creek and that was taken at the station near the mouth. The sample revealed that the bed was comprised totally of sands, in the very fine to medium range.

Unfortunately, the sediment sampling program for the Leinan station was limited in some years due to mechanical problems with the automatic suspended sediment sampler. So for those years (1973, 1974 and 1976) the sediment load had to be interpolated. This was done by plotting the available concentrations on the annual hydrograph, then interpolating the missing concentrations based on discharge trends. This proved to be the most accurate method of constructing the sediment loads.

Table X indicates the annual suspended sediment load that was transported by Swift Current Creek during the open-water period. The greatest load was 152 728 tonnes in 1967, and the smallest load was 243 tonnes in 1973. On average, the creek transports 40 969 tonnes a year. In comparison to the South Saskatchewan River's contribution, it is insignificant, but it is important as a localized input.

Table X

Total Annual Suspended Sediment Load (Tonnes) for Swift Current Creek

Year	Annual Suspended Sediment Load	Year	Annual Suspended Sediment Load
1966	27 685	1973	243
1967	152 728	1974	19 058
1968	2 119	1975	13 594
1969	84 790	1976	28 713
1970	104 209	1977	1 277
1971	96 011	1978	735
1972	1 433	MEAN	40 969

Source: Environment Canada, Sediment Data Publications

CHAPTER IV

Data Analyses and Results

4.1 Introduction

For this analysis the 38 ranges have been divided into three distinct reaches (see insert map). These reaches have been defined on original minimum bed elevations and reservoir water level operations. The first reach, referred to as the backwater reach, extends from Range 38 downstream to Range 32. Range 32 marks the location where the bed elevation approximates the FSL elevation of 556.87 metres. The minimum bed elevations in some cases are less than that of the FSL elevation, however it only represents a very small portion of cross-sectional area of a range. Range 32 marks the point where it becomes a more significant portion of the cross-sectional area. In this reach, the South Saskatchewan River still functions as a river but is influenced by reservoir water level operations.

The next reach spans from Range 32 to Range 26 and has been termed the drawdown reach. In this reach, the bed elevations are less than that of the FSL elevation, but greater than the minimum operating water level elevation of 545.59 metres. It is in this reach that conditions change from river to reservoir depending on the reservoir water level. In most cases, this is where the major portion of the sediment load transported by the river will be deposited. The capacity in this reach is live storage capacity and therefore any changes will directly affect reservoir operations.

Range 26 marks the approximate location where reservoir conditions are maintained year round. This also marks the beginning of the dead storage zone and where changes in this storage do not directly affect reservoir operations. However, changes do become important once the dead storage capacity has been depleted and live storage becomes affected.

The massive amount of hydrographic data that have been used in this study are available in Appendix J. In this appendix, there are cross-sectional profiles, elevation-area tables and a profile sheet for all the ranges that have been examined. The sector data used have also been placed in this appendix and includes contour plots, elevation-capacity tables and a contour difference plot. Because most of the hydrographic data collected over the years were range data, this form of data was used primarily for assessing sedimentation. Furthermore, because there were limited sector data it was impossible to properly evaluate and compare the two data collection techniques. The data summaries that are contained in the text have been derived from these original data.

Background information for the analysis of the reservoir as a whole, as well as for particular reaches, has been provided here (Table XI). It provides important information such as thalweg distance between ranges, reference elevations used in the measurement of the baseline for each range, and the live, dead and total storage volumes representative for each range. The volume figures were derived by averaging the cross-sectional area of two consecutive ranges and multiplying it by the distance between the two

TABLE XI

Distance and Volume Information for Ranges

Location	Distance (km)	Range	Reference Elevation (m)	Baseline Length (m)	Live Storage (dam ³)	Dead Storage (dam ³)	Total Storage (dam ³)
38-37	11.99	38	563.0	121.88	-	-	
37-36	7.64	37	561.0	156.25	-	-	
36-35	6.00	36	560.0	323.75	-	-	
35-34	3.09	35	558.5	210.00	-	-	
34-33	5.10	34	588.0	375.00	-	-	
33-32	5.10	33	557.0	234.00	-	-	
32-31	6.37	32	556.5	453.13	3 520.0	-	3 520.0
31-30	7.10	31	556.5	718.75	14 352.5	-	14 352.5
30-29	5.83	30	556.5	1 725.00	27 694.0	-	27 694.0
29-28	4.90	29	556.5	1 593.75	36 157.5	-	36 157.5
28-27	8.92	28	556.5	1 675.00	51 465.0	-	51 465.0
27-26	3.46	27	566.5	589.13	44 185.5	-	44 185.5
26-25	6.92	26	556.5	871.25	40 139.5	835.0	40 974.5
25-24	8.00	25	566.5	770.00	53 077.5	3 832.0	56 909.5
24-23	6.00	24	566.5	496.88	40 491.0	6 513.0	47 004.0
23-22	3.64	23	556.5	715.00	27 373.0	6 093.0	33 466.0
22-21	2.91	22	556.5	840.00	21 976.0	5 156.5	27 132.5
21-20	2.37	21	556.5	946.88	91 939.5	5 418.5	25 358.0
20-19	5.46	20	556.5	1 012.50	40 177.0	10 847.5	51 024.5
19-18	6.20	19	556.5	1 162.50	64 281.0	21 515.5	85 796.5
18-17	4.38	18	556.5	822.50	56 405.0	24 897.5	81 302.5
17-16	2.19	17	556.5	1 040.63	35 134.5	17 809.5	52 944.0
16-15	4.73	16	556.5	975.00	46 966.0	29 786.5	76 752.5
15-14	5.84	15	556.5	1 556.25	82 770.0	57 312.0	140 089.0
14-13	6.20	14	556.5	1 375.00	107 056.0	77 326.5	184 382.5
13-12	4.38	13	556.5	2 156.25	111 855.0	85 905.0	197 560.0
12-11	4.91	12	556.5	2 406.25	120 321.5	101 066.0	221 387.5
11-10	5.10	11	556.5	2 400.00	131 055.0	125 644.5	256 669.5
10-9	7.77	10	556.5	1 828.13	151 833.0	170 344.5	322 182.5
9-8	9.67	9	556.5	1 893.75	205 829.0	240 938.5	446 767.5
8-7	13.78	8	556.5	2 080.00	287 592.5	356 777.0	644 369.5
7-6	13.02	7	556.5	2 137.50	323 477.0	453 430.5	776 907.5
6-5	16.58	6	556.5	2 000.00	331 271.5	580 908.0	911 369.5
5-4	24.62	5	556.5	1 625.00	ESTIMATED REMAINING VOLUME		
4-3	13.90	4	556.5	1 968.75	1 533 812	2 970 124	4 503 936
3-2	8.26	3	556.5	3 075.00			
1-DAM							
Total	262.33				4 009 964	5 351 692	9 361 660

ranges. These values were then summed to provide a total, and each individually ratioed to the total. The ratios were applied to the more accurately determined original capacity value to derive the volumes between each set of ranges. The representative volumes were calculated by taking half the volume to the immediate upper range and half the volume to the next lower range. The baseline length for all the ranges downstream and including Range 32 were measured at the reference elevation of 556.5 metres, which approximates the FSL elevation. For the ranges upstream of Range 32, the reference elevation was based on the minimum water level elevation that had been measured each time the cross section was surveyed. The reason for this approach was that it would reflect changes that were occurring in the original river channel.

Even though the ranges continue down to the dams, all the analyses have been with data upstream of Range 9. There are two reasons why this analysis did not proceed further downstream. The first is that this thesis is primarily interested in sedimentation and by Range 9 there was negligible sedimentation. The second is that for these larger ranges the accuracy of the data is severely reduced making the results somewhat questionable.

The hydrographic surveys since 1972 have been on a three-year return basis, so this interval was used for this analysis. Changes from pre-reservoir to 1972 were studied as well as from the period 1972 to 1975 and from 1975 to 1978.

4.2 Backwater Reach

The original bed profile was based on minimum elevations from the earliest hydrographic surveys, while the changes were derived from differences in mean depth (the cross-sectional area divided by the baseline length).

The backwater reach is normally an aggrading reach as river velocities are reduced due to higher water levels (Vanoni, 1975). However, as the 1972 survey results revealed, the 38.92 km-long reach had been degrading (Figure 30). In this reach, the South Saskatchewan River meanders and there are many islands and migrating sandbars that provide anchorage for ice jams. Two major ice jams occurred prior to 1972; the first happened on April 7, 1969 and the second April 10, 1971 (Water Survey of Canada Files). The 1969 ice jam was the most significant and was responsible for washing away the Lemsford hydrometric station just immediately upstream of Range 38. To put a perspective on the magnitude of the ice jam, the highest stage recorded for a flood at this site was 6.03 metres for the 1975 flood, whereas the stage recorded from this event was 9.36 metres. Therefore, upon breaking up, the water backed up behind the ice jam was responsible for flushing out the main channel.

Table XII shows the cross section at Range 37 had degraded the most with 1.32 metres of sediment being removed from the channel. All the ranges were found to have experienced some degradation. From the cross section



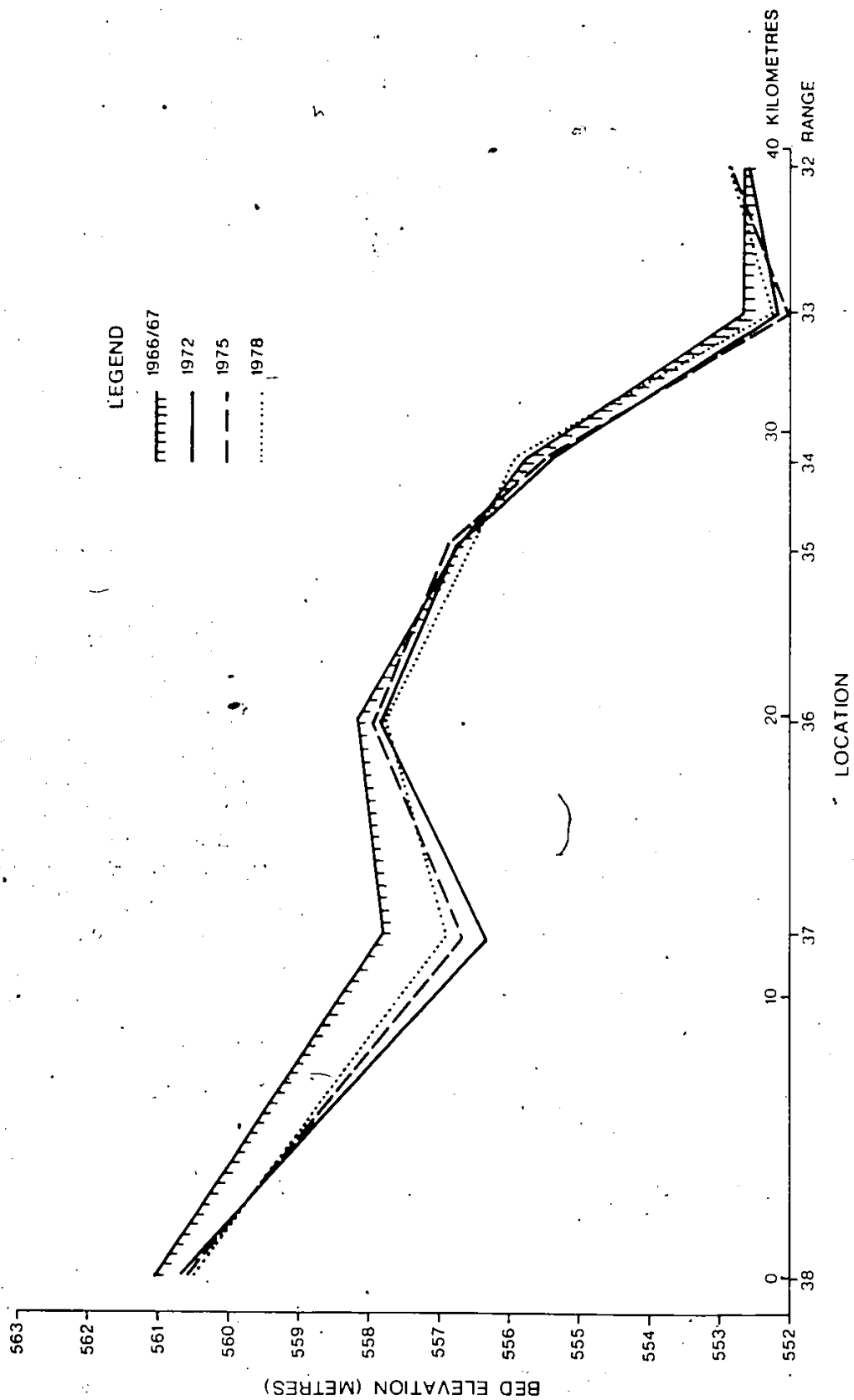


FIGURE 30
BED ELEVATION CHANGES
IN BACKWATER REACH

TABLE XII

Mean Bed Changes (Metres) and Elevations (Metres) for Backwater Ranges

Year	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Range													
38 Mean Bed Change							-0.40			-0.49			-0.53
Elevation	561.05						560.65			560.56			560.52
37 Mean Bed Change					-1.19		-1.32			-1.09			-0.87
Elevation	557.75				557.75		556.43			556.66			556.88
36 Mean Bed Change							-0.40			-0.26			-0.44
Elevation	558.18						557.78			557.92			557.74
35 Mean Bed Change							-0.09			+0.04			-0.17
Elevation	556.72			556.72			556.63			556.76			556.55
34 Mean Bed Change						-0.42						-0.04	
Elevation	555.74					555.32						555.70	
33 Mean Bed Change			-0.26				-0.35			-0.54			-0.37
Elevation	552.60		552.34				552.25			552.06			552.23
32 Mean Bed Change					-0.03		-0.06			+0.11		+0.12	
Elevation	552.66				552.63		552.60			552.77		552.78	

changes it was estimated that approximately 4 500 dam³ of sediment were eroded from the main channel in this reach by 1972.

By 1975, most of the reach had begun to infill. Range 38 still demonstrated further minor degradation as it adjusted for the change in slope that had occurred. Range 33 had also continued to degrade, but this can be explained by the fact that it is a narrow cross section and is probably subject to local scour.

The 1978 survey showed further infilling along most of the stretch. Range 38 still continued to show adjustment by degradation. Range 36 and Range 35 had also been determined to be degrading as channel adjustments were being made.

The original slope for the whole reach based on the earliest surveys was .00022, but by 1972 it was .00021. By 1975 and 1978 the slope had continued to flatten with a slope of .00020. The slope will continue to adjust until an equilibrium is reached that compensates for ice jam effects as well as deposited loads.

4.3 Drawdown Reach

This reach extends for 36.58 km and has an estimated volume of 218 349 dam³, which represents about 5.4% of the total live storage volume. In this reach the river flows into the reservoir, greatly reducing the velocities and depositing a major part of the sediment load.

The water level when the freshet occurs each year will indicate where the sediment loads will begin to be deposited out of suspension (Table XIII). As the water levels revealed sedimentation most years would begin in this reach and most of the reach would be exposed to deposition. Prior to 1968 most of the sediment loads would be transported and deposited at lower ranges in the reservoir. The period from 1968 to 1978 marks the first ten years the reservoir has been fully operational.

As Figure 31 shows, most of this reach had been continually aggrading. By 1972, all the ranges downstream of Range 31 had experienced deposition. By 1972, Range 26 had experienced the greatest change with 0.87 metre of deposition (Table XIV). Both Range 27 and Range 28 had significant accumulation with 0.62 and 0.61 metres respectively.

The 1975 surveys revealed that deposition had occurred along the whole reach. Range 27 experienced 1.45 metres of deposition followed closely by Range 26 with 1.41 metres. In comparison the upper ranges showed negligible change.

After ten years of operation significant changes along the whole reach had been recorded. Range 27 still remained the most significant with 1.68 metres of deposition while Range 26 was recorded to have been 1.60 metres. This general sedimentation trend can be expected to continue as long as reservoir operations do not change drastically over time.

TABLE XIII

Reservoir Water Level Elevations at Peak Discharge

Date	Peak Discharge (m ³ /s)	Return Period	Elevation (m)
June 23, 1965	1 951	3.75	525.2
June 8, 1966	1 184	1.67	526.1
June 4, 1967	2 432	7.50	541.0
June 16, 1968	897	1.25	550.1
July 3, 1969	2 178	5.00	555.7
June 21, 1970	1 824	3.00	553.8
June 11, 1971	1 388	1.88	553.5
June 7, 1972	1 472	2.14	552.9
June 3, 1973	779	1.15	552.9
June 23, 1974	1 501	2.50	554.5
June 24, 1975	2 890	15.00	555.1
August 14, 1976	906	1.36	551.4
June 15, 1977	268	1.07	551.3
June 15, 1978	1 076	1.50	553.8

Source: Saskatchewan Environment Records

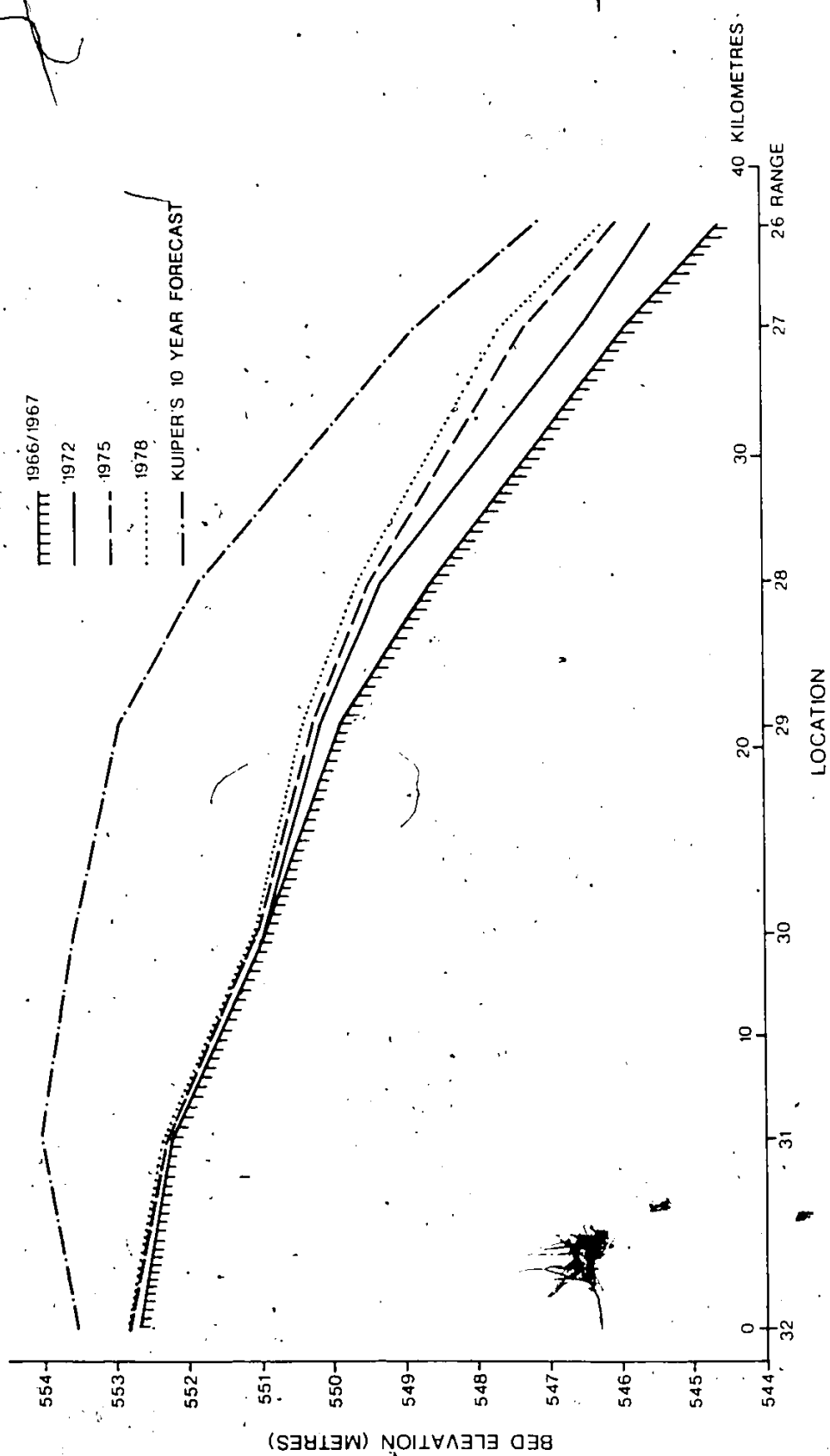


FIGURE 31
BED ELEVATION CHANGES
IN DRAWDOWN REACH

TABLE XIV

Mean Bed Changes (Metres) and Elevations (Metres) for Drawdown Ranges

Year	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	KUIPER'S FORECAST
Range														
32 Mean Bed Change					-0.03		-0.06			+0.11			+0.12	+0.93
Elevation		552.66			552.63		552.60			552.77			552.78	553.59
31 Mean Bed Change				+0.03		-0.02								+1.88
Elevation		552.27		552.30		552.25								554.15
30 Mean Bed Change					+0.01		+0.02			+0.06			+0.24	+2.81
Elevation		550.90			550.91		550.92			550.96			551.14	553.71
29 Mean Bed Change				+0.28									+0.56	+3.05
Elevation		549.86		550.14									550.42	552.91
28 Mean Bed Change			+0.31			+0.61						+0.85		+3.05
Elevation	548.70	549.01				549.31						549.55		551.75
27 Mean Bed Change				+0.61			+0.61			+1.45			+1.68	+2.81
Elevation	545.90			546.51			546.52			547.35			547.58	548.71
26 Mean Bed Change			+0.28				+0.87			+1.41			+1.60	+2.59
Elevation	544.65	544.93					545.52			546.06			546.28	547.23

These results are considerably less than Kuiper's (1962) forecasts. There are two reasons for this discrepancy. The first is that his prediction was based on sediment loads that were 25% higher on average than those that occurred, and that it was assumed that the water levels would always be near FSL at the time of the freshet. This illustrates the inaccuracy of forecasting sedimentation rates with limited data.

To determine volumetric changes in this reach the percentage change in the cross-sectional area of each range was applied to the representative volume (Table XV). By 1972 an estimated 15 442 dam³ of storage had been lost due to sedimentation in this reach. That is a loss of 7.1% in storage to this reach, while in terms of total live storage of the reservoir it amounts to only 0.39%. Between 1972 and 1975 a further 12 498 dam³ of sediment had accumulated amounting to a further 5.7% loss to the reach and 0.31% to the total live reservoir volume. The next three years only reduced the volume of this reach by 7 636 dam³, or a 3.5% loss, and 0.19% to the total live storage. So by 1978 there had been a total of 16.3% loss in storage to the drawdown reach, amounting to just less than 1.0% loss in the total live storage of the reservoir. In terms of the total reservoir volume this would be only a 0.4% loss in capacity.

The original slope for this reach was .00022, and by 1972 it had been reduced to .00019. As sedimentation continued, the slope was further flattened to .00018 in 1975, but by 1978 it was recorded not to have

TABLE XV
Percentage and Volumetric Changes for Drawdown Ranges

Range	Original Volume (dam ³)	Years	Percentage Change	Volume Change (dam ³)	Years	Percentage Change	Volume Change (dam ³)	Years	Percentage Change	Volume Change (dam ³)
32	3 520.0	1967-1972	+4.5	+158	1972-1975	-13.8	-486	1975-1978	-1.3	-46
31	14 352.5	1967-1972	+1.1	+158	1972-1975	-7.6	-1 091	1975-1978	-3.8	-545
30	27 694.0	1967-1972	-0.9	-249	1972-1975	-2.1	-582	1975-1978	-7.4	-2 049
29	36 157.5	1967-1972	-9.2	-3 327	1972-1975	-3.8	-1 374	1975-1978	-4.1	-1 482
28	51 465.0	1966-1972	-9.0	-4 632	1972-1975	-3.5	-1 801	1975-1978	-2.5	-1 287
27	44 185.5	1966-1972	-7.6	-3 358	1972-1975	-10.0	-4 419	1975-1978	-3.0	-1 326
26	40 974.5	1966-1972	-10.8	-4 192	1972-1975	-6.7	-2 745	1975-1978	-2.2	-901
Total	218 349			-15 442			-12 498			-7 636

changed. This gradual reduction in the slope with time should continue until equilibrium conditions are reached with incoming sediment loads.

4.4 Reservoir

4.4.1 Total Storage Changes

The longitudinal profile (Figure 32) shows that by 1972 there had been deposition along the whole reach. These deposition rates should show a decline with increased distance from sediment source, and although this is the general trend, there are many factors which have affected this trend. Prior to 1968 the reservoir was being filled and therefore deposition patterns are distorted. Also, the channel morphology for the individual ranges will also affect the measured sedimentation rates. An example of this is Range 18 which is a very narrow cross section with steep banks susceptible to slumping and which, in turn, produced a higher sedimentation rate (Table XVI). Range 15 is an example of a range which is affected by the local input of Swift Current Creek.

Changes between 1972 and 1975 begin to indicate what the sedimentation pattern will be like in the future, because during this period normal working reservoir operations were maintained. The hydrographic survey results show that the only ranges that experienced significant changes were those upstream of Range 20.

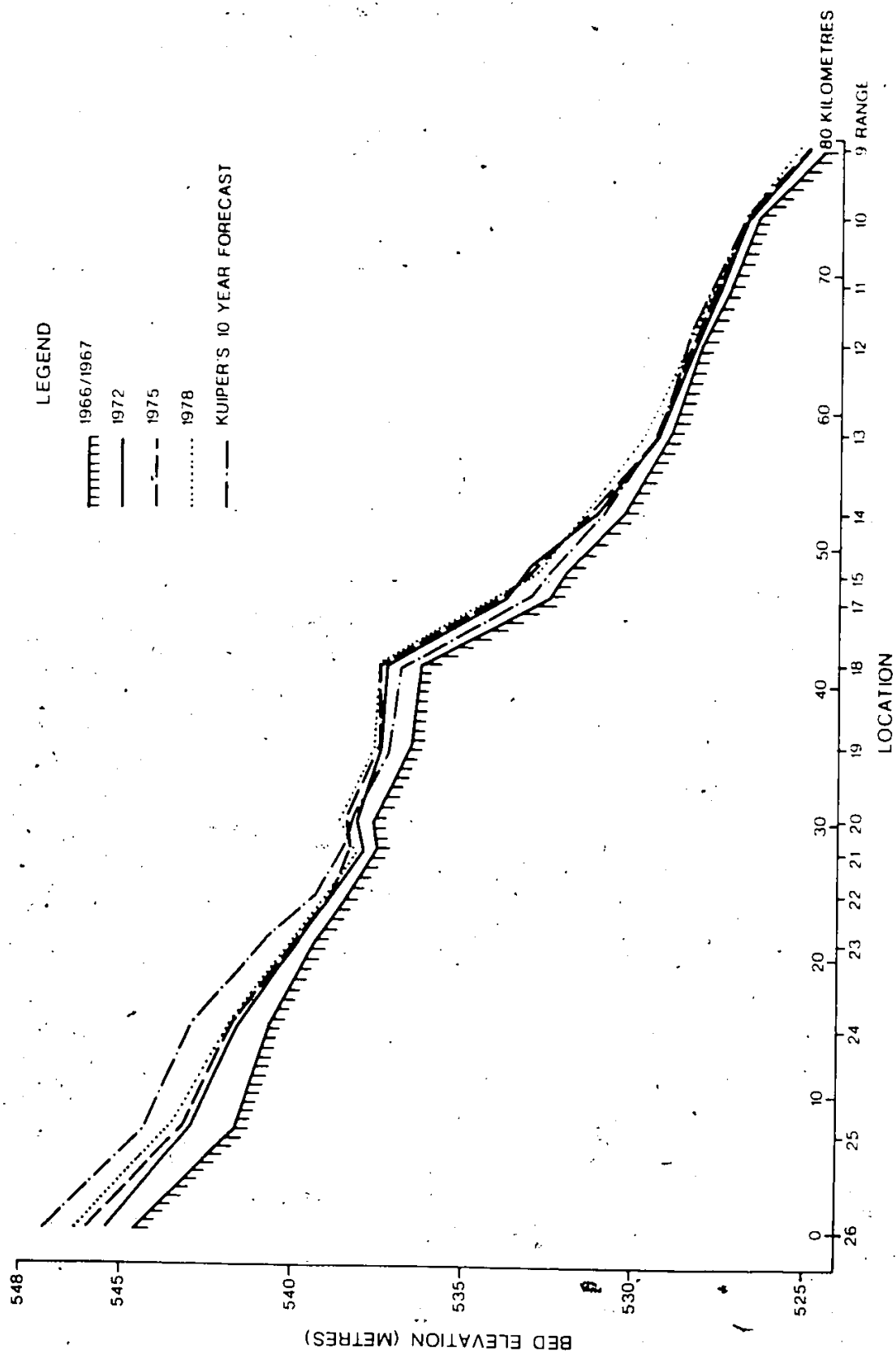


FIGURE 32
BED ELEVATION CHANGES
IN THE RESERVOIR

TABLE XVI

Mean Bed Changes (Metres) and Elevations (Metres) for Reservoir Ranges

Range	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	KUIPERS FORECAST
26 Mean Bed Change			+0.28				+0.87			+1.41			+1.60	+2.58
Elevation	544.65		544.93				545.52			456.06			546.25	547.23
25 Mean Bed Change						+1.07						+1.76		+2.34
Elevation	541.87					542.94						543.63		544.21
24 Mean Bed Change							+0.70			+0.94				+2.11
Elevation	540.84						541.54			541.78				542.95
23 Mean Bed Change			+0.14				+0.42			+0.50			+0.63	+1.41
Elevation	539.34		539.48				539.76			539.84			539.97	540.75
22 Mean Bed Change						+0.39								+0.94
Elevation	538.34					538.73								539.28
21 Mean Bed Change		+0.20					+0.36			+0.68			+0.63	+0.94
Elevation	537.55	537.75					573.91			538.23			538.18	538.49
20 Mean Bed Change							+0.46			+0.81			+0.88	+0.71
Elevation	537.67						538.13			538.48			538.55	538.38
19 Mean Bed Change						+0.69						+0.92		+0.71
Elevation	536.54					537.23						537.46		537.25

TABLE XVI (Cont'd)

Range		1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	KHUPER'S FORECAST
18 Mean Bed Change							+0.98			+1.02					+0.71
Elevation		536.20					537.18			537.21					536.91
17 Mean Bed Change			+0.43					+0.26			+0.46			+0.53	+0.70
Elevation		532.44	533.07					532.90			533.10			533.17	533.34
15 Mean Bed Change							+1.08						+0.94		+0.70
Elevation		532.00					533.08						532.94		532.70
14 Mean Bed Change								+0.75			+0.84				+0.70
Elevation		530.35						531.10			531.19				531.05
13 Mean Bed Change													+0.49		+0.47
Elevation		529.01											529.50		529.48
12 Mean Bed Change															+0.47
Elevation		528.01													528.48
11 Mean Bed Change								+0.07			+0.18				+0.47
Elevation			527.33					527.40			527.51				527.80
10 Mean Bed Change							+0.26						+0.30		+0.47
Elevation			526.42				526.68						526.72		526.89
9 Mean Bed Change								+0.63			+0.54				+0.47
Elevation			524.53					525.16			525.07				525.00

By 1978 it had become apparent that the sediment loads transported by the South Saskatchewan River were being deposited in the upper most ranges. Range 25 appears to be the pivotal point, the point of maximum sediment accumulation. Therefore, now that reservoir operations have stabilized, this general sedimentation pattern can be expected to continue. Kuiper's (1962) forecast overestimated the ten-year sedimentation rates in the upper ranges but by Range 20 underestimated the deposition rates.

Table XVII reflects the volume losses due to sedimentation. By 1972 there was 57 289 dam³ of volume lost, which amounts to approximately 0.61% of the total reservoir capacity. The 1975 results showed that a further 14 375 dam³ were lost or 0.15% loss in total volume. The period 1975-1978 revealed that 13 731 dam³ were lost or a further 0.15% of total capacity. Therefore up to 1978 slightly less than 1.0% of the total reservoir capacity of Lake Diefenbaker had been lost due to sedimentation.

This 79.23 km of reservoir length had an original slope of .00025 but because of higher sedimentation rates in the upper ranges the overall slope increased over time. In 1972 and 1975 it was calculated to have been .00026 and had increased further to .00027 by 1978.

4.4.2 Dead Storage Changes

Dead storage losses are not considered important to reservoir operations until that capacity is lost and live storage is directly

TABLE XVII

Percentage and Volumetric Changes for Reservoir Ranges

Range	Original Volume (dam ³)	Years	Percentage Change	Volume Change (dam ³)	Years	Percentage Change	Volume Change (dam ³)	Years	Percentage Change	Volume Change (dam ³)
25	56 909.5	1966-1972	-12.0	-6 829	1972-1975	-5.0	-2 276	1975-1978	-3.0	-1 707
24	47 004.0	1966-1972	-4.4	-2 063	1972-1975	-5.6	-2 632	1975-1978	-2.4	-1 128
23	33 466.0	1966-1972	-4.0	-1 606	1972-1975	-0.9	-301	1975-1978	-1.5	-507
22	27 132.5	1966-1972	-4.5	-1 221	1972-1975	-1.7	-461	1975-1978	-1.2	-376
21	25 358.0	1966-1972	-4.5	-1 141	1972-1975	-2.5	-634	1975-1978	-0.8	-203
20	51 024.5	1966-1972	-4.4	-2 245	1972-1975	-3.1	-1 592	1975-1978	-0.9	-459
19	85 796.5	1966-1972	-6.0	-5 148	1972-1975	-1.4	-1 201	1975-1978	-1.2	-1 039
18	81 302.5	1966-1972	-6.4	-5 203	1972-1975	-0.9	-732	1975-1978	-1.4	-1 138
17	52 955.0	1966-1972	-3.3	-1 747	1972-1975	-0.1	-53	1975-1978	-0.5	-265
15	76 752.5	1966-1972	-3.6	-2 763	1972-1975	-0.5	-384	1975-1978	-1.6	-1 228
14	140 089.0	1966-1972	-4.4	-6 164	1972-1975	-0.7	-921	1975-1978	-0.1	-140
13	184 382.5	1966-1972	-3.8	-7 007	1972-1975	-0.4	-738	1975-1978	-0.6	-1 106
12	197 560.0	1966-1972	-3.1	-6 124	1972-1975	-0.3	-591	1975-1978	-0.4	-290
11	221 387.5	1967-1972	-0.4	-886	1972-1975	-0.7	-1 550	1975-1978	-0.6	-1 328
10	256 669.5	1967-1972	-1.4	-3 593	1972-1975	-0.1	-257	1975-1978	-0.3	-770
9	322 182.5	1967-1972	-1.1	-3 544	1972-1975	-	-	1975-1978	-0.5	-1 611
TOTAL				-57 289			-14 375			-13 731

affected. As Figure 33 illustrates, by 1972 all the dead storage capacity had been filled in at Range 26 and 95% of the capacity for Range 25. By 1975, all of the dead storage for Range 25 had been lost and Range 24 had undergone significant change. Below these first few ranges the losses are not as significant and at the lower ranges the changes are very small. Range 14 marks the point where changes in the dead storage are negligible after 1972. Range 24 is the only range that from 1975 to 1978 lost a significant portion of its dead storage volume.

From Table XVIII, the amount of dead storage calculated to have been lost by 1972 was 50 838 dam³ or 0.95% of the total dead storage capacity of the reservoir. Between 1972 and 1975 only 10 000 dam³ were determined to have been filled in or 0.19% of the total dead storage. During the period 1975 to 1978 the dead storage loss was estimated to have been 7 262 dam³ or 0.14%. Therefore in terms of dead storage loss due to sedimentation, 1.28% of the total storage had been lost by 1978. The dead storage losses upstream of Range 21 would be significant over the years only because these ranges represent a small portion of the total dead storage capacity.

4.4.3 Live Storage Changes

According to Van Everdingen's (1968) calculations the live storage would increase due to bank erosion, by as much as 7.4% within the first ten years of the reservoir life. The hydrographic data findings do not support

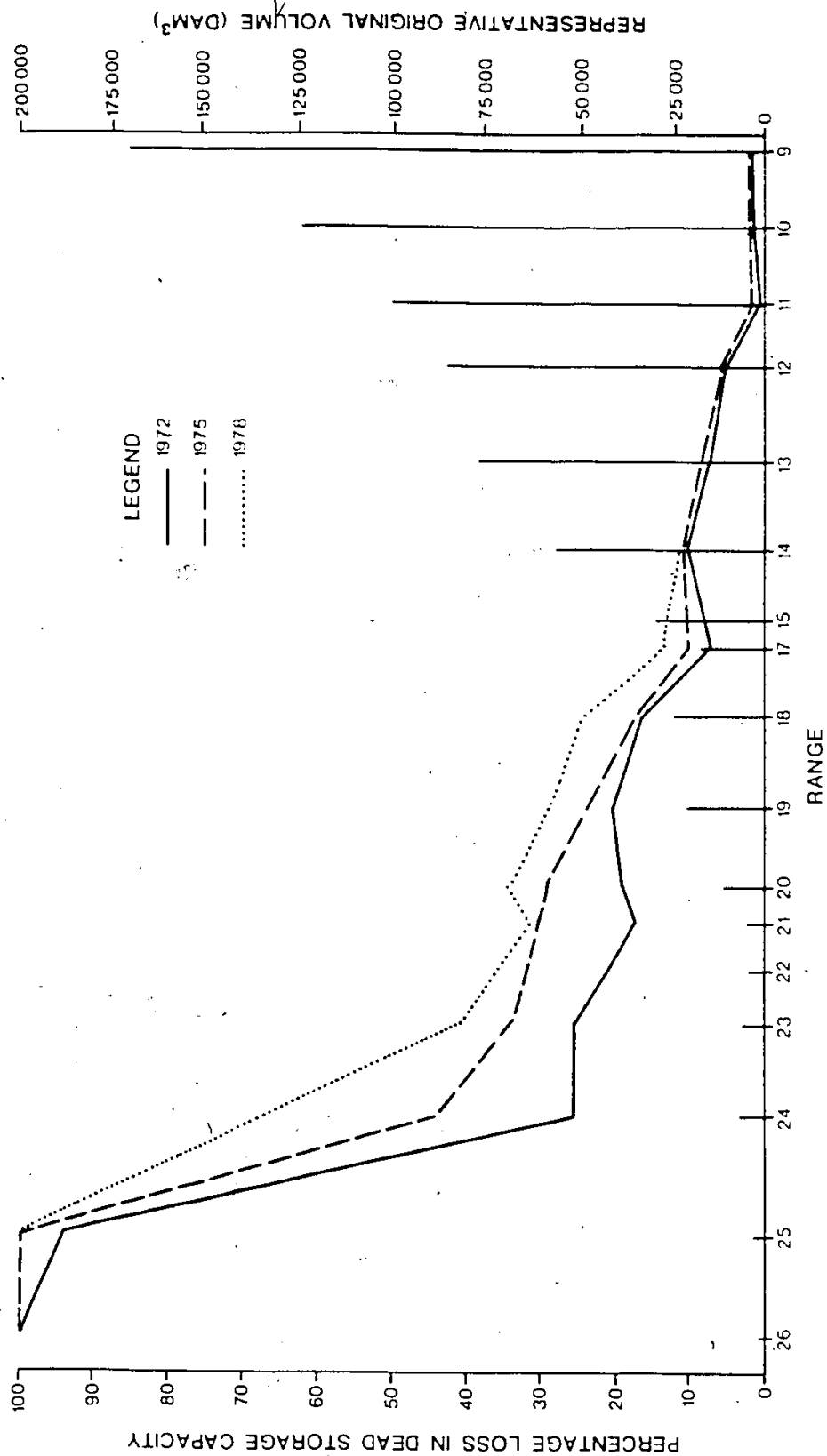


FIGURE 33
PERCENTAGE LOSS IN
DEAD STORAGE CAPACITY

TABLE VIII
Percentage and Volumetric Changes in Dead Storage for Reservoir Ranges

Range	Original Volume (dam ³)	Years	Percentage Change	Volume Change (dam ³)	Years	Percentage Change	Volume Change (dam ³)	Years	Percentage Change	Volume Change (dam ³)
26	835.0	1966-1972	-160	-835	1972-1975	-	-	1975-1978	-	-
25	3 832.0	1966-1972	-95	-3 640	1972-1975	-5	-192	1975-1978	-	-
24	6 513.0	1966-1972	-25	-1 628	1972-1975	-20	-1 304	1975-1978	-22	-1 433
23	6 093.0	1966-1972	-26	-1 584	1972-1975	-8	-497	1975-1978	-8	-487
22	5 150.5	1966-1972	-22	-1 134	1972-1975	-11	-567	1975-1979	-2	-101
21	5 148.5	1966-1972	-18	-927	1972-1975	-14	-721	1975-1978	-1	-51
20	10 847.5	1966-1972	-20	2 170	1972-1975	-9	-976	1975-1978	-6	-641
19	21 515.5	1966-1972	-20	-4 303	1972-1975	-4	-861	1975-1978	-4	-861
18	24 897.5	1966-1972	-17	-4 344	1972-1975	-1	-249	1975-1978	-6	-1 494
17	17 809.5	1966-1972	-8	-1 425	1972-1975	-3	-534	1975-1978	-4	-712
15	29 786.5	1966-1972	-9	-2 681	1972-1975	-3	-894	1975-1978	-3	-897
14	57 312.0	1966-1972	-11	-6 304	1972-1975	-1	-573	1975-1978	-1	-573
13	77 326.5	1966-1972	-8	-6 186	1972-1975	-1	-773	1975-1978	-	-
12	85 905.0	1966-1972	-6	-5 154	1972-1975	-1	-859	1975-1978	-	-
11	101 066.0	1967-1972	-1	-1 011	1972-1975	-1	-1 011	1975-1978	-	-
10	125 644.5	1967-1972	-2	-2 513	1972-1975	-	-	1975-1978	-	-
9	170 349.5	1967-1972	-3	-5 110	1972-1975	-	-	1975-1978	-	-
TOTAL				-50 838			-10 000			-7 262

this forecast. The live storage volume changes were derived by subtracting the dead storage changes from the total volume changes. The results show that sedimentation has occurred. Bank slumping is noticeable along the length of the reservoir and it is this source of sediment that has been affecting the live storage. By 1972 it was estimated that 7 286 dam³ of sediment had reduced the total live storage capacity by 0.18% (Table XIX). Between 1972 and 1975 considerably more ranges had experienced erosion, and the net change for the reach was a 4 375 dam³ loss in live storage capacity, amounting to 0.11%. During the period between 1975 to 1978, deposition was still the dominant process, as 6 469 dam³ were infilled, or a 0.16% loss in the live capacity. Therefore after ten years of operation an estimated 0.45% of the live storage had been lost due to bank slumping.

TABLE XIX

Volumetric Changes in Live Storage for Reservoir Ranges

Range	Years	Volume Change (dam ³)	Years	Volume Change (dam ³)	Years	Volume Change (dam ³)
25	1966-1972	-3 189	1972-1975	-2 084	1975-1978	-1 707
24	1966-1972	-440	1972-1975	-1 329	1975-1978	+305
23	1966-1972	-22	1972-1975	+186	1975-1978	-15
22	1966-1972	-87	1972-1975	+106	1975-1978	-223
21	1966-1972	-214	1972-1975	+87	1975-1978	-152
20	1966-1972	-75	1972-1975	-606	1975-1978	+192
19	1966-1972	-845	1972-1975	-340	1975-1978	-169
18	1966-1972	-970	1972-1975	-483	1975-1978	+356
17	1966-1972	-322	1972-1975	+481	1975-1978	+447
15	1966-1972	-82	1972-1975	+510	1975-1978	-331
14	1966-1972	+140	1972-1975	-408	1975-1978	+433
13	1966-1972	-821	1972-1975	+35	1975-1978	-1 106
12	1966-1972	-970	1972-1975	+266	1975-1978	-790
11	1967-1972	+125	1972-1975	-539	1975-1978	-1 328
10	1967-1972	-1 080	1972-1975	-257	1975-1978	-770
9	1967-1972	+1 566	1972-1975	-	1975-1978	-1 611
TOTAL		-7 286		-4 375		-6 469

4.5 Sediment Sampling Analyses

4.5.1 Suspended Sediment Sampling

The suspended sediment sampling program provides only limited information because it had been improperly conducted. Sampling was undertaken at the same time as the hydrographic surveys, which was after the reservoir had reached FSL. By this time, most of the sediment had settled out of suspension and the concentrations obtained were very low. Only in 1972 was the suspended sediment sampling program conducted at the optimum time - that was when the reservoir was being filled by the peak discharge. Concentrations at this time are normally sufficiently large to perform particle size analyses and provide information on settling characteristics of the incoming sediment loads. The 1972 data revealed that almost 85% of the suspended sediment load had settled out of suspension by Range 21 (Table XX). Furthermore, almost all of the sand component of suspended sediment load had been deposited by Range 30. By Range 26, most of suspended sediment was comprised of clay. The 1972 peak discharge had a return period of 2.14. Therefore, the information is only indicative of the transport capacities of a lower return period discharge. If this sampling program had been conducted properly over the years, it could have provided this kind of information for the range of peak discharges - valuable supportive information to the hydrographic surveys.

TABLE XX

Concentration and Particle Size Data for 1972 Suspended Sediment Samples

Range	Suspended Sediment Concentration(mg/L)	Percentage Sand	Percentage Silt	Percentage Clay
36	705	49	34	17
33	490	23	45	32
30	326	1	50	49
29	266	1	40	59
26	260	1	26	73
21	111*			
17	24*			
14	51*			
9	22*			

Source: Wiebe and Drennan, 1973

* Insufficient concentration for particle size analysis

4.5.2 Bed material sampling

In most reservoir studies bed material data have seldom been collected but have been estimated from empirically derived relationships. The most commonly used method of obtaining a density value for the deposited sediment is the Lane and Koelzer (1953) method, where the density is determined by taking into account only the particle size of incoming sediment load, the method of operation of the reservoir, and time. The equation used is:

$$W = W_1 + B \log t$$

where W = density of deposited material after t years

W_1 = initial density

B = constant

The initial density of the sediment is obtained by applying the percentage of each of the three sediment fractions to a mean density value and then summing the three fractions (Table IIX).

TABLE XXI

Lane and Koelzer's Deposited Sediment Density Values (Kg/m³)

Reservoir Operation	Sand		Silt		Clay	
	W ₁	B	W ₁	B	W ₁	B
Sediment always submerged or nearly submerged	1 490	0	1 041	91.3	481	256.3
Normally a moderate reservoir drawdown	1 490	0	1 185	43.2	737	171.4
Normally considerable research drawdown	1 490	0	1 265	16.0	961	96.1
Reservoir normally empty	1 490	0	1 313	0	1 249	0

Source: Lane and Koelzer, 1953.

Since, in most cases, only particle size data were available for the bed samples, this computation method was evaluated against measured values. The 144 in situ densities collected from Lake Diefenbaker provided a good basis for comparison. Densities were computed based on particle sizes using values for sediment that would always be submerged (Appendix K). Figure 34 illustrates that computed values were generally higher than those actually measured, suggesting that the technique tends to overestimate. This weakness has been acknowledged by others (Lara and Pemberton, 1963; Vanoni, 1975).

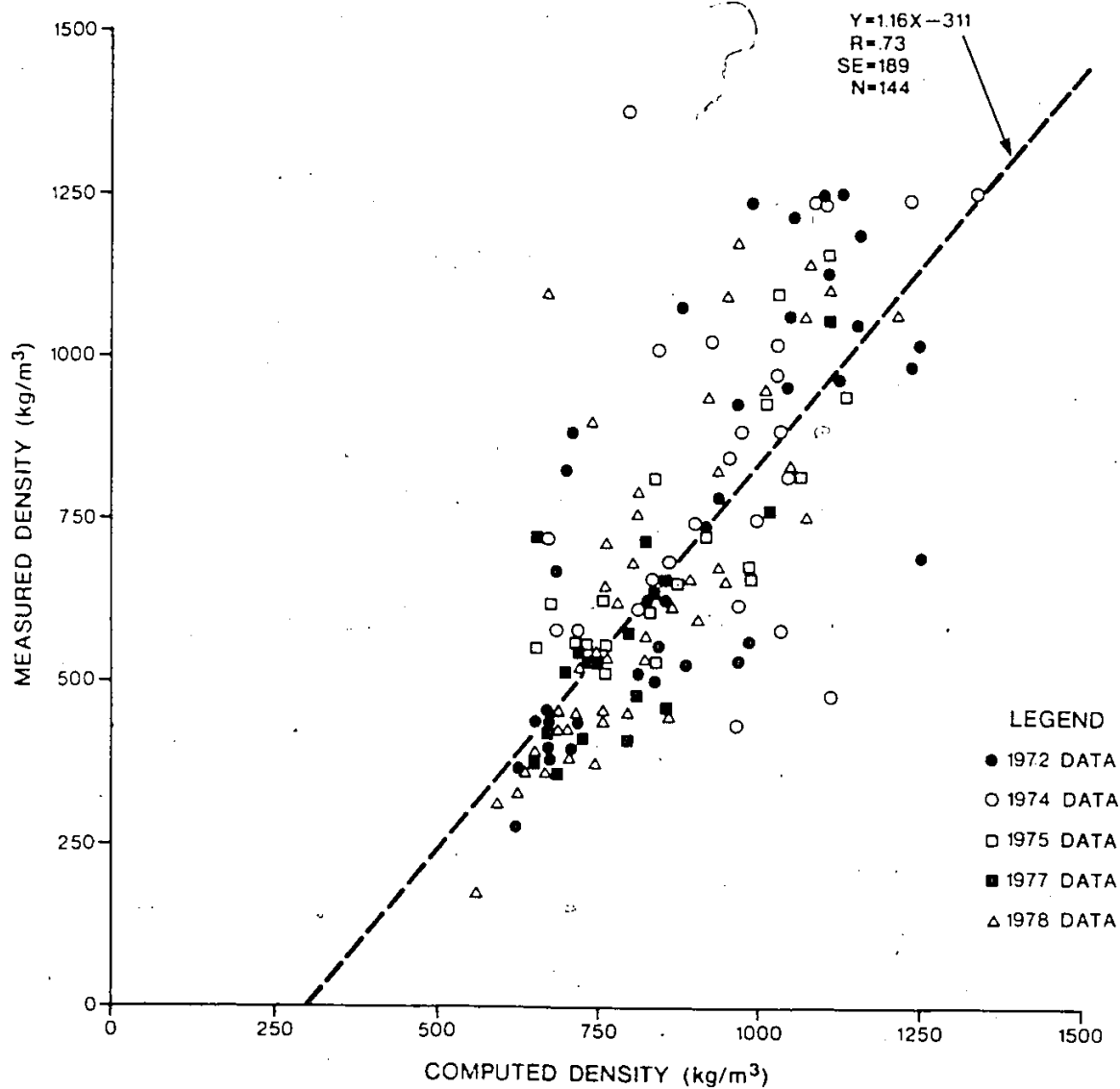


FIGURE 34
MEASURED DENSITIES OBTAINED FROM A
PHLEGER CORER VERSUS COMPUTED
DENSITIES BASED ON PARTICLE SIZES

To derive the most suitable density values, multiple regression correlation analysis was applied to the 144 bed material samples. The equation derived was:

$$Y = 12\,553 \text{ Kg/m}^3 - 123.5 \text{ Kg/m}^3 (X_1) - 116.3 \text{ Kg/m}^3 (X_2) - 110.8 \text{ Kg/m}^3 (X_3)$$

$$R = .75$$

where X_1 = Percentage clay

X_2 = Percentage silt

X_3 = Percentage sand

If the average density of each fraction is compared to Lane and Koelzer's (1953) values it appears that it is in the clay/silt fractions where there are differences (Table XXII).

TABLE XXII
Deposited Sediment Densities (Kg/m³) Comparison

Fraction	Multiple Regression Equation	Lane and Koelzer
Pure Clay	203	481
Pure Silt	923	1 041
Pure Sand	1 474	1 490

The clay density is more than twice as large as that from the multiple regression equation revealing where the Lane and Koelzer's weakness lies. For the other two fractions there appears to be better agreement, especially for the sand fraction.

This multiple regression equation was then used to determine densities where only particle size data had been collected. The densities or particle size data used were from samples that were collected in the thalweg, which best represent densities of the loads transported by the South Saskatchewan River. Table XXIII shows that by 1972 the sand component of the loads were being deposited upstream of Range 26 and the wash load was transported a considerable distance into the reservoir. The 1975 data revealed that sand had been transported by the flows as far downstream as Range 26 but beyond Range 21 only fine clays were being transported and deposited. In 1978, the sand portion of loads was found to be deposited in the upper ranges with a major portion of the bed being comprised of clays. The lower discharges between 1975 and 1978 were only capable of carrying finer material, explaining why the bed was found to be comprised of significantly more clays and silts.

Figure 35 illustrates the relationships between density to distance over time. The best data fit was determined to be a quadratic relationship. The 1972 developed relationship was different due to the fact that filling of the reservoir had distorted the density pattern. The 1975 and 1978 data revealed the sedimentation pattern that will continue now that reservoir operations have stabilized. This relationship showed that Range 20 marks the approximate location where the relationship goes asymptotic, as only the finest materials are carried beyond this point.

TABLE XXIII

* M - Measured with Phleger Corer
C - Calculated using multiple regression equation

2

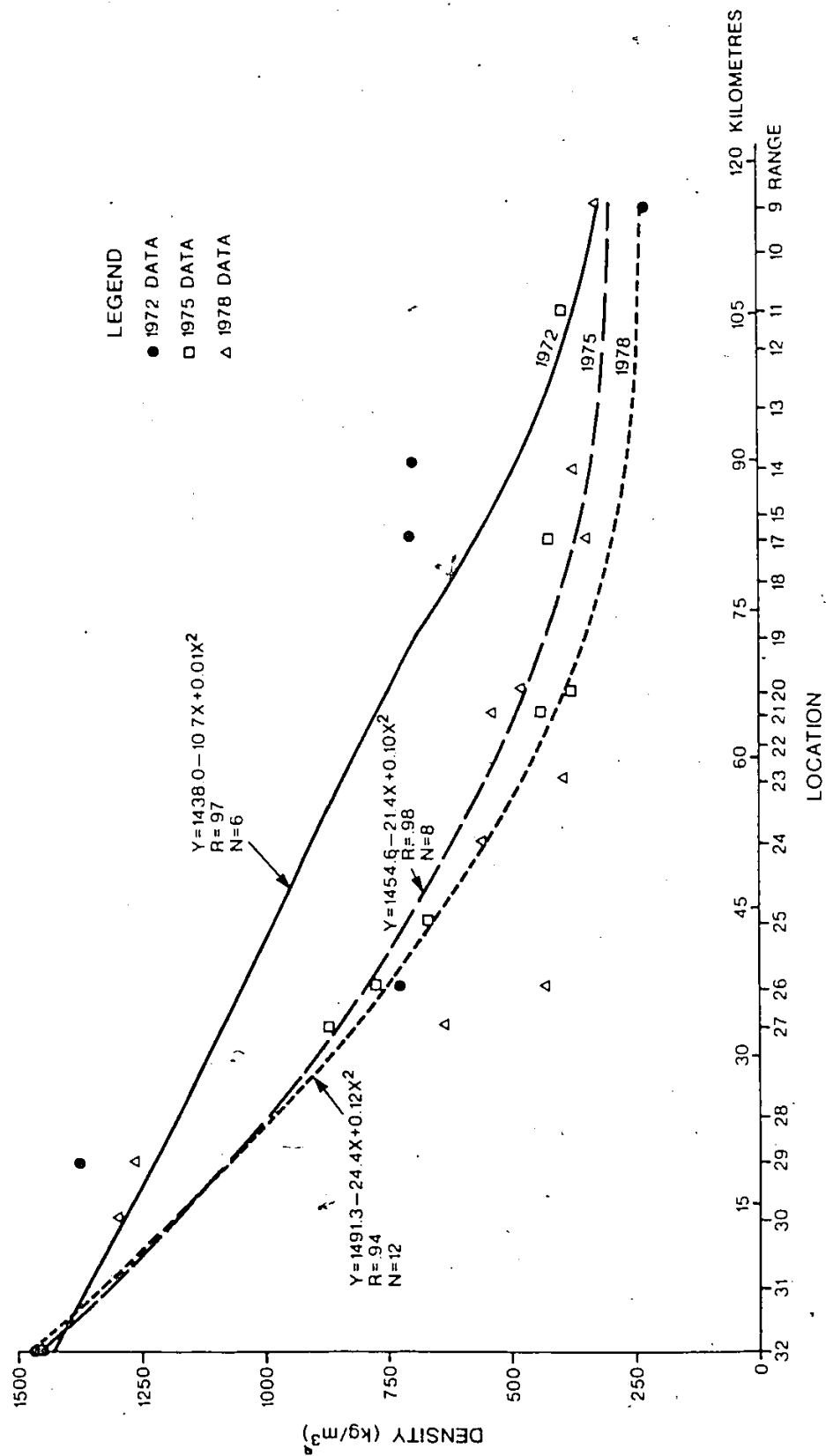


FIGURE 35
BED MATERIAL DENSITY
RELATIONSHIPS

4.6 Delta Formation

The structures of classical deltas has been well documented (Thakur and MacKay, 1973; Walker, 1979; Reineck and Singh, 1980). The classical delta is comprised of three types of deposits: topset, foreset and bottomset. However, classical deltas are formed under an environment considerably different from that of Lake Diefenbaker's. First, these deltas are not usually subject to such a large fluctuation in water levels. In the case of Lake Diefenbaker the sediments are deposited over a 37 kilometre stretch during the filling of the reservoir each year. Second, most of the deltas described in the literature are formed in an unconfined location, unlike Lake Diefenbaker, where growth is restricted to the narrow channel. With this in mind, the sedimentary structure of the deposits have been analyzed.

From the hydrographic data, Range 25 was determined to mark the apex of sediment deposition or, in other terms, the maximum extent of the topset beds into the reservoir. Since Range 32 marks the beginning of reservoir conditions, the topset bed can be said to be forming from Range 32 to Range 25. The original slope for this reach was determined to have been .00025 but by 1978 it had been reduced significantly due to sedimentation to .00019. Reservoir studies in the United States have revealed that topset beds in reservoirs normally stabilized once the slope had been reduced to half of the original slope (Shen, 1971; U.S. Bureau of Reclamation, 1977). Therefore, in the case of Lake Diefenbaker the slope should become stabilized at about .00013.

Another approach used to estimate the topset slope is that of determining the theoretical slope at which no bed load will be transported (Vanoni, 1975). Using the Schoklitsch formula for zero bed load transport this theoretical slope was calculated (Shulits and Hill, 1968). The data used were from the Lemsford station. The equation is:

$$S = \left(\frac{.00021 DB}{Q} \right)^{3/4}$$

where D = mean bed material particle size (mm) .359

B = bankfull width (ft) 830

Q = mean annual flood (ft³/s) 52 500

Note: data are in both metric and imperial units

A slope of .00004 was determined in this study to be minimum slope that would ensure no bed load transport. This theoretical value is considerably lower than the empirical findings but it provides a good estimate of the lower limit that the slope might reach.

The suspended and bed material data indicate that Range 21 marks the point where only clays are transported, which normally indicates the beginning of the bottomset deposits. Therefore, the foreset bed slope should extend from Range 25 to Range 21. Originally the slope for this reach was .00021 but has increased to .00027 due to deposition. Foreset slopes are normally steep, some 6.5 times greater than topset slopes (U.S. Bureau of

Reclamation, 1977). In Lake Diefenbaker, the foreset slope was less than twice that of topset, further showing how the large water level fluctuation has affected development of a delta.

The bottomset slopes are normally very gentle and do not show much change which is the case for Lake Diefenbaker. The original slope for the reach from Range 21 to Range 9 was .00025 and by 1978 it had remained virtually the same.

4.7 Hydrometric Station Loads Compared to the Measured Load Estimates

The estimation of deposited loads is very complex, however the results presented in Table XXIV show good agreement between comparing the station derived loads and those determined from the hydrographic surveys.

The total load of sediment that had been transported into Lake Diefenbaker between 1966 to 1972 by the South Saskatchewan River and Swift Current Creek was approximately 47 000 000 tonnes. The measured load was estimated to have been 52 000 000 tonnes - a difference of only +11%, which can be considered a good agreement.

Between 1972 and 1975, some 20 000 000 tonnes were calculated to have been transported into the reservoir. The measured load was approximately 19 000 000 tonnes, an underestimation, but within -5% which is considered a close approximation.

TABLE XXIV

Measured Deposited Loads

Range	Year	1972				1975				1978			
		Volume (dam ³)	Density (Kg/m ³) ¹	Load (Tonnes)	Volume (dam ³)	Density (Kg/m ³) ²	Load (Tonnes)	Volume (dam ³)	Density (Kg/m ³) ³	Load (Tonnes)	Volume (dam ³)	Density (Kg/m ³) ³	
32		+158	1 438	+227 215	-486	1 454	-706 678	-46	1 491	-68 589			
31		+158	1 370	+216 471	-1091	1 322	-1 442 372	-545	1 340	-730 336			
30		-249	1 296	-322 720	-582	1 184	-689 122	-2 049	1 184	-2 426 134			
29		-3 327	1 236	-4 112 372	-1 374	1 078	-1 481 244	-1 482	1 064	-1 576 925			
28		-4 632	1 185	-5 489 187	-1 801	995	-1 792 082	-1 287	970	-1 248 451			
27		-3 358	1 095	-3 677 189	-4 419	855	-3 778 429	-1 326	814	-1 079 416			
26		-4 192	1 061	-4 447 928	-2 745	805	-2 209 832	-901	758	-682 991			
25		-6 829	1 992	-6 774 697	-2 276	713	-1 622 867	-1 707	655	-1 118 139			
24		-2 068	915	-1 892 312	-2 632	617	-1 624 023	-1 128	551	-621 551			
23		-1 606	857	-1 376 409	-301	554	-166 762	-502	483	-242 478			
22		-1 221	822	-1 003 711	-461	519	-239 271	-326	446	-145 403			
21		-1 141	795	-907 139	-634	494	-313 211	-203	418	-84 858			
20		-2 245	773	-1 735 469	-1 582	474	-749 904	-459	398	-182 691			
19		-5 148	722	-3 717 037	-1 201	432	-518 857	-1 030	355	-365 668			
18		-5 203	665	-3 460 163	-732	393	-287 690	-1 138	315	-358 487			
17		-1 747	625	-1 091 926	-53	369	-19 558	-265	293	-77 649			
15		-2 763	606	-1 674 459	-384	359	-137 863	-1 228	283	-347 541			
14		-6 164	563	-3 470 501	-981	340	-333 556	-140	266	-37 242			
13		-7 007	512	-3 587 758	-738	323	-238 386	-1 106	253	-279 832			
12		-6 124	458	-2 804 928	-593	312	-195 025	-790	248	-195 930			
11		-886	420	-372 138	-1 550	309	-478 973	-1 328	243	-322 720			
10		-3 593	378	-1 358 220	-257	305	78 389	-770	239	-184 639			
9		-3 544	335	-1 187 298	-	303	-	-1611	236	-380 214			
TOTAL				-52 316 877			-19 094 034			-12 757 291			

NOTE: 1 Y = 1438.0 + 10.7 X + 0.01 X²
 2 Y = 1454.6 - 21.4 X + 0.10 X²
 3 Y = 1491.3 - 24.4 X + 0.12 X²

The sediment loading for the period between 1975 and 1978 was calculated to be just over 6 000 000 tonnes and the measured load was 13 000 000 tonnes. There appears to be discrepancy between the two methods for this period. During this period, changes to the live storage in the reservoir ranges which measure the bank contribution were significantly higher than before. Part of the difference in loads can be attributed to an increase in the bank contribution, which has not been accounted for. Even accounting for the bank contribution, it is apparent that the measured load has been overestimated for this period.

It is possible therefore to get reasonable agreement between these two methods with an understanding of the processes that affect reservoir sedimentation.

4.8. Swift Current Creek Area Study

The hydrographic surveys conducted in 1972 and 1978 were to assess the Swift Current Creek source of sediment. As noted in Chapter III, the sediment loads transported by Swift Current Creek in later years were significantly smaller. In fact, between 1972 and 1978, only 65 000 tonnes of sediment were transported into the reservoir by this source. Compared to the long term mean of 41 000 tonnes per annum, this period was not characteristic of normal loadings and therefore should be taken in this context.

The 1972 contour map (Figure 36) which covers an area of 2.4 km^2 reveals the submerged topography of this area. The arrow points to where Swift Current Creek flows into the reservoir. The side where Swift Current Creek drains into the reservoir is marked by a large flood plain and the channel used by pre-reservoir flows can be identified, as well as the old South Saskatchewan River channel. The north side of the area has steeper slopes. By 1978, (Figure 37) many morphological changes had become apparent. The most significant change was where a bank had slumped across the creek's channel causing the flows to cut a wider channel. Bank slumping was noticeable along the length of the shoreline and is best depicted in Figure 38 of contour differences between the 1972 and 1978.

An examination of the bed material samples collected from this reach (sample identifier SCC in Appendix K) reflect the changes that have been occurring. In 1972, the average bed material sample was 71.5% silt and clay, but by 1978, silt and clay made up 90.9% on average. This increase in fines can be attributed to the finer material that was transported by Swift Current Creek, as well as fines derived from bank erosion and slumping. The mean density of the deposited material in 1978 was found to be only 565 Kg/m^3 , a very low density.

The capacity table (Appendix L) revealed that $1\,190.2 \text{ dam}^3$ of sediment had been deposited in this area - 175.5 dam^3 in live storage and the remaining in the dead storage zone. Based on the average density, this volume converts to a load of approximately 672 500 tonnes. The 65 000 tonnes

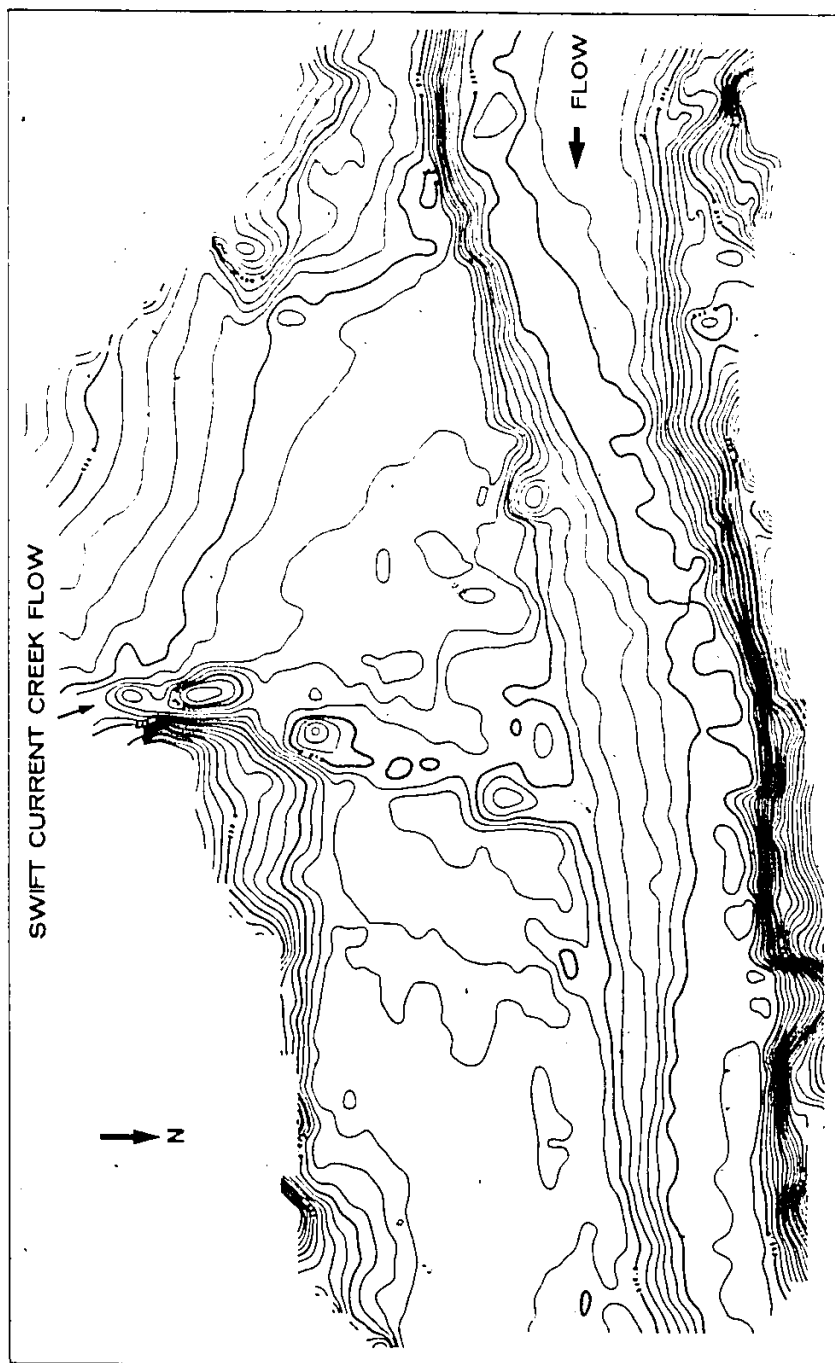


FIGURE 36
SWIFT CURRENT CREEK AREA
1972 CONTOURS
CONTOUR INTERVAL = 1.0 METRE

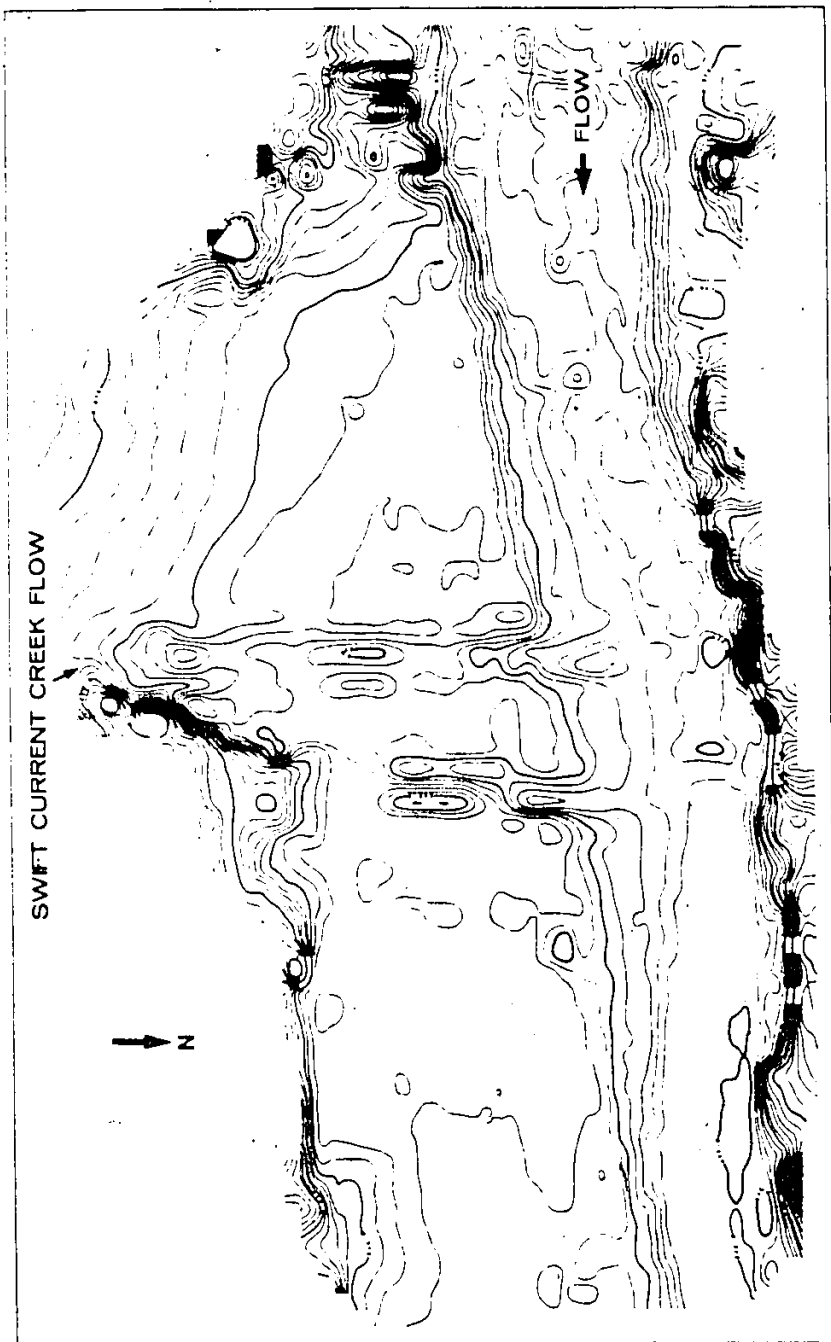


FIGURE 37
SWIFT CURRENT CREEK AREA
1978 CONTOURS
CONTOUR INTERVAL = 1.0 METRE

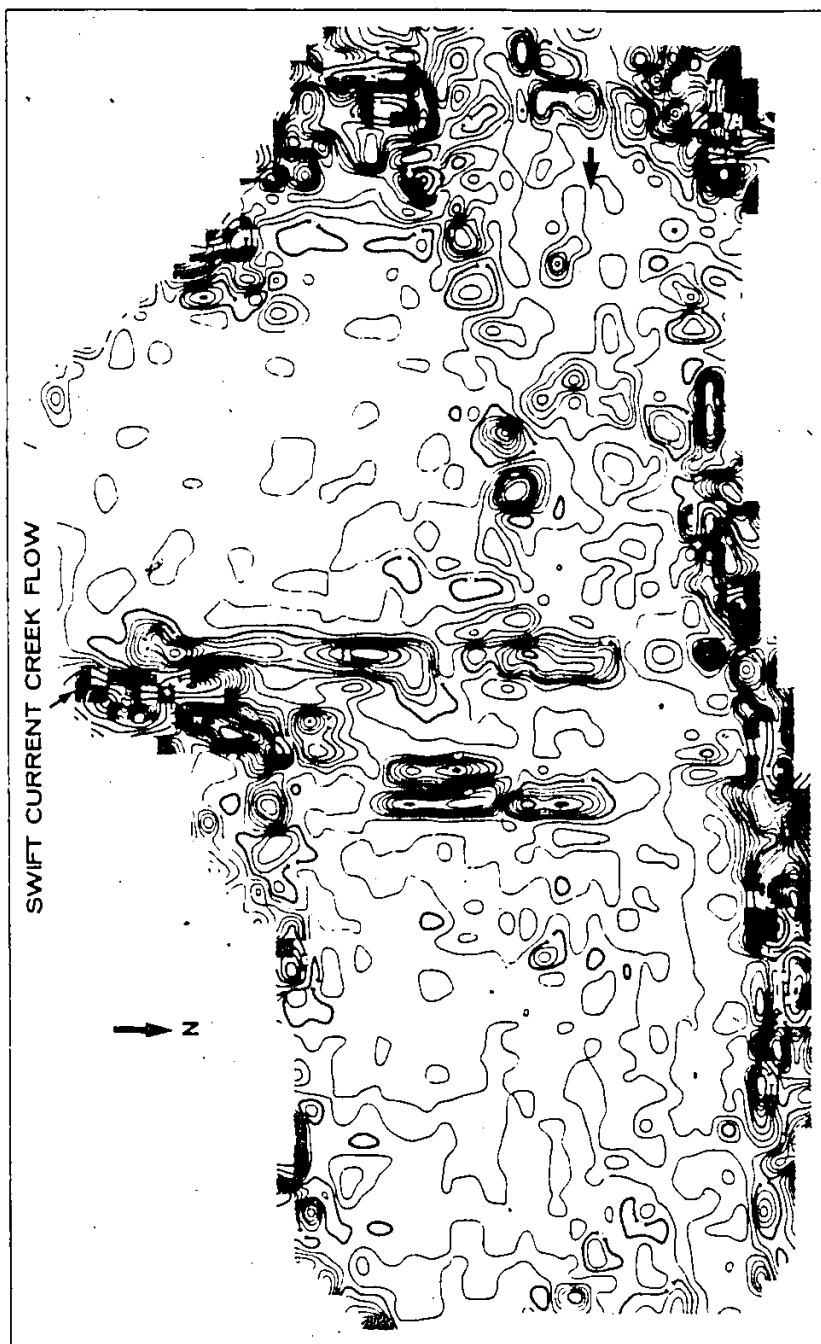


FIGURE 38
SWIFT CURRENT CREEK AREA
1972-1978 CONTOUR DIFFERENCES
CONTOUR INTERVAL = 0.5 METRE

estimated from Swift Current during this period is only 10% of the total value. This information reveals that Swift Current Creek, as a sediment supply, is a minimal source. This study also points out that bank material was a significant source of sediment in this particular area of the reservoir.

CHAPTER V

Summary and Conclusions

The Lake Diefenbaker data collection program has provided data that have contributed to a better understanding of the processes affecting reservoir sedimentation. Analyzing sedimentation in reservoirs not only provides valuable scientific information, but is useful to the operation of the reservoir and is therefore of economic importance. This and other studies have shown that sedimentation rates are low and therefore not a major problem. The concern therefore is not in magnitude but in the ability to understand the processes and how they interact over time.

This particular program has also provided the opportunity to document changing methodology as well as technological changes in the field of reservoir sedimentation. The most notable developments over the past ten years have been the development of an automated hydrographic data acquisition system (HYDAC-200) and processing system (HYDRA). These systems made it possible to undertake area surveys where previously the traditional cross section approach had been used. Unfortunately, because there are only limited area data and the quality of the earlier surveys using the area method were poor, it is impossible to compare and evaluate the two methodologies. Therefore in this thesis most of the hydrographic data used to analyze sedimentation were cross-sectional data.

The hydrometric station data revealed that the South Saskatchewan River has had an average annual flow in the order of $8\,000\,000\text{ dam}^3$. Since the reservoir came into existence the flows have been representative of the long term flow regime. Discharge data revealed that the median flow was $146\text{ m}^3/\text{s}$ and that June provided the greatest amount of flow, originating from mountain runoff. Regression analysis enabled flows to be reconstructed for the Lemsford Station after it had been discontinued in 1970.

The average annual load transported by the South Saskatchewan River was determined to be approximately $6\,000\,000$ tonnes. Most of the sediment transport was associated with the mountain freshet. On average sand made up 21% of the load, silt 41% and clay the remaining 38%, based on depth integrating sample. The river bed was comprised mainly of sand (87%). Sediment transport relationships were characteristic of a large river that has a high wash load contribution.

Swift Current Creek's mean annual flow is $59\,000\text{ dam}^3$, but during the period under study the flows were significantly less, in most cases, than the long term mean. This in turn severely reduced the sediment loadings. On average sand comprised 28% of sample, silt 53% and clay 19%. Based on sediment data the creek is characteristic of a flashy stream.

The hydrographic results from backwater reaches revealed that by 1972 the bed had been degraded along most of the reach. This was attributed to at least two major ice jams which had developed in the reach. By 1972, an

estimated 4 500 dam³ of material had been removed. Range 37 experienced the most change, where the bed was scoured by as much 1.32 metres. By 1975, aggradation was the dominant process. The 1978 data revealed that both aggradation and degradation were occurring as local adjustments. The gradient for the whole reach had continued to decrease with time as the river adjusted to the change in conditions.

The drawdown reach (Range 32 - Range 26) has been continuously aggrading over the years with the maximum deposition being recorded as 1.68 metres at Range 27 by 1978. The rate of deposition was found to be considerably less than had been forecasted in an earlier study. By 1978, 16.3% of the storage volume in this 36.58 km-reach had been lost due to sedimentation. This represents a loss of just less than 1% of the total live storage or 0.4% of the total reservoir storage. The slope of the bed had been reduced due to the sediment loads deposited in the lower portion of the reach.

The remaining ranges are located in the reservoir but this analysis was only conducted as far downstream as Range 9, because beyond this point the accuracy of the data was found to be questionable and the sedimentation rate negligible. The data revealed that approximately 1% of the total reservoir capacity had been lost by 1978. Dead storage changes were significant in the upper part reservoir, and 1.28% in the total dead storage capacity was computed to have been filled in. Bank slumping reduced the total live storage by about 0.5% over the years, which was contrary to a theoretical estimate that had been made.

Suspended sediment sampling was conducted improperly most of the time with the exception of 1972. If the sampling is conducted at the same time the freshet reaches the reservoir, the transport capabilities of the inflows can be determined, but data collection after that point will be affected by settling and mixing.

The Lane and Koelzer method of computing densities from particle sizes was found to overestimate, especially for the clay fraction, based on multiple regression analysis of 144 in situ bed material samples collected from Lake Diefenbaker. Bed material samples revealed that the sand portion of the sediment loads were deposited in the upper ranges of the drawdown reach and by Range 21 mostly clays were being transported and deposited. The density to distance relationship was determined to be quadratic and became asymptotic beyond Range 21.

The environmental conditions have restricted the development of a classical delta. The topset beds extend from Range 32 to Range 25 and had a slope of .00019 based on 1978 data. The topset slope should stabilize at about .00013. The foreset slope extends from Range 25 to Range 21 and had a slope of .00027, which was not very steep in comparison to findings of other studies. The large water level drawdown was determined to be responsible for affecting the development of the delta. The bottomset beds extend beyond Range 21, and the slope of .00025 is basically the same as the original bed slope.

Comparison of the hydrometric station measured loads to the loads estimated from hydrographic surveys revealed a good agreement, for the periods between 1966 and 1972 (+11%) and 1972 and 1975 (-5%) but not from 1975 to 1978. The discrepancy for that period was attributed to a higher bank contribution and the quality of the hydrographic surveys.

Swift Current Creek's contribution of sediment was negligible between 1972 and 1978. Almost all the change to the area where Swift Current Creek drains into Lake Diefenbaker was determined to be from bank slumping. In fact, only 10% of the change was attributed to the creek's contribution.

There are a few modifications that should be made to the program. One of the first would be to restrict the hydrographic surveys to upstream of Range 21, because there is a negligible amount of sediment that is transported by the inflows beyond that point. Also, the return interval should be increased between surveys because there is such a low sedimentation rate. Because there would be fewer ranges to survey they would not have to be offset in different years. The two methods (cross section vs. area) still need to be tied in with more accurate data to properly evaluate and compare them. The suspended sediment sampling program should be run independently of the hydrographic surveys and conducted when the freshet reaches the reservoir. Care should be taken to ensure the bed material sampling results are only indicative of post-reservoir changes.

In addressing the original hypotheses of this thesis, the following statements can be made. From 1966 to 1978 it was calculated that 1.4% of the total reservoir volume had been lost due to sedimentation, which is a sediment rate of only 0.1% a year. The live storage volume was decreased by 1.5% over the period, while dead storage was reduced by 1.3%. In terms of the operation of the reservoir, the impact is insignificant. The sediment load transported by the South Saskatchewan River was deposited in the upper ranges, with a negligible amount being transported beyond Range 21. The large water level drawdown was responsible for making it difficult to readily identify the different deposits of a delta, and for flattening out the structure. Bank erosion and slumping reduced the live storage of reservoir by about 0.5% over the period. Swift Current Creek's sediment load did not even make local impact on the reservoir and was overshadowed by the bank material contribution.



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APPENDIX A

Flow Duration of Daily Discharges
for the South Saskatchewan River
near Lemsford

SOUTH SASKATCHEWAN RIVER YEAR - MSFURD

DISCHARGE IN M3/S	Z JF TIME INDICATED DISCHARGE WAS EQUALLED OR EXCEEDED												TOTAL TIME
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
23.2	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
42.1	98.90	98.26	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	99.25	99.39	99.00
48.2	93.08	97.55	100.00	100.00	100.00	100.00	100.00	100.00	100.00	99.63	97.54	89.97	98.00
53.6	89.30	95.80	100.00	100.00	100.00	100.00	100.00	100.00	99.36	98.38	95.73	85.52	97.00
58.3	85.69	95.88	100.00	100.00	100.00	100.00	100.00	100.00	97.77	96.99	93.84	81.52	96.00
62.4	82.23	94.74	99.78	100.00	100.00	100.00	100.00	100.00	96.04	95.55	92.04	77.73	95.00
65.8	79.26	93.48	94.52	100.00	100.00	100.00	100.00	100.00	94.35	94.20	90.40	74.44	94.00
68.4	76.82	92.29	94.32	100.00	100.00	100.00	100.00	100.00	92.91	93.06	89.06	71.85	93.00
70.3	74.97	91.27	98.96	100.00	100.00	100.00	100.00	100.00	91.76	92.16	88.04	69.91	92.00
72.0	73.14	90.05	97.56	100.00	100.00	100.00	100.00	100.00	90.64	91.33	87.10	68.11	91.00
73.6	71.21	88.56	96.15	100.00	100.00	100.00	100.00	100.00	84.52	90.52	86.21	66.34	90.00
75.2	69.12	86.76	94.67	100.00	100.00	100.00	100.00	100.00	88.33	89.69	85.29	64.50	89.00
76.8	68.87	84.64	93.13	100.00	100.00	100.00	100.00	100.00	87.08	88.84	84.36	62.61	88.00
78.3	64.65	82.54	91.64	100.00	100.00	100.00	100.00	100.00	85.87	88.01	83.47	60.80	87.00
79.9	62.18	80.04	90.00	100.00	100.00	100.00	100.00	100.00	84.55	87.11	82.51	58.83	86.00
81.5	59.63	77.37	88.34	100.00	100.00	100.00	100.00	100.00	83.19	86.18	81.52	56.84	85.00
83.1	57.01	74.57	86.65	100.00	100.00	100.00	100.00	100.00	81.82	85.22	80.51	54.84	84.00
84.7	54.34	71.65	84.95	100.00	100.00	100.00	100.00	100.00	80.44	84.25	79.47	52.83	83.00
86.3	51.66	68.67	83.25	100.00	100.00	100.00	100.00	100.00	79.05	83.25	78.42	50.82	82.00
87.8	49.14	65.83	81.66	100.00	100.00	100.00	100.00	100.00	77.77	82.29	77.40	48.95	81.00
89.4	46.48	62.79	79.99	100.00	100.00	100.00	100.00	100.00	76.42	81.24	76.29	46.98	80.00
91.1	43.69	59.59	78.25	100.00	100.00	100.00	100.00	100.00	75.01	80.10	75.09	44.93	79.00
92.7	41.14	56.64	76.65	100.00	100.00	100.00	100.00	100.00	73.72	79.00	73.92	43.04	78.00
94.3	38.67	53.78	75.10	100.00	100.00	100.00	100.00	100.00	72.49	77.88	72.73	41.20	77.00
96.0	36.17	50.88	73.52	100.00	100.00	100.00	100.00	100.00	71.24	76.67	71.42	39.32	76.00
97.7	33.82	48.16	72.03	100.00	100.00	100.00	100.00	100.00	70.06	75.42	70.08	37.52	75.00
99.4	31.64	45.60	70.63	100.00	100.00	100.00	100.00	100.00	68.97	74.15	68.70	35.81	74.00
101	29.74	43.50	69.39	100.00	100.00	100.00	100.00	100.00	68.03	72.92	67.37	34.29	73.00
103	27.44	43.82	67.85	100.00	100.00	100.00	100.00	100.00	66.93	71.30	65.63	32.46	72.00
105	25.22	43.16	66.31	100.00	100.00	100.00	100.00	100.00	65.90	69.60	63.84	30.70	71.00
106	24.14	43.83	65.54	100.00	100.00	100.00	100.00	100.00	65.41	68.72	62.93	29.84	70.00
108	22.03	44.21	64.00	100.00	100.00	100.00	100.00	100.00	64.47	68.91	61.06	28.19	69.00
110	20.00	41.61	62.48	100.00	100.00	100.00	100.00	100.00	63.56	65.05	59.15	26.50	68.00
112	18.05	39.04	60.96	100.00	100.00	100.00	100.00	100.00	62.69	63.16	57.22	25.09	67.00
113	17.11	37.78	60.20	100.00	100.00	100.00	100.00	100.00	61.34	62.20	56.25	24.36	66.00
115	15.28	35.28	58.70	100.00	100.00	100.00	100.00	100.00	60.52	60.28	54.28	22.96	65.00
117	13.53	32.83	57.22	100.00	100.00	100.00	100.00	100.00	59.27	58.37	52.32	21.63	64.00
119	11.87	30.44	55.75	100.00	100.00	100.00	100.00	100.00	58.69	56.96	50.35	20.38	63.00
120	11.07	28.03	53.73	100.00	100.00	100.00	100.00	100.00	57.52	55.52	49.37	19.78	62.00
122	9.54	25.97	51.59	100.00	100.00	100.00	100.00	100.00	56.34	53.67	47.43	18.64	61.00
124	8.09	23.18	49.46	100.00	100.00	100.00	100.00	100.00	55.39	51.86	45.51	17.59	60.00
126	6.74	20.80	47.24	100.00	100.00	100.00	100.00	100.00	54.39	50.12	43.63	16.61	59.00
128	5.47	18.44	44.94	100.00	100.00	100.00	100.00	100.00	53.32	48.46	41.79	15.71	58.00
129	4.87	16.53	42.78	100.00	100.00	100.00	100.00	100.00	52.35	46.97	40.89	15.29	57.00
131	3.76	14.02	40.47	100.00	100.00	100.00	100.00	100.00	51.44	45.61	39.12	14.50	56.00
133	2.76	11.59	38.17	100.00	100.00	100.00	100.00	100.00	50.29	44.66	37.34	13.73	55.00
136	2.56	9.59	35.25	100.00	100.00	100.00	100.00	100.00	49.48	43.44	36.65	12.62	54.00
138	2.46	7.60	32.34	100.00	100.00	100.00	100.00	100.00	48.90	41.08	35.87	11.90	53.00
140	2.33	5.61	29.43	100.00	100.00	100.00	100.00	100.00	47.47	39.71	34.11	11.20	52.00
143	2.15	3.62	26.54	100.00	100.00	100.00	100.00	100.00	46.29	37.72	32.54	10.21	51.00
146	1.65	1.64	30.18	100.00	100.00	100.00	100.00	100.00	45.10	35.83	30.09	9.30	50.00

SOUTH SASKATCHEWAN RIVER NEAR - EMSFORD

DISCHARGE IN M³/S 2 UP TIME INDICATED DISCHARGE WAS EQUALLED OR EXCEEDED TOTAL TIME

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
149	1.16	0.00	30.49	82.07	84.06	100.00	94.82	78.35	40.90	34.05	23.80	8.48	49.00
152	0.00	0.00	34.86	80.62	86.24	100.00	94.55	77.25	38.77	32.38	21.71	7.77	48.00
155	0.00	0.00	33.31	79.56	87.41	100.00	94.30	75.98	36.72	30.83	19.86	7.16	47.00
158	0.00	0.00	31.84	78.32	86.57	100.00	94.06	74.51	34.80	29.41	18.30	6.69	46.00
161	0.00	0.00	30.46	77.09	85.74	100.00	93.84	72.79	33.04	28.12	17.06	6.35	45.00
165	0.00	0.00	28.74	75.43	84.54	100.00	93.56	70.36	30.82	26.51	15.86	5.95	44.00
169	0.00	0.00	24.12	73.75	83.24	100.00	93.27	67.84	28.72	25.00	15.04	5.55	43.00
173	0.00	0.00	25.63	72.09	81.90	100.00	92.99	65.25	26.76	23.59	14.48	5.17	42.00
178	0.00	0.00	23.94	70.05	80.23	100.00	92.64	61.96	24.49	21.98	13.95	4.68	41.00
182	0.00	0.00	22.73	68.47	78.97	100.00	92.36	59.30	22.84	20.82	13.51	4.29	40.00
187	0.00	0.00	21.40	66.60	77.58	100.00	92.01	56.00	20.99	19.53	12.74	3.79	39.00
192	0.00	0.00	20.26	64.91	76.47	100.00	91.66	52.73	19.37	18.43	11.50	3.26	38.00
197	0.00	0.00	19.19	63.56	75.53	100.00	91.30	49.46	17.88	17.37	9.98	2.72	37.00
203	0.00	0.00	17.98	62.28	74.57	100.00	90.86	45.53	16.25	16.15	8.00	2.06	36.00
209	0.00	0.00	16.85	61.18	73.72	100.00	90.39	41.59	14.90	15.03	6.06	1.40	35.00
215	0.00	0.00	15.82	60.03	72.94	100.00	89.88	37.56	13.87	14.06	4.38	0.76	34.00
221	0.00	0.00	14.91	58.63	72.19	100.00	89.31	33.76	13.26	13.28	3.17	0.16	33.00
227	0.00	0.00	14.05	57.10	71.52	100.00	88.10	30.07	12.85	12.60	2.29	0.00	32.00
235	0.00	0.00	12.95	55.03	70.71	100.00	85.57	25.77	12.37	11.74	1.38	0.00	31.00
243	0.00	0.00	11.98	52.95	69.83	100.00	82.82	22.41	11.88	10.97	0.71	0.00	30.00
253	0.00	0.00	11.04	50.31	68.31	100.00	80.35	19.82	11.16	10.22	0.09	0.00	29.00
265	0.00	0.00	10.18	46.93	66.16	100.00	78.07	17.71	10.21	9.41	0.00	0.00	28.00
276	0.00	0.00	9.58	43.84	64.15	99.67	75.95	16.12	9.26	8.89	0.00	0.00	27.00
289	0.00	0.00	9.15	40.65	61.88	99.08	73.23	14.48	7.70	7.89	0.00	0.00	26.00
301	0.00	0.00	8.92	38.44	59.83	98.70	70.67	13.44	5.67	7.19	0.00	0.00	25.00
315	0.00	0.00	8.32	36.67	57.64	98.17	67.75	11.07	3.96	6.55	0.00	0.00	24.00
331	0.00	0.00	7.24	35.10	56.24	97.38	64.56	8.44	2.72	6.53	0.00	0.00	23.00
345	0.00	0.00	6.49	33.60	54.20	95.78	62.16	6.21	1.99	6.02	0.00	0.00	22.00
358	0.00	0.00	5.92	32.07	51.54	93.79	60.20	4.26	1.45	4.54	0.00	0.00	21.00
371	0.00	0.00	5.33	30.42	49.01	91.69	58.32	2.88	1.09	3.13	0.00	0.00	20.00
384	0.00	0.00	4.62	27.77	46.71	89.56	56.52	2.24	0.98	1.97	0.00	0.00	19.00
399	0.00	0.00	3.81	24.83	44.24	87.12	54.38	1.90	0.85	0.81	0.00	0.00	18.00
418	0.00	0.00	3.04	23.05	42.58	84.56	51.14	1.56	0.32	0.06	0.00	0.00	17.00
437	0.00	0.00	2.52	21.22	39.75	81.60	47.61	1.22	0.00	0.00	0.00	0.00	16.00
453	0.00	0.00	2.22	19.54	36.59	78.23	44.39	0.93	0.00	0.00	0.00	0.00	15.00
475	0.00	0.00	2.06	17.99	32.26	74.48	41.76	0.64	0.00	0.00	0.00	0.00	14.00
498	0.00	0.00	1.96	16.64	27.74	70.26	39.62	0.60	0.00	0.00	0.00	0.00	13.00
519	0.00	0.00	1.88	15.07	24.66	66.75	36.61	0.55	0.00	0.00	0.00	0.00	12.00
548	0.00	0.00	1.82	13.43	21.95	61.76	34.02	0.29	0.00	0.00	0.00	0.00	11.00
579	0.00	0.00	1.79	12.28	19.18	56.42	31.56	0.00	0.00	0.00	0.00	0.00	10.00
612	0.00	0.00	1.76	10.44	16.18	51.36	29.24	0.00	0.00	0.00	0.00	0.00	9.00
647	0.00	0.00	1.69	8.56	11.76	47.39	27.14	0.00	0.00	0.00	0.00	0.00	8.00
684	0.00	0.00	1.49	6.03	8.13	44.61	23.57	0.00	0.00	0.00	0.00	0.00	7.00
741	0.00	0.00	1.16	4.96	6.51	39.74	20.12	0.00	0.00	0.00	0.00	0.00	6.00
805	0.00	0.00	0.95	3.88	4.44	34.10	16.70	0.00	0.00	0.00	0.00	0.00	5.00
900	0.00	0.00	0.66	2.57	3.58	27.12	14.21	0.00	0.00	0.00	0.00	0.00	4.00
1040	0.00	0.00	0.15	2.13	2.00	21.13	10.40	0.00	0.00	0.00	0.00	0.00	3.00
1230	0.00	0.00	0.00	0.87	0.62	15.17	7.84	0.00	0.00	0.00	0.00	0.00	2.00
1440	0.00	0.00	0.00	0.17	0.00	9.09	3.09	0.00	0.00	0.00	0.00	0.00	1.00
2091	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						23.200							2890.000

APPENDIX B

Total Monthly Discharges at Lemsford,
Bindloss and HWY 41, and Reconstructed
Monthly Discharges for Lemsford

SOUTH SASKATCHEAN RIVER NEAR LEMS FORD
(STN. NO. 05HG001)

TOTAL MONTHLY DISCHARGE
(M³/S)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1966	-	-	-	-	12 727	23 523	17 234	7 459	5 059	4 283	3 151	3 316
1967	2 736	2 992	5 117	13 791	24 181	45 700	18 015	5 986	3 511	3 056	3 353	2 886
1968	2 865	2 884	4 718	4 030	5 623	17 841	9 283	6 399	6 746	8 045	5 117	2 165
1969	3 109	2 676	4 874	18 403	16 091	19 216	32 081	8 109	4 196	3 803	3 415	2 492
1970	2 032	2 400	3 226	8 032	10 925	24 291	12 914	4 4770	2 660	3 441	3 384	2 319

Source: Environment Canada, Surface Water Publications

SOUTH SASKATCHEWAN RIVER AT HIGHWAY NO. 41
(STN. NO. 05AK001)
AND
RED DEER RIVER NEAR BINDLOSS
(STN. NO. 05CK004)

TOTAL MONTHLY DISCHARGE
(M³/S)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1966	-	-	-	-	13 823	24 623	17 495	7 586	5 239	4 559	3 747	3 154
1967	2 872	2 902	4 861	12 735	25 109	44 082	17 248	5 734	3 523	3 159	3 390	2 119
1968	2 934	2 626	5 578	3 773	5 961	18 064	9 665	6 470	6 720	7 832	5 210	2 613
1969	3 145	2 663	4 607	17 452	16 524	20 228	30 707	7 264	3 961	3 901	3 062	2 278
1970	2 151	2 224	3 243	8 041	11 858	25 107	12 676	4 808	2 638	3 515	3 405	2 489

Source: Environment Canada, Surface Water Publications

TOTAL MONTHLY DISCHARGES
(M³/S)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1971 (A)	2 353	3 231	3 368	17 543	15 669	25 367	9 486	5 686	2 840	3 048	3 331	1 825
(B)	2 291	3 176	3 314	17 588	15 701	25 467	9 474	5 648	2 782	2 991	3 276	1 760
1972 (A)	1 892	1 832	8 743	9 434	17 857	31 182	18 333	10 611	6 471	5 647	4 305	2 193
(B)	1 827	1 767	8 726	9 422	17 904	31 322	13 383	10 607	6 438	5 609	4 257	2 130
1973 (A)	2 803	2 828	5 256	8 384	10 823	17 190	10 097	4 561	3 576	2 803	2 355	2 995
(B)	2 745	2 770	5 215	8 365	10 821	17 232	10 090	4 515	3 523	2 745	2 293	2 938
1974 (A)	2 416	2 767	3 560	15 391	22 484	29 940	15 129	7 416	4 748	3 514	2 845	2 360
(B)	2 355	2 708	3 507	15 421	22 563	30 072	15 157	7 390	4 703	3 461	2 787	2 299
1975 (A)	2 374	1 869	2 946	6 937	17 692	29 355	16 540	5 486	4 619	4 582	3 027	3 238
(B)	2 313	1 804	2 889	6 908	17 718	29 482	16 578	5 446	4 573	4 536	2 970	3 183
1976 (A)	3 852	3 733	5 069	6 742	12 035	9 654	8 965	13 695	6 240	3 908	2 550	2 122
(B)	3 801	3 681	5 026	6 711	12 041	9 644	8 950	13 713	6 206	3 857	2 490	2 059
1977 (A)	2 369	2 822	3 293	3 455	4 090	5 664	2 877	3 892	3 409	3 144	1 914	1 807
(B)	2 308	2 764	3 238	3 401	4 041	5 626	2 819	3 841	3 355	3 088	1 849	1 742
1978 (A)	1 666	2 014	5 269	8 486	13 176	20 873	12 149	7 131	8 792	6 737	3 321	3 426
(B)	1 600	1 950	5 228	8 467	13 190	20 941	12 156	7 103	8 776	6 706	3 266	3 382

(A) Total monthly combined discharge from Bindloss and Highway 41

(B) Total monthly discharge near Lemsford ($Y = 1.01x - 78.0$)



APPENDIX C

Frequency Analysis of the South Saskatchewan River Flows

ANNUAL SUMMARY DATA

YEAR DATA ORDERED YEAR MARK PROR. REF. PERIOD

1912	11352980.	12770840.	1916	1	.012	68.000
1913	9807096.	15071624.	1917	2	.029	34.000
1914	8703791.	15777216.	1918	3	.044	22.667
1915	15602603.	15862608.	1919	4	.059	17.000
1916	18796360.	14746004.	1920	5	.074	13.600
1917	12535122.	13747676.	1921	6	.088	11.333
1918	7503524.	13337724.	1922	7	.103	9.214
1919	5013400.	12835152.	1923	8	.118	8.500
1920	10722244.	12803616.	1924	9	.132	7.556
1921	6043312.	12109824.	1925	10	.147	6.800
1922	5937923.	12007372.	1926	11	.162	6.182
1923	10627632.	11352700.	1927	12	.176	5.667
1924	7196203.	11356374.	1928	13	.191	5.231
1925	9586744.	10722244.	1929	14	.206	4.857
1926	4325504.	10722244.	1930	15	.221	4.533
1927	16051024.	10627032.	1931	16	.235	4.250
1928	13746096.	10235462.	1932	17	.250	4.000
1929	7284613.	10224064.	1933	18	.265	3.778
1930	7084024.	7537212.	1934	19	.279	3.574
1931	4066144.	9807096.	1935	20	.294	3.400
1932	8423184.	9713347.	1936	21	.309	3.238
1933	7844000.	9550010.	1937	22	.324	3.091
1934	6937923.	9586944.	1938	23	.338	2.957
1935	6307200.	8957600.	1939	24	.353	2.833
1936	5137302.	8777904.	1940	25	.368	2.720
1937	4027323.	8703796.	1941	26	.382	2.615
1938	7947072.	8501760.	1942	27	.397	2.519
1939	6024712.	8483104.	1943	28	.412	2.429
1940	6023376.	8325504.	1944	29	.426	2.345
1941	4174288.	8282432.	1945	30	.441	2.267
1942	9620016.	8123312.	1946	31	.456	2.194
1943	6262932.	8075032.	1947	32	.471	2.125
1944	4604256.	8014876.	1948	33	.485	2.061
1945	6746704.	7947072.	1949	34	.500	2.000
1946	7410750.	7884784.	1950	35	.515	1.943
1947	10722244.	7804000.	1951	36	.529	1.889
1948	14945224.	7631712.	1952	37	.544	1.838
1949	4327304.	7537104.	1953	38	.559	1.789
1950	7631712.	7495536.	1954	39	.574	1.744
1951	15957616.	7410900.	1955	40	.588	1.700
1952	12107624.	7284616.	1956	41	.603	1.659
1953	12803616.	7176204.	1957	42	.618	1.619
1954	13337724.	7094024.	1958	43	.632	1.581
1955	1037236.	6937923.	1959	44	.647	1.545
1956	6967700.	6937923.	1960	45	.662	1.511

YOMIA JOURNAL - 1977-1978

YEAR	DATA	UNDERLID	YEAR	RANK	PAUSE	REL. PERIOD
1977	6022300.	6111700.	1977	32	.820	1.470
1978	7537104.	6643312.	1978	37	.891	1.447
1979	8153437.	6796600.	1979	43	.700	1.417
1980	6716240.	6796704.	1980	47	.721	1.388
1981	5723440.	6710240.	1981	50	.735	1.360
1982	5723440.	6622500.	1982	51	.750	1.333
1983	6013344.	6613344.	1983	52	.765	1.308
1984	7087754.	6541770.	1984	53	.779	1.283
1985	1200702.	6320973.	1985	54	.794	1.259
1986	5977400.	6307200.	1986	55	.809	1.236
1987	1346374.	6054912.	1987	56	.824	1.214
1988	6541770.	6023370.	1988	57	.838	1.193
1989	1023550.	5723440.	1989	58	.851	1.172
1990	6943303.	5723440.	1990	59	.868	1.153
1991	8075637.	5613408.	1991	60	.882	1.133
1992	10227007.	5140308.	1992	61	.897	1.115
1993	6325973.	4007320.	1993	62	.912	1.097
1994	9713347.	4004270.	1994	63	.920	1.079
1995	8201721.	5332931.	1995	64	.931	1.063
1996	6754000.	4142000.	1996	65	.950	1.046
1997	3289421.	4008144.	1997	66	.971	1.030
1998	8014870.	3209421.	1998	67	.985	1.015

SAMPLE STATISTICS

SAMPLE STATISTICS

MEAN = 867753.5 S.D. = 3106903.4 C.S. = .9587 C.K. = 3.8546

SAMPLE STATISTICS (LOGS)

MEAN = 15.9132 S.D. = .3577 C.S. = .0171 C.K. = 3.1220

SAMPLE MIN = 3209421. SAMPLE MAX = 18290880. N = 67

PARAMETERS FOR GUMBEL 1 A = .000000 U = 7245914.

PARAMETERS FOR LOGNORMAL A = 15.9132 S = .3577

PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 102244. M = 15.8913 S = .3656

STATISTICS OF LOG(X-A)

MEAN = 15.8913 S.D. = .3656 C.S. = -.0063 C.K. = 3.1386

PARAMETERS FOR LOG PEAKSUN III BY MOMENTS A = .0031 B = .1365E+05 LOG(M) = -25.8755 M = .5786E-11

PARAMETERS FOR LOG PEAKSUN III BY MAXIMUM LIKELIHOOD A = .0032 B = .1222E+05 LOG(M) = -23.3274 M = .7397E-10

DISTRIBUTION STATISTICS MEAN = 15.9132 S.D. = .3550 C.S. = .0181

GUMBEL I LOGNORMAL THREE PARAMETER LOG PEAKSUN III MOMENTS

RETURN PERIOD	DATA ESTIMATE	ST. ERROR PERCENT	DATA ESTIMATE PERCENT	ST. ERROR PERCENT	DATA ESTIMATE PERCENT	ST. ERROR PERCENT
1.005	3140000.	3240000.	3270000.	3280000.	3260000.	
1.050	4520000.	4520000.	4530000.	4520000.	4530000.	
1.250	6030000.	6030000.	6020000.	6040000.	6030000.	
2.000	8140000.	8150000.	8140000.	8140000.	8140000.	5.14
5.000	10900000.	9.94 11000000.	9.94 11000000.	5.12 11000000.	5.10 11000000.	6.06
10.000	17600000.	5.43 17600000.	5.43 17600000.	6.12 17600000.	6.01 17600000.	7.43
20.000	14500000.	5.33 14500000.	6.70 14500000.	7.40 14500000.	7.38 14700000.	9.71
50.000	12200000.	5.27 12200000.	7.11 12100000.	9.22 17000000.	9.65 17000000.	11.60
100.000	13500000.	5.54 13600000.	6.41 13500000.	10.30 16700000.	11.60 16800000.	13.70
200.000	20200000.	5.77 20500000.	9.09 20600000.	12.20 20700000.	13.60 20600000.	16.50
500.000	22500000.	7.02 22600000.	9.91 23000000.	14.20 22800000.	16.40 23000000.	

APPENDIX D

Depth Integrating Particle Size Analysis
of Suspended Sediment Collected
at the Lemsford Station

DEPTH INTEGRATING PARTICLE SIZE ANALYSIS OF SUSPENDED SEDIMENT

SAMPLE IDENTIFIER DATE	DISCHARGE (M ³ /S)	CONC. (MG/L)	PERCENT FINER THAN INDICATED SIZE, IN MICROMETRES										TOTAL			SAND			PERCENT		
			2	4	8	16	31	62	125	250	500	1000	2000	D50	GDG	D50	GDG	CLAY	SILT	SAND	
AUG 2 1961	167 H	500 R	52	72	84	90	93	96	98	99	100			0.015	7.3	0.125	2.0	72	24	4	
APR 17 1962	306 H	405 K	11	19	36	51	61	70	78	94	98	100		0.015		0.180	1.6	19	51	30	
APR 18 1962	306 H	420 R	37	50	61	71	78	84	89	95	97	99		0.015		0.167	2.2	29	43	28	
MAY 27 1962	442 H	1 200 K	22	30	41	52	62	74	83	91	96	98		0.015		0.188	2.5	50	34	16	
MAY 28 1962	467 H	690 R	14	20	32	40	48	57	68	81	89	93		0.036	11.4	0.188	2.3	30	44	26	
JUN 7 1962	436 H	315 R	18	25	35	46	56	64	72	83	94	96		0.022		0.226	*	20	37	43	
JUN 13 1962	311 H	155 K	14	19	28	39	50	63	76	85	90	93		0.031	9.2	0.239	2.3	25	39	36	
JUN 20 1962	462 H	330 R	18	22	33	47	58	68	78	86	91	95		0.020		0.201	*	19	44	37	
JUN 21 1962	487 H	430 K	18	22	33	47	58	68	78	86	91	95		0.020		0.219	3.2	22	46	32	
JUN 22 1962	479 H	490 K	30	39	50	63	70	76	84	92	96	97		0.008		0.180	2.5	39	37	24	
JUN 23 1962	456 H	400 K	22	26	33	44	52	59	69	78	84	89		0.027	*	0.313	*	26	33	41	
JUN 24 1962	481 H	675 K	27	34	53	64	70	75	83	90	94	96		0.007	*	0.205	3.3	34	41	25	
JUN 25 1962	456 H	440 R	18	29	45	57	69	75	84	91	94	96		0.011	*	0.188	3.3	29	46	25	
JUN 27 1962	413 H	390 K	27	36	49	57	61	66	72	86	94	96		0.009	*	0.223	2.3	36	30	34	
JUL 10 1962	275 H	275 R	43	50	64	71	79	85	90	95	96	98		0.004	*	0.180	3.1	50	35	15	
JUL 17 1962	253 H	2 880 K	45	80	92	97	99	100						*	*	0.094	1.3	80	20	0	
JUL 18 1962	261 H	1 950 K	45	72	92	96	98	99	100					0.002	*	0.094	1.3	72	27	1	
AUG 9 1962	180 H	1 080 R	53	65	94	97	98	99	100					0.002	*	0.094	1.3	65	34	1	
SEP 4 1962	131 H	355 K	42	82	92	96	98	99	100					*	*	0.094	1.3	82	17	1	
SEP 12 1962	184 H	370 K	83	94	96	98	99	100						*	*	0.094	1.3	94	6	0	
SEP 13 1962	161 H	440 R	59	66	85	92	93	97	100					*	*	0.094	1.3	66	31	3	
SEP 15 1962	159 H	1 480 K	17	27	94	97	98	98	98	99	100			0.005	*	0.250	2.0	27	71	2	
SEP 20 1962	143 H	1 160 K	34	44	87	97	98	99	100					0.005	*	0.094	1.3	44	55	1	
MAR 29 1963	294 H	700 R	16	24	34	46	58	70	80	88	95	97		0.021	9.7	0.203	2.4	24	46	30	
JUN 11 1963	399 H	440 R	12	19	32	47	58	69	81	89	93	95		0.020	7.4	0.180	*	19	50	31	
JUN 18 1963	595 H	750 R	12	18	32	49	65	76	88	94	98	99		0.017	5.6	0.125	2.2	18	58	24	
JUN 26 1963	782 H	1 240 R	19	28	42	58	73	84	92	97	99	100		0.012	*	0.125	1.9	28	56	16	
JUL 4 1963	1 690 H	4 340 R	07	14	33	54	75	89	93	96	99	100		0.014	3.4	0.188	2.2	14	75	11	
JUL 31 1963	273 H	230 R	14	20	40	45	65	77	89	96	98	99		0.020	6.1	0.122	1.9	20	57	23	
APR 11 1964	166 H	280 R	16	24	40	53	60	72	85	94	98	99		0.014	7.8	0.139	2.0	24	48	28	
APR 18 1964	202 H	415 K	16	22	30	38	42	48	56	69	80	88		0.078	10.4	0.364	*	22	26	52	
MAY 15 1964	677 H	1 190 R	19	28	42	56	68	78	89	96	99	100		0.013	*	0.125	1.9	28	50	22	
MAY 25 1964	773 H	1 110 K	08	13	24	36	57	77	87	95	98	99		0.026	4.6	0.148	2.1	13	64	23	
JUN 9 1964	544 H	485 R	10	16	25	36	51	66	79	88	94	96		0.030	7.0	0.181	2.7	16	50	34	
JUN 13 1964	1 870 H	2 360 R	23	32	47	63	76	85	90	94	96	98		0.010	*	0.203	3.1	32	53	15	
JUL 3 1964	634 H	455 R	09	18	28	40	52	64	80	90	95	98		0.029	7.0	0.150	2.3	18	46	36	
JUL 22 1964	422 H	195 R	20	26	34	43	50	58	71	88	94	98		0.031	*	0.184	2.2	26	32	42	
SEP 7 1964	99.7 H	1 110 K	34	94	98	100								0.003	*	0.094	1.5	94	6	0	
SEP 8 1964	94.9 H	1 850 K	85	93	97	98	99	100						*	*	0.094	1.5	93	7	0	
SEP 25 1964	63.7 H	180 R	28	36	50	66	79	91	98	100				0.008	*	0.103	1.5	36	55	9	

DISCHARGE FOOTNOTE SYMBOLS
BLANK - INSTANTANEOUS
H - DAILY MEAN
CONCENTRATION FOOTNOTE SYMBOLS
R - SAMPLES COLLECTED IN SEVERAL VERTICALS
K - SAMPLE(S) COLLECTED IN A SINGLE VERTICAL

GDG (GRADING) = SQUARE ROOT (D84/D16)
* - UNABLE TO COMPUTE DUE TO INSUFFICIENT DATA
** - NO SANDS (>0.062 MM)

SOUTH SASKATCHEWAN RIV. NEAR LEMS FORD

 WATER SURVEY OF CANADA
 23/08/82, PAGE 2
 SEDIMENT SURVEY SECTION

DEPTH INTEGRATING PARTICLE SIZE ANALYSIS OF SUSPENDED SEDIMENT

SAMPLE IDENTIFIER DATE	DISCHARGE (M ³ /S)	CONC. (MG/L)	PERCENT FINER THAN INDICATED SIZE, IN MICROMETRES												TOTAL D50	GDG	SAND D50	CLAY	PERCENT SILT SAND	
			2	4	8	16	31	62	125	250	500	1000	2000							
SEP 28 1964	88.6 H	335 K	63	75	92	96	97	98	99	100				*	*	0.125	1.6	75	23	2
SEP 30 1964	103 H	2 100 K	75	83	93	97	99	100						*	*	0.125	1.6	83	17	0
OCT 4 1964	109 H	1 690 K	42	86	91	93	94	97	99	100				0.002	*	0.109	1.6	86	11	3
OCT 22 1964	136	75 R	09	18	33	47	56	64	72	84	93	96		0.021	8.4	0.229	2.6	18	46	36
APR 20 1965	742	1 490 R	20	27	38	53	68	80	91	97	99	100		0.014	*	0.119	1.7	27	53	20
APR 28 1965	442	475 R	16	24	34	46	57	70	83	94	98	100		0.021	8.3	0.148	2.0	24	46	30
MAY 2 1965	572 H	720 K	15	23	32	45	58	72	84	92	97	99		0.022	7.5	0.156	2.2	23	49	28
MAY 4 1965	614 H	730 K	11	18	28	38	50	64	78	87	92	95		0.031	7.8	0.181	3.2	18	46	36
MAY 20 1965	360	380 R	14	23	32	44	55	70	83	93	98	99		0.024	7.5	0.150	2.1	23	47	30
JUN 2 1965	479	520 R	12	18	29	40	53	71	85	94	98	100		0.028	6.0	0.132	2.0	18	53	29
JUN 7 1965	750 H	1 470 K	19	26	34	46	60	76	88	96	99	100		0.020	*	0.125	1.8	26	50	24
JUN 9 1965	739 H	1 130 K	26	34	44	55	66	78	89	95	98	99		0.012	*	0.125	2.1	34	44	22
JUN 11 1965	733 H	770 K	17	24	33	44	55	66	80	91	95	98		0.024	*	0.159	2.3	24	42	34
JUN 17 1965	776	820 R	11	16	24	35	50	68	84	95	99	100		0.031	5.6	0.125	1.7	16	52	32
JUN 21 1965	1 490	2 430 R	04	12	22	34	43	57	71	81	96	99	100	0.037	4.1	0.114	1.9	12	65	23
JUN 23 1965	1 950	2 560 R	16	26	38	52	64	78	90	96	99	100		0.015	6.8	0.120	1.9	26	52	22
JUN 29 1965	1 020	1 630 R	08	31	59	66	75	86	95	99	100		0.007	4.6	0.111	1.6	31	35	34	
JUL 1 1965	1 230 H	1 650 K	31	41	50	59	67	76	85	93	97	98		0.008	*	0.172	2.2	41	35	24
JUL 8 1965	1 210	710 R	18	24	34	44	55	66	84	97	99	100		0.024	*	0.122	1.7	24	42	34
AUG 8 1965	326 H	670 K	54	63	75	82	86	89	92	97	99	100		*	*	0.188	2.0	63	26	11
AUG 13 1965	450	420 R	14	18	26	39	50	64	78	91	97	98		0.031	7.8	0.163	2.1	18	46	36
SEP 5 1965	309 H	670 K	37	45	54	59	62	66	71	87	93	97		0.006	*	0.219	2.3	45	21	34
SEP 7 1965	292 H	1 130 K	11	30	90	90	90	91	94	97	99		0.005	1.7	0.188	2.2	30	61	9	
SEP 8 1965	292	445 R	07	25	72	77	79	83	90	98	99	100		0.006	4.9	0.168	1.7	25	56	17
SEP 9 1965	314 H	990 K	62	75	80	85	87	90	92	96	97	98		*	*	0.219	*	75	15	10
SEP 11 1965	331 H	905 K	22	31	41	54	71	86	92	97	99	100		0.014	*	0.150	2.0	31	35	14
SEP 17 1965	283 H	220 K	38	46	52	58	62	66	76	92	98	99		0.007	*	0.180	1.9	46	20	34
OCT 3 1965	368 H	280 K	36	39	46	51	56	63	83	98	100		0.014	*	0.120	1.6	39	24	37	
OCT 7 1965	425	295 R	13	16	21	28	38	51	73	91	98		0.060	7.1	0.142	1.9	16	35	49	
MAR 25 1966	362 H	230 K	65	73	81	88	94	98	100					*	*	0.094	1.3	73	25	2
APR 3 1966	867 H	2 940 K	32	44	58	78	93	98	100					0.006	*	0.094	1.3	44	34	2
APR 12 1966	408	550 R	13	19	29	44	58	74	88	98	100			0.022	6.0	0.121	1.7	19	35	26
APR 16 1966	326 H	360 K	13	17	31	45	55	65	77	92	97	99		0.024	7.2	0.171	2.0	17	48	35
MAY 11 1966	402	675 R	10	15	22	32	48	75	89	97	99	100		0.033	4.7	0.118	1.7	15	60	25
MAY 11 1966	402	670 K	10	13	20	34	59	78	88	95	98	99		0.026	4.2	0.143	2.1	13	65	22
MAY 16 1966	629 H	960 K	08	11	23	40	65	81	91	97	99	100		0.022	3.8	0.122	1.8	11	70	19
MAY 23 1966	394	320 R	14	18	32	47	56	64	77	93	97	99		0.021	7.7	0.164	1.9	18	46	36
JUN 3 1966	620 H	745 K	15	24	37	54	69	79	88	95	98	99		0.014	6.6	0.152	2.1	24	35	21
JUN 8 1966	1 180	1 680 R	14	18	26	37	53	73	87	95	98	99		0.028	6.1	0.123	1.9	18	55	27
JUN 15 1966	1 010 H	1 855 K	17	25	34	44	55	66	80	90	95	98		0.024	*	0.163	2.4	25	41	34

 DISCHARGE FOOTNOTE SYMBOLS
 BLANK - INSTANTANEOUS
 H - DAILY MEAN

CONCENTRATION FOOTNOTE SYMBOLS

 R - SAMPLES COLLECTED IN SEVERAL VERTICALS
 K - SAMPLE(S) COLLECTED IN A SINGLE VERTICAL

 GDG (GRADING) - SQUARE ROOT (084/D16)
 * - UNABLE TO COMPUTE DUE TO INSUFFICIENT DATA
 ** - NO SANDS (>0.062 MM)

DEPTH INTEGRATING PARTICLE SIZE ANALYSIS OF SUSPENDED SEDIMENT

SAMPLE IDENTIFIER DATE	DISCHARGE (M ³ /S)	CONC. (MG/L)	PERCENT FINER THAN INDICATED SIZE, IN MICROMETRES											TOTAL D50	GOG	SAND D50	GDG	PERCENT		
			2	4	8	16	31	62	125	250	500	1000	2000					CLAY	SILT	SAND
JUN 16 1966	1200	917	23	43	51	59	69	79	88	95	98	99	0.008	*	0.152	2.1	43	36	21	
JUN 16 1966	1205	917	32	40	49	58	66	75	85	95	98	99	0.009	*	0.156	2.0	40	35	25	
JUN 16 1966	2000	920 H	27	36	47	59	68	76	87	95	98	99	0.010	*	0.141	2.0	36	40	24	
JUN 22 1966	1300	572 H	31	42	57	74	87	98	100				0.006	*	0.094	1.3	42	56	2	
JUN 23 1966	1400	592	13	17	26	33	43	54	75	93	98	99	0.051	7.3	0.139	1.7	17	37	46	
JUN 28 1966	1100	507	31	39	49	59	67	77	85	96	99	100	0.009	*	0.165	1.7	39	38	23	
JUN 28 1966	1105	507	33	41	52	64	71	76	87	95	98	99	0.007	*	0.141	2.0	41	35	24	
JUL 6 1966	0930	527 H	40	49	55	62	69	79	87	96	98	99	0.005	*	0.160	1.9	49	30	21	
JUL 6 1966	2000	527 H	28	35	43	56	71	82	89	96	98	99	0.012	*	0.161	2.1	35	47	18	
JUL 7 1966	1000	725 H	36	45	55	62	69	79	87	96	98	99	0.006	*	0.160	1.9	45	34	21	
JUL 7 1966	1630	725 H	40	55	74	81	88	92	96	99	100		0.003	*	0.125	1.7	55	37	8	
JUL 8 1966	1340	934	49	58	68	80	87	91	95	98	99	100	0.002	*	0.146	2.1	58	33	9	
JUL 8 1966	1345	934	28	50	74	84	90	94	97	99	100		0.004	*	0.125	1.8	50	44	6	
JUL 18 1966	1730	665	31	41	51	62	70	77	85	94	98	99	0.008	*	0.174	2.1	41	36	23	
JUL 20 1966	1420	532	14	24	39	56	66	73	86	95	99	100	0.013	6.9	0.132	1.9	24	49	27	
JUL 27 1966	1400	430 H	33	44	57	69	79	84	90	96	99	100	0.006	*	0.167	2.0	44	40	16	
JUL 29 1966	1300	345 H	50	60	76	90	93	95	97	99	100		0.002	*	0.156	1.9	60	35	5	
JUL 29 1966	2100	345 H	45	55	72	87	92	94	97	99	100		0.003	*	0.125	1.8	55	39	6	
AUG 8 1966	2000	231 H	58	69	82	89	93	95	98	100			*	*	0.115	1.6	69	26	5	
AUG 9 1966	1435	236	70	80	88	93	96	97	98	100			*	*	0.156	1.5	80	17	3	
AUG 9 1966	1440	236	67	77	89	95	96	97	98	99	100		*	*	0.188	2.0	77	20	3	
AUG 10 1966	1930	236 H	49	57	70	83	88	92	96	99	100		0.002	*	0.125	1.7	57	35	8	
AUG 12 1966	1300	300 H	55	64	73	83	89	93	96	100			*	*	0.141	1.6	64	29	7	
AUG 24 1966	1945	184 H	51	59	69	77	83	86	92	99	100		*	*	0.143	1.6	59	27	14	
SEP 4 1966	1700	214 H	35	39	45	52	61	73	81	90	96	99	0.014	*	0.201	2.3	39	34	27	
OCT 6 1966	1030	1	38	48	57	65	70	76	85	94	98	99	0.005	*	0.167	2.1	48	28	24	
APR 21 1967	1300	592 H	29	39	50	63	72	79	87	94	97	99	0.008	*	0.170	2.3	39	40	21	
APR 26 1967	1630	391 H	33	42	52	65	73	78	87	96	99	100	0.007	*	0.153	1.8	42	36	22	
APR 30 1967	1730	498 H	26	36	49	66	80	88	92	97	99	100	0.008	*	0.175	2.0	36	52	12	
MAY 2 1967	1300	555	20	30	42	56	73	82	88	95	98	99	0.013	*	0.179	2.2	30	52	18	
MAY 7 1967	1415	439 H	21	30	41	55	69	79	86	93	96	98	0.013	*	0.188	2.7	30	49	21	
MAY 12 1967	1245	968 H	12	20	33	49	68	83	91	97	99	100	0.017	4.0	0.135	1.8	20	63	17	
MAY 16 1967	1700	629 H	19	27	40	54	65	73	83	93	98	100	0.014	*	0.169	2.1	27	46	27	
MAY 20 1967	1330	765 H	21	30	44	58	70	80	88	94	98	99	0.011	*	0.167	2.2	30	50	20	
MAY 21 1967	1520	900 H	14	22	32	46	62	76	84	91	94	96	0.020	7.1	0.156	*	22	54	24	
MAY 22 1967	1730	937 H	13	22	34	49	66	80	88	94	97	98	0.017	5.9	0.167	2.4	22	58	20	
MAY 23 1967	2130	934 H	16	25	37	53	70	84	92	97	99	100	0.015	5.6	0.125	1.9	25	59	16	
MAY 24 1967	1600	983 H	14	21	33	48	63	81	90	96	98	99	0.018	5.7	0.135	2.1	21	60	19	
JUN 1 1967	2030	1	13	20	29	43	57	73	85	94	98	99	0.024	6.5	0.146	2.0	20	53	27	
JUN 3 1967	1610	1	10	14	22	33	49	74	88	95	99	100	0.032	4.6	0.121	1.9	14	60	26	

DISCHARGE FOOTNOTE SYMBOLS
BLANK - INSTANTANEOUS
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CONCENTRATION FOOTNOTE SYMBOLS

R - SAMPLES COLLECTED IN SEVERAL VERTICALS
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GOG (GRADING) - SQUARE ROOT (D84/D16)
* - UNABLE TO COMPUTE DUE TO INSUFFICIENT DATA

DEPTH INTEGRATING PARTICLE SIZE ANALYSIS OF SUSPENDED SEDIMENT

SAMPLE IDENTIFIER DATE	DISCHARGE (M ³ /S)	CONC. (MG/L)	PERCENT FINER THAN INDICATED SIZE, IN MICROMETRES	TOTAL D50	GDG	SAND D50	CLAY	PERCENT SILT SAND
JUN 4 1967	2 430	4 580 R	14 23 37 52 67 81 92 97 99 100	0.015	5.7	0.116	1.0	23 58
JUN 5 1967	2 310 H	3 210 K	16 26 39 53 66 80 92 99 100	0.014	6.4	0.115	1.6	26 54
JUN 6 1967	2 030 H	2 690 K	21 28 40 56 68 80 91 99 100	0.013	*	0.119	1.6	28 52
JUN 7 1967	2 010 H	2 030 K	18 26 39 52 65 77 89 96 99 100	0.015	*	0.122	1.0	26 51
JUN 8 1967	1 920 H	1 880 K	18 25 36 51 61 73 86 94 98 99	0.015	*	0.133	2.1	25 48
JUN 14 1967	1 650	1 100 R	15 20 30 42 54 68 84 94 98 99	0.026	7.2	0.125	1.9	20 48
JUN 21 1967	1 390 H	1 910 K	13 17 24 34 45 61 78 89 95 98	0.041	7.4	0.153	2.3	17 44
JUN 28 1967	1 180	640 R	12 16 25 36 48 60 77 90 96 98	0.036	6.9	0.154	2.2	16 44
JUL 7 1967	816 H	410 K	16 20 28 42 56 72 83 92 96 98	0.029	8.3	0.167	2.3	20 52
MAY 23 1968	179 H	191 K	12 13 22 33 45 58 72 85 92 95	0.043	6.7	0.192	2.0	13 45
MAY 26 1968	215 H	281 K	04 05 11 21 34 49 63 77 88 92	0.067	5.8	0.228	3.2	5 44
MAY 27 1968	345	611 R	07 08 14 24 42 68 86 95 98 99	0.041	3.5	0.118	1.0	8 60
MAY 30 1968	504	885 R	16 19 32 46 60 74 88 95 98 99	0.020	7.3	0.121	2.0	19 55
JUN 3 1968	507 H	1 490 K	49 59 70 78 82 90 96 98 99 100	0.002	*	0.115	2.1	59 31
JUN 6 1968	493	435 R	19 28 39 51 61 73 85 93 97 99	0.015	*	0.148	2.2	28 45
JUN 6 1968	481 H	450 K	18 28 40 51 61 72 83 91 96 98	0.015	*	0.172	2.3	28 44
JUN 8 1968	589 H	561 K	18 22 32 44 58 76 88 95 98 99	0.022	*	0.125	2.1	22 54
JUN 16 1968	847 H	856 K	19 25 34 47 59 72 85 92 96 98	0.020	*	0.143	2.4	25 47
JUN 25 1968	470	605 K	21 28 44 62 76 86 94 98 99 100	0.011	*	0.117	1.7	28 58
JUL 31 1968	280 H	396 K	23 30 43 57 68 76 86 88 92 95	0.012	*	0.250	*	30 46
AUG 1 1968	470	266 R	23 32 43 60 72 79 84 92 97 99	0.011	*	0.211	2.1	32 47
AUG 1 1968	250 H	256 K	32 40 54 69 78 84 91 97 99 100	0.007	*	0.146	1.9	40 44
AUG 13 1968	181 H	942 K	64 76 88 94 96 97 98 100	*	*	0.156	1.5	76 21
SEP 25 1968	249	2 090 R	77 86 92 94 95 96 98 99 100	*	*	0.125	2.0	86 10
SEP 27 1968	331 H	1 490 K	65 73 78 84 88 91 96 99 100	*	*	0.119	1.7	73 18
SEP 28 1968	328 H	1 600 K	76 82 84 87 89 91 95 99 100	*	*	0.141	1.7	82 9
SEP 29 1968	340 H	1 470 K	66 75 84 87 90 91 95 99 100	*	*	0.119	1.7	75 16
SEP 30 1968	354 H	1 050 K	60 69 78 84 86 89 94 97 98 99	*	*	0.146	2.7	69 20
OCT 4 1968	371 H	416 K	31 35 48 58 63 68 80 91 96 98	0.010	*	0.170	2.2	35 33
APR 16 1969	668 H	476 K	38 49 65 82 94 98 99 100	0.004	*	0.125	1.6	49 49
JUN 3 1969	603 H	396 K	15 20 31 50 58 68 81 90 95 98	0.016	8.3	0.167	2.4	20 48
JUN 3 1969	614	430 R	17 21 29 39 50 60 76 90 96 98	0.031	*	0.161	2.1	21 39
JUN 17 1969	665	397 R	14 21 31 41 51 62 77 91 97 99	0.030	8.5	0.161	2.1	21 41
JUN 30 1969	1 620	3 290 R	14 22 33 48 65 81 90 95 98 99	0.018	5.8	0.138	2.2	22 59
JUN 30 1969	1 590 H	3 510 K	13 24 35 49 64 79 90 97 99 100	0.017	6.4	0.122	1.7	24 55
JUL 1 1969	1 600 H	2 810 K	16 26 39 54 69 81 90 95 98 99	0.014	6.4	0.138	2.2	26 55
JUL 3 1969	2 180 H	2 730 K	16 24 35 47 60 74 87 95 98 100	0.019	7.4	0.129	2.0	24 50
JUL 3 1969	2 200	2 750 R	15 23 33 47 62 75 85 93 97 98	0.019	7.3	0.164	2.2	23 52
JUL 7 1969	1 390 H	1 390 K	23 30 42 55 67 79 88 95 98 99	0.013	*	0.152	2.1	30 49
JUL 10 1969	1 610	1 620 R	20 27 37 47 58 69 78 85 90 94	0.020	*	0.241	*	27 42

DISCHARGE FOOTNOTE SYMBOLS
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GDG (GRADING) = SQUARE ROOT (D84/D16)
* - UNABLE TO COMPUTE DUE TO INSUFFICIENT DATA

DEPTH INTEGRATING PARTICLE SIZE ANALYSIS OF SUSPENDED SEDIMENT

SAMPLE IDENTIFIER DATE	DISCHARGE (M3/S)	CONC. (MG/L)	PERCENT FINER THAN INDICATED SIZE, IN MICROMETRES										TOTAL			SAND			PERCENT		
			2	4	8	16	31	62	125	250	500	1000	2000	D50	GDG	D50	GDG	D50	CLAY	SILT	SAND
JUL 10 1969	1306	1 490 K	22	28	37	49	63	77	88	95	98	100		0.017	*	0.134	2.1		28	49	23
JUL 17 1969	1100	441 K	10	15	27	38	50	63	75	94	99	100		0.031	6.5	0.168	1.7		15	48	37
JUL 23 1969	1345	513 K	18	25	34	44	53	63	79	95	99	100		0.026	*	0.145	1.7		25	38	37
SEP 11 1969	0715	612 K	74	80	87	90	91	91	93	97	100			*	0.203	2.0		80	11	9	
SEP 13 1969	1320	2 010 K	84	92	98	100								*	*	*	*		92	8	0
SEP 14 1969	1545	1 000 K	51	71	80	85	88	90	93	96	98	99		*	*	0.208	2.7		71	19	10
SEP 27 1969	0830	1 540 K	77	88	96	98	99	100						*	*	0.094	1.3		88	11	1
SEP 28 1969	1700	98.3 H	82	90	96	99	99	100						*	*	*	*		90	10	0
SEP 29 1969	1000	3 330 K	88	94	96	96	96	98	100					0.003	1.3	0.094	1.3		94	4	2
SEP 29 1969	1005	3 160 K	62	96	97	98	98	99	100					*	*	0.094	1.3		96	3	1
SEP 30 1969	1400	1 520 K	87	91	95	98	99	100						*	*	*	*		91	9	0
OCT 3 1969	1830	1 680 K	02	03	05	09	20	47	85	99	100			0.067	2.2	0.106	1.6		3	44	53
OCT 19 1969	1700	330 K	58	64	73	77	78	80	83	88	95	98		*	*	0.321	2.9		64	16	20
MAY 24 1970	515 H	774 K	14	20	34	50	64	75	86	96	99	100		0.016	6.5	0.144	1.7		20	55	25
MAY 26 1970	1430	580 R	14	21	33	48	64	76	87	94	98	99		0.018	6.5	0.143	2.1		21	55	24
MAY 26 1970	1435	560 K	14	20	32	48	62	75	85	93	97	99		0.018	6.7	0.164	2.2		20	55	25
JUN 1 1970	0845	639 K	16	22	34	50	64	74	83	91	95	97		0.016	8.4	0.188	2.6		22	52	26
JUN 11 1970	2000	424 K	12	17	30	42	60	71	86	96	99	100		0.023	5.7	0.123	1.7		17	54	29
JUN 15 1970	1640	511 R	23	29	39	50	60	69	82	95	99	100		0.016	*	0.149	1.7		29	40	31
JUN 15 1970	1645	600	23	30	42	55	65	74	84	93	97	99		0.013	*	0.167	2.2		30	44	26
JUN 17 1970	0815	466 K	40	50	62	74	84	92	98	99	100			0.004	*	0.104	1.7		50	42	8
JUN 17 1970	1600	934 H	22	28	37	48	63	80	91	94	96	97		0.018	*	0.119	3.3		28	52	20
JUN 19 1970	1430	5 090 R	08	23	43	65	75	87	96	99	100			0.011	4.2	0.108	1.6		23	64	13
JUN 19 1970	1435	4 860 K	06	30	54	65	76	90	98	100				0.007	4.1	0.101	1.4		30	60	10
JUN 21 1970	0830	2 350 K	18	23	32	42	56	70	83	92	96	98		0.025	*	0.153	2.3		23	47	30
JUN 23 1970	1420	1 590 R	22	28	41	57	69	81	92	98	99	100		0.013	*	0.116	1.7		28	53	19
JUN 23 1970	1425	1 800 K	20	26	36	48	60	70	78	86	92	96		0.019	*	0.234	3.0		26	44	30
JUN 26 1970	1040	665 K	17	25	37	50	61	73	87	96	99	100		0.016	*	0.123	1.7		25	48	27
JUL 3 1970	1655	659 K	26	33	40	51	56	67	77	91	97	99		0.015	*	0.183	2.1		33	34	33
JUL 3 1970	1700	619 R	24	31	40	49	58	67	79	92	97	99		0.018	*	0.168	2.1		31	36	33
JUL 4 1970	1415	651 H	31	38	42	47	48	52	55	60	65	90		0.047	*	0.720	*		38	14	48
JUL 5 1970	1645	4 160 K	41	50	58	67	72	77	82	90	94	97		0.004	*	0.227	2.9		50	27	23
JUL 7 1970	2030	767 H	19	25	37	51	66	75	83	93	97	99		0.015	*	0.181	2.2		25	50	25
JUL 9 1970	1045	679 K	32	41	51	67	76	84	88	93	94	98		0.008	*	0.225	3.0		41	43	16
JUN 24 1975	1715	2 890	18	27	48	63	76	85	92	96	98	99		0.009	*	0.141	2.3		27	58	15

DISCHARGE FOOTNOTE SYMBOLS
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GDG (GRADING) = SQUARE ROOT (D84/D16)
* - UNABLE TO COMPUTE DUE TO INSUFFICIENT DATA
** - NO SANDS (>0.062 MM)

APPENDIX E

Bed Material Particle Size Analysis
of Data Collected at the Lemsford Site

STAT. NO. 05H001

NEAR LANSFORD

26/04/62, 7 P.M.

SEDIMENT SURVEY RESULTS

PERCENT FINER THAN INDICATED SIZES IN METERES

PERCENT FINER THAN INDICATED SIZES IN METERES

SAMPLE IDENTIFIER	DATE	TIME	0.075	0.15	0.3	0.6	1.2	2.5	5.0	10.0	20.0	40.0	60.0	80.0	100	TOTAL	GOG	TYPE OF SAMPLER
JUL 11 1961			01	02	04	07	11	16	21	25	29	32	35	38	41	0.295	2.1	
MAY 11 1962			04	09	13	17	21	25	29	32	35	38	41	44	47	0.351	7.0	
JUN 20 1962			24	34	40	46	50	54	57	60	63	66	69	72	75	0.275		
JUL 24 1962			28	30	36	40	44	48	52	56	60	64	68	72	76	0.279		
AUG 29 1962			32	32	38	42	46	50	54	58	62	66	70	74	78	0.188		
JAN 3 1963			01	02	04	07	11	16	21	25	29	32	35	38	41	0.250	8.1	
MAR 29 1963			03	11	16	21	25	29	32	35	38	41	44	47	50	0.300	2.0	
APR 24 1963			04	07	11	16	21	25	29	32	35	38	41	44	47	0.332	2.2	
JUN 1 1963			00	01	17	03	07	09	100							0.375	1.5	
JUN 15 1963			13	17	23	31	37	44	48	52	56	60	64	68	72	0.191	3.9	
JUN 25 1963			04	07	11	16	21	25	29	32	35	38	41	44	47	0.292	1.7	
JUL 4 1963			01	04	07	11	16	21	25	29	32	35	38	41	44	0.429	7.9	
JUL 30 1963			01	04	07	11	16	21	25	29	32	35	38	41	44	0.272	1.7	
SEP 28 1963			01	04	07	11	16	21	25	29	32	35	38	41	44	0.325	1.6	LANE
OCT 10 1963			02	04	07	11	16	21	25	29	32	35	38	41	44	0.294	1.7	LANE
JAN 22 1964			01	04	07	11	16	21	25	29	32	35	38	41	44	0.373	1.9	LANE
FEB 23 1964			02	04	07	11	16	21	25	29	32	35	38	41	44	0.343	1.6	LANE
MAR 22 1964			01	04	07	11	16	21	25	29	32	35	38	41	44	0.375	1.6	LANE
MAY 9 1964			01	04	07	11	16	21	25	29	32	35	38	41	44	0.213	1.6	LANE
JUN 13 1964			15	22	29	36	43	50	57	64	71	78	85	92	99	0.222	5.2	BM-54
JUL 3 1964			01	03	07	11	16	21	25	29	32	35	38	41	44	0.278	7.4	LANE
AUG 14 1964			02	04	07	11	16	21	25	29	32	35	38	41	44	0.335	3.9	BM-54
OCT 22 1964			01	02	04	07	11	16	21	25	29	32	35	38	41	0.269	1.6	BM-54
MAR 31 1965			01	02	04	07	11	16	21	25	29	32	35	38	41	0.265	1.6	LANE
APR 28 1965			03	13	23	33	43	53	63	73	83	93	100			0.371	11.5	LANE
JUN 17 1965			17	27	37	47	57	67	77	87	97	100				0.245	2.9	BM-54
JUN 23 1965			02	08	18	28	38	48	58	68	78	88	98	100		0.500	5.6	BM-54
AUG 13 1965			01	03	08	13	18	23	28	33	38	43	48	53	58	0.327	5.9	BM-54
NOV 2 1965			00	12	24	36	48	60	72	84	96	100				0.382	1.4	LANE
APR 12 1966			01	20	43	66	89	112	135	158	181	204	227	250	273	0.369	1.6	BM-54
JUN 8 1966			00	02	07	12	17	22	27	32	37	42	47	52	57	0.183	1.7	BM-54
JUL 8 1966			00	05	12	20	28	36	44	52	60	68	76	84	92	2.000		BM-54
AUG 31 1966			00	01	03	07	11	16	21	26	31	36	41	46	51	0.290	1.7	LANE
APR 22 1967			00	00	15	30	45	60	75	90	100					0.361	1.4	BM-54
MAY 26 1967			01	14	27	40	53	66	79	92	100					0.358	1.3	BM-54
MAR 13 1968	1023		00	06	12	18	24	30	36	42	48	54	60	66	72	0.500	2.1	LANE
MAY 31 1968	1010		00	03	07	11	16	21	26	31	36	41	46	51	56	0.234	1.7	BM-54
JUN 12 1968	1200		01	12	24	36	48	60	72	84	96	100				0.318	1.6	BM-54
OCT 21 1968	1400		00	19	37	56	75	94	113	132	151	170	189	208	227	0.388	2.0	BM-54
MAR 11 1969	1410		02	13	26	39	52	65	78	91	100					0.409	1.7	BM-54

USE (GRADING) - SQUARE ROOT (0.847316)

* - UNABLE TO COMPUTE DUE TO INSUFFICIENT DATA

HEAR LEMSFUKU

УДК 62-75

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2010/08/22, 2010/08/23

RECEIVED

PARTICLE SIZE ANALYSIS OF BED MATERIAL.

EXPERIMENTAL AND THEORETICAL STUDIES ON THE EFFECTS OF VIBRATION ON THE HUMAN BODY

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APPENDIX F

A Review of Various Sediment Discharge Formulae

Introduction

Since Dubois exposed the tip of the iceberg in 1879, bed load transport has been the subject of extensive research. In the past hundred years dozens of bed load formulae have been derived and to begin to mention them would be a monumental and probably futile task. Therefore, this paper will restrict itself to reviewing a few of the more accepted formulae. Emphasis will be placed on the application and possible limitations of these formulae and refrain from analyzing the mechanics and the derivation of each formula.

It is important to note here that the term "bed load" has been used rather loosely in the literature. Formulae that predict total sediment load and bed material load have in many cases, for the sake of simplicity, been included under the general heading of bed load formulae. This in turn has added much confusion and has caused many formulae to be incorrectly applied or the results misinterpreted. For the sake of clarity these terms have been defined in Appendix A. Also for comparison purposes the A.S.C.E. Task Committee's approved grade scale has been included in Appendix B.

Bed load formulae can be sub-divided into three basic groups according to their theoretical relationships:

1. bed load as a function of discharge;
2. bed load as a function of tractive force;
3. bed load as it relates to relative roughness.

One formula has been chosen from each group so as to present a representative view of the various approaches that have been taken towards determining bed load movement. The Schoklitsch (1943) was chosen from the various discharge formulae that exist, while the Meyer-Peter and Muller (1948) will represent the tractive force formulae and Rottner (1959) will represent the relative roughness formulae.

The Einstein (1950) formula will also be considered because of its innovative approach of determining statistical relationships to predict bed material discharge. Finally, Toffaleti (1968) will be included because of the fact that total sediment load formulae have increased in popularity over the strictly bed load formulae.

Schoklitsch (1943)

Schoklitsch originally derived his bed load formula in 1934 and then after some revisions reintroduced it in 1943. However, it would appear that the newer formula has not been accepted as readily as the earlier version and most literature even today when referring to the Schoklitsch formula are referring to the 1934 formula.

Some criticisms of the earlier formula were that at higher sediment discharges the computed tonnages were found to be much lower than measured tonnages (Colby et al., 1955), while Hubbell and Matejka (1959) concluded that in general, computed discharges were higher and that they did not vary consistently with any of the hydraulic parameters. Concern was also shown that part of the suspended discharge may be included in the predicted bed load discharge.

The original formula was based on Gilbert's flume data on well-sorted and also graded sediments with a median size ranging from .3mm - 5mm and measured data from two European rivers that have gravel beds. Vanoni (1975) suggests that this would mean that the bed load formula should not be applied to sand bed streams that carry considerable bed sediment in suspension.

The revised formula was based primarily on the same experimental data, but it is not known whether Schoklitsch included any other data in deriving his newer formula. The major change to the formula has been to the coefficient, which no longer includes particle diameter to determine its value. Schoklitsch does not give an explanation to why he made this change, therefore, taking away from its credibility. (Shulits et al., 1968) Also, rather than effective diameter, D_{40} (grain size of which 40% is finer) was considered more acceptable. These unsubstantiated changes are probably the reason why the 1943 formula has not been readily accepted.

The formula is available in a metric form as well as available for use with English units. The basic field data required are slope, discharge and a sample of the sediment so as to be able to determine D_{40} .

Shulits and Hill (1968) after some research choose the Schoklitsch 1934 formula to be the most suitable of the five discharge formulae he reviewed, and also went as far as to credit it as the best of the thirteen bed load formulae because of its simple form, and because it directly produces a rating curve of bed load versus discharge. Also Stein (1965) credited the Schoklitsch formula as one of the

most suitable bed load formulae due to the fact it proved the easiest and least susceptible to errors in calculating.

Meyer-Peter and Muller (1948)

Meyer-Peter like Schoklitsch derived his original formula in 1934, however, his first formula was a discharge formula whereas his second one was based on tractive force. Unlike Schoklitsch it was Meyer-Peter's second formula that rose to prominence.

The revision of the formula was in view of subsequent data changes, and are:

1. the inclusion of the effect of sediment density;
2. separation of bar resistance from total bed resistance (achieved by using Manning equation) for sediment consisting of a mixture of various sizes and an effective grain size diameter proposed. (Chitale, 1966)

The M.P.M. formula was based on data from experiments in flumes ranging in width from 15 cm. - 2 m. with slopes varying from .0004 - .02 and water depths from 1 cm. - 120 cm. Coal, barite and river sediment were used to determine the effects of different specific gravities. Graded and sorted sediments with mean sizes and effective diameters in the range .4 mm. - 30 mm. were used in the experiments. Vanoni (1975) again suggests that because the formula is based upon flows with little or suspended sediment that it is not applicable for flows with appreciable suspended loads.

Of interest is that the 1948 paper states that the formula determines the movement of the solid matter rolling or jumping along the bed of a river, but not the transport of matter in suspension. It is not clear where they mean the distinction between bed load and suspended load be drawn and it is possible that some suspended sediment might have been included in the original results. (Crickmore, 1967).

Field results showed that computed discharges compared reasonably with total sediment discharges and with unmeasured sediment discharge under different hydraulic conditions, and claimed that the formula accurately measured the actual bed load discharge (Hubbell et al., 1959).

This formula based on shear stresses was originally presented for a metric format and has since been revised for use with data in English units. Field data required to be collected includes: total sediment discharge, width, depth, slope; while specific weight of the sediment, effective diameter and D_{90} can be obtained from the sediment samples.

Of the six tractive force formulae reviewed by Shulits and Hill (1968) the M.P.M. and Straub were determined the most applicable, M.P.M. was chosen because it was the most firmly founded on experiments, of all the recent formulae. None of the formulae were shown to be more accurate over all than any of the rest.

Rottner (1959)

Rottner and Laursen are the only formulae

that are based on relative roughness (particle size divided by the depth of flow). The Laursen formula is for determining total load, whereas, Rottner's is primarily a bed load formula. Rottner's formula has not been widely accepted as a bed load formula, which explains why it is rarely mentioned in the literature.

Rottner applied the least squares method to obtain linear correlations between his parameters. The formula might be considered a velocity formula due to the fact that it has a velocity parameter and a bed load parameter, both of which have depth as the characteristic length.

Shulits and Hill (1968) points out a weakness with Rottner's method, in that it ignores bed form phenomena and their relation to his relative roughness concept. Also of interest is that Rottner intentionally omits slope, mainly because he felt that in the majority of cases it will not be known, or erroneous because of flows that are not uniform.

Data used for the derivation of Rottner's formula was compiled by various researchers and as far as is known, was not supplemented with data from his own flume experiments. This in turn has added some confusion and reservations about using his method because of the fact that the range of his data is unknown.

The original metric version of his formula has since been modified so as to be able to be used with English units. The data required to be collected are: depth, velocity, and sediment samples from which sediment density (in water) and mean diameter can be determined.



Einstein (1950)

Einstein's probabilistic approach is valid for computing bed material discharge (bed load plus suspended load minus wash load). In his 1950 paper Einstein refers to his formula as a bed load function which in turn has been misinterpreted by some to mean it computes bed load discharge. His procedure was found to be so complicated and laborious that it was modified by Colby and Hubbell (1961) and now with the aid of tables and graphs it computes total sediment discharge (including wash load). Many of the concepts that were introduced by Einstein have since been incorporated by others to compute sediment discharge.

The original formula was based on nine assumptions and it is now obvious that some of them were unrealistic. An example, is the assumption that the viscosity of the water is not affected by the presence of the sediment, or equally untrue is the notion that the settling velocity of the particles be assumed to be the same in the suspension as in still water at zero concentration (Einstein et al, 1972). Einstein's theory that a sediment particle moves only when the lift force acting on the particle is greater than the submerged weight was shown to be not valid for a high sediment transport rate. (Shen, 1975)

Einstein realized that sand beds, particularly in large streams, do not satisfy the condition that all transport occurs along the bed and that a considerable part of the motion takes the form of suspension. This concept is what distinguished his approach from the earlier conventional

bed load formulae. However, it is important to mention that his method is only considered applicable to:

1. steady uniform flow in alluvial rivers;
2. bed material load (no wash load);
3. cohesionless sediment particles;
4. to a sediment transport rate that is not too high;
5. where the ratio between the flow depths to the sediment size are not too high. (Shen, 1975)

Einstein derived his formula from data obtained from flume experiments with two well-sorted sediments of mean size 28.65 mm. and .785 mm., respectively.

In the original computations the foot-pound-second system of units was used, but since the relations are dimensionally homogeneous, any consistent set of units could be used. (Vanoni, 1975). The field data required for the calculations are: channel slope; data on cross section; depth, width, cross-sectional area and wetted perimeter; sample of bed material; weight fractions, specific weight, D_{35} , D_{65} ; and finally, water temperature.

Colby and Hembree (1955) applied the Einstein formula and compared it to measured results on the Niobrara River. The bed material load computed by the Einstein formula plus measured wash load compared well to the measured total load at the contracted section, however, the relative tonnages in the different size ranges compared poorly. Tests on the Middle Loup River using the formula showed some agreement even though the number and location of the cross sections did not meet Einstein's recommendations. (Hubbell et al., 1959).

Toffaletti (1968)

Toffaletti developed a procedure that analytically determines the total sand transport of a river. The method was based on the procedure and concepts introduced by Einstein, along with the following changes:

1. velocity distribution in the vertical;
2. a combining of several of the correction factors into one;
3. a relating of stream parameters to sediment transport at other than the two grains as bed load. (Toffaletti, 1969)

A point of interest is that Toffaletti divides his flow into three zones for computation purposes: the lower zone where the depth of flow is less than $R/11.24$ (R is the hydraulic radius), the middle zone is between $R/2.5$ and $R/11.24$ and the upper zone is above $R/2.5$.

Due to the fact that his formula is relatively new, very little has been written about it. A good critical review has, however, been written by Willis (1969). Willis feels that some of the theoretical relationships involved appear to be arbitrary even though there is a good agreement between computed and observed loads. Also he believes that the relationship between the exponent of the power function velocity distribution and temperature is coincidental rather than general. Toffaletti's division of the flow into his three zones appear arbitrary, but qualitatively correct. Theoretical concepts of the procedure development are deficient, but are apparently compensated for by other empirical relations, such as the proposed nucleus load equation and "A" factors.

Toffaletti based his procedure on data that had been collected from seven large rivers and flume data from four investigators. The seven rivers had depths ranging from one foot to over fifty feet with bed sediment in the fine to medium sand ranges. The flume data was based on flow depths ranging from 2 in. - 2 ft. and the bed sediment was of medium grain sizes varying from .3 mm. - .93 mm. (Vanoni, 1975)

One minor drawback with the procedure is that it can only be used with English units and has yet been converted to use with the metric system. The data required for computation are: the average velocity in the vertical, stream width, hydraulic radius, energy slope, water temperature, D_{65} , and the portion of the bed material that is of a given grain size fraction and their settling velocity.

A comparison of approximately 600 cases (339 river cases and 282 model studies) showed a good agreement of computed versus measured loads; that covered a very wide range of conditions. (Toffaletti, 1969)

Conclusions

Most of the formulae discussed are either empirical or semiempirical in nature and have been based on the results of laboratory flume experiments. In most cases, the data collected was from a narrow range of flow conditions. Transport rates obtained in the laboratory usually apply to straight flymes, whereas, natural water courses are irregular in cross section and alignment. As Herbertson (1969) points out, a set or series of functionally

correct diagrams would provide a more reliable starting point for extrapolative deduction than would an equation which results from the superficial compressing of experimental points into a narrow band covering a limited range of circumstances.

As has been mentioned earlier, the problem is that the basic data which was used to derive some of these formulae is unknown. Shulits and Hill (1968) also find it disconcerting that the data of Gilbert has been applied by many if not all to create their formulae, yet Gilbert's own formula is not used and the wall effects of his work are still debated.

Another dilemma becomes apparent when one tries to collect satisfactory data from natural rivers. The efficiency of a bed load sampler is difficult to determine and only fairly reliable because samplers can be calibrated only in laboratory flumes by using sampler models, which are not likely to be hydraulically similar to the prototype in the field (Hubbell, 1964). This in turn makes it difficult in assessing the accuracy of the various formulae. Also, because bed load discharge has an oscillatory manner, bed load discharge defined by a single measurement will not be representative of the mean discharge.

Raudkivi (1967) points out an interesting fact, and that is that even between formulae accounting for the same thing the variations are appreciable (errors of 100% are common) and suggests that more than one formula should always be used. However, Chitale (1966) summarizes the situation the best;

In fact; the problem of picking a sediment transport equation is an unhappy one that must

be faced by each individual designer. All of the equations are slightly different in form; all are based on limited data, either entirely or largely from the laboratory; each fits some data better than the others; none fits all the data (which is why there are so many); none has gained the wide acceptance shared by the relatively few flow equations.

So as can be seen, these formulae should only be considered to provide estimates, if anything at all.

APPENDIX G

Montnly Suspended Sediment Loads
at Lemsford, Bindloss and HWY 41,
and Reconstructed Monthly
Loads for Lemsford

SOUTH SASKATCHEWAN RIVER NEAR LEMS FORD
(STN. NO. 05HB001)

TOTAL MONTHLY SUSPENDED SEDIMENT LOADS
(TONNES)

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1966	-	-	-	-	531 380	1 453 000	1 250 120	230 290	75 343	38 491	10 101	6 199
1967	4 957	5 077	104 076	1 244 400	3 300 000	6 137 600	517 630	45 456	39 652	9 363	15 025	14 989
1968	20 589	10 386	65 110	33 864	198 500	1 040 870	398 870	101 600	313 546	184 880	38 451	4 164
1969	2 563	1 620	99 058	3 282 740	620 990	1 296 970	3 825 390	92 118	222 068	91 765	32 323	9 941
1970	2 822	3 346	7 800	501 154	362 454	3 219 160	854 620	68 681	17 306	62 800	9 119	2 665

Source: Environment Canada, Sediment Data Publications

SOUTH SASKATCHEWAN RIVER AT HIGHWAY NO. 41
(STN. NO. 05AK001)

AND
RED DEER RIVER NEAR BINDLOSS
(STN. NO. 05CK004)

TOTAL MONTHLY SUSPENDED SEDIMENT LOADS
(TONNES)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1966	-	-	-	-	465 485	1 870 910	1 716 430	136 152	45 462	26 051	6 802	4 609
1967	3 435	3 791	43 756	1 114 156	3 321 660	4 937 250	393 399	35 508	7 894	8 323	12 376	4 259
1968	3 019	3 858	19 874	19 005	204 350	960 550	384 696	107 251	169 216	123 381	18 662	3 089
1969	3 367	3 167	145 874	3 038 370	608 340	1 420 770	3 641 090	82 620	265 553	45 612	7 776	3 332
1970	3 444	2 663	9 156	549 419	427 867	3 587 081	954 505	34 854	12 066	28 525	8 775	5 014

Source: Environment Canada, Sediment Data Publications

TOTAL MONTHLY SUSPENDED SEDIMENT LOADS
(TONNES)

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1971 (A)	3 122	14 742	7 903	4 018 543	680 781	1 991 590	152 781	57 013	13 595	10 629	7 803	2 107
(B)	-	2 937	-	4 234 955	706 941	2 092 466	148 852	47 618	-	-	-	-
1972 (A)	2 065	2 233	631 533	384 704	1 332 177	3 136 169	604 780	143 947	56 986	12 137	6 167	3 304
(B)	-	-	654 885	393 987	1 395 466	3 302 286	626 607	139 507	47 589	-	-	-
1973 (A)	3 096	3 716	29 841	498 602	282 203	1 143 210	204 802	75 765	37 125	7 365	2 448	2 601
(B)	-	-	18 897	514 377	285 644	1 195 728	203 831	67 439	26 596	-	-	-
1974 (A)	3 136	6 152	9 593	3 816 723	2 409 250	2 645 230	353 873	73 136	37 835	14 230	3 678	2 108
(B)	-	-	-	4 021 631	2 533 932	2 783 363	60 342	64 660	27 347	2 396	-	-
1975 (A)	2 052	2 597	4 315	834 824	1 368 190	5 605 907	681 993	51 092	20 742	10 105	6 706	5 469
(B)	-	-	-	869 764	1 433 532	5 912 799	708 222	41 359	9 279	-	-	-
1976 (A)	11 001	8 471	57 064	182 979	560 566	211 903	196 200	920 235	26 618	7 898	2 289	1 316
(B)	-	-	47 672	180 764	579 873	211 336	194 738	960 043	14 433	-	-	-
1977 (A)	2 491	3 630	6 755	65 189	199 750	161 090	17 202	38 047	164 390	37 949	6 527	2 210
(B)	-	-	-	56 620	198 491	157 627	5 538	27 571	161 115	27 361	-	-
1978 (A)	2 323	5 122	234 431	643 167	789 710	1 537 810	205 315	178 628	452 384	31 966	-	-
(B)	-	-	235 149	677 183	822 078	1 612 820	204 373	176 165	465 525	21 143	-	-

(A) Total monthly combined suspended sediment load from Bindloss and Highway 41
 (B) Total monthly suspended sediment load near Lemsford ($Y = 1.06x - 12\ 645.0$)

APPENDIX H

Flow Duration of Daily Discharges
for Swift Current Creek Near
the Mouth and the Leinan Stations

SWIFT CURRENT CREEK NEAR THE JIM

WISCONSIN

2 OF TIME INDICATED DISCHARGE WAS EQUALLED OR EXCEEDED

Run	Time	Temp	Pressure	Flow	Conc	Yield	Quality
1	10.0	100.0	10.0	1.0	1.0	1.0	1.0
2	10.0	100.0	10.0	1.0	1.0	1.0	1.0
3	10.0	100.0	10.0	1.0	1.0	1.0	1.0
4	10.0	100.0	10.0	1.0	1.0	1.0	1.0
5	10.0	100.0	10.0	1.0	1.0	1.0	1.0
6	10.0	100.0	10.0	1.0	1.0	1.0	1.0
7	10.0	100.0	10.0	1.0	1.0	1.0	1.0
8	10.0	100.0	10.0	1.0	1.0	1.0	1.0
9	10.0	100.0	10.0	1.0	1.0	1.0	1.0
10	10.0	100.0	10.0	1.0	1.0	1.0	1.0
11	10.0	100.0	10.0	1.0	1.0	1.0	1.0
12	10.0	100.0	10.0	1.0	1.0	1.0	1.0
13	10.0	100.0	10.0	1.0	1.0	1.0	1.0
14	10.0	100.0	10.0	1.0	1.0	1.0	1.0
15	10.0	100.0	10.0	1.0	1.0	1.0	1.0
16	10.0	100.0	10.0	1.0	1.0	1.0	1.0
17	10.0	100.0	10.0	1.0	1.0	1.0	1.0
18	10.0	100.0	10.0	1.0	1.0	1.0	1.0
19	10.0	100.0	10.0	1.0	1.0	1.0	1.0
20	10.0	100.0	10.0	1.0	1.0	1.0	1.0
21	10.0	100.0	10.0	1.0	1.0	1.0	1.0
22	10.0	100.0	10.0	1.0	1.0	1.0	1.0
23	10.0	100.0	10.0	1.0	1.0	1.0	1.0
24	10.0	100.0	10.0	1.0	1.0	1.0	1.0
25	10.0	100.0	10.0	1.0	1.0	1.0	1.0
26	10.0	100.0	10.0	1.0	1.0	1.0	1.0
27	10.0	100.0	10.0	1.0	1.0	1.0	1.0
28	10.0	100.0	10.0	1.0	1.0	1.0	1.0
29	10.0	100.0	10.0	1.0	1.0	1.0	1.0
30	10.0	100.0	10.0	1.0	1.0	1.0	1.0
31	10.0	100.0	10.0	1.0	1.0	1.0	1.0
32	10.0	100.0	10.0	1.0	1.0	1.0	1.0
33	10.0	100.0	10.0	1.0	1.0	1.0	1.0
34	10.0	100.0	10.0	1.0	1.0	1.0	1.0
35	10.0	100.0	10.0	1.0	1.0	1.0	1.0
36	10.0	100.0	10.0	1.0	1.0	1.0	1.0
37	10.0	100.0	10.0	1.0	1.0	1.0	1.0
38	10.0	100.0	10.0	1.0	1.0	1.0	1.0
39	10.0	100.0	10.0	1.0	1.0	1.0	1.0
40	10.0	100.0	10.0	1.0	1.0	1.0	1.0
41	10.0	100.0	10.0	1.0	1.0	1.0	1.0
42	10.0	100.0	10.0	1.0	1.0	1.0	1.0
43	10.0	100.0	10.0	1.0	1.0	1.0	1.0
44	10.0	100.0	10.0	1.0	1.0	1.0	1.0
45	10.0	100.0	10.0	1.0	1.0	1.0	1.0
46	10.0	100.0	10.0	1.0	1.0	1.0	1.0
47	10.0	100.0	10.0	1.0	1.0	1.0	1.0
48	10.0	100.0	10.0	1.0	1.0	1.0	1.0
49	10.0	100.0	10.0	1.0	1.0	1.0	1.0
5							

IN. M3/S	JAN	-EB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TIME
0.198			100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
0.213			98.75	100.00	100.00	100.00	100.00	98.72	100.00	100.00	100.00	100.00	99.00
0.229			97.42	100.00	100.00	100.00	100.00	97.36	100.00	100.00	100.00	100.00	98.00
0.246			96.02	100.00	100.00	100.00	100.00	95.74	100.00	100.00	100.00	100.00	97.00
0.264			94.54	100.00	100.00	100.00	100.00	94.44	100.00	100.00	100.00	100.00	96.00
0.282			93.07	100.00	100.00	100.00	100.00	92.75	97.57	100.00	100.00	100.00	95.00
0.301			91.53	100.00	100.00	100.00	100.00	91.40	95.87	100.00	100.00	100.00	94.00
0.322			89.84	100.00	100.00	100.00	100.00	89.70	94.02	100.00	100.00	100.00	93.00
0.342			88.25	100.00	100.00	100.00	98.26	88.10	92.27	99.95	100.00	100.00	92.00
0.364			86.52	100.00	100.00	100.00	95.89	86.36	90.38	99.41	100.00	100.00	91.00
0.386			84.81	100.00	100.00	100.00	93.54	84.64	88.50	98.86	100.00	100.00	90.00
0.406			83.13	100.00	100.00	100.00	91.22	82.44	86.65	98.31	100.00	100.00	89.00
0.431			81.39	100.00	100.00	100.00	88.83	81.19	84.75	97.71	100.00	100.00	88.00
0.455			79.61	100.00	100.00	100.00	86.37	79.38	82.79	97.08	100.00	100.00	87.00
0.479			77.86	100.00	100.00	98.24	83.94	77.60	80.86	96.44	100.00	100.00	86.00
0.503			76.15	100.00	100.00	95.79	81.56	75.84	78.97	95.80	100.00	100.00	85.00
0.528			74.41	100.00	100.00	93.28	79.13	74.03	77.04	95.11	100.00	100.00	84.00
0.553			72.70	100.00	100.00	90.81	76.74	72.25	75.14	94.42	100.00	100.00	83.00
0.579			70.98	100.00	100.00	88.47	74.32	70.43	73.21	93.69	100.00	100.00	82.00
0.604			69.38	100.00	100.00	85.92	72.05	68.70	71.39	92.98	100.00	100.00	81.00
0.630			67.76	100.00	100.00	83.52	69.75	66.93	69.54	92.23	100.00	100.00	80.00
0.656			66.20	100.00	100.00	81.18	67.53	65.19	67.74	91.47	100.00	100.00	79.00
0.682			64.69	100.00	100.00	78.91	65.37	63.48	65.99	90.71	100.00	100.00	78.00
0.708			63.25	100.00	100.00	76.72	63.28	61.20	64.28	89.94	100.00	100.00	77.00
0.735			61.82	100.00	99.75	74.52	61.20	60.07	62.56	89.14	100.00	100.00	76.00
0.761			60.51	100.00	99.46	72.48	59.28	58.44	60.96	88.36	100.00	100.00	75.00
0.787			59.28	100.00	99.13	70.54	57.44	56.84	59.40	87.57	100.00	100.00	74.00
0.813			58.11	100.00	98.76	68.68	55.69	55.27	57.90	86.78	100.00	100.00	73.00
0.840			56.98	100.00	98.34	66.85	53.97	53.66	56.40	85.96	100.00	100.00	72.00
0.865			56.00	100.00	97.91	65.25	52.45	52.21	55.06	85.20	100.00	100.00	71.00
0.891			55.07	100.00	97.44	63.64	50.99	50.71	53.72	84.40	100.00	100.00	70.00
0.917			54.22	100.00	96.94	62.22	49.63	49.25	52.44	83.60	100.00	100.00	69.00
0.942			53.48	100.00	96.43	60.93	48.41	47.87	51.27	82.83	100.00	100.00	68.00
0.967			52.82	99.89	95.90	59.74	47.29	46.51	50.14	82.06	100.00	100.00	67.00
0.991			52.26	99.66	95.37	58.70	46.31	45.23	49.12	81.33	100.00	100.00	66.00
1.022			51.67	99.31	94.70	57.54	45.22	43.71	47.94	80.43	100.00	100.00	65.00
1.047			51.27	99.06	94.22	56.76	44.48	42.56	47.13	79.79	100.00	100.00	64.00
1.07			50.67	98.66	93.47	55.59	43.38	41.09	45.92	78.82	100.00	100.00	63.00
1.094			50.28	98.39	92.95	54.82	42.66	40.94	45.11	78.16	100.00	100.00	62.00
1.12			49.69	97.96	92.14	53.67	41.57	38.48	43.92	77.15	100.00	100.00	61.00
1.15			49.11	97.52	91.30	52.52	40.50	36.92	42.73	76.11	100.00	100.00	60.00
1.18			48.54	97.06	90.43	51.39	39.43	35.37	41.55	75.05	100.00	100.00	59.00
1.21			47.97	96.59	89.52	50.27	38.38	33.63	40.37	73.97	100.00	100.00	58.00
1.24			47.41	96.10	88.59	49.16	37.34	32.30	39.21	72.86	100.00	100.00	57.00
1.27			46.85	95.60	87.64	48.00	36.31	30.79	38.06	71.74	100.00	100.00	56.00
1.31			46.12	94.92	86.32	46.61	34.95	28.79	36.53	70.61	100.00	100.00	55.00
1.34			45.50	94.34	85.30	45.54	33.94	27.31	35.40	69.40	100.00	100.00	54.00
1.37			44.85	93.84	84.26	44.48	32.95	25.86	34.28	67.87	100.00	100.00	53.00
1.41			44.35	93.10	82.84	43.03	31.64	23.95	32.81	66.26	100.00	100.00	52.00
1.44			43.83	92.54	81.75	42.04	30.68	22.54	31.71	65.05	100.00	100.00	51.00
1.49			43.15	91.77	80.27	40.63	29.41	20.71	30.28	63.40	100.00	100.00	50.00

WATER SURVEY CANADA
23/08/92 1 PAUL J
SCHEMATIC SURVEY SECTION

SWIFT CURRENT CREEK NEAR THE M...-IN

DISCHARGE IN M³/S 2 OF TIME INDICATED DISCHARGE WAS EQUALLED OR EXCEEDED

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL TIME
1.52	42.48	90.96	78.76	39.34	28.16	18.93	28.86	61.73	49.00				
1.56	41.83	90.16	77.22	38.02	26.94	17.20	27.46	60.05	48.00				
1.59	41.55	89.58	76.05	37.05	26.03	15.94	26.44	58.77	47.00				
1.63	40.71	88.76	74.47	35.77	24.85	14.31	25.08	57.06	46.00				
1.67	40.09	87.93	72.87	34.52	23.69	12.75	23.76	55.33	45.00				
1.71	39.48	87.09	71.26	33.29	22.55	11.26	22.46	53.59	44.00				
1.75	38.89	86.25	69.63	32.07	21.44	9.84	21.19	51.84	43.00				
1.80	38.17	85.19	67.58	30.81	20.08	8.18	19.63	49.65	42.00				
1.84	37.60	84.34	65.94	29.47	19.02	6.94	18.43	47.89	41.00				
1.88	37.05	83.49	64.29	28.34	17.99	5.79	17.25	46.13	40.00				
1.92	36.51	82.64	62.64	27.25	16.99	4.73	16.10	44.37	39.00				
1.97	35.86	81.58	60.99	25.91	15.77	3.54	14.71	42.17	38.00				
2.01	35.35	80.73	59.95	24.88	14.62	2.70	13.64	40.43	37.00				
2.06	34.74	79.68	58.92	23.62	13.68	1.80	12.34	38.25	36.00				
2.10	34.26	78.85	57.52	22.65	12.80	1.21	11.34	36.53	35.00				
2.15	33.64	77.83	56.33	21.47	11.73	.62	10.15	34.39	34.00				
2.19	33.25	77.02	55.16	20.56	10.92	0.00	9.23	32.70	33.00				
2.24	32.72	76.03	53.84	19.47	9.93	0.00	8.14	30.61	32.00				
2.29	32.21	75.06	52.96	18.42	9.00	0.00	7.11	28.55	31.00				
2.34	31.72	74.11	51.13	17.43	8.11	0.00	6.14	26.54	30.00				
2.38	31.25	73.38	49.71	16.66	7.43	0.00	5.41	24.96	29.00				
2.43	30.91	72.49	48.98	15.75	6.63	0.00	4.56	23.02	28.00				
2.48	30.49	71.63	48.12	14.90	5.88	0.00	3.78	21.13	27.00				
2.53	30.10	70.81	47.73	14.07	5.13	0.00	3.06	19.31	26.00				
2.58	29.73	70.03	46.22	13.33	4.53	0.00	2.42	17.54	25.00				
2.63	29.39	69.30	45.79	12.63	3.94	0.00	1.84	15.83	24.00				
2.68	29.07	68.61	45.46	11.98	3.39	0.00	1.34	14.19	23.00				
2.73	28.78	67.97	44.22	11.37	2.93	0.00	.92	12.63	22.00				
2.78	28.51	67.36	43.08	10.82	2.42	0.00	.58	11.15	21.00				
2.83	28.27	66.84	42.05	10.37	2.08	0.00	.31	9.74	20.00				
2.88	28.05	66.37	41.13	9.95	1.76	0.00	0.00	8.43	19.00				
2.93	27.87	65.96	40.34	9.58	1.47	0.00	0.00	7.20	18.00				
2.98	27.71	65.61	39.67	9.27	1.28	0.00	0.00	6.07	17.00				
3.03	27.49	65.14	38.78	8.86	.77	0.00	0.00	3.94	16.00				
3.08	27.01	64.19	37.05	7.99	.68	0.00	0.00	3.22	15.00				
3.13	26.16	62.57	34.35	6.44	0.00	0.00	0.00	1.95	14.00				
3.18	24.89	60.34	31.11	4.30	0.00	0.00	0.00	0.00	13.00				
3.23	23.32	57.44	27.91	2.16	0.00	0.00	0.00	0.00	12.00				
3.28	21.90	53.93	15.26	1.58	0.00	0.00	0.00	0.00	11.00				
3.33	20.42	49.95	12.51	1.44	0.00	0.00	0.00	0.00	10.00				
3.38	18.89	46.35	9.55	1.13	0.00	0.00	0.00	0.00	9.00				
3.43	17.24	43.27	6.05	.70	0.00	0.00	0.00	0.00	8.00				
3.48	15.69	40.07	3.52	.31	0.00	0.00	0.00	0.00	7.00				
3.53	13.06	36.74	2.75	0.00	0.00	0.00	0.00	0.00	6.00				
3.58	9.42	30.97	2.42	0.00	0.00	0.00	0.00	0.00	5.00				
3.63	5.19	27.71	1.02	0.00	0.00	0.00	0.00	0.00	4.00				
3.68	4.52	24.09	0.00	0.00	0.00	0.00	0.00	0.00	3.00				
3.73	1.77	14.76	0.00	0.00	0.00	0.00	0.00	0.00	2.00				
3.78	0.00	9.45	0.00	0.00	0.00	0.00	0.00	0.00	1.00				
3.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				

119.000

MAXIMUM DISCHARGE

.1195

MINIMUM DISCHARGE

10/10/1944

WILL CUMMINT CREEK NEAR LINA

DISCHARGE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL TIME
0.000	31.00	65.79	57.31	75.22	77.70	40.18	48.01	62.68	49.00				49.00
0.011	30.00	65.77	65.77	76.76	76.76	39.45	48.92	61.57	48.00				48.00
0.017	29.15	65.15	65.15	75.75	75.75	38.72	48.82	60.46	47.00				47.00
0.069	28.12	64.02	61.00	74.34	74.34	37.76	48.09	59.32	46.00				46.00
0.090	26.98	64.51	59.02	71.40	71.40	37.23	47.60	58.22	45.00				45.00
1.07	25.73	64.14	57.71	70.20	70.20	36.39	47.33	56.95	44.00				44.00
1.09	24.98	63.09	56.34	69.25	69.25	35.03	46.49	56.10	43.00				43.00
1.07	23.82	63.50	54.31	68.48	68.48	34.98	46.23	54.83	42.00				42.00
1.10	22.79	63.11	52.36	67.43	67.43	34.11	45.97	53.55	41.00				41.00
1.17	22.15	62.04	51.09	66.75	66.75	33.53	45.69	52.69	40.00				40.00
1.15	21.26	62.42	49.27	65.74	65.74	32.65	45.07	51.39	39.00				39.00
1.18	20.86	61.94	47.55	64.76	64.76	31.76	44.34	50.08	38.00				38.00
1.21	20.76	61.53	45.94	63.81	63.81	30.84	43.50	48.75	37.00				37.00
1.23	19.75	61.21	44.94	63.19	63.19	30.22	43.50	47.85	36.00				36.00
1.26	18.62	60.71	43.55	62.28	62.28	29.27	42.24	46.48	35.00				35.00
1.28	18.53	60.36	42.71	61.69	61.69	28.62	41.40	45.56	34.00				34.00
1.31	18.17	59.81	41.57	60.82	60.82	27.62	40.13	44.15	33.00				33.00
1.34	17.98	59.25	40.84	59.96	59.96	26.58	38.87	42.66	32.00				32.00
1.37	17.52	58.67	39.43	59.09	59.09	25.50	37.61	41.09	31.00				31.00
1.39	17.31	58.28	38.74	58.50	58.50	24.75	36.77	40.01	30.00				30.00
1.42	17.00	57.69	37.74	57.63	57.63	23.61	35.51	38.33	29.00				29.00
1.46	16.61	56.89	36.84	56.85	56.85	22.05	33.83	35.99	28.00				28.00
1.49	16.37	56.28	35.89	55.99	55.99	20.85	32.56	34.18	27.00				27.00
1.52	16.04	55.67	34.58	54.72	54.72	19.65	31.30	32.32	26.00				26.00
1.55	15.77	55.06	33.69	53.86	53.86	18.44	30.04	30.84	25.00				25.00
1.59	15.43	54.24	32.55	52.72	52.72	17.82	28.36	27.88	24.00				24.00
1.62	15.17	53.63	31.73	51.88	51.88	16.62	27.10	25.94	23.00				23.00
1.66	14.89	52.82	30.68	50.77	50.77	15.41	23.35	22.00	22.00				22.00
1.69	14.69	52.21	29.92	49.76	49.76	14.39	22.08	21.40	21.00				21.00
1.73	14.42	51.42	28.95	48.70	48.70	13.38	20.47	18.82	20.00				20.00
1.77	14.17	50.64	28.03	47.67	47.67	12.79	19.79	16.28	19.00				19.00
1.81	13.85	49.89	27.16	46.85	46.85	12.24	18.61	13.78	18.00				18.00
1.84	13.45	49.33	26.53	46.16	46.16	11.77	17.06	11.96	17.00				17.00
1.89	13.70	48.62	25.74	45.24	45.24	11.21	16.49	9.61	16.00				16.00
1.94	13.20	48.00	25.00	44.37	44.37	10.69	15.44	7.35	15.00				15.00
1.97	13.29	47.93	24.50	43.55	43.55	10.00	14.52	5.22	14.00				14.00
1.76	13.44	46.67	23.66	42.78	42.78	9.00	13.76	3.23	13.00				13.00
0.000	13.39	45.64	22.56	41.51	41.51	8.00	12.73	.66	12.00				12.00
2.07	13.30	44.70	20.52	40.32	40.32	7.00	11.77	0.00	11.00				11.00
2.03	13.19	41.32	17.04	38.73	38.73	6.00	10.70	0.00	10.00				10.00
0.000	13.19	41.32	17.04	38.73	38.73	6.00	10.70	0.00	9.00				9.00
0.000	13.06	38.00	15.12	37.27	37.27	5.00	1.50	0.00	8.00				8.00
0.000	13.71	35.13	12.43	34.14	34.14	4.00	1.00	0.00	7.00				7.00
3.27	12.36	30.72	9.46	31.92	31.92	3.00	.83	0.00	6.00				6.00
3.29	11.61	26.05	7.61	28.43	28.43	2.00	.66	0.00	5.00				5.00
3.55	11.09	21.46	6.30	24.06	24.06	1.06	.51	0.00	4.00				4.00
3.26	6.36	16.09	4.43	.77	.77	0.00	.34	0.00	3.00				3.00
0.000	7.25	12.21	3.53	.53	.53	0.00	.13	0.00	2.00				2.00
3.76	5.93	9.23	2.41	.24	.24	0.00	0.00	0.00	1.00				1.00
3.44	4.88	7.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00

APPENDIX I

Depth Integrating Particle Size Analysis
of Suspended Sediment Collected
from the Swift Current Creek near the
Mouth Station

SWIFT CURRENT CREEK NEAR THE MOUTH

DEPTH INTEGRATING PARTICLE SIZE ANALYSIS OF SUSPENDED SEDIMENT

WATER SURVEY OF CANADA
13/00/82, PAGE 1
SEEDIMENT SURVEY SECTION

SAMPLE IDENTIFIER	DISCHARGE	CONC.	PERCENT FINER THAN INDICATED SIZE, IN MICROMETRES	TOTAL	SAND	CLAY	PERCENT
DATE	TIME	(MG/L)	2 4 8 16 31 62 125 250 500 1000 2000	D50	D50	D50	CLAY SILT SAND
APR 9 1963	1530	955 K	14 22 33 52 77 96 99 100	0.015	4.0	0.099	1.4 22 74 4
APR 10 1963	1630	955 K	09 12 19 31 48 70 88 98 100	0.033	4.1	0.113	1.6 12 58 30
APR 11 1963	1000	1 330 K	08 13 20 29 44 62 80 95 99 100	0.039	5.2	0.129	1.7 13 49 38
APR 11 1963	1600	3 080 K	09 14 22 32 50 74 91 98 100	0.031	4.4	0.107	1.6 14 60 26
APR 12 1963	1600	3 890 K	08 14 22 31 47 70 89 98 99 100	0.034	4.7	0.110	1.6 14 56 30
APR 16 1963	1530	1 860 K	08 12 20 32 47 64 80 92 98 100	0.034	5.0	0.137	2.0 12 52 36
MAR 12 1966	1530	570 K	12 22 34 46 64 78 93 99 100	0.018	5.0	0.106	1.6 22 56 22
MAR 13 1966	1350	760 K	09 16 24 37 58 80 96 100	0.025	4.2	0.097	1.3 16 64 20
MAR 16 1966	1115	460 K	10 15 22 33 48 69 89 97 99 100	0.033	4.8	0.109	1.7 19 54 31
MAR 16 1966	1730	715 K	12 21 31 46 63 82 92 98 99 100	0.025	4.2	0.097	1.3 16 64 20
MAR 18 1966	1100	335 K	09 14 24 34 48 67 89 98 100	0.033	4.7	0.118	1.7 21 61 18
MAR 18 1966	1730	1 810 K	07 11 17 28 48 72 91 98 99 100	0.032	3.6	0.107	1.6 14 53 33
MAR 21 1966	1600	1 750 K	09 16 24 38 56 78 94 99 100	0.025	4.4	0.102	1.5 16 62 22
MAR 24 1966	1500	885 K	07 10 16 28 44 67 91 99 100	0.037	3.9	0.103	1.5 10 57 33
MAR 27 1966	1400	1 220 K	03 07 11 20 33 53 75 92 99 100	0.056	3.8	0.130	1.7 7 46 47
MAR 29 1966	0245	1 110 K	07 11 18 28 44 72 93 99 100	0.037	3.7	0.100	1.2 11 61 28
MAR 31 1966	1000	480 K	17 23 41 60 78 86 92 96 98 99	0.011	*	0.144	2.4 23 63 14
JUL 29 1966	1500	760 K	20 32 82 96 97 98 99 100	0.005	*	0.125	1.5 32 66 2
APR 10 1967	1100	1 600 K	09 14 20 34 54 78 92 97 99 100	0.027	3.9	0.108	1.8 14 64 22
APR 11 1967	1100	3 200 K	13 16 26 39 55 76 91 98 100	0.025	4.7	0.110	1.7 16 60 24
APR 11 1967	1700	1 790 K	08 13 20 31 45 66 86 95 99 100	0.033	4.3	0.107	1.6 13 57 30
APR 11 1967	1700	2 250 K	09 14 20 32 48 69 87 96 98 100	0.033	4.6	0.115	1.7 14 55 31
APR 12 1967	1100	3 610 K	11 15 22 32 47 64 82 92 99 100	0.034	5.3	0.125	2.0 15 49 36
APR 12 1967	1900	3 810 K	08 13 20 31 45 66 86 95 99 100	0.037	4.5	0.114	1.8 13 53 34
APR 13 1967	1450	4 480 K	07 11 17 25 37 55 77 92 97 99	0.022	4.8	0.126	1.8 11 44 49
APR 14 1967	1330	4 150 K	07 11 17 27 41 59 76 88 94 97	0.044	5.2	0.149	2.4 11 46 41
APR 15 1967	1300	2 600 K	10 14 20 28 39 54 71 87 94 97	0.052	6.1	0.161	2.2 14 40 46
APR 16 1967	1255	2 100 K	10 14 20 28 36 50 68 83 93 97	0.062	7.0	0.183	2.2 14 36 50
APR 17 1967	1350	1 360 K	11 15 22 30 39 49 63 78 87 93	0.065	9.4	0.216	3.0 15 34 51
APR 18 1967	1400	1 240 K	13 16 23 32 41 51 62 80 91 97	0.057	8.8	0.217	2.2 16 35 49
APR 19 1967	1000	1 020 K	13 17 24 32 41 51 62 81 92 96	0.058	9.1	0.209	2.2 17 34 49
APR 21 1967	1635	1 930 K	12 19 26 37 50 65 82 93 98 99	0.031	6.9	0.127	1.9 19 46 33
APR 26 1967	1900	165 K	29 41 59 72 82 90 94 98 99 100	0.005	*	0.145	2.0 41 49 10
MAY 12 1967	1830	460 K	15 18 34 59 79 89 94 98 100	0.013	3.8	0.134	1.8 18 71 11
MAY 24 1967	2000	585 K	05 08 14 22 33 48 73 93 97 99	0.066	4.2	0.122	1.7 8 40 52
MAR 5 1968	1330	371 K	11 16 28 46 67 84 94 98 99 100	0.016	3.9	0.110	1.7 16 68 16
MAR 6 1968	1930	380 K	13 24 50 69 84 93 98 99 100	0.016	4.9	0.117	1.7 22 62 16
APR 3 1969	1630	224 K	14 17 37 63 86 97 99 100	0.011	2.8	0.106	1.3 17 60 3
APR 4 1969	1630	1 210 K	13 16 25 38 55 80 99 100	0.026	4.2	0.096	1.4 16 64 20
APR 5 1969	1800	1 280 K	11 15 22 32 49 71 92 99 100	0.031	4.6	0.103	1.5 15 56 29

DISCHARGE FOOTNOTE SYMBOLS

BLANK - INSTANTANEOUS

M - DAILY MEAN

CONCENTRATION FOOTNOTE SYMBOLS

K - SAMPLES COLLECTED IN SEVERAL VERTICALS

X - SAMPLE(S) COLLECTED IN A SINGLE VERTICAL

GOC (GRADING) - SQUARE ROOT (D84/D16)

* - UNABLE TO COMPUTE DUE TO INSUFFICIENT DATA

DEPTH INTEGRATING PARTICLE SIZE ANALYSIS OF SUSPENDED SEDIMENT

SAMPLE IDENTIFIER DATE	DISCHARGE (M ³ /S)	CONC. (MG/L)	PERCENT FINER THAN INDICATED SIZE, IN MICROMETRES										TOTAL Ø50	SAND		PERCENT					
			2	4	8	16	31	62	125	250	500	1000		2000	Ø50	GOG	CLAY	SILT	SAND		
APR 6 1969	1415	98.0	09	13	19	29	43	66	87	98	100			0.039	4.4	0.111	1.6	13	53	34	
APR 8 1969	1430	63.1	09	12	17	25	36	55	77	89	96			0.053	5.1	0.126	2.1	12	43	45	
APR 9 1969	1000	47.0	11	15	23	35	57	62	78	91	97			0.026	6.1	0.143	2.0	15	47	38	
APR 11 1969	1000	19.7	20	30	45	61	77	87	93	97	99			0.009		0.133	2.0	30	57	13	
APR 14 1969	1700	14.3	18	29	47	66	79	90	96	99	100			0.008		0.112	1.7	29	61	10	
MAR 22 1970	1845	14.2	31	41	56	70	83	97	99	100				0.006		0.106	1.5	41	56	3	
MAR 23 1970	1800	15.6	19	28	40	53	70	84	93	99	100			0.013		0.117	1.6	28	56	16	
MAR 23 1970	1450	16.9	22	26	33	47	66	83	93	98	100			0.017		0.113	1.7	26	57	17	
MAR 25 1970	1305	16.9	22	29	41	58	74	87	95	99	100			0.011		0.111	1.7	29	58	13	
MAR 25 1970	1940	16.9	21	29	42	60	78	91	97	99	100			0.011		0.109	1.7	29	62	9	
MAR 26 1970	1300	15.5	13	16	25	38	53	72	86	95	99	100		0.027	5.3	0.125	1.8	16	56	28	
MAR 26 1970	1430	15.5	19	24	32	50	66	80	88	93	96			0.016		0.161	2.7	24	56	20	
MAR 26 1970	1450	15.5	23	28	43	64	83	92	96	99	100			0.010		0.125	1.7	28	64	8	
APR 4 1970	1900	35.4	20	27	41	59	78	93	98	100				0.011		0.102	1.4	27	66	7	
APR 5 1970	1530	62.3	11	15	24	39	60	85	97	99	100			0.023	3.6	0.093	1.4	15	70	15	
APR 6 1970	0800	69.7	13	21	30	41	54	72	91	99	100			0.025	6.5	0.106	1.5	21	51	28	
APR 6 1970	0745	96.3	10	15	21	26	39	63	89	98	100			0.044	5.0	0.104	1.5	15	48	37	
APR 7 1970	0745	96.3	11	15	21	30	42	60	79	92	97			0.043	5.9	0.129	2.0	15	45	40	
APR 7 1970	1730	96.3	09	12	20	27	39	54	71	86	95			0.052	6.3	0.164	2.2	12	42	46	
APR 8 1970	0745	63.1	16	23	35	46	58	68	84	92	96			0.019		0.125	2.2	23	45	32	
APR 8 1970	1120	61.7	350	06	09	13	20	29	45	67	84	94		0.073	4.7	0.154	2.2	9	36	55	
APR 8 1970	1150	63.1	300	08	10	14	20	30	48	72	90	96		0.065	4.4	0.132	1.8	10	38	52	
APR 8 1970	1740	63.1	07	09	13	19	27	44	69	87	96	99		0.074	4.4	0.136	2.0	9	35	56	
APR 12 1970	1125	37.4	866	11	17	26	36	47	59	73	83	89	93		0.037	8.6	0.196		17	42	41
APR 12 1970	1210	37.4	838	11	18	27	37	49	61	74	85	92	96		0.032	8.4	0.189	2.6	18	43	39
APR 14 1970	1805	33.4	544	16	21	31	43	52	61	73	86	96	99		0.026	10.7	0.191	2.1	21	40	39
APR 16 1970	1900	25.5	381	18	27	37	48	60	70	80	87	92	96		0.017		0.205	3.1	27	43	30
APR 20 1970	1300	17.6	397	22	28	38	52	65	76	84	91	95	97		0.014		0.187	2.8	28	48	24
JUN 15 1970	2130	8.21	523	28	38	57	74	81	85	93	98	99	100		0.006		0.121	1.7	38	47	15
APR 3 1971	1530	23.1	453	10	16	26	44	66	81	94	99	100		0.019	4.2	0.105	1.6	16	65	19	
APR 5 1971	1330	39.6	958	09	19	22	34	55	81	94	99	100		0.027	5.9	0.104	1.6	19	62	19	
APR 5 1971	1710	39.6	3	630	12	18	28	40	56	79	94	98	100		0.025	4.7	0.101	1.6	18	61	21
APR 6 1971	1500	42.5	2	860	09	13	20	27	41	62	84	96	99		0.042	4.7	0.115	1.7	13	49	38
APR 6 1971	1435	95.4	4	130	10	14	20	28	40	59	79	93	98		0.046	5.5	0.126	1.8	14	42	41
APR 12 1971	1030	24.3	363	19	25	38	52	65	73	85	92	96		0.014		0.157	2.4	25	50	25	
APR 13 1971	1710	21.6	290	27	34	47	62	72	80	89	94	97	99		0.009		0.138	2.4	34	46	20
APR 6 1972	1530	1.78	391	13	17	28	45	69	86	96	99	100		0.016	4.0	0.102	1.6	17	69	14	

CONCENTRATION FOOTNOTE SYMBOLS

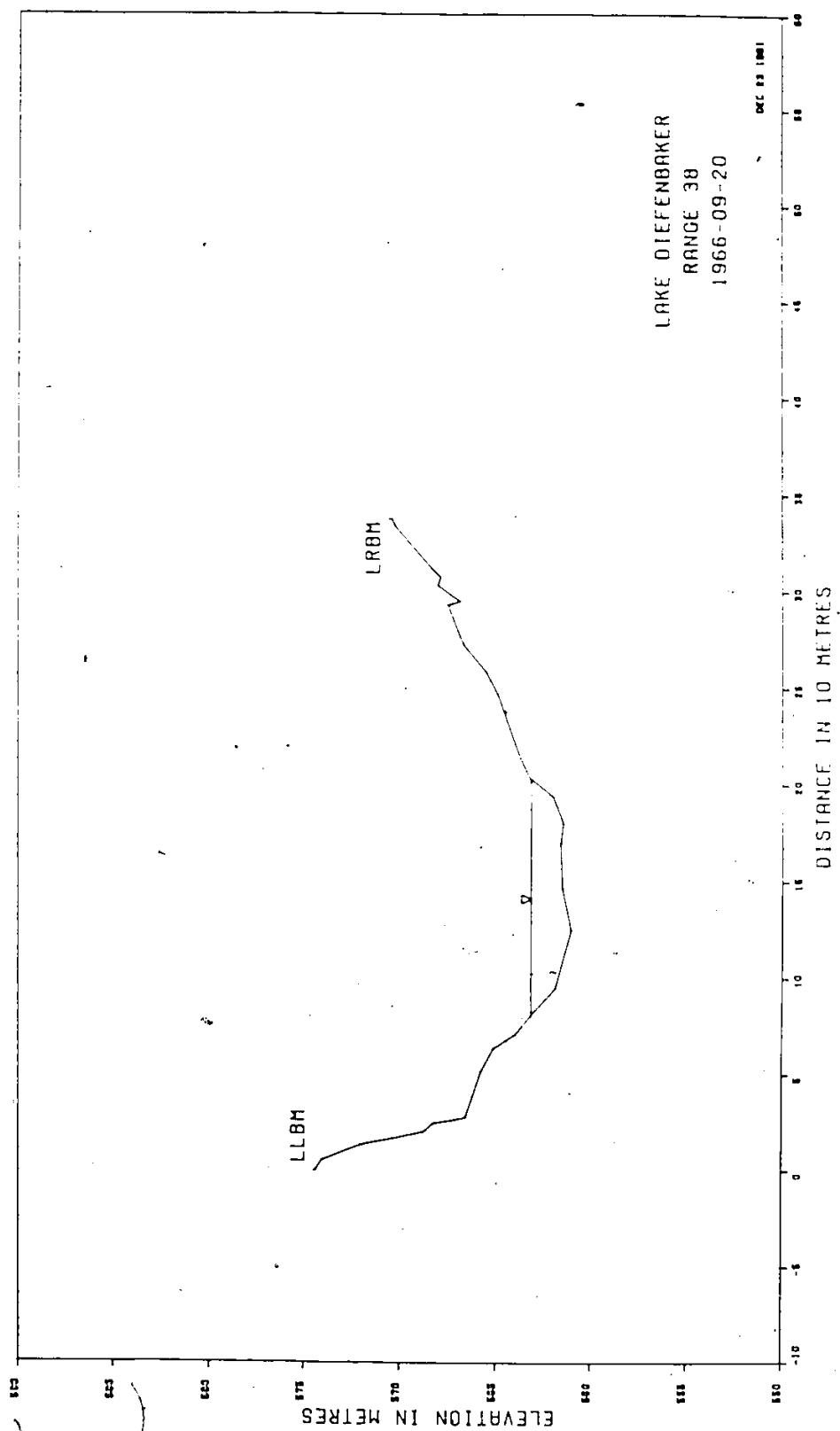
R - SAMPLES COLLECTED IN SEVERAL VERTICALS
K - SAMPLE(S) COLLECTED IN A SINGLE VERTICALGOS (GRADING) - SQUARE ROOT (D84/D16)
* - UNABLE TO COMPUTE DUE TO INSUFFICIENT DATA

DISCHARGE FOOTNOTE SYMBOLS

BLANK - INSTANTANEOUS
H - DAILY MEAN

APPENDIX J

Hydrographic Data Collected from
Lake Diefenbaker between 1966 and 1978



WATER SURVEY OF CANADA
D-C 23 1981 PAGE 1
DITAMA, ONT.

LAKE JEFFERSON

PROFILE DATA

RANGE NO 56 SURVEY DATE 1966-04-20

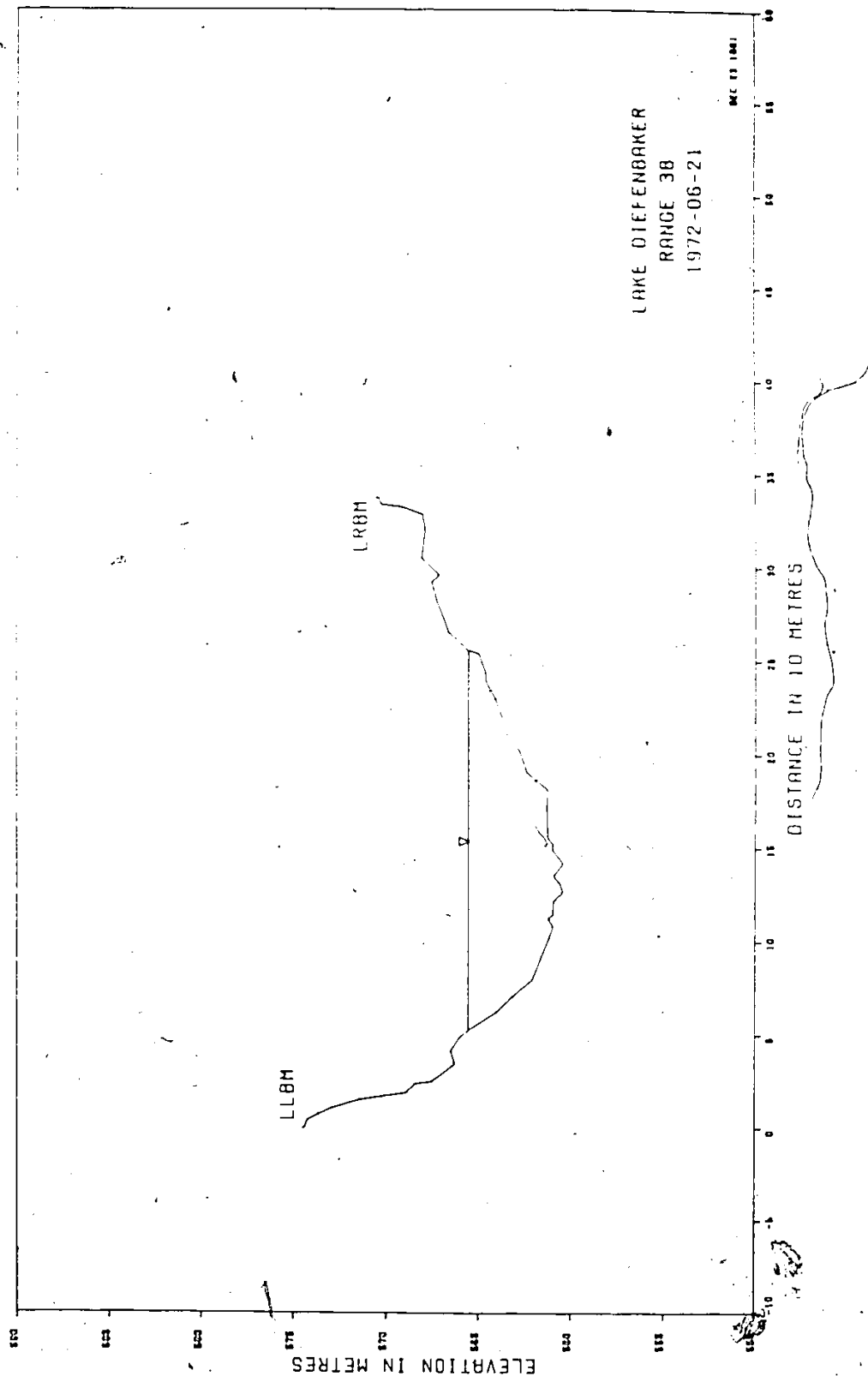
STA	ELEV	RMS	STA	ELEV	RMS	STA	ELEV	RMS
0.00	574.89	LLBM						
0.00	574.89							
5.49	574.06							
13.41	572.02							
20.12	568.76							
24.38	568.27							
27.43	566.59							
53.90	565.90							
63.09	565.13							
70.41	564.00							
80.00	563.15	HL						
80.77	563.15							
94.89	561.87							
124.36	561.05							
146.30	561.50							
168.86	561.59							
179.83	561.44							
193.85	561.99							
202.00	563.15	HL						
203.00	563.15							
215.19	563.79							
245.67	564.89							
257.86	565.53							
271.54	566.64							
275.13	566.90							
282.61	567.54							
294.44	566.90							
302.67	568.06							
306.63	567.90							
311.20	568.36							
333.15	573.28							
337.11	573.46							
337.11	573.59	LRM						

SEDIMENT SURVEY SECTION
 DEC 23 1961, PAGE 1
 UTTAMA, DNT.

LAKE DEF. NUMBER
 MINIMUM ELEVATION - 561.05
 ASSUMED MINIMUM JAILIN 561.53

RANGE NO. 18
 SURVEYED 20/ 7/1965

ELEVATION (IN)	ACC. AREA (SQ. FT.)	ELEVATION (IN)	ACC. AREA (SQ. FT.)	ELEVATION (IN)	ACC. AREA (SQ. FT.)	ELEVATION (IN)	ACC. AREA (SQ. FT.)
561.50	8.9						
562.00	51.7						
562.50	104.5						
563.00	161.9						
563.50	224.7						
564.00	295.4						
564.50	375.0						
565.00	453.1						
565.50	553.1						
566.00	663.6						
566.50	778.1						
567.00	901.1						
567.50	1032.3						
568.00	1173.1						
568.50	1313.1						
569.00	1463.6						
569.50	1611.7						
570.00	1765.2						
570.50	1924.3						



LARK JELLYMAGER

PROFILE DATA

RANGE NO 10 SURVEY DATE 1972-05-21

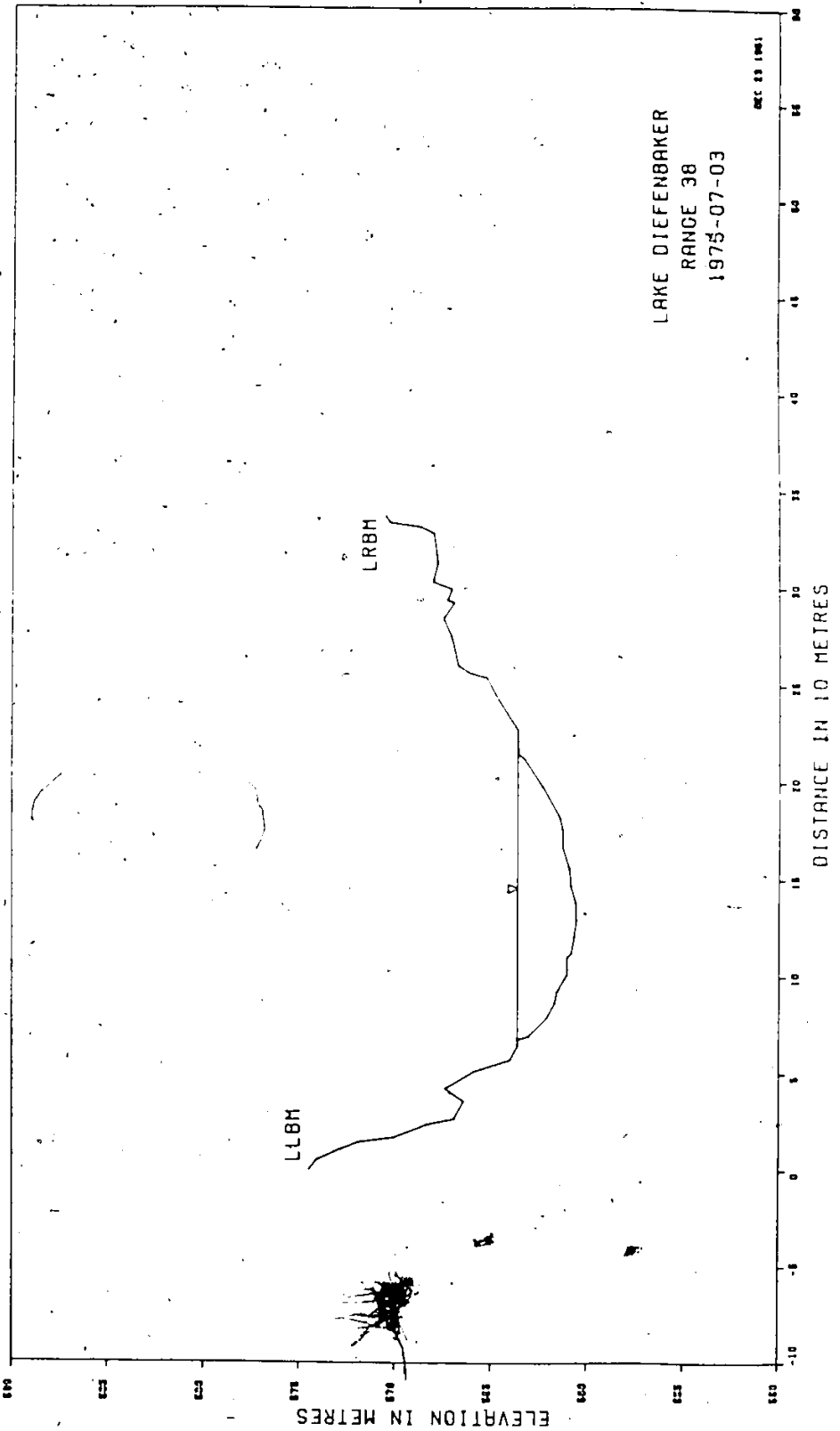
STA	ELEV	RMS	STA	ELEV	RMS	STA	ELEV	RMS
0+00	574.40	LLRM	221+27	566.85				
0+00	574.40		221+27	566.85				
6+57	574.21		221+27	566.85				
10+67	572.96		221+27	566.85				
15+24	571.44		221+27	566.85				
18+90	568.94		221+27	566.85				
23+77	568.45		221+27	566.85				
24+69	567.57		221+27	566.85				
34+14	566.26		221+27	566.85				
41+15	566.47		221+27	566.85				
48+77	565.98		221+27	566.85				
52+00	565.53	4L	221+27	566.85				
52+43	565.53		221+27	566.85				
62+18	564.00		221+27	566.85				
70+10	563.15		221+27	566.85				
79+55	562.08		221+27	566.85				
90+83	561.62		221+27	566.85				
101+80	561.17		221+27	566.85				
107+90	560.95		221+27	566.85				
112+17	561.23		221+27	566.85				
114+00	560.95		221+27	566.85				
121+62	560.92		221+27	566.85				
126+49	560.44		221+27	566.85				
131+06	560.59		221+27	566.85				
135+03	560.92		221+27	566.85				
141+73	560.41		221+27	566.85				
147+05	560.98		221+27	566.85				
152+10	563.95		221+27	566.85				
155+14	561.23		221+27	566.85				
161+54	561.26		221+27	566.85				
170+69	561.29		221+27	566.85				
181+05	561.23		221+27	566.85				
190+50	562.39		221+27	566.85				
201+47	562.75		221+27	566.85				
210+42	563.45		221+27	566.85				
220+37	563.73		221+27	566.85				
230+12	564.09		221+27	566.85				
234+70	564.37		221+27	566.85				
239+57	564.61		221+27	566.85				
243+54	564.61		221+27	566.85				
253+59	564.40		221+27	566.85				
255+00	565.53	4L	221+27	566.85				
255+73	565.53		221+27	566.85				
261+21	566.14		221+27	566.85				
265+18	565.62		221+27	566.85				

RANGE NO. - 38
 SURVEYED 21/ 5/1972
 MINIMUM ELEVATION - 562.41
 ASSUMED MINIMUM DATUM - 561.00

LAKE DIFFERENCE
 ELEVATION - AREA TABLE

SEDIMENT SURVEY SECTION
 DEC 23 1961, PAGE 1
 JITHAMONT.

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
561.00	3.6				
561.50	43.0				
562.00	31.8				
562.50	147.6				
563.00	213.9				
563.50	283.5				
564.00	359.5				
564.50	444.6				
565.00	532.1				
565.50	639.4				
566.00	742.9				
566.50	852.8				
567.00	972.0				
567.50	1103.4				
568.00	1239.1				
568.50	1390.7				
569.00	1545.7				
569.50	1702.6				
570.00	1853.1				
570.50	2018.7				



63

5062 496 1015

STA	ELEV	MARKS	STA	ELCV	MARKS	STA	ELCV	MARKS
U-00	574.49	CLBS.	312.72	567.81				
5.18	574.09		327.76	568.01				
13.67	572.37		331.32	568.71				
14.33	571.93		333.45	570.11				
15.76	570.07		337.11	570.59	LRSM			
21.67	568.36							
26.32	568.93							
35.86	565.44							
42.06	567.19							
51.21	565.89							
57.00	564.03							
64.00	563.64	4L						
68.01	563.64							
67.67	563.61							
69.19	563.09							
78.64	562.14							
86.26	561.72							
92.35	561.59							
98.43	561.23							
100.89	561.06							
110.34	561.05							
111.86	560.86							
120.40	560.71							
129.93	560.59							
138.07	560.52							
146.00	560.46							
155.45	560.95							
166.12	561.23							
174.96	561.29							
181.97	561.44							
197.21	562.30							
212.14	563.30							
2214.58	563.51							
2227.00	563.64	4L						
2227.08	563.64							
243.84	564.73							
2533.90	565.28							
256.14	565.20							
257.34	565.75							
274.32	567.08							
284.07	567.51							
292.30	566.96							
293.52	567.32							
304.31	567.08							
302.77	564.06							

SEDIMENT SURVEY SECTION
DEC 23 1981, PAGE 1
OTTAWA, ONT.

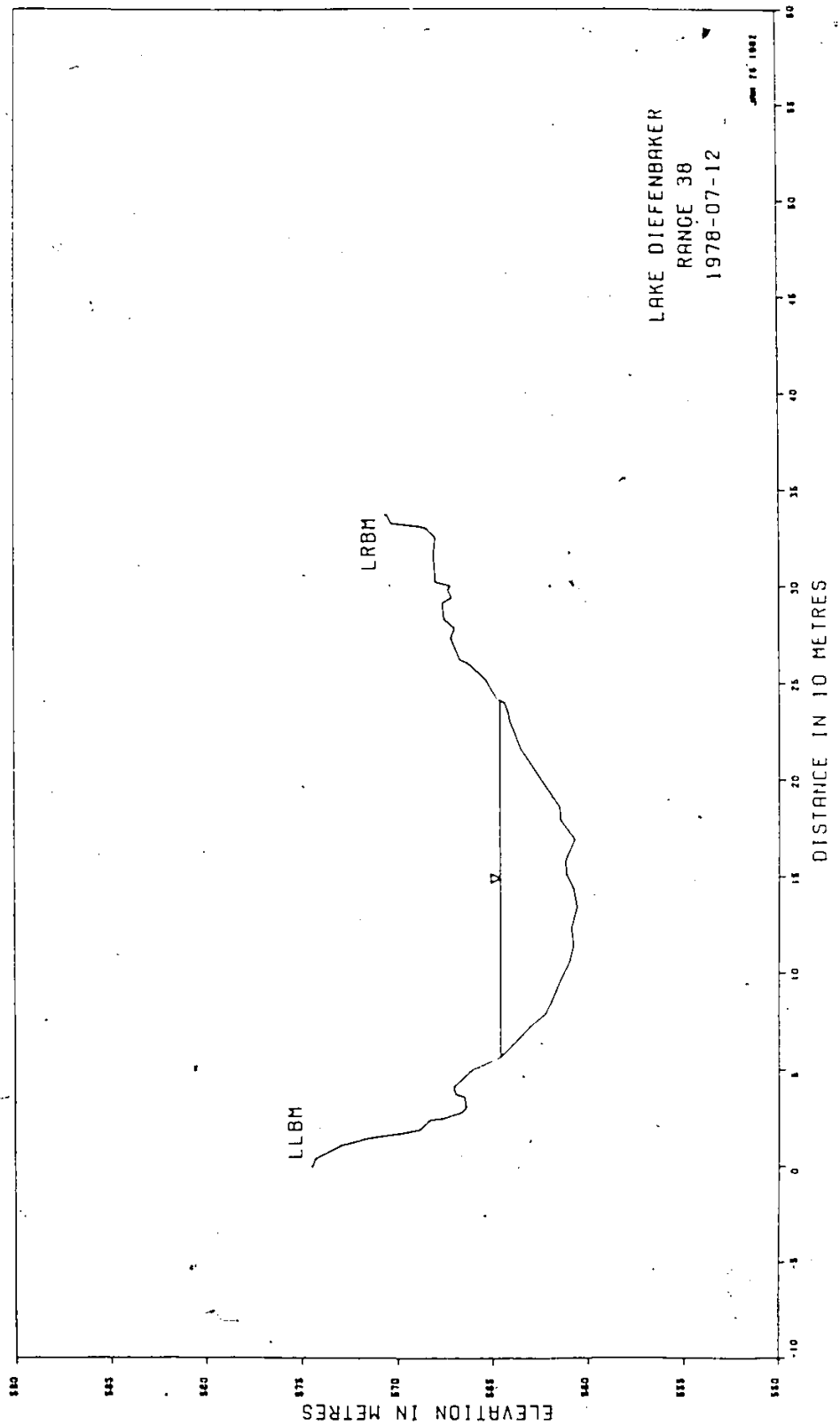
CAPE DEPRENACE

.....
ELEVATION - AREA 1A3 - 0
.....

.....
MINIMUM ELEVATION - 582.54
ASSUMED MINIMUM DATUM - 551.55
.....

.....
SURVEYED 3/ 7/1975
.....

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
581.50	86.5						
582.00	95.8						
582.50	125.1						
583.00	221.8						
583.50	292.9						
584.00	374.6						
584.50	464.7						
585.00	559.5						
585.50	653.2						
586.00	763.9						
586.50	864.9						
587.00	977.0						
587.50	1106.9						
588.00	1247.4						
588.50	1377.9						
589.00	1554.6						
589.50	1713.6						
590.00	1967.9						
590.50	2025.6						



PROFILE DATA

CHANGE NU 38 SURVEY DATE 1978-07-12

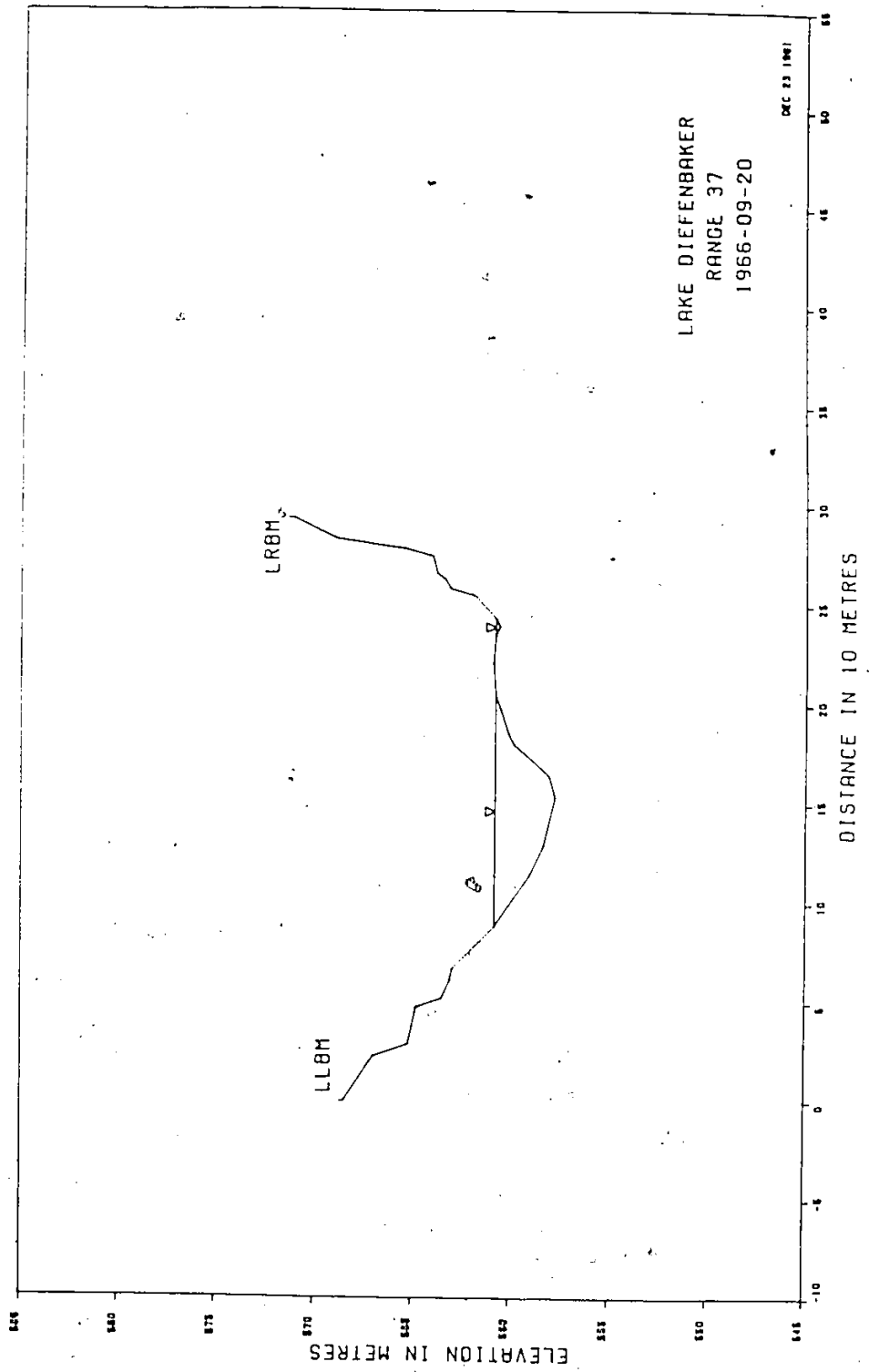
[illegible]

SEDIMENT SURVEY SECTION
 JAN 26 1982, PAGE 1
 OTTAWA, ONT.

MAPLE RIDGE
 ELEVATION - AREA TABLE

MAPLE RIDGE - 38
 SURVEYED 12/ 7/1978
 MINIMUM ELEVATION - 560.55
 ASSUMED MINIMUM DATUM - 561.00

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
561.00	12.6	561.30	50.4	562.00	101.4	562.50	160.7
563.00	226.1	563.50	297.3	564.00	376.3	564.50	464.8
565.00	556.1	565.50	656.6	566.00	758.7	566.50	864.6
567.00	979.1	567.50	1108.5	568.00	1246.8	568.50	1398.6
569.00	1710.6	570.00	1867.9	570.50	2026.4		



LAKE DUFENWATER

PROFILE DATA

RANGE 40 37 SURVEY DATE 1966-03-20

STA ELEV MARKS STA ELEV MARKS STA ELEV MARKS

0.00 568.67 LLBM

0.00 568.48

18.29 567.23

22.86 566.96

28.96 565.19

47.55 564.79

51.82 563.48

60.96 563.06

67.06 562.94

68.00 560.80 WL

68.09 563.80

114.30 559.03

128.63 558.33

153.01 557.75

163.98 558.06

179.83 559.86

185.01 560.13

197.21 560.53

206.30 560.80 WL

208.22 560.80

222.68 560.92

236.00 563.80 WL

236.39 560.80

238.96 565.59

243.00 563.80 WL

243.23 560.80

254.51 561.90

258.17 563.12

262.74 563.39

265.79 561.92

274.32 564.03

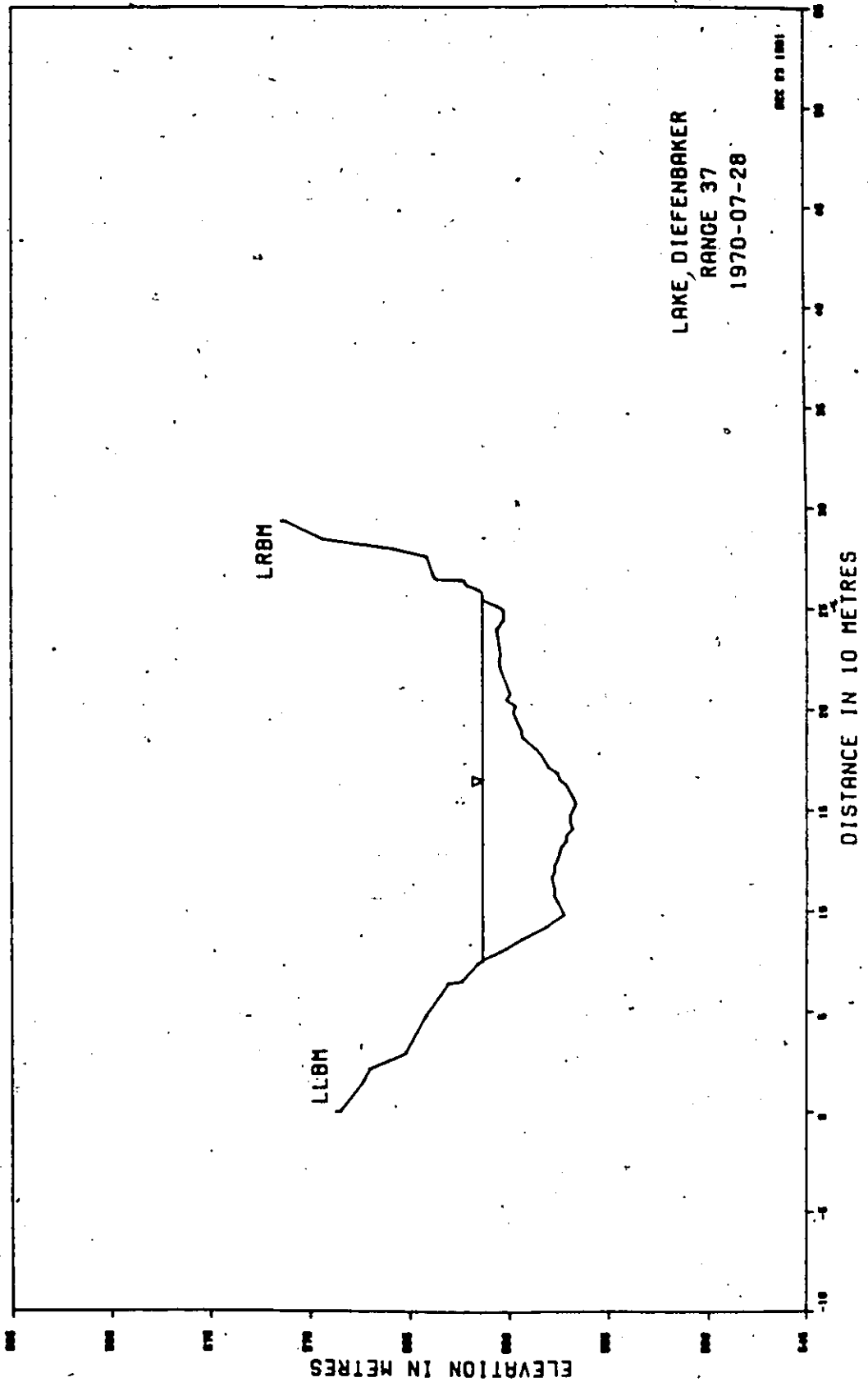
277.98 565.46

282.85 568.94

293.22 571.16

293.22 571.41 LLBM

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
558.50	19.8				
559.00	43.8				
559.50	75.5				
560.00	113.2				
560.50	152.5				
561.00	223.0				
561.50	305.1				
562.00	372.1				
562.50	453.0				
563.00	577.2				
563.50	672.0				
564.00	786.7				
564.50	872.4				
565.00	1014.6				
565.50	1138.1				
566.00	1263.8				
566.50	1392.7				
567.00	1518.8				
567.50	1647.6				
568.00	1786.8				
568.50	1923.7				



LAKE DIEFENBAKER

PROFILE DATA

RANGE VU 37 SURVEY DATE 1970-07-20

STA

ELEV

CHKS

STA

ELEV

CHKS

STA

ELEV

CHKS

STA

ELEV

CHKS

STA

ELEV

CHKS

0.00	508.87	LLUM	205.52	560.10	
0.00	508.49		207.57	559.72	
15.24	507.32		219.76	560.41	
21.34	507.02		223.42	560.47	
28.96	505.22		227.08	560.41	
47.85	504.18		236.83	560.56	
64.01	503.06		238.05	560.56	
64.92	502.36		239.27	560.62	
73.78	501.56		240.49	560.53	
75.00	501.32	HL	241.71	560.41	
75.50	501.32		242.93	560.37	
75.55	500.44		244.15	560.29	
75.65	500.37		245.36	560.25	
91.74	508.09		246.58	560.25	
97.84	507.40		247.80	560.25	
103.94	507.51		249.02	560.25	
106.98	507.69		250.24	560.41	
110.03	507.66		251.46	561.32	
118.13	507.81		252.68	561.32	
119.18	507.66		253.90	561.35	
122.22	507.66		255.12	561.62	
125.27	507.51		256.34	562.00	
128.32	507.42		257.56	562.25	
131.37	507.33		258.78	563.59	
134.42	507.08		260.00	563.79	
137.46	507.05		261.22	564.12	
140.51	506.75		262.44	565.80	
143.56	506.87		263.66	569.31	
146.61	506.90		264.88	571.40	
149.66	506.75		266.10	571.41	
152.70	506.80		267.32	571.41	
155.75	506.72		268.54	571.41	
158.80	506.90		269.76	571.41	
161.85	507.05		270.98	571.41	
164.90	507.42		272.20	571.41	
167.94	507.51		273.42	571.41	
170.99	507.97		274.64	571.41	
177.04	508.33		275.86	571.41	
180.14	508.58		277.08	571.41	
183.23	509.31		278.30	571.41	
186.28	509.34		279.52	571.41	
189.33	509.49		280.74	571.41	
192.38	509.64		281.96	571.41	
195.43	509.79		283.18	571.41	
198.48	509.77		284.40	571.41	
201.47	509.64		285.62	571.41	

LRBM

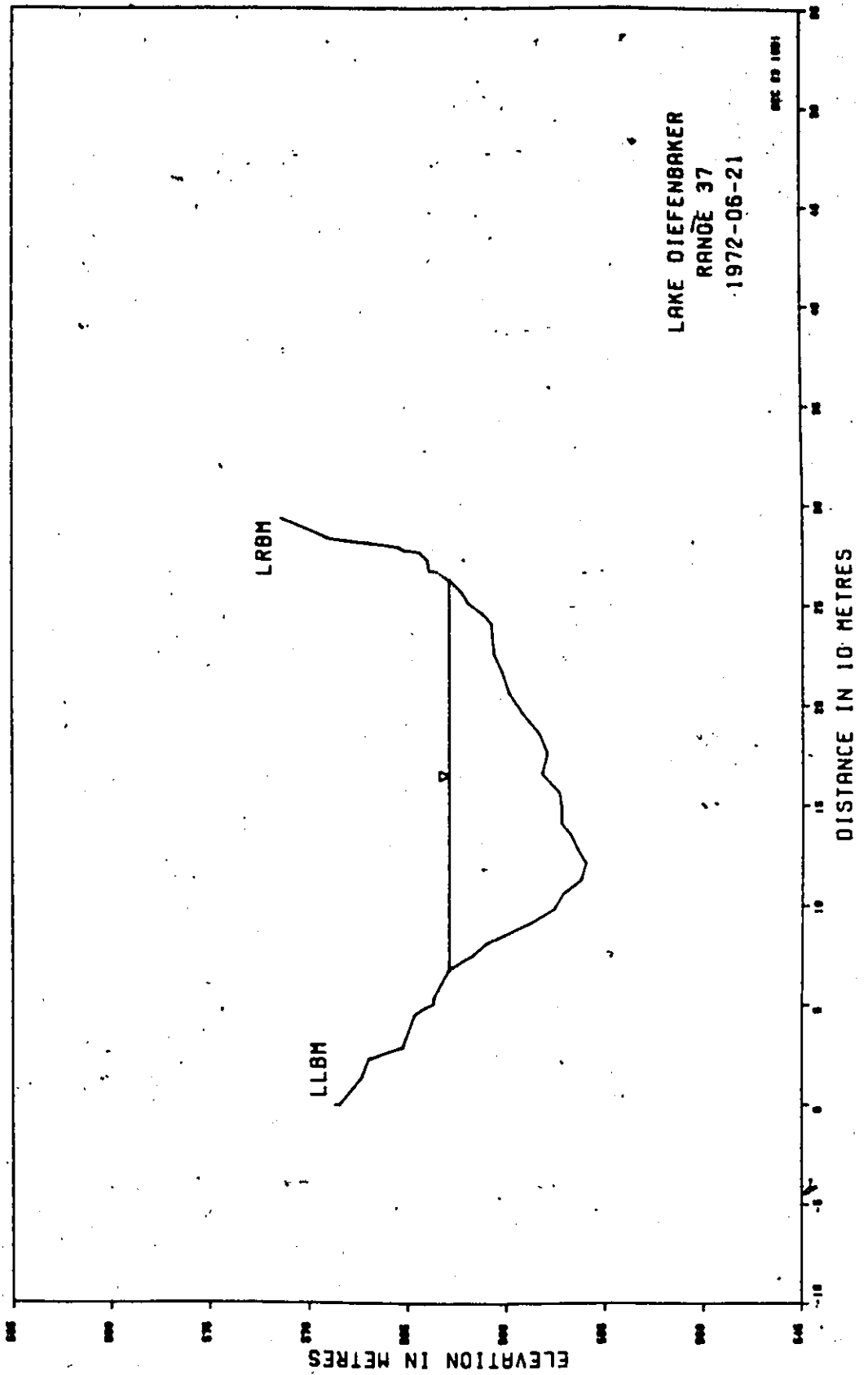
SEDIMENT SURVEY SECTION
DEC 23 1981, PAGE 1.
JF1144, ONT.

LAKE DUFFENSAKER

RANGE NO. - 17
SURVEYED 26/ 7/1979
MINIMUM ELEVATION = 556.02
ASSUMED MINIMUM DATUM = 557.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
557.50	21.5				
558.00	55.4				
558.50	97.7				
559.00	149.2				
559.50	196.6				
560.00	252.7				
560.50	322.7				
561.00	409.2				
561.50	498.9				
562.00	593.1				
562.50	691.5				
563.00	791.4				
563.50	891.0				
564.00	993.3				
564.50	1119.9				
565.00	1233.7				
565.50	1358.1				
566.00	1485.4				
566.50	1612.2				
567.00	1741.3				
567.50	1873.6				
568.00	2009.8				
568.50	2149.8				



LAKE DIEPEMBACER

PROFILE DATA

RANGE NO 37 SURVEY DATE 1972-26-21

STA ELEV LMS

STA ELEV LMS

STA ELEV LMS

STA ELEV LMS

STA ELEV LMS

STA ELEV LMS

STA ELEV LMS

STA ELEV LMS

STA ELEV LMS

LRBM

HL

HL

0.00	568.67	231.94	568.03
0.00	568.45	282.85	568.91
13.22	567.32	293.22	571.39
22.86	566.96		
28.96	565.22		
45.11	564.64		
47.85	564.25		
50.60	563.67		
53.95	563.64		
67.00	562.87		
67.97	562.87		
74.68	561.69		
83.77	560.98		
90.53	558.76		
97.84	557.54		
105.46	557.08		
112.47	556.17		
120.70	555.92		
127.71	555.35		
134.72	556.69		
140.51	557.17		
148.74	557.17		
155.75	557.27		
165.51	558.15		
175.36	557.88		
185.62	558.30		
195.68	559.13		
205.74	559.83		
215.49	560.16		
225.55	560.62		
235.61	560.71		
240.49	560.74		
245.67	561.20		
250.55	561.90		
255.73	562.20		
262.00	562.87		
262.74	562.87		
266.70	561.51		
267.30	563.88		
269.14	563.94		
272.19	563.97		
276.45	564.40		
277.37	565.19		
278.89	565.43		
280.72	565.81		

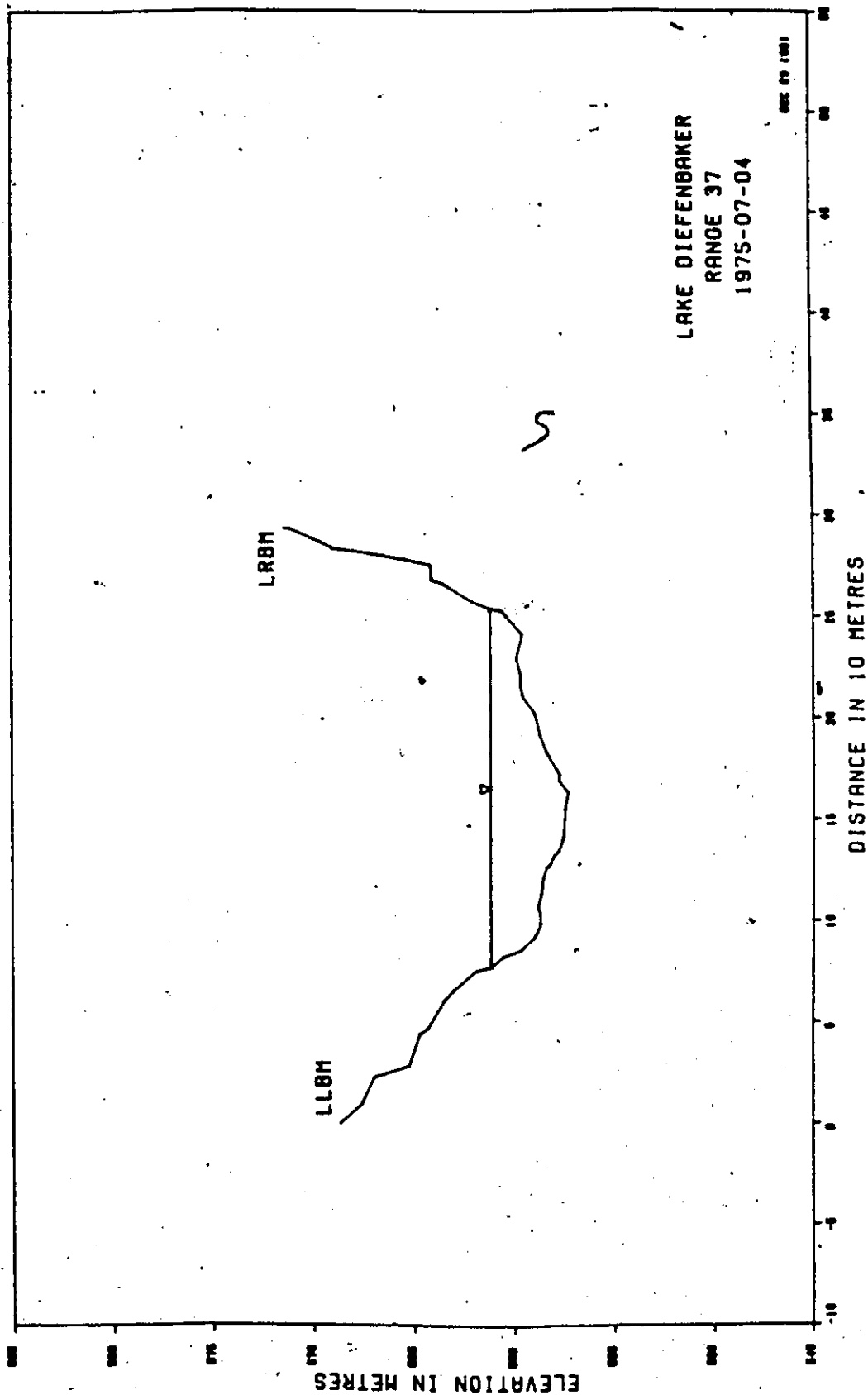
SEDIMENT SURVEY SECTION -
USC 23 1981, PAGE 1
DITRAMONT.

LAKE DULFEMACER

RANGE NO. - 37
SURVEYED 21/ 6/1972
ELEVATION - 555.92
MINIMUM ELEVATION - 550.50

ELEVATION - AREA TABLE
ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
556.50	5.9						
557.00	23.5						
557.50	44.2						
558.00	75.9						
558.50	121.6						
559.00	171.6						
559.50	226.3						
560.00	295.8						
560.50	352.4						
561.00	429.3						
561.50	513.0						
562.00	603.6						
562.50	692.8						
563.00	789.2						
563.50	891.2						
564.00	994.3						
564.50	1112.9						
565.00	1230.5						
565.50	1354.4						
566.00	1483.5						
566.50	1607.8						
567.00	1736.4						
567.50	1857.0						
568.00	2005.5						
568.50	2145.4						



LAKE DUFRENOY

PROFILE DATA

RANGE NO 37 SURVEY DATE 1975-07-04

STA ELEV RMKS STA ELEV RMKS STA ELEV RMKS

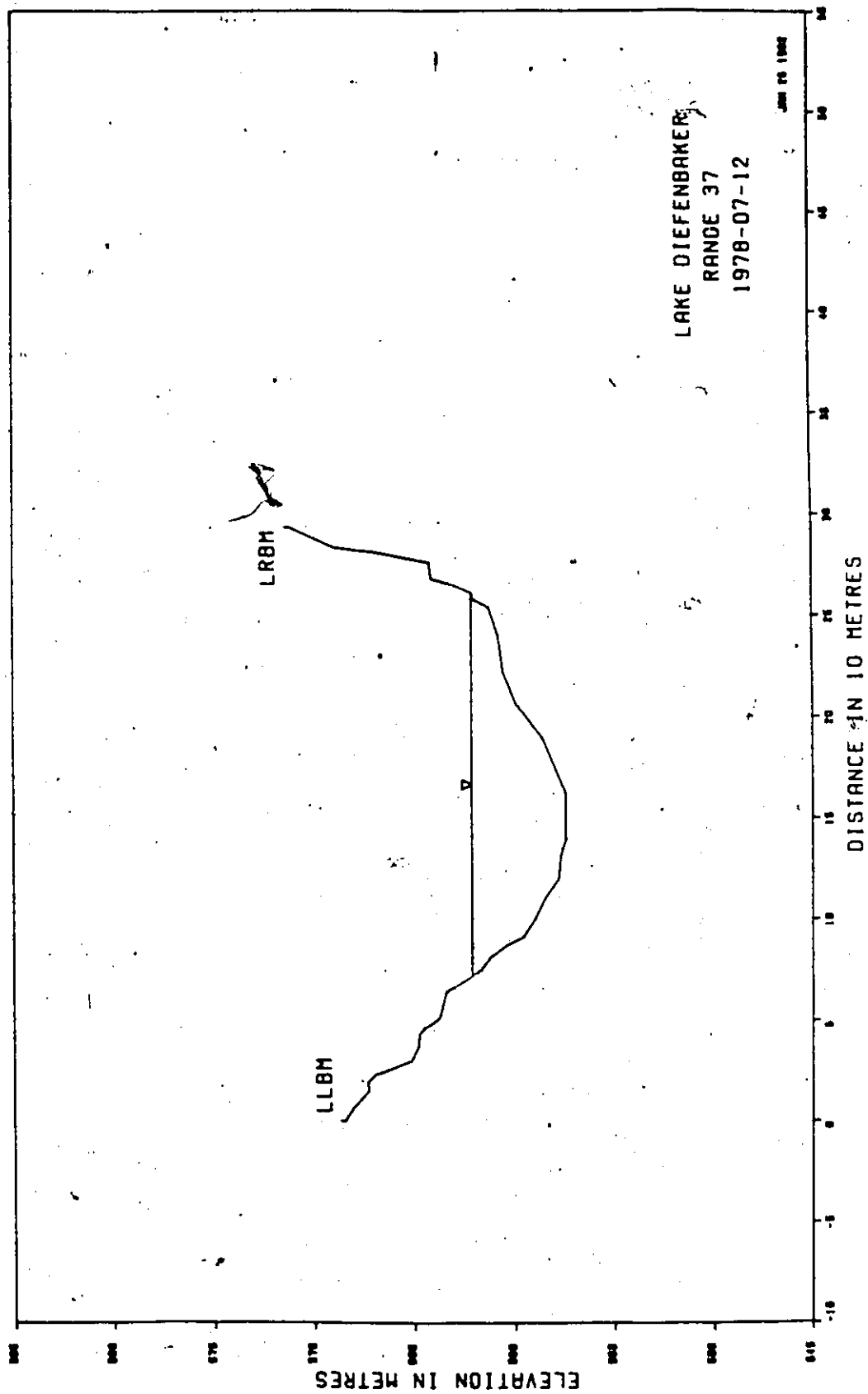
0+00 558.87 LLBM 269.22 564.06
9+75 567.60 275.56 569.12
23+16 565.99 277.98 565.34
28+65 565.25 281.33 567.08
44+20 566.70 283.16 568.91
47+24 566.28 285.51 569.54
50+06 565.88 293.22 571.13
65+53 563.06 293.22 571.41 LBM
73+29 561.93
77+00 561.14 WL
77+62 561.14
82+60 560.53
85+55 559.87
92+05 558.97
97+84 558.67
104+24 558.70
108+68 558.79
111+25 558.67
114+30 558.81
117+35 558.55
119+18 558.58
126+49 558.36
127+10 558.21
131+67 558.00
134+11 557.75
140+21 557.51
154+53 557.42
158+50 557.36
163+27 557.27
168+86 557.72
171+71 557.59
182+58 558.33
191+11 558.67
202+39 558.94
210+92 559.25
215+80 559.64
221+28 559.84
229+51 559.86
241+40 559.55
250+24 560.37
251+98 560.59
256+00 561.14 WL
259+20 561.14
257+56 562.05
260+40 561.51

RANGE NO. - 37
 SURVEYED - 7/7/75
 MINIMUM ELEVATION - 557.27
 ASSUMED MINIMUM DATUM - 558.00

LAKE DIFFERENCE
 ELEVATION - AREA TABLE

SEDIMENT SURVEY SECTION
 DEC 23 1981, PAGE 1
 UTIARAO, ONT.

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
558.00	23.4						
558.50	67.6						
559.00	73.4						
559.50	152.0						
560.00	223.2						
560.50	307.9						
561.00	394.2						
561.50	482.9						
562.00	573.3						
562.50	666.4						
563.00	763.2						
563.50	863.9						
564.00	963.3						
564.50	1062.4						
565.00	1159.8						
565.50	1323.6						
566.00	1443.4						
566.50	1576.4						
567.00	1704.7						
567.50	1836.6						
568.00	1973.2						
568.50	2112.5						



WATER SURVEY OF CANADA
JAN 25 1982 PAGE 1
OTTAWA, ONT.

LAKE OPEFENBAKER

PROFILE DATA

RANGE NO 37 SURVEY DATE 1978-07-12

STA ELEV RMKS STA ELEV RMKS STA ELEV RMKS

0+00 588.67 LLBM

0+00 588.45

6+00 568.05

15+00 567.25

19+00 567.32

23+00 566.95

25+00 566.35

30+00 565.10

37+00 564.75

43+00 564.70

46+00 564.45

48+00 564.10

51+00 563.70

64+00 563.35

66+00 563.00

71+50 562.05 ML

72+00 562.05

75+00 561.60

81+00 561.15

87+00 560.35

91+00 559.50

100+00 558.90

110+00 558.40

120+00 557.70

131+00 557.60

139+00 557.35

150+00 557.35

162+00 557.35

189+00 558.50

198+00 559.20

206+00 559.85

222+00 560.50

240+00 560.75

254+00 561.20

258+00 562.00

261+00 562.05 ML

265+00 563.05

268+00 564.05

274+00 564.15

278+00 565.30

281+00 566.90

283+00 568.90

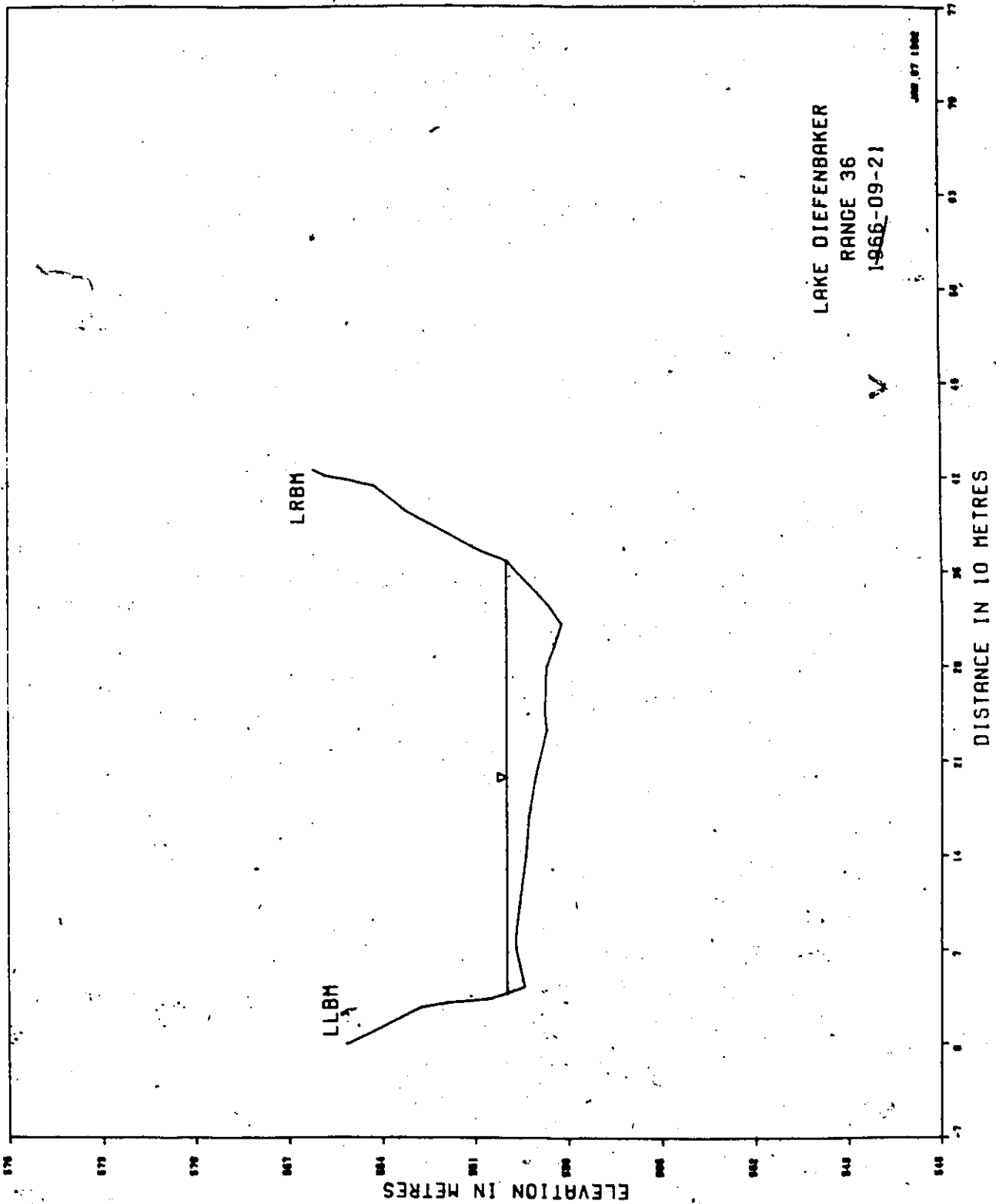
287+00 569.80

293+20 571.15

293+20 571.40 LLBM

7

SEDIMENT SURVEY SECTION			LIRE D'EGALISATION			RANGE NO. - 37		
JAN 25 1987, PAGE 1			ELEVATION - AREA TABLE			SURVEYED 12/7/1978		
OTTAWA, ONT.			ELEVATION - AREA TABLE			MINIMUM ELEVATION - 557.35		
						ASSUMED MINIMUM DATUM - 558.00		
ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	
558.00	28.6							
558.50	64.1							
559.00	108.7							
559.50	160.6							
560.00	218.2							
560.50	292.5							
561.00	359.2							
561.50	446.0							
562.00	537.4							
562.50	633.1							
563.00	731.3							
563.50	832.1							
564.00	939.8							
564.50	1053.5							
565.00	1172.6							
565.50	1296.8							
566.00	1422.5							
566.50	1549.7							
567.00	1678.2							
567.50	1810.0							
568.00	1946.3							
568.50	2085.9							



WATER SURVEY OF CANADA
JAN 07 1982 PAGE 1
OTTAWA, ONT.

LAKE OPEPENBACE

PROFILE DATA

RANGE NO 36		SURVEY DATE 1966-09-21			
STA	ELEV	RMS	STA	ELEV	RMS
0.00	555.16	LLBM			
8.00	545.10				
27.43	542.72				
30.48	541.84				
33.53	540.50	WL			
37.00	559.95				
42.87	559.40				
71.63	559.67				
79.25	559.67				
103.02	559.35				
140.21	559.34				
166.25	559.25				
198.42	559.03				
222.26	558.67				
244.75	558.73				
278.09	558.67				
294.13	558.42				
313.80	558.18				
323.08	558.55				
338.00	558.95	WL			
358.14	559.95				
384.05	560.77				
395.33	563.27				
413.61	564.22				
421.23	565.80				
425.81	566.17	LLBM			

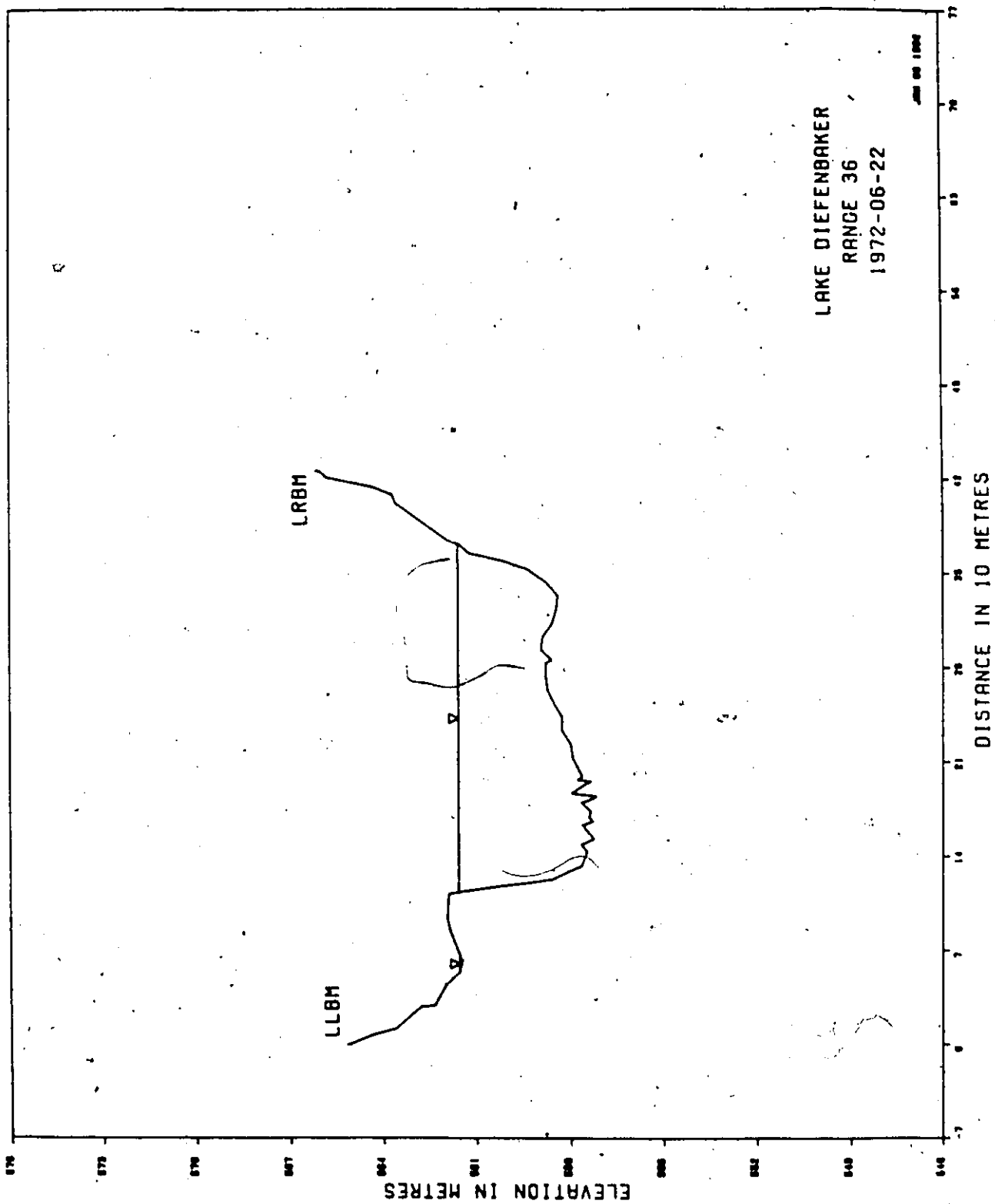
SEDIMENT SURVEY SECTION
DEC 23 1981, PAGE 1
OTTAWA, ONT.

LAKE DUFENHAKER

RANGE NO. - 75
SURVEYED 21/ 7/1985
MINIMUM ELEVATION = 558.10
ASSUMED MINIMUM DATUM = 554.00

ELEVATION - AREA TAB. 5

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
559.00	48.1				
559.50	138.7				
560.00	289.7				
560.50	452.3				
561.00	616.2				
561.50	787.7				
562.00	962.7				
562.50	1137.6				
563.00	1318.8				
563.50	1505.8				
564.00	1702.3				
564.50	1902.0				
565.00	2138.1				



LAKE DUFFENBARGER

PROFILE DATA

RANGE NO 36 SURVEY DATE 1972-06-22

STA	ELEV	RKMS	STA	ELEV	RKMS	STA	ELEV	RKMS
0.00	563.16	LLBM	302.97	558.85				
0.00	563.10		313.03	558.55				
7.32	564.24		323.09	558.42				
12.19	563.58		333.15	558.36				
28.35	562.78		343.20	558.73				
29.27	562.33		353.25	558.34				
45.11	561.96		359.05	560.07				
54.00	561.53	WL	365.15	561.20	WL			
54.56	561.53		372.00	561.56				
68.96	561.47		372.47	561.56				
67.00	561.53	WL	374.60	561.90				
67.06	561.53		402.34	563.58				
85.06	561.84		408.43	563.67				
94.49	561.93		413.92	564.24				
112.47	561.87		421.23	565.80				
113.00	561.56	WL	425.81	566.01				
114.88	561.56		425.81	566.14	LRBM			
123.14	558.58							
133.20	557.63							
143.26	557.43							
148.74	557.63							
153.01	557.24							
163.07	557.60							
166.12	557.27							
169.16	557.39							
173.13	557.33							
178.83	557.63							
183.18	557.24							
184.71	557.17							
186.84	557.94							
193.24	557.54							
195.68	557.33							
196.90	557.75							
199.34	557.60							
203.00	557.69							
213.06	557.91							
223.11	557.97							
233.17	558.24							
243.23	558.24							
252.98	558.49							
263.04	558.70							
273.10	558.74							
283.16	558.74							
285.90	558.56							
293.22	558.91							

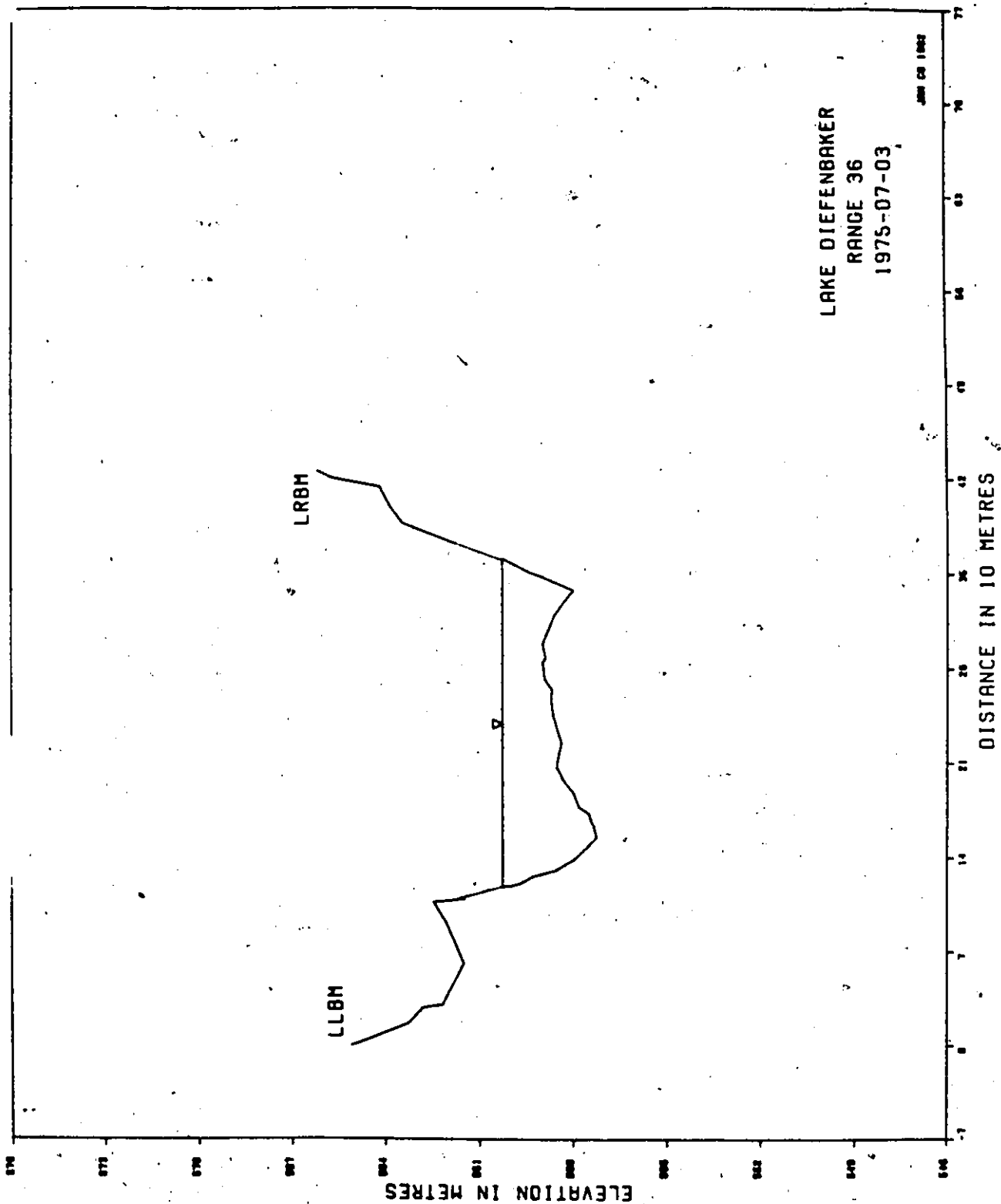
SECRETARY SURVEY SECTION
DEC 23 1961, PAGE 1
211440ZT.

LAKE ULF & VBA&L

EXPLANATION - ALPHABETICALLY

14452 MO. - 16
 334657-127 5/1972
 N1M14J4 E-EAT1J4 - 557.17
 455J920 Q1M1J4 24J4 - 558.00

ELEVATION (M.)	ACC. AREA 150 M.	ELEVATION (M.)	ACC. AREA 150 M.	ELEVATION (M.)	ACC. AREA 150 M.
558.00	38.4				
558.50	46.1				
559.00	192.4				
559.50	307.6				
560.00	425.1				
560.50	547.1				
561.00	673.2				
561.50	796.2				
562.00	903.7				
562.50	1115.9				
563.00	1297.4				
563.50	1466.5				
564.00	1684.8				
564.50	1897.7				
565.00	2094.1				



WATER SURVEY OF CANADA
JAN 08 1982 PAGE 1
OTTAWA, ONT.

LAKE DIEFENBAKER

PROFILE DATA

RANGE NO 36		SURVEY DATE 1975-07-03		STA		ELEV		RMS		STA		ELEV		RMS	
STA		ELEV		RMS		STA		ELEV		RMS		STA		ELEV	
0.00		355.10		LLBN		360.00		360.25							
7.62		364.22				371.06		361.72							
16.76		363.27				387.10		363.45							
28.35		362.81				398.08		363.82							
30.48		362.17				413.92		364.16							
60.96		361.50				420.82		365.71							
91.44		362.05				425.01		366.17							
106.68		362.45													
109.12		361.97													
109.73		361.62													
116.00		360.25													
116.26		360.25													
118.57		360.01													
120.40		359.70													
125.58		359.31													
130.45		358.55													
138.07		357.97													
147.22		357.54													
155.53		357.25													
162.76		357.33													
167.03		357.42													
171.91		357.48													
177.39		357.81													
187.15		357.97													
197.82		358.33													
207.26		358.52													
216.10		358.45													
224.33		358.36													
228.97		358.39													
230.12		358.45													
245.36		358.54													
255.73		358.70													
263.96		358.67													
272.19		358.91													
284.07		358.97													
287.43		358.88													
297.79		358.97													
304.80		359.85													
311.20		358.73													
318.52		358.41													
323.18		358.27													
327.41		357.97													
337.57		358.97													
350.82		359.40													
360.00		360.25													

HL

SEDIMENT SURVEY SECTION
 DEC 23 1981, PAGE 1
 DITAMONT.

LAKE DIFFERENCE
 * ELEVATION - AREA TABLE *
 * * * * *

LAKE DIFFERENCE

SEDIMENT SURVEY SECTION
 DEC 23 1981, PAGE 1
 DITAMONT.

LAKE DIFFERENCE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
558.00	21.1	558.50	56.6	559.00	143.1	559.50	255.1	560.00	372.4
560.00	493.7	561.00	618.4	561.50	746.6	562.00	890.9	562.50	1059.3
563.00	1235.9	563.50	1413.5	564.00	1611.8	564.50	1814.6	565.00	2021.3

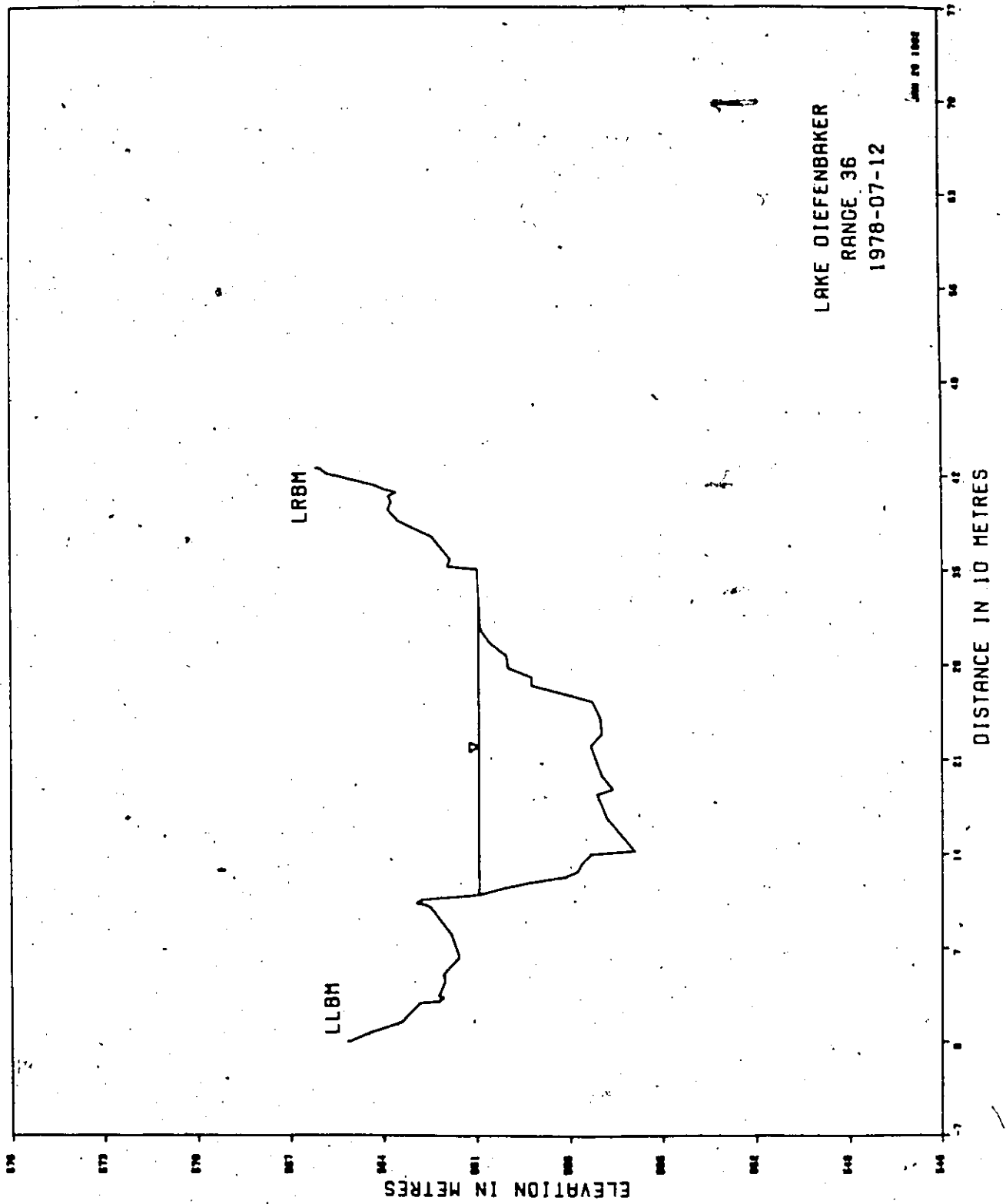
LAKE DIFFERENCE
 * ELEVATION - AREA TABLE *
 * * * * *

LAKE DIFFERENCE
 * ELEVATION - AREA TABLE *
 * * * * *

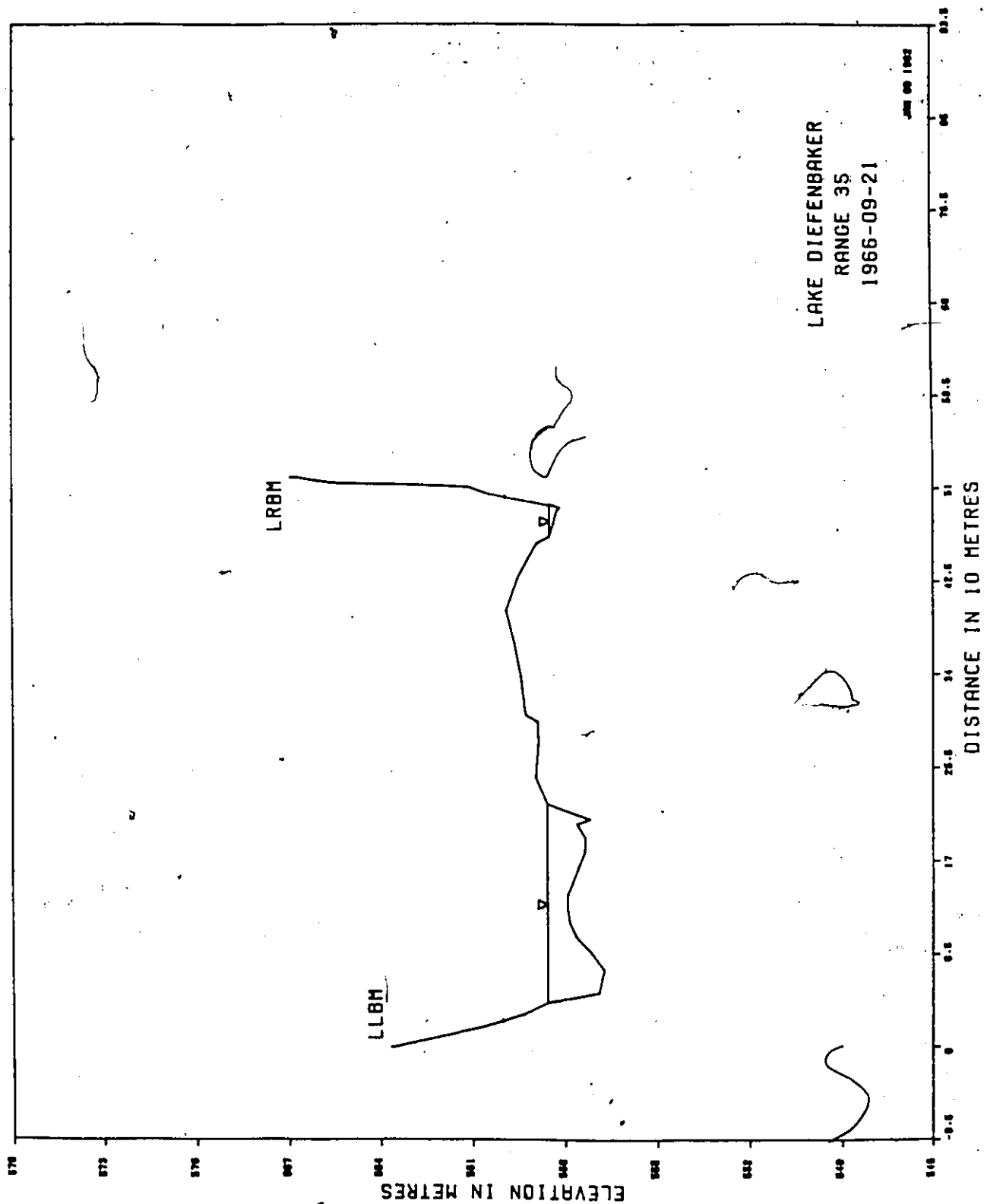
LAKE DIFFERENCE

SEDIMENT SURVEY SECTION
 DEC 23 1981, PAGE 1
 DITAMONT.

LAKE DIFFERENCE



SEDIMENT SURVEY SECTION				LAKE DIEFFENBACHER				RANGE NO. - 36			
JAN 26 1982, PAGE 1				SURVEYED 127 7/1978				MINIMUM ELEVATION = 559.90			
OTTAWA, ONT.				ELEVATION - AREA TABLE				ASSUMED MINIMUM DATUM = 558.50			
ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)
556.50	5.3										
557.00	21.5										
557.50	72.8										
558.00	136.4										
558.50	204.6										
559.00	275.3										
559.50	350.3										
560.00	430.3										
560.50	519.2										
561.00	619.7										
561.50	741.0										
562.00	873.4										
562.50	1035.5										
563.00	1209.5										
563.50	1392.4										
564.00	1586.6										
564.50	1789.1										
565.00	1995.4										



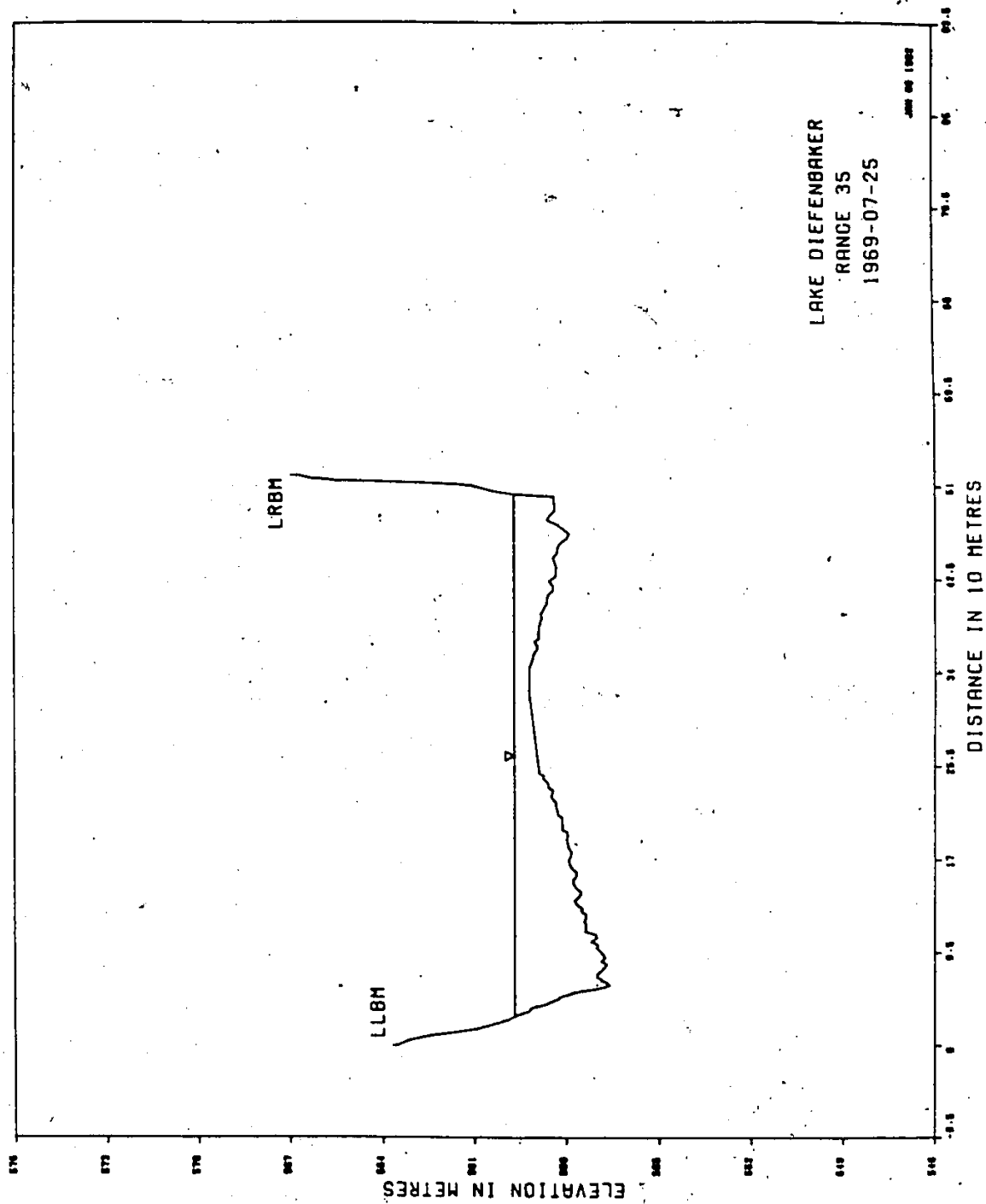
SEDIMENT SURVEY SECTION
DEC 23 1981, PAGE 1
OFFAN, UMT.

LAKE DIEFENBAKER

RANGE NO. - 35
SURVEYED 21/ 9/1966
MINIMUM ELEVATION - 556.12
ASSUMED MINIMUM DATUM - 557.53

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
557.50	30.7						
558.00	75.5						
558.50	188.1						
559.00	309.1						
559.50	479.5						
560.00	702.5						
560.50	943.2						
561.00	1187.7						
561.50	1435.7						
562.00	1685.8						
562.50	1937.6						
563.00	2191.2						
563.50	2466.6						



LAKE DIEFFENBACHER

PROFILE DATA

RANGE NO 35 SURVEY DATE 1969-07-25

STA	ELEV	RKKS	STA	ELEV	RKKS	STA	ELEV	RKKS
0+00	563.67	LLBM	122+83	557.51		354+79	559.06	
0+00	563.54		125+58	557.48		358+14	559.03	
4+57	563.18		129+26	557.66		361+49	558.94	
9+14	562.45		132+89	557.72		364+85	558.94	
15+24	560.92		136+55	557.57		368+20	559.03	
23+27	559.89		140+21	557.51		371+55	558.88	
26+00	558.67	HL	143+87	557.66		374+90	558.91	
28+82	558.67		147+52	557.75		378+26	558.84	
31+70	559.19		151+18	557.78		381+61	558.88	
33+23	559.19		154+84	557.68		385+27	558.85	
35+36	559.03		158+50	557.66		389+53	558.79	
37+19	558.73		162+15	557.81		393+80	558.82	
39+01	558.56		165+81	557.88		398+07	558.73	
40+84	558.42		169+47	557.91		402+34	558.64	
42+87	558.27		173+13	557.84		406+60	558.61	
44+50	558.18		176+78	557.81		410+87	558.58	
46+33	557.97		180+44	557.91		415+14	558.42	
48+16	557.81		184+10	557.94		419+40	558.42	
49+99	557.51		187+76	557.97		423+67	558.55	
51+82	557.11		191+41	557.94		427+94	558.33	
53+64	556.75		195+07	557.97		436+47	558.30	
55+47	556.40		197+21	558.12		440+74	558.36	
57+30	556.49		199+95	558.09		445+01	558.42	
59+13	556.84		202+63	558.12		449+28	558.27	
60+96	556.90		205+44	558.12		453+54	558.27	
62+79	557.02		208+18	558.12		457+81	558.18	
64+62	557.02		210+92	558.27		462+38	557.97	
67+97	556.90		213+65	558.27		466+65	557.86	
71+02	556.78		216+41	558.30		470+92	558.06	
74+07	556.49		219+15	558.33		475+18	558.27	
77+11	556.87		221+87	558.33		479+45	558.61	
80+16	556.75		224+64	558.42		483+72	558.52	
83+21	556.81		227+38	558.49		487+98	558.36	
86+26	556.90		230+12	558.45		492+25	558.36	
89+31	557.02		232+87	558.42		496+52	558.39	
92+35	556.99		235+61	558.58		500+79	558.39	
95+40	557.20		238+35	558.58		503+00	559.67	HL
98+45	557.02		241+10	558.64		503+22	559.67	
101+50	557.05		243+84	558.76		505+97	560.37	
104+55	557.39		246+58	558.73		510+84	561.05	
107+59	557.36		248+41	558.88		512+37	561.65	
110+64	557.36		251+26	559.19		514+50	561.83	
113+69	557.42		254+73	559.19		515+11	563.53	
116+74	557.36		258+08	559.13		516+64	563.92	
119+79	557.36		261+43	559.07		517+25	566.32	

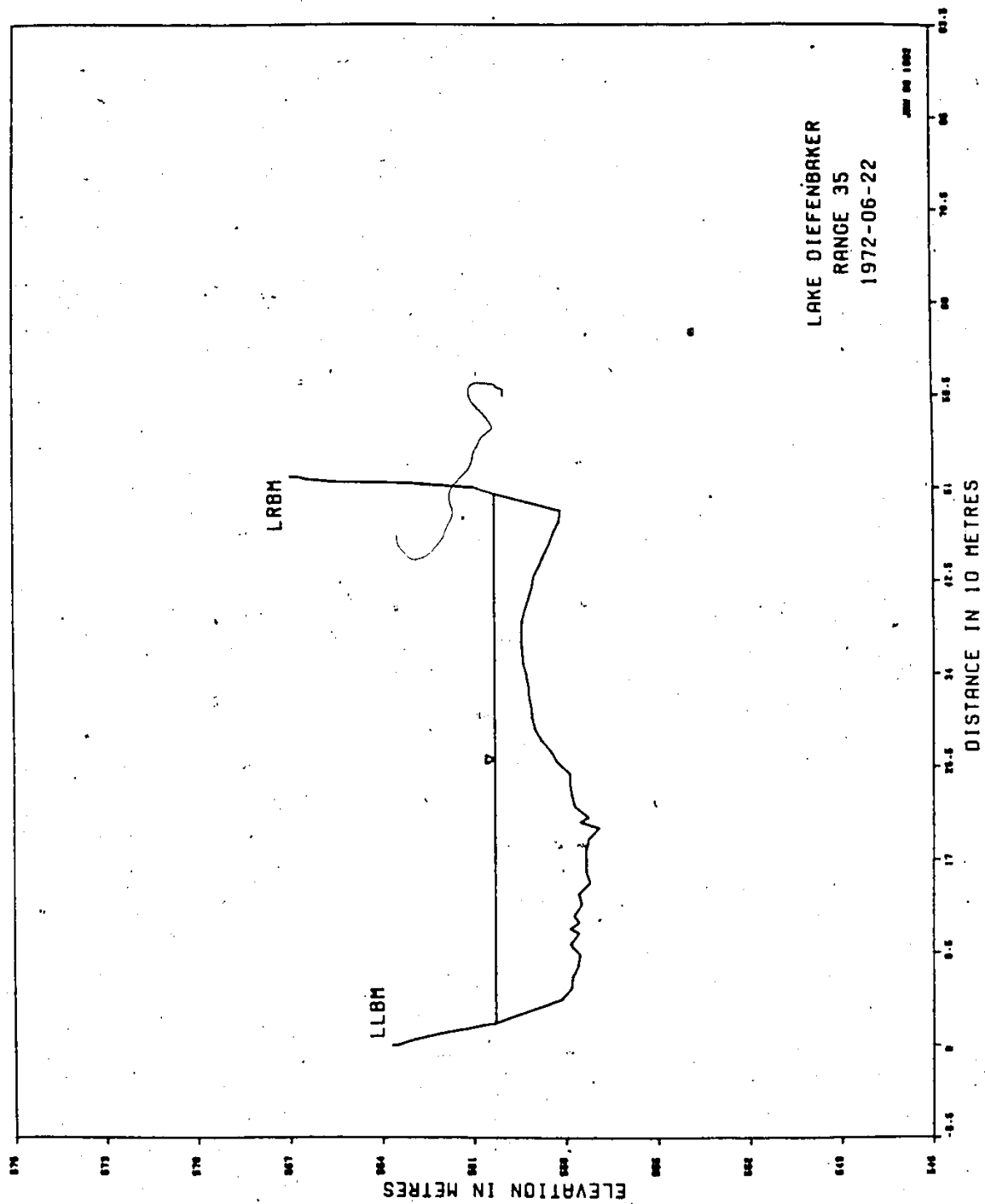
SEDIMENT SURVEY SECTION
DEC 23 1991, PAGE 1
OFFANNOJMI.

PLEASE REPLY TO THE DIRECTOR

RAYGE NO.- 35
 SURVEYED 29/ 7/1967
 MINIMUM ELEVATION = 556.63
 ASSUMED MINIMUM DATUM = 557.52

[illegible]

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
537.50	33.4				
538.00	95.3				
538.50	157.3				
539.00	348.3				
539.50	573.7				
540.00	812.7				
540.50	1035.2				
541.00	1301.2				
541.50	1549.9				
542.00	1803.2				
542.50	2051.6				
543.00	2304.6				
543.50	2559.7				



LAKE DIEFFENBAKER

PROFILE DATA

RANGE NO 35 SURVEY DATE 1972-06-22

STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS
0+00	563.67	LLBM	38+92	559.37				
0+00	563.54		39+98	559.28				
5+79	562.90		40+04	559.16				
10+67	562.14		41+80	559.06				
15+54	561.20		42+85	559.00				
18+90	560.48		43+91	558.82				
20+00	560.28	HL	44+97	558.67				
20+73	560.28		45+03	558.49				
42+98	558.12		46+78	558.36				
53+04	557.81		47+84	558.18				
62+79	557.78		48+90	558.12				
72+95	557.60		50+00	560.28	HL			
82+91	557.54		50+14	560.28				
92+94	557.84		50+93	560.95				
103+02	557.57		51+24	561.20				
107+29	557.84		51+89	563.43				
112+78	557.57		51+11	565.46				
118+07	557.72		51+03	565.66				
128+93	557.48		51+55	566.41				
138+99	557.57		51+99	566.71				
149+05	557.20		51+99	566.93	LRBM			
158+80	557.33							
168+84	557.33							
178+92	557.33							
188+98	557.24							
199+03	556.90							
204+52	557.51							
208+79	557.24							
218+85	557.69							
228+90	557.78							
238+96	557.84							
249+02	557.84							
258+78	558.24							
268+83	558.45							
278+89	558.76							
288+95	558.97							
299+01	559.06							
308+74	559.09							
318+82	559.16							
328+88	559.19							
338+94	559.25							
349+00	559.34							
359+05	559.37							
368+81	559.40							
378+87	559.40							

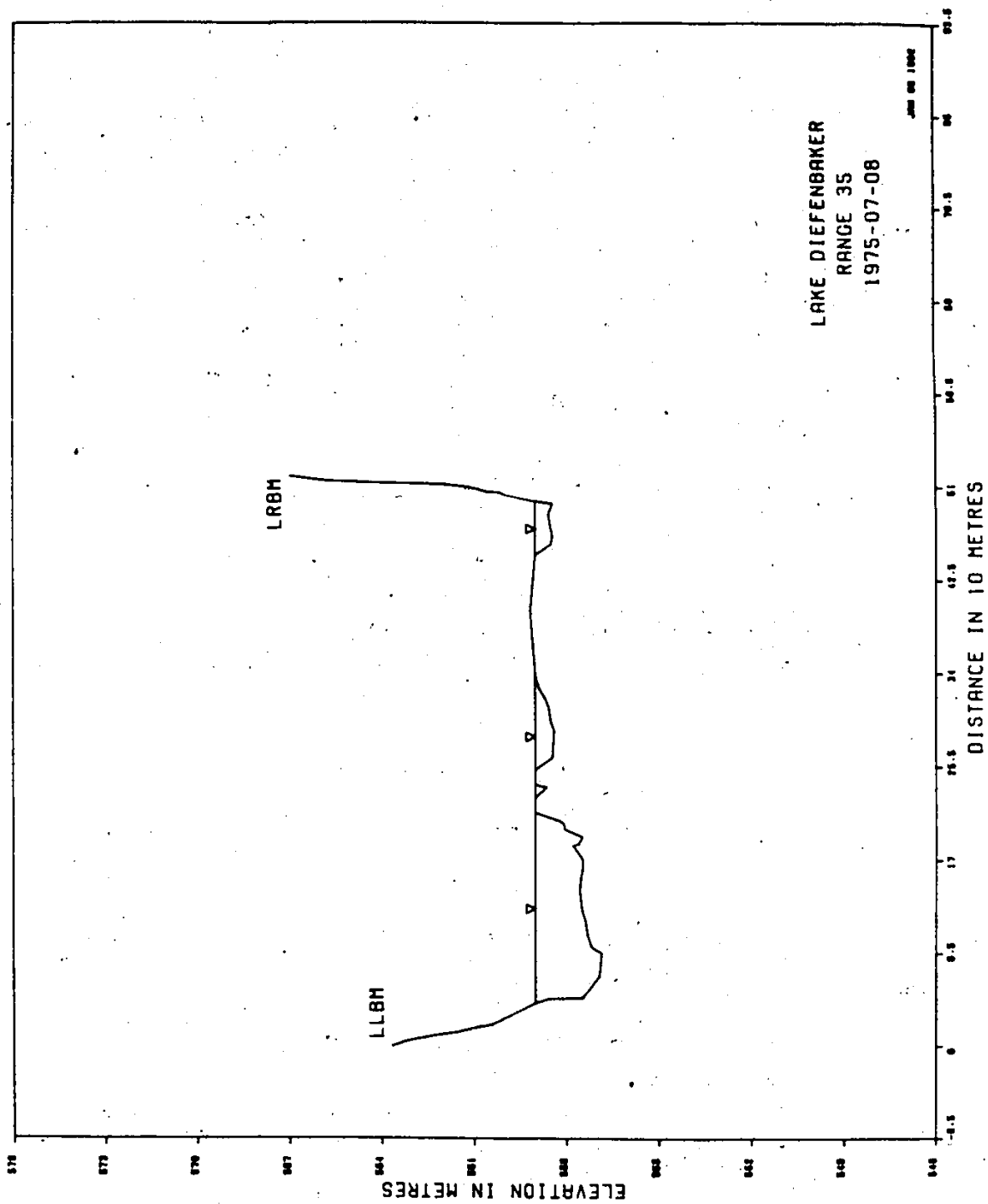
SEUTMENT SURVEY SECTION
DEC 23 1981, PAGE 1
OTTAWA, ONT.

LAKE DUFFERINAKER

RANGE NO. - 35
SURVEYED 22/ 6/1972
MINIMUM ELEVATION = 555.93
ASSUMED MINIMUM DATUM = 557.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
557.50	15.5				
558.00	92.0				
558.50	208.4				
559.00	358.7				
559.50	556.3				
560.00	793.4				
560.50	1038.7				
561.00	1279.8				
561.50	1527.1				
562.00	1776.5				
562.50	2027.7				
563.00	2280.9				
563.50	2536.6				



LAKE DEFENDER

PROFILE DATA

RANGE NO 35 SURVEY DATE 1975-07-08

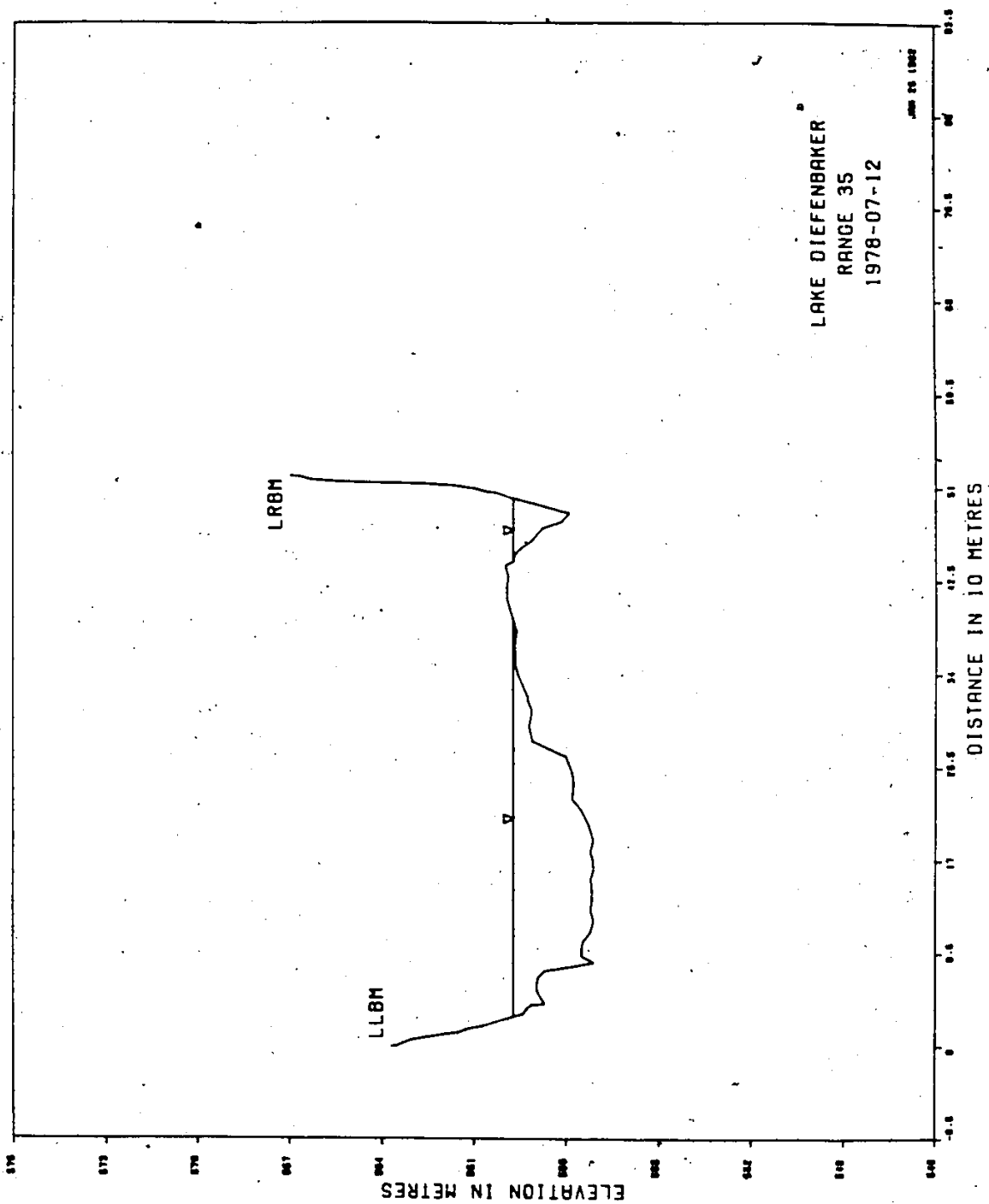
STA	ELEV	RKKS	STA	ELEV	RKKS
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4+57	563.21		458.11	558.49	
10+67	562.14		464.82	558.45	
13+11	561.53		474.88	558.52	
17+37	560.92		485.24	558.54	
20+12	560.41		495.02	558.45	
30+00	559.00	ML	497.80	559.00	ML
39+62	559.00		497.43	559.00	
43+59	558.55		502.92	559.98	
44+50	557.48		505.36	560.19	
54+54	557.20		505.66	560.56	
64+82	556.93		507.80	560.83	
85+34	556.87		510.24	561.20	
88+09	557.05		512.67	562.02	
91+14	557.20		514.52	564.76	
102+41	557.33		515.72	565.83	
113+09	557.39		519.99	566.96	LQRM
125+58	557.51				
141+12	557.57				
152+40	557.54				
161+49	557.48				
170+99	557.48				
183+18	557.78				
185+01	557.60				
191+11	557.48				
198+42	558.06				
203+30	558.09				
205+74	558.21				
213+00	559.00	ML			
213+36	559.00	ML			
227+00	559.00	ML			
227+08	559.00				
236+22	558.84				
238+96	559.00				
252+37	559.00				
262+65	558.45				
288+82	558.39				
298+09	558.52				
309+68	558.58				
317+91	558.70				
328+14	558.88				
338+00	559.00	ML			
338+02	559.00				
396+24	559.16				
447+00	559.00	ML			

RANGE NO. - 33
 DATED 6/ 7/1973
 MINIMUM ELEVATION - 556.07
 ASSUMED MINIMUM DATUM - 557.50

LAKE DIEFENBAKER
 ELEVATION - AREA TABLE

SEDIMENT SURVEY SECTION
 DEC 23 1981, PAGE 1
 DITMA,ONT.

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
557.50	26.1						
558.00	97.6						
558.50	181.0						
559.00	312.6						
559.50	542.1						
560.00	778.3						
560.50	1019.7						
561.00	1264.1						
561.50	1511.7						
562.00	1761.5						
562.50	2012.9						
563.00	2265.9						
563.50	2520.6						



LAKE DIEFENBAKER
PROFILE DATA

RANGE MU 35				SURVEY DATE 1978-07-12			
STA	ELEV	RKKS	STA	ELEV	RKKS	STA	ELEV
0.00	963.48	LLBM	359.00	559.65			
0.00	963.33		369.00	559.65			
8.00	581.05		379.00	559.60			
11.00	582.05		389.00	558.70	WL		
13.00	581.50		399.00	559.80			
16.00	581.25		409.00	559.90			
19.00	580.70		419.00	559.90			
27.70	559.70		429.00	559.85			
28.00	559.70	WL	439.00	559.95			
30.00	559.40		443.00	559.70	WL		
34.00	559.30		449.00	559.65			
38.00	559.15		454.00	559.50			
39.00	558.70		462.00	559.10			
51.00	558.95		473.00	558.75			
57.00	558.95		479.00	558.15			
63.00	558.90		487.00	557.90			
69.00	558.70		499.00	559.55			
77.00	557.10		500.00	559.70	WL		
83.00	557.50		500.40	559.70			
89.00	557.50		505.00	560.20			
96.00	557.45		506.00	560.50			
105.00	557.20		507.00	560.70			
115.00	557.10		509.00	560.95			
124.00	557.20		510.00	561.20			
134.00	557.15		511.00	561.40			
143.00	557.15		512.00	561.70			
153.00	557.20		513.00	562.30			
160.00	557.10		515.00	565.40			
169.00	557.10		516.00	565.40			
177.00	557.20		517.00	566.30			
188.00	557.10		520.00	566.70			
202.00	557.25		520.00	566.94	LRBM		
216.00	557.50						
226.00	557.80						
239.00	557.75						
250.00	557.80						
265.00	558.00						
279.00	559.10						
292.00	559.20						
306.00	559.10						
316.00	559.25						
319.00	559.25						
329.00	558.40						
339.00	559.55						
349.00	559.65						

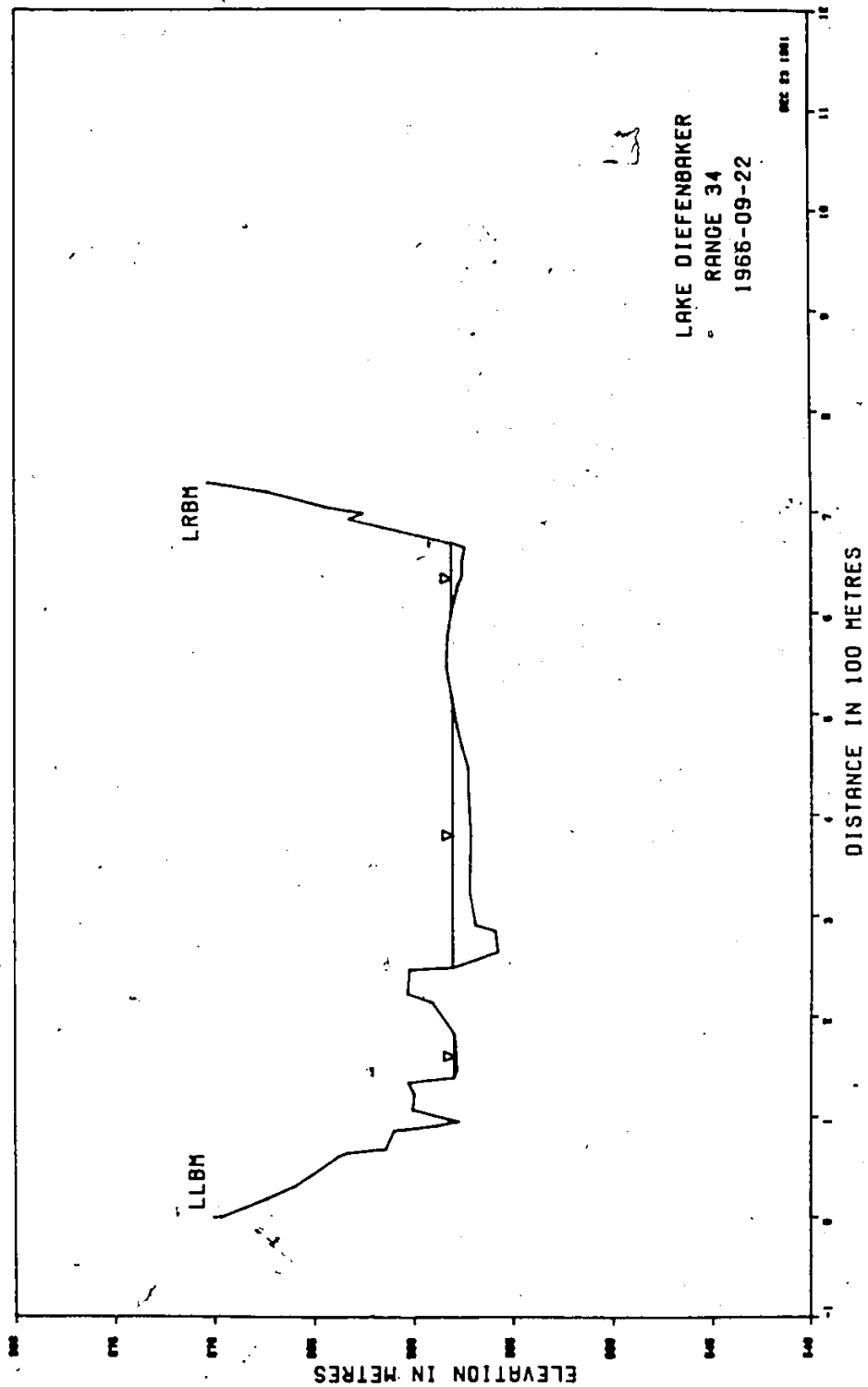
LAKE DIEFTHAKEN

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RANGE NO. - 35
SURVEYED 12/ 7/1976
MINIMUM ELEVATION = 557.10
ASSURED MINIMUM DATUM = 557.50

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SEDIMENT SURVEY SECTION				LAKE DIEFFENBAKER			
JAN 28 1982, PAGE 1				RANGE NO. - 35			
OTTAWA, ONT.				SURVEYED 12/ 7/1978			
ELEVATION - AREA TABLE				MINIMUM ELEVATION - 557.10			
ELEVATION - AREA TABLE				ASSUMED MINIMUM DATUM - 557.50			
ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
557.50	36.7						
558.00	120.4						
558.50	224.4						
559.00	341.9						
559.50	498.5						
560.00	708.0						
560.50	949.0						
561.00	1197.3						
561.50	1440.7						
562.00	1690.6						
562.50	1942.1						
563.00	2195.0						
563.50	2450.0						



WATER SURVEY OF CANAJA
DEC 23 1961 PAGE 1
UITTAWA, ONT.

LAKE DIEFENBACHER

PROFILE DATA

CHANGE NO 34 SURVEY DATE 1966-03-22

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

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808.79 557.97

615.02 557.91

621.18 557.81

627.23 557.75

633.37 557.60

639.47 557.54

645.57 557.37

651.66 557.54

657.75 557.48

663.85 557.42

669.93 558.07

676.03 558.09

682.12 561.24

688.22 561.24

694.31 562.51

699.40 562.51

705.48 564.31

711.57 567.29

717.66 570.31

723.75 570.31

729.84 570.31

735.93 570.31

741.92 570.31

747.91 570.31

753.90 570.31

759.99 570.31

765.98 570.31

771.97 570.31

777.96 570.31

783.95 570.31

789.94 570.31

795.93 570.31

801.92 570.31

807.91 570.31

813.90 570.31

819.89 570.31

825.88 570.31

831.87 570.31

837.86 570.31

843.85 570.31

849.84 570.31

855.83 570.31

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867.81 570.31

873.80 570.31

879.79 570.31

885.78 570.31

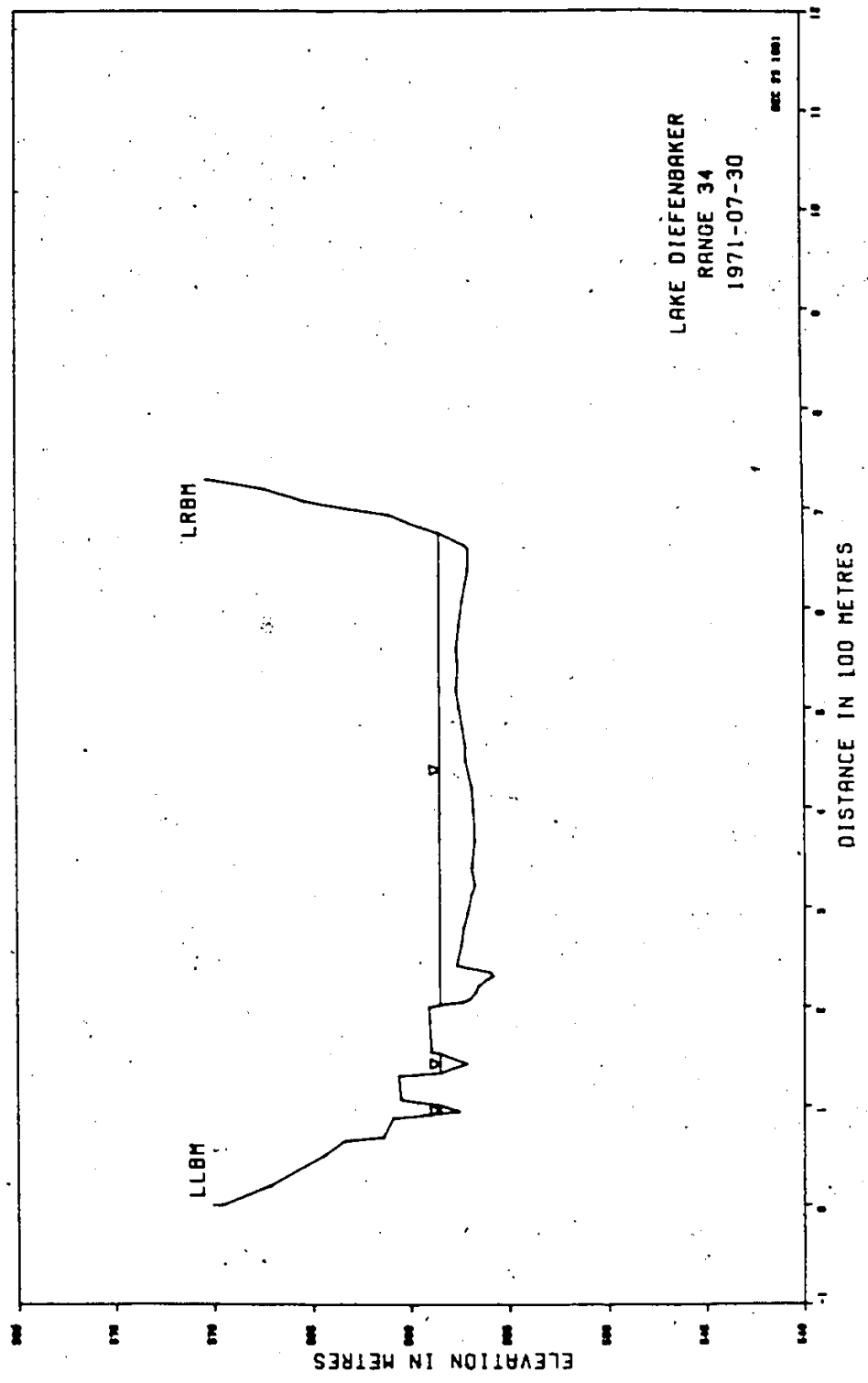
891.77 570.31

RANGE NO. - 34
 SURVEYED 22/ 9/1965
 MINIMUM ELEVATION = 555.74
 ASSIGNED MINIMUM DATUM = 555.50

LAKE DUFFENBARGER
 ELEVATION - AREA TABLE

SEDIMENT SURVEY SECTION
 DEC 23 1961, PAGE 1
 JTB:RUMT.

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
556.50	17.6	569.50	7129.2		
557.00	36.9	569.50	7490.0		
557.50	109.8	570.00	7853.1		
558.00	252.4				
558.50	469.3				
559.00	719.6				
559.50	978.6				
560.00	1243.2				
560.50	1523.4				
561.00	1825.0				
561.50	2123.3				
562.00	2417.9				
562.50	2749.1				
563.00	3061.3				
563.50	3378.7				
564.00	3693.2				
564.50	4021.7				
565.00	4352.9				
565.50	4655.8				
566.00	5025.4				
566.50	5345.0				
567.00	5716.1				
567.50	6053.5				
568.00	6415.9				
568.50	6712.2				



LAKE UTEPENBAGER

PROFILE DATA

RANGE NO 39 SURVEY DATE 1971-07-30

STATION ELEV RMKS STA ELEV RMKS

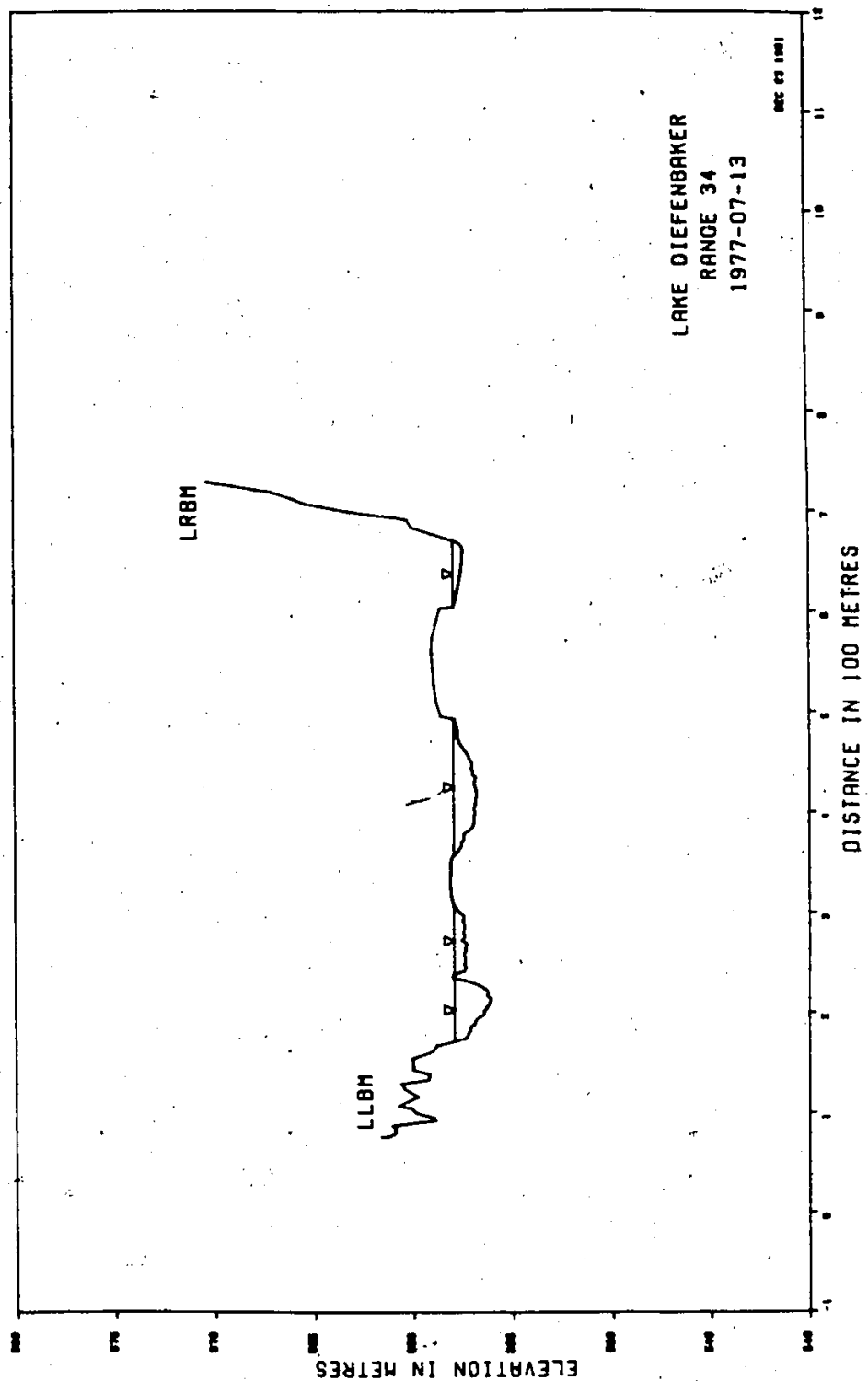
0+00	570.04	LLBM	498.04	557.48	
0+00	569.58		516.03	557.83	
19+81	567.17		540.11	557.34	
50+29	564.46		556.87	557.83	
64+62	563.42		580.95	557.48	
68+86	561.41		605.03	557.33	
87+78	560.92		622.12	557.17	
92+00	558.52	HL	637.34	557.02	
92+96	558.52		658.98	557.02	
95+10	557.54		662.03	557.17	WL
99+06	556.21		674.00	558.52	
100+00	558.52	HL	674.22	558.52	
100+84	558.52		683.97	559.92	
106+48	562.50		692.81	561.05	
130+45	560.62		696.21	563.24	
133+00	558.52	HL	706.53	565.40	
133+50	558.52		718.72	567.35	
142+95	557.14	HL	727.85	570.16	LLBM
152+70	558.52		727.85	570.31	
154+53	558.97				
185+01	559.06				
190+03	559.09				
201+00	558.52	HL			
201+47	558.52				
204+52	557.33				
208+96	557.02				
213+06	556.72				
220+07	556.56				
221+08	556.11				
230+32	555.80				
234+09	555.96				
241+10	557.63				
261+82	557.39				
278+89	557.27				
292+91	557.08				
313+03	555.97				
320+85	556.72				
336+02	556.87				
346+06	556.72				
393+94	556.78				
420+01	556.87				
496+84	557.17				
497+94	557.17				
480+06	557.33				

RANGE NO. - 34
 SURVEYED 30/ 7/1971
 MINIMUM ELEVATION - 555.00
 ASSUMED MINIMUM DATUM - 556.50

LAKE DIEFENBACHER
 ELEVATION - AREA TABLE

STOKING SURVEY SECTION
 DEC 23 1961, PAGE 1
 OTTAWA, ONT.

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
556.50	5.9	569.50	7367.2		
557.00	42.1	569.50	7728.3		
557.50	179.3	570.00	8091.5		
558.00	409.7				
558.50	855.1				
559.00	907.7				
559.50	1185.2				
560.00	1467.8				
560.50	1754.0				
561.00	2053.9				
561.50	2362.8				
562.00	2676.1				
562.50	2992.7				
563.00	3306.4				
563.50	3623.5				
564.00	3941.8				
564.50	4266.4				
565.00	4597.0				
565.50	4923.3				
566.00	5251.8				
566.50	5586.6				
567.00	5951.8				
567.50	6301.1				
568.00	6651.6				
568.50	7007.0				

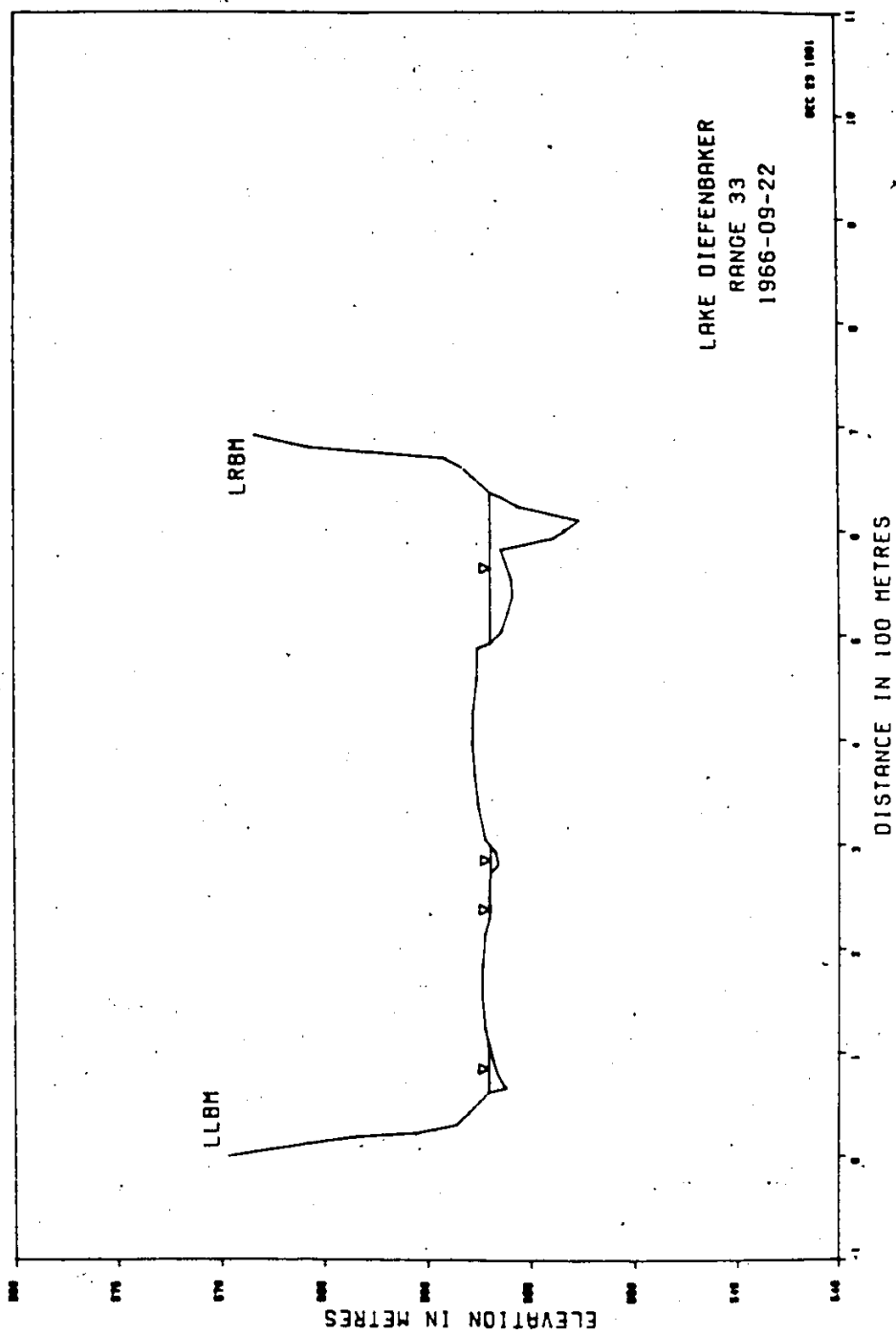


LAKE JIEFENBACHER

PROFILE DATA

RANGE NO 34 SURVEY DATE 1977-07-13

STA	ELEV	RKMS	STA	ELEV	RKMS	STA	ELEV	RKMS	STA	ELEV	RKMS
76.50	501.39	LL65	234.39	557.88		357.00	557.88	4L	492.00	557.88	4L
76.50	501.23		235.92	557.97		357.23	557.88		492.23	557.88	
77.55	500.88		237.03	557.84	4L	360.27	557.88		492.86	557.88	
78.73	500.88		237.76	557.84		363.32	557.88		495.37	558.52	
79.17	501.01		238.35	557.81		366.37	557.88		510.54	558.76	
80.70	500.89		238.43	557.36		368.42	557.51		525.78	558.05	
82.66	508.45		244.45	557.27		372.47	557.36		541.22	558.91	
95.40	508.94		247.50	557.36		375.51	557.36		556.28	558.97	
100.28	509.86		250.55	557.33		378.56	557.36		571.53	558.96	
104.55	500.07		253.57	557.33		381.61	557.04		586.74	558.76	
107.29	502.71		256.64	557.35		384.66	555.93		601.98	558.55	
115.82	509.73		259.67	557.36		387.71	555.87		603.00	557.88	4L
123.44	500.37		262.74	557.30		391.76	555.84		603.81	557.88	
128.93	500.59		265.77	557.30		395.11	555.87		608.08	557.81	
129.24	500.41		268.83	557.24		397.15	555.81		611.12	557.75	
133.20	509.19		272.13	557.51		400.20	556.81		614.17	557.75	
138.30	509.13		275.23	557.31		403.25	556.87		617.22	557.69	
142.65	509.98		278.28	557.39		406.30	556.78		620.27	557.66	
147.52	509.95		281.33	557.39		409.35	555.78		623.32	557.63	
153.82	500.01		284.38	557.36		412.39	556.78		626.37	557.60	
161.24	508.97		287.53	557.36		415.44	556.69		629.74	557.57	
167.03	508.76		290.57	557.42		418.49	556.75		632.76	557.59	
171.00	507.88	4L	293.52	557.42		421.54	556.72		635.81	557.51	
171.60	507.88		296.57	557.36		424.59	556.81		638.86	557.48	
176.65	507.27		299.62	557.63		427.94	556.84		641.91	557.48	
177.70	507.20		302.67	557.72		430.99	556.81		644.96	557.45	
180.75	507.14		305.71	557.81		434.04	556.75		648.00	557.42	
182.88	507.05		308.76	557.84	4L	437.08	556.93		651.05	557.42	
185.93	507.05		311.81	557.88		440.13	556.90		654.13	557.42	
188.98	506.84		314.85	557.96		443.18	556.99		657.15	557.39	
192.02	506.81		317.89	557.97		446.23	556.99		660.22	557.39	
195.07	506.63		318.93	558.00		449.28	556.99		663.25	557.42	
198.12	506.38		319.13	558.03		452.32	557.08		666.28	557.57	
201.17	506.36		322.17	558.03		455.37	557.14		669.33	557.76	4L
204.52	506.26		325.22	558.06		458.72	557.24		670.03	557.88	
207.57	506.14		328.27	558.06		461.77	557.34		670.55	557.88	
210.62	506.08		331.32	558.06		464.82	557.45		682.75	559.98	
213.66	506.02		334.37	558.06		467.87	557.57		690.68	560.22	
216.71	506.23		337.41	558.03		470.92	557.63		693.12	563.78	
219.76	506.17		340.46	558.03		473.96	557.69		695.25	562.05	
222.81	506.29		343.51	558.03		477.01	557.69		698.37	563.06	
225.86	506.50		346.56	558.03		480.06	557.69		701.09	563.85	
228.90	506.84		349.61	558.03		483.11	557.72		704.76	564.55	
231.95	507.36		352.65	558.00		486.16	557.75		706.57	565.37	
234.00	507.88	4L	355.70	557.96		489.20	557.81		711.13	565.95	



LAKE DIEFFENBACHER

PROFILE DATA

CANAL NO 33 SURVEY DATE 1966-09-22

STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS
0.00	569.88	LLBM	537.27	555.80				
12.19	565.80		555.56	555.80				
18.90	563.51		587.17	556.18				
22.86	560.56		592.86	553.85				
30.48	558.61		599.24	553.33				
62.00	556.99	HL	610.21	552.60				
67.18	556.99		623.32	555.53				
66.14	556.14		632.46	556.35				
67.06	556.20		637.20	556.90				
73.15	555.18		660.81	558.27				
79.25	556.56		668.43	558.97				
85.24	556.66		669.95	559.05				
91.34	556.75		679.72	565.71				
97.54	556.84		691.24	568.33	LRBM			
107.63	556.90							
108.00	556.29	HL						
108.81	556.99							
121.92	557.14							
137.40	557.30							
182.88	557.27							
213.36	557.14							
229.00	555.93	HL						
242.21	556.93							
237.74	556.87							
246.00	556.93	HL						
246.58	556.93							
256.03	556.93							
272.00	555.47	HL						
272.80	556.87							
280.42	556.50							
286.51	556.96							
292.61	556.61							
298.00	556.87	HL						
299.40	556.87							
306.80	557.14							
335.28	557.68							
365.78	557.68							
395.24	557.78							
425.72	557.75							
457.20	557.57							
487.88	557.54							
492.00	556.90	HL						
492.86	556.90							
503.53	556.95							
521.21	556.05							

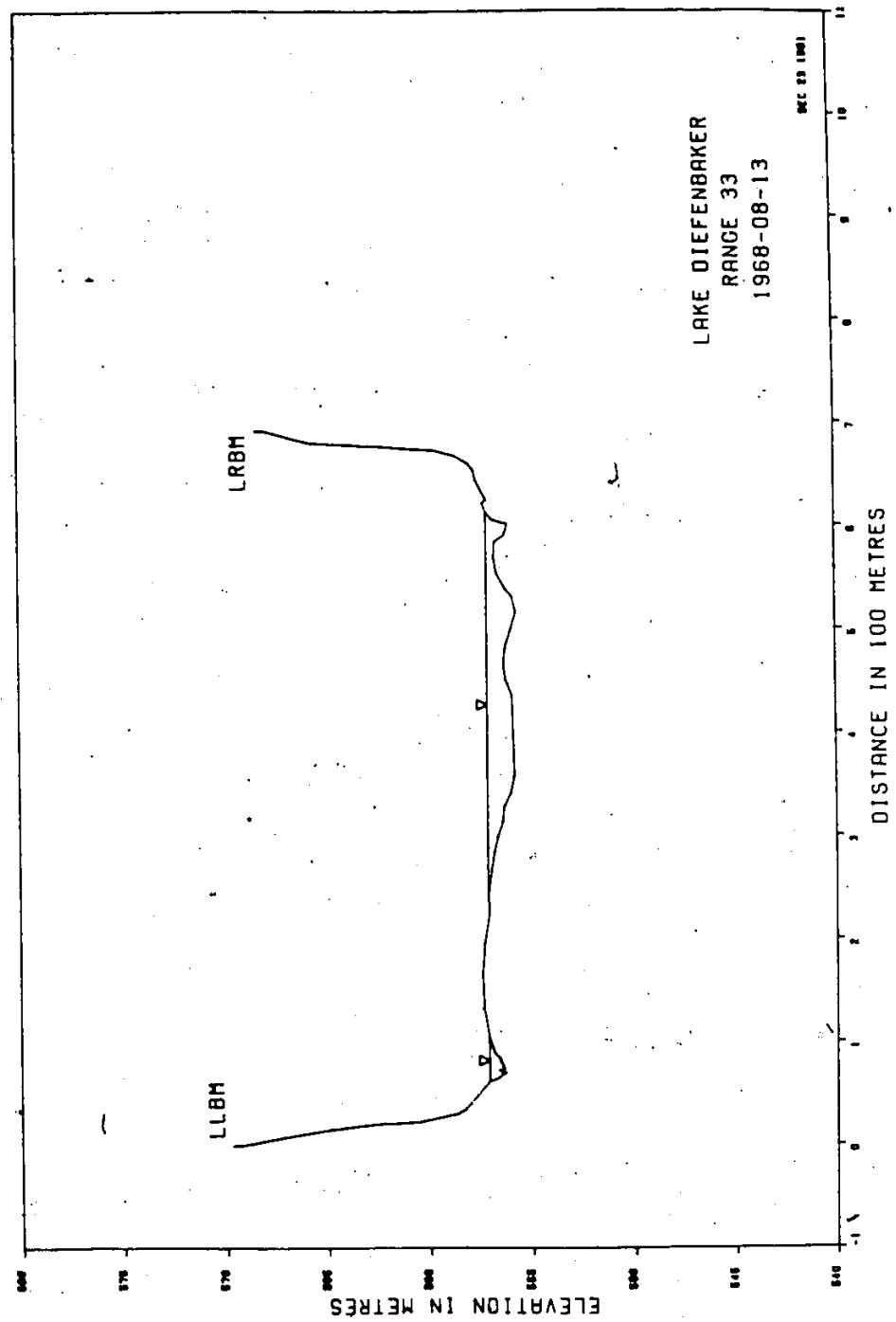
SEDIMENT SURVEY SECTION
DEC 23 1981, PAGE 1
JITANA, UNT.

LAKE DIEFENBAKER

ELEVATION - AREA TABLE

RANGE NO. - 33
SURVEYED 22/ 9/1965
MINIMUM ELEVATION = 552.60
ASSURED MINIMUM DATUM = 553.50

ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)
553.50	7.8	566.00	5921.0		
554.00	10.3	566.50	6256.6		
554.50	31.6	567.00	6594.2		
555.00	47.0	567.50	6933.7		
555.50	64.5	568.00	7275.0		
556.00	89.2				
556.50	147.5				
557.00	245.5				
557.50	429.2				
558.00	706.6				
558.50	1010.0				
559.00	1335.9				
559.50	1657.0				
560.00	1973.5				
560.50	2301.3				
561.00	2620.2				
561.50	2951.0				
562.00	3283.1				
562.50	3607.1				
563.00	3934.9				
563.50	4253.3				
564.00	4572.6				
564.50	4921.0				
565.00	5254.5				
565.50	5587.1				



LAKE DUFFERIN

PROFILE DATA

RANGE NO 33 SURVEY DATE 1968-09-13

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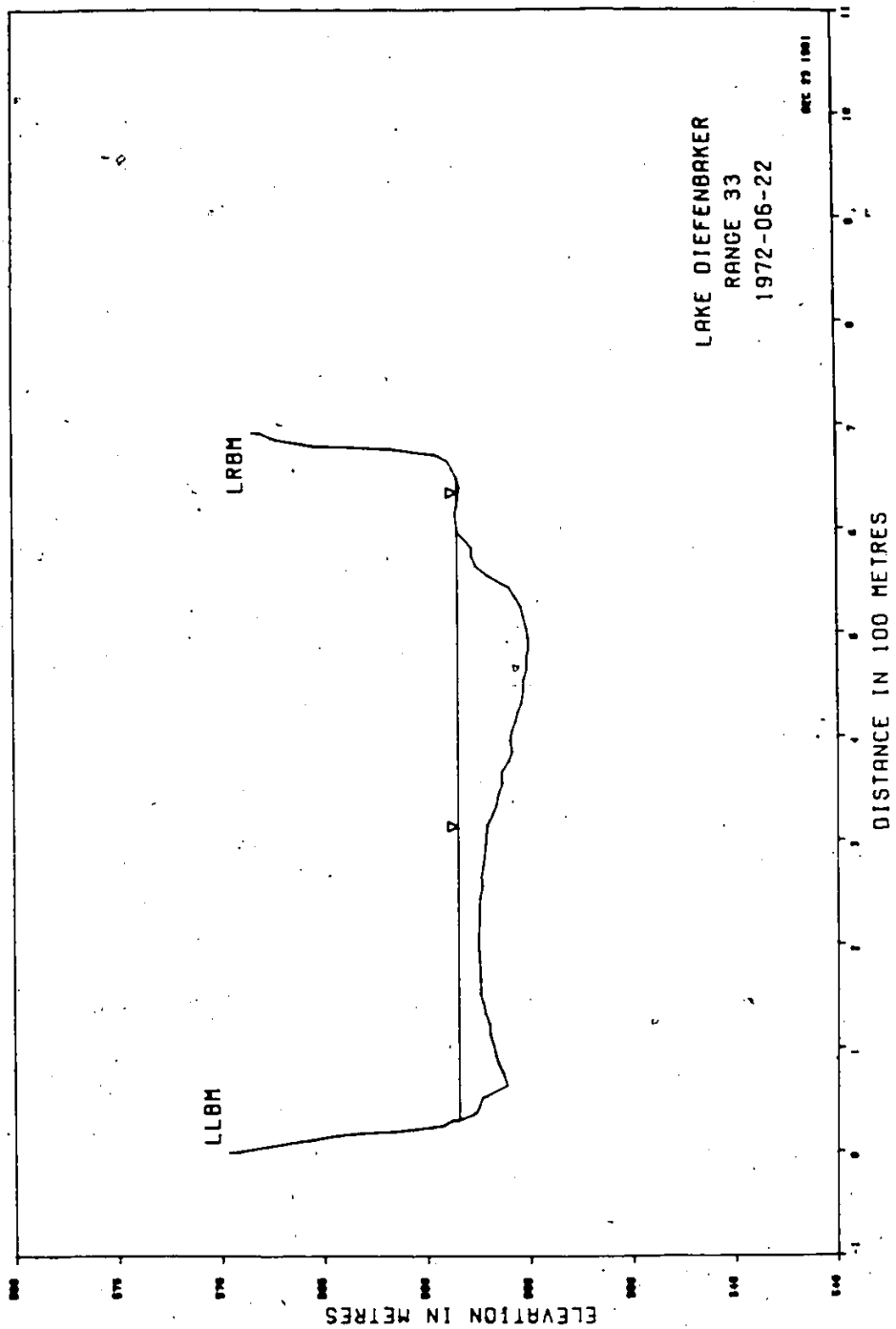
SEDIMENT SURVEY SECTION
JUL 23 1961, PAGE 1
OTTAWA, ONT.

LAKE DIFFERENCE

ELEVATION - AREA TABLE

RANGE NO. - 33
SURVEYED 137 8/1968
MINIMUM ELEVATION - 555.65
ASSUMED MINIMUM DATUM - 556.50

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
556.50	135.1				
557.00	305.5				
557.50	563.6				
558.00	867.4				
558.50	1181.3				
559.00	1500.2				
559.50	1821.6				
560.00	2145.0				
560.50	2469.8				
561.00	2795.5				
561.50	3121.8				
562.00	3448.8				
562.50	3776.5				
563.00	4104.8				
563.50	4433.8				
564.00	4763.7				
564.50	5094.4				
565.00	5426.1				
565.50	5758.8				
566.00	6092.7				
566.50	6428.8				
567.00	6765.9				
567.50	7107.2				
568.00	7443.6				



LAKE UICEMBAKER

PROFILE DATA

RANGE NO 33 SURVEY DATE 1972-06-22

STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS
0+00	589.51	LLBM	765.45	556.35				
0+00	589.27		775.51	556.02				
6+10	587.72		784.35	555.83				
12+19	585.65		793.63	555.92				
15+76	584.31		803.26	555.85				
18+59	583.45		814.53	555.65				
20+42	581.59		823.37	555.53				
24+34	584.90		832.91	555.35				
25+91	589.25		841.48	555.25				
31+00	588.45	HL	851.54	555.25				
31+09	588.76		864.52	555.07				
31+39	588.45		874.27	555.10				
37+49	587.66		884.63	554.93				
43+59	587.48		893.47	555.01				
52+43	587.33		903.53	555.13				
64+62	586.16		914.52	555.25				
75+59	586.32		924.58	555.38				
81+52	586.50		933.42	555.65				
92+59	586.86		943.45	555.93				
103+33	586.78		954.43	556.96				
112+47	586.93		963.58	557.54				
123+44	586.96		973.63	557.75				
134+42	587.17		981.55	557.75				
143+56	587.24		996.22	558.45	HL			
152+80	587.39		996.83	558.45				
164+59	587.39		814.17	558.55				
173+43	587.39		821.02	558.45	HL			
183+47	587.42		831.18	558.45				
193+55	587.65		838.05	558.33				
203+61	587.68		848.22	558.45	HL			
217+86	587.82		853.31	559.45				
225+55	587.92		864.65	558.89				
234+39	587.92		872.56	557.41				
244+45	587.33		876.25	561.57				
255+42	587.27		877.83	563.42				
264+57	587.33		879.24	565.17				
273+41	587.29		885.19	567.17				
283+46	587.17		891.69	567.93				
294+44	587.11		891.69	568.11	LRBM			
304+50	587.08							
314+55	587.02							
324+61	586.78							
333+45	586.50							
343+51	586.50							
354+46	585.17							

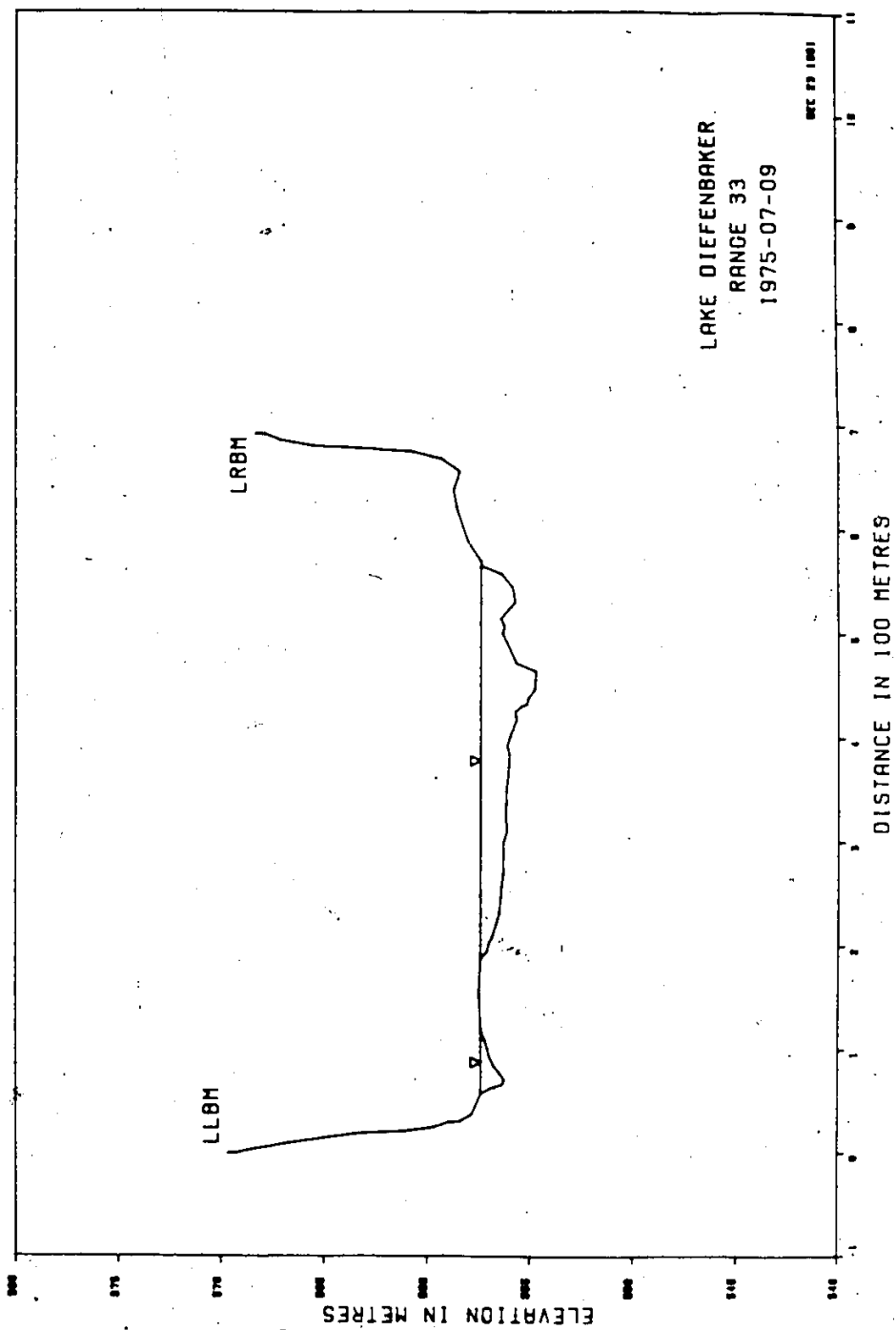
SEDIMENT SURVEY SECTION
 (CFC 2) FORM, PAGE 1
 DISTANCE, FT.

LAKE DUFF MARCER

RANGE NO. - 33
 SURVEYED 22/ 6/1972
 MINIMUM ELEVATION - 555.98
 ASSUMED MINIMUM DATUM - 555.53

ELEVATION - AREA TABLE
 ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
555.50	12.1	568.07	7350.0				
556.00	17.9						
556.50	131.7						
557.00	327.6						
557.50	523.2						
558.00	797.4						
558.50	1075.3						
559.00	1382.9						
559.50	1712.4						
560.00	2031.8						
560.50	2338.4						
561.00	2584.2						
561.50	3011.2						
562.00	3317.2						
562.50	3657.6						
563.00	3926.6						
563.50	4326.1						
564.00	4655.1						
564.50	4985.9						
565.00	5318.6						
565.50	5651.4						
566.00	5985.6						
566.50	6321.4						
567.00	6659.8						
567.50	6797.1						



LAKE CLEVELAND

REFILE DATA

UNCONFIDENTIAL SURVEY DATE 1995-07-09

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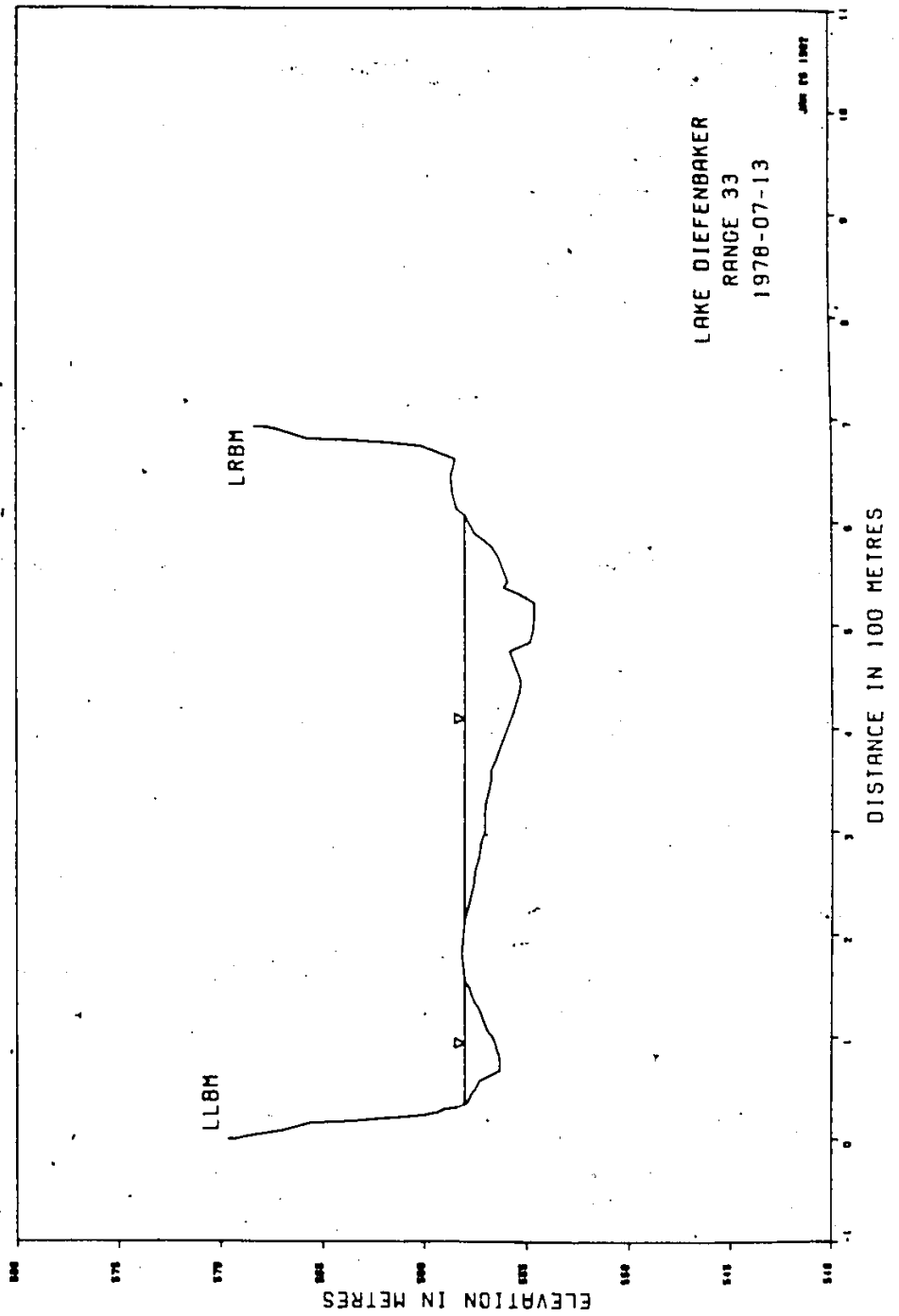
SEDIMENT SURVEY SECTION
DEC 23 1981, PAGE 1
JTTAAR,ONT.

LAKE DIEFENBAKER

RANGE NO. - 31
SURVEYED 9/ 7/1975
MINIMUM ELEVATION = 555.00
ASSUMED MINIMUM DATUM = 555.50

ELEVATION - AREA TABLE
ELEVATION (M.)

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
555.50	24.9	565.00	7407.0		
556.00	61.8				
556.50	187.6				
557.00	372.1				
557.50	593.1				
558.00	853.0				
558.50	1148.1				
559.00	1455.8				
559.50	1779.0				
560.00	2103.4				
560.50	2429.9				
561.00	2751.1				
561.50	3078.2				
562.00	3405.8				
562.50	3734.1				
563.00	4062.9				
563.50	4392.3				
564.00	4722.4				
564.50	5053.5				
565.00	5385.4				
565.50	5713.3				
566.00	6052.4				
566.50	6398.2				
567.00	6725.5				
567.50	7054.9				



LAKE DIEFENBAKER

PROFILE DATA

RANGE NO 33 SURVEY DATE 1970-07-13

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0.00 569.64 LLUM 415.00 559.60

0.00 569.30 426.00 559.30

4.00 568.40 435.00 559.30

9.00 566.85 445.00 559.25

16.00 565.60 474.00 559.80

18.00 563.45 483.00 559.80

20.00 562.25 495.00 559.65

22.00 560.85 505.00 559.80

24.00 559.85 514.00 559.60

25.00 559.75 541.00 559.60

26.00 559.35 529.00 559.30

29.50 559.00 536.00 559.10

31.00 558.45 541.00 559.90

34.50 558.00 567.00 558.40

35.00 558.00 WL 576.00 556.70

36.70 557.85 580.00 556.95

44.00 557.70 589.00 557.55

46.00 557.50 606.00 558.00 WL

57.00 557.30 612.20 558.40

67.00 556.70 627.40 558.60

79.00 556.70 642.70 558.68

88.00 556.45 660.40 558.45

98.00 556.60 673.20 560.15

106.00 556.90 674.10 560.60

115.00 557.10 675.90 561.35

126.00 557.30 677.10 562.45

134.00 557.55 679.00 563.85

141.00 557.70 679.90 565.75

148.00 557.80 688.40 567.10

153.00 558.00 691.50 567.75

160.00 558.15 691.50 568.33 L98M

213.00 558.00 WL

228.00 557.80

248.00 557.55

260.00 557.50

274.00 557.30

288.00 557.20

305.00 557.00

318.00 557.00

328.00 556.95

339.00 556.80

349.00 556.70

358.00 556.70

370.00 556.45

381.00 556.25

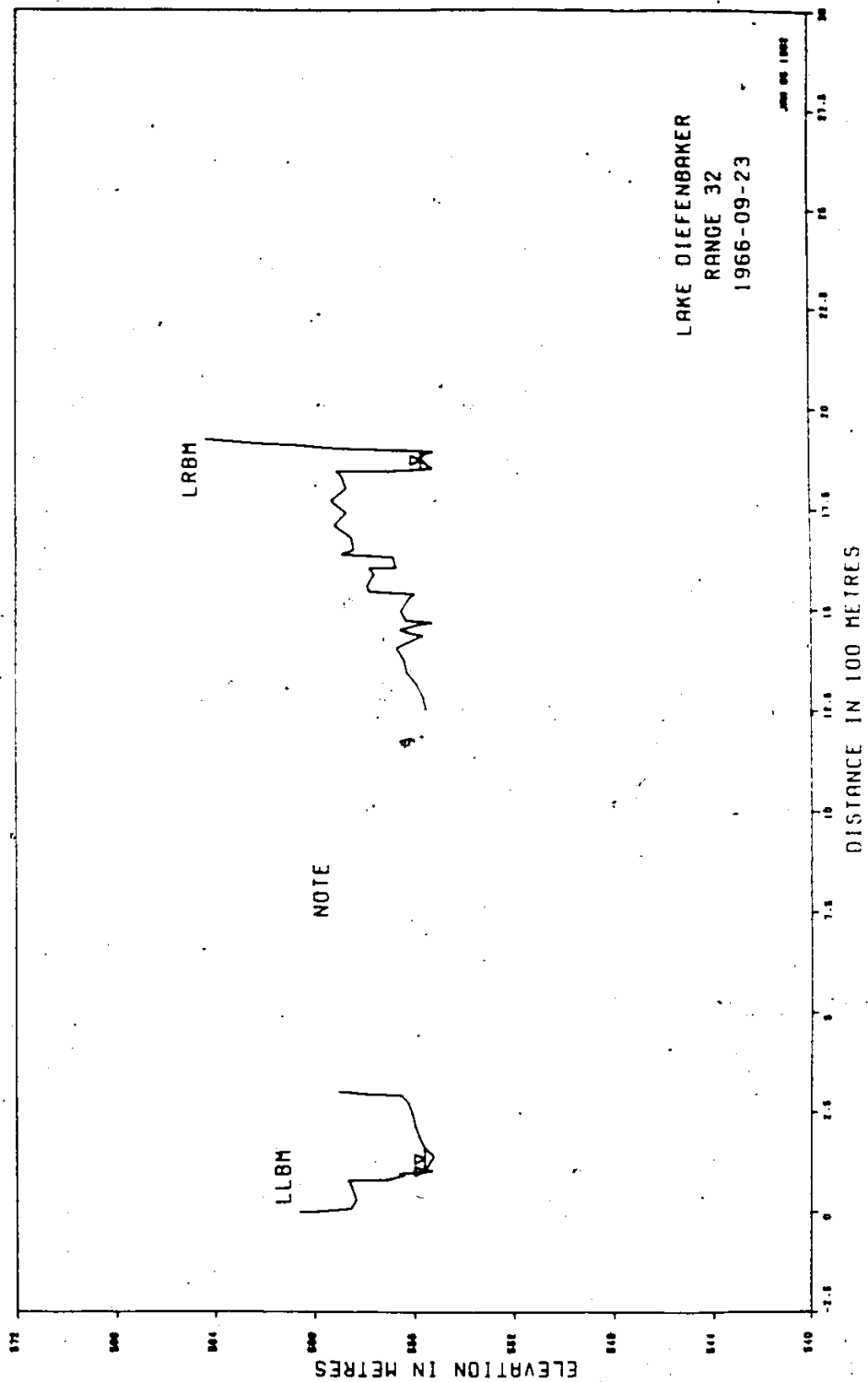
SEDIMENT SURVEY SECTION
JAN 26 1982, PAGE 1
OTTAWA, ONT.

LAKE DUFFIN

RANGE NO. - 33
SURVEYED 11/7/1978
MINIMUM ELEVATION - 555.00
ASSUMED MINIMUM DATUM - 555.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
555.50	48.3	568.00	7297.1		
556.00	108.7				
556.50	197.4				
557.00	331.9				
557.50	517.0				
558.00	750.1				
558.50	1034.7				
559.00	1387.1				
559.50	1666.8				
560.00	1989.5				
560.50	2314.5				
561.00	2640.7				
561.50	2967.8				
562.00	3285.8				
562.50	3624.0				
563.00	3953.2				
563.50	4283.1				
564.00	4613.7				
564.50	4944.7				
565.00	5276.0				
565.50	5607.6				
566.00	5940.2				
566.50	6275.6				
567.00	6611.9				
567.50	6948.5				



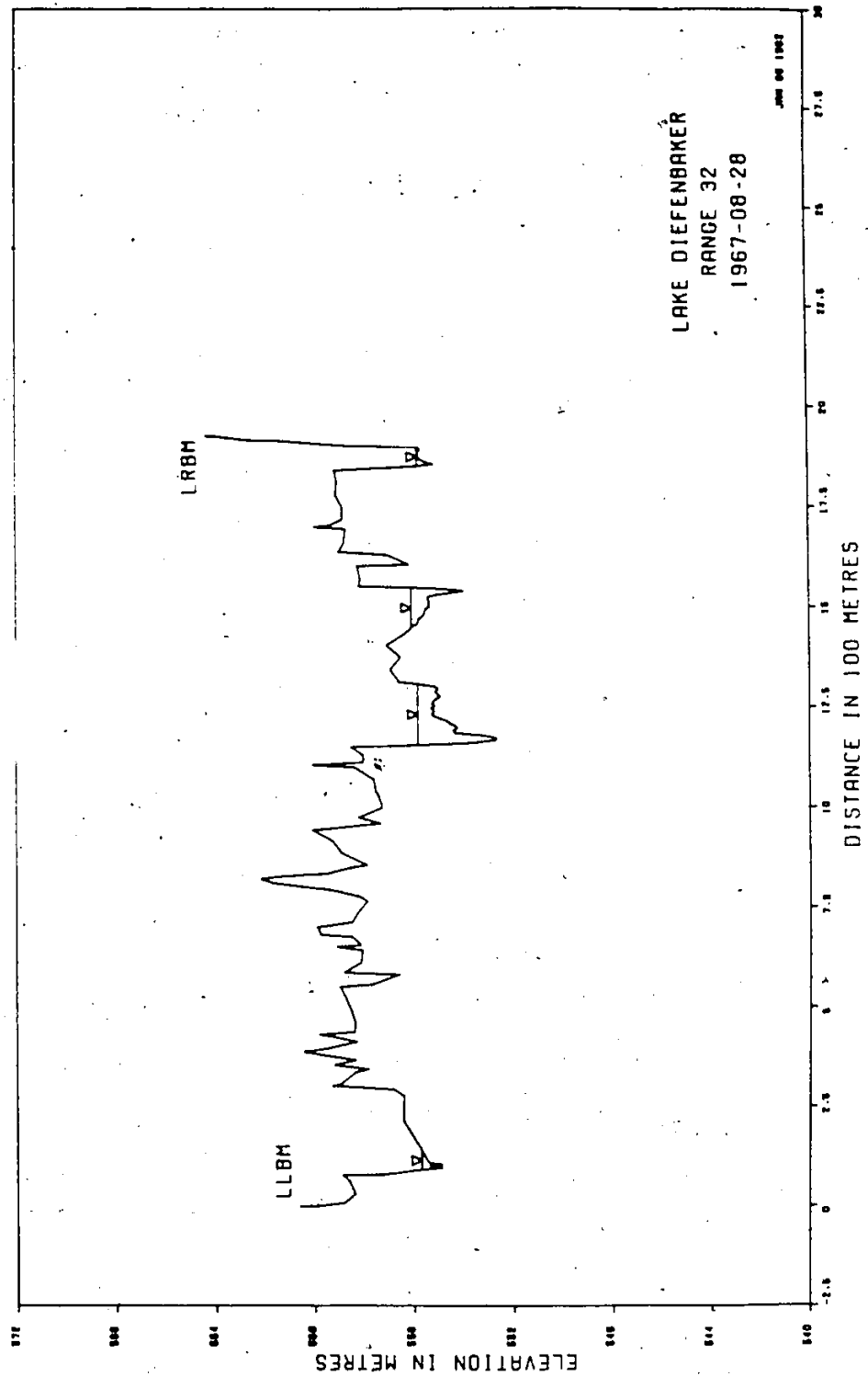
WATER SURVEY OF CANADA
JAN 05 1947 PAUL I
OTTAWA, ONT.

LAKE OJIBWAGAN

PAUL I DATA

RANGE NO 12 SURVEY DATE 1946-09-23

STA	ELEV	MKS	STA	ELEV	MKS	STA	ELEV	MKS
0.00	560.62	LLM	1526.74	556.20				
0.00	560.16		1518.94	555.40				
9.14	558.55		1545.03	557.79				
30.48	558.36		1557.22	557.83				
60.96	558.52		1567.72	557.60				
79.25	559.67		1602.33	557.76				
80.77	557.11		1604.77	556.72				
91.44	554.44		1616.18	556.81				
96.01	556.60		1610.38	556.84				
98.00	555.59	WL	1627.34	558.88				
99.47	555.59		1646.65	558.42				
102.41	555.28		1679.14	558.52				
105.00	555.59	WL	1739.62	559.17				
105.46	555.59		1740.10	558.73				
107.00	555.59	WL	1770.58	559.31				
107.29	555.59		1801.05	558.73				
115.82	555.44		1811.54	558.91				
124.97	555.38		1843.74	559.03				
134.11	555.25		1844.14	557.02				
142.04	555.28		1848.51	555.71				
146.35	555.41		1849.00	555.71				
159.00	555.59	WL	1849.22	555.71				
159.11	555.59		1849.43	555.25				
182.88	555.77		1852.95	555.25				
213.36	555.96		1855.21	555.54				
243.84	556.08		1862.02	555.50				
274.32	556.26		1868.12	555.51				
292.61	556.55		1874.22	555.83				
296.27	558.00		1880.31	555.63				
302.67	559.06		1883.35	555.92				
39997.00	0.00	NOTE	1887.45	555.47				
1250.59	555.53		1892.57	555.22				
1282.90	555.63		1895.33	555.71				
1313.38	555.69		1895.55	555.71				
1343.86	555.29		1900.73	555.01				
1374.34	556.41		1904.27	560.50				
1404.82	556.72		1914.43	562.73				
1435.30	555.55		1922.95	564.31				
1442.02	556.23							
1449.54	556.56							
1463.65	555.77							
1465.70	555.24							
1470.16	555.62							
1472.74	556.14							
1496.75	556.53							



LARE DIEFFENBACHER
PROFILE DATA

RANGE NO 32			SURVEY DATE 1957-J3-28		
STA.	ELEV	RKKS	STA	ELEV	RKKS
0+00	563.62	LLBM	1231.39	555.22	
0+00	560.07		1231.49	555.13	
7+62	558.02		1231.58	555.25	
30+48	558.36		1243.68	555.10	
60+96	558.58		1255.78	555.22	
78+03	558.93		1261.87	555.16	
79+25	557.20		1267.97	555.04	
90+00	555.68	WL	1274.06	554.89	
90+33	555.68		1280.16	555.01	
94+49	554.95		1286.26	555.10	
96+01	554.86		1292.35	554.98	
100+58	555.35		1298.45	555.10	
101+63	555.16		1305.00	555.80	4L
108+51	555.41		1305.46	555.80	
121+92	555.53		1310.64	555.56	
138+00	555.68	WL	1341.12	555.90	
138+99	555.68		1371.60	556.50	
169+47	555.99		1402.08	557.05	
182+88	556.11		1432.56	556.25	
213+36	556.41		1444.00	556.05	WL
243+84	556.41		1444.75	556.05	
274+32	556.38		1449.32	555.99	
292+61	556.81		1455.42	555.80	
301+75	559.25		1461.52	555.77	
308+80	558.94		1467.61	555.74	
335+28	558.33		1473.71	555.59	
342+90	557.78		1479.80	555.53	
353+57	559.16		1485.90	555.50	
365+76	558.33		1492.00	555.47	
387+10	560.41		1498.09	555.32	
396+24	559.37		1504.19	555.35	
411+48	558.27		1510.28	555.32	
426+72	559.40		1516.38	555.38	
429+77	559.77		1522.48	555.38	
435+86	559.36		1528.57	555.01	
457+20	558.33		1534.67	554.22	
487+68	558.49		1537.72	553.94	
518+16	558.70		1540.76	554.28	
548+64	558.94		1546.86	555.05	4L
554+43	557.66		1546.86	556.05	
579+12	556.58		1549.91	558.17	
584+91	558.76		1563.62	558.09	
609+60	558.09		1564.10	558.18	
640+08	558.03		1560.20	554.21	
643+22	559.06		1603.86	556.14	
			1627.63	556.99	
			1635.25	554.97	
			1655.06	558.76	
			1685.54	558.70	
			1691.64	558.70	
			1697.74	559.92	
			1700.78	559.34	
			1716.02	558.82	
			1746.52	558.82	
			1776.98	559.09	
			1807.45	557.03	
			1837.94	557.13	
			1844.00	557.24	
			1848.00	555.80	4L
			1853.18	555.13	
			1860.80	555.53	
			1868.42	555.74	
			1880.62	555.80	
			1889.75	555.68	
			1895.03	555.80	4L
			1895.86	555.80	
			1898.24	557.14	
			1899.51	558.67	
			1910.49	561.14	
			1912.62	561.96	
			1913.23	562.57	
			1922.98	563.91	LRJM
			1922.98	564.31	

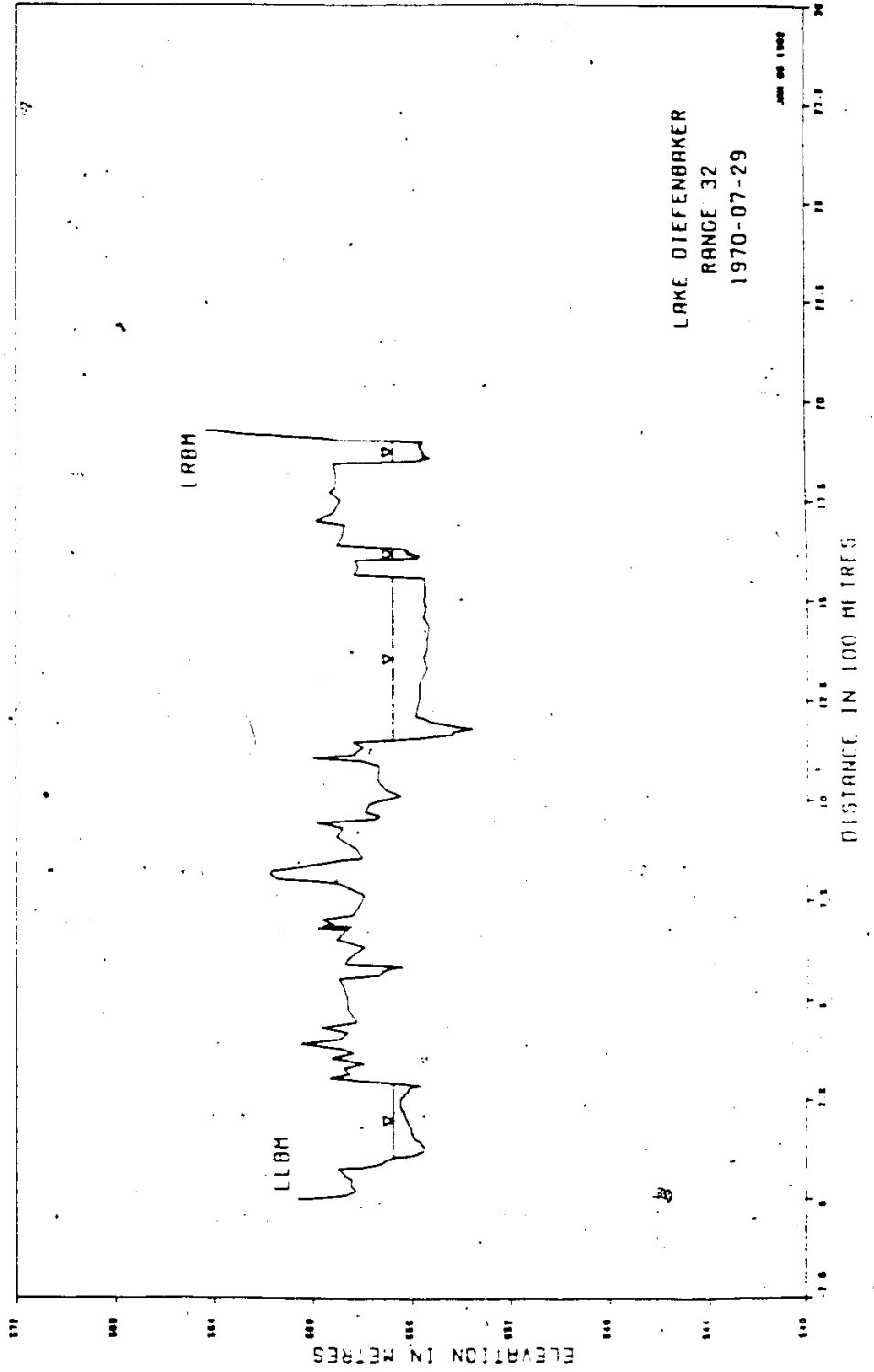
SEDIMENT SURVEY SECTION
JAN 4 1982, PAGE 1
OTTAWA, ONT.

LAKE DUFFENAKEN

ELEVATION - AREA TABLE

RANGE NO. - 32
SURVEYED 28/ 8/1967
MINIMUM ELEVATION - 552.65
ASSURED MINIMUM DATUM - 553.50

ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)
553.50	11.3	554.00	22.3	554.50	42.7	555.00	79.8
555.50	165.8	556.00	327.3	556.50	550.0	557.00	861.5
557.50	1224.9	558.00	1642.8	558.50	2185.3	559.00	2907.0
559.50	3775.5	560.00	4688.5	560.50	5624.6		



LAST JIFF-MRACER

PROFILE DATA

RANGE NO 32 SURVEY DATE 1970-07-29

STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS
0+00	560.62	LEBM	8+22	551.59		12+35	555.91		16+67	555.49	
0+00	560.13		8+31	560.41		13+58	555.21		18+11	555.51	
8+53	558.70		8+44	559.13		13+76	555.41		18+41	555.36	
20+42	558.27		8+75	558.91		14+00	555.55		18+70	555.53	
33+53	558.49		8+75	558.00		14+32	555.32		18+70	555.62	
40+77	558.55		8+75	558.21		14+55	555.42		18+73	555.56	
57+91	558.73		8+75	559.01		14+80	555.94		18+76	555.62	
74+68	558.97		8+75	559.77		14+99	555.62		18+80	555.62	
75+20	558.94		8+75	559.77		15+04	555.97		18+81	555.71	
75+33	558.94		8+75	559.77		15+04	555.97		18+81	555.71	
82+91	557.57		8+75	559.77		15+04	555.97		18+81	555.71	
89+00	557.27		8+75	559.77		15+04	555.97		18+81	555.71	
95+10	557.11		8+75	559.77		15+04	555.97		18+81	555.71	
101+19	556.91		8+75	559.77		15+04	555.97		18+81	555.71	
104+00	556.78		8+75	559.77		15+04	555.97		18+81	555.71	
104+24	556.78		8+75	559.77		15+04	555.97		18+81	555.71	
107+29	556.20		8+75	559.77		15+04	555.97		18+81	555.71	
110+34	555.96		8+75	559.77		15+04	555.97		18+81	555.71	
113+39	555.80		8+75	559.77		15+04	555.97		18+81	555.71	
116+43	555.74		8+75	559.77		15+04	555.97		18+81	555.71	
119+48	555.56		8+75	559.77		15+04	555.97		18+81	555.71	
124+72	555.53		8+75	559.77		15+04	555.97		18+81	555.71	
137+77	555.65		8+75	559.77		15+04	555.97		18+81	555.71	
143+87	555.68		8+75	559.77		15+04	555.97		18+81	555.71	
146+91	555.60		8+75	559.77		15+04	555.97		18+81	555.71	
149+96	555.92		8+75	559.77		15+04	555.97		18+81	555.71	
161+20	555.99		8+75	559.77		15+04	555.97		18+81	555.71	
165+19	555.05		8+75	559.77		15+04	555.97		18+81	555.71	
171+30	556.02		8+75	559.77		15+04	555.97		18+81	555.71	
175+39	556.05		8+75	559.77		15+04	555.97		18+81	555.71	
183+49	556.14		8+75	559.77		15+04	555.97		18+81	555.71	
189+59	556.17		8+75	559.77		15+04	555.97		18+81	555.71	
195+68	556.23		8+75	559.77		15+04	555.97		18+81	555.71	
198+73	556.20		8+75	559.77		15+04	555.97		18+81	555.71	
201+78	556.29		8+75	559.77		15+04	555.97		18+81	555.71	
207+87	556.29		8+75	559.77		15+04	555.97		18+81	555.71	
213+97	556.35		8+75	559.77		15+04	555.97		18+81	555.71	
220+07	556.35		8+75	559.77		15+04	555.97		18+81	555.71	
223+11	556.41		8+75	559.77		15+04	555.97		18+81	555.71	
228+21	556.47		8+75	559.77		15+04	555.97		18+81	555.71	
235+31	556.47		8+75	559.77		15+04	555.97		18+81	555.71	
241+40	556.50		8+75	559.77		15+04	555.97		18+81	555.71	
247+50	556.50		8+75	559.77		15+04	555.97		18+81	555.71	
253+59	556.44		8+75	559.77		15+04	555.97		18+81	555.71	
256+64	556.35		8+75	559.77		15+04	555.97		18+81	555.71	

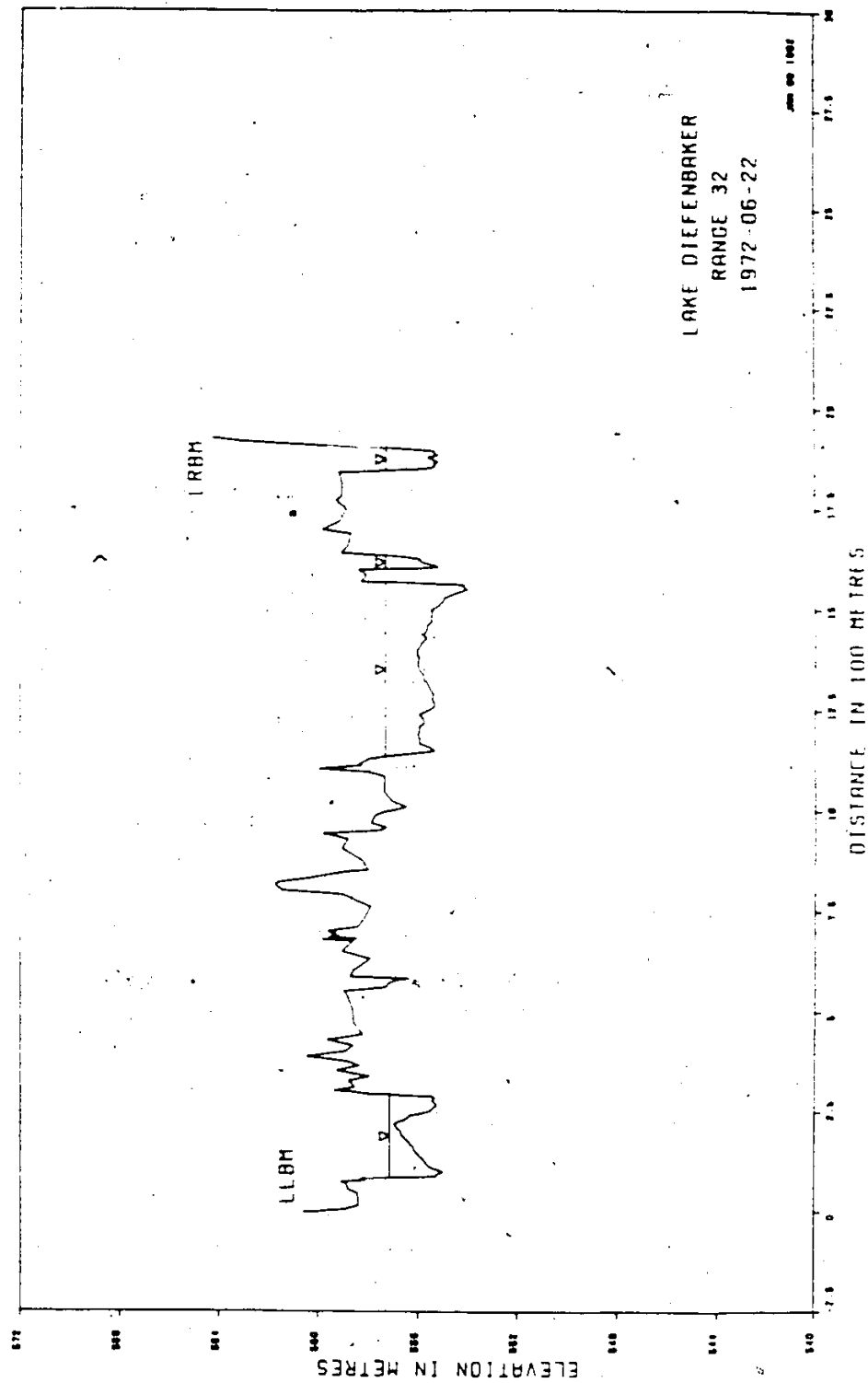
SEDIMENT SURVEY SECTION
 JAN 4 1982, PAGE 1
 UTTAMA, ONT.

LAKE OILFENBACHER

RANGE NO. - 32
 SURVEYED 2/7/1973
 MINIMUM ELEVATION - 551.55
 ASSUMED MINIMUM DRAIN - 554.53

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
554.50	9.3				
555.00	23.8				
555.50	55.8				
556.00	268.8				
556.50	553.4				
557.00	909.3				
557.50	1294.7				
558.00	1731.1				
558.50	2262.2				
559.00	2964.3				
559.50	3834.2				
560.00	4754.8				
560.50	5609.1				



LAKE DUFF-WHAVER

PROFILING DATA

RANGE NO. 12 SURVEY DATE 1972-05-22

STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS
0+00	350.59	LLBM	271.08	355.35		419.43	361.72		1298.95	355.30	
0+00	350.13		276.28	355.44		427.05	361.57		1308.51	355.39	
6+00	358.91		284.38	355.32		431.19	360.91		1319.26	355.55	
16+46	358.36		288.05	355.47		445.31	359.43		1328.35	355.77	
46+94	358.42		290.17	356.72		447.95	358.91		1337.66	355.80	
56+69	358.79		293.00	357.14		452.53	359.00		1345.94	355.95	
73+15	358.91		293.22	357.14		454.47	359.01		1354.47	356.02	
74+68	359.06		294.13	357.97		455.19	359.01		1367.11	356.02	
78+94	359.12		294.92	358.58		457.87	359.01		1379.12	359.09	
83+52	359.27		302.36	359.31		458.73	358.79		1389.43	359.04	
84+00	357.16		311.51	359.52		459.35	359.28		1394.36	359.05	
84+12	357.14		326.75	358.76		459.70	359.60		1397.51	359.08	
88+79	355.28		338.94	357.34		459.70	359.61		1406.98	359.92	
91+27	355.25		352.65	359.22		459.70	359.61		1417.32	359.86	
99+16	355.01		364.85	358.36		459.70	359.61		1428.24	359.85	
105+46	355.22		375.51	358.82		459.70	359.61		1436.52	359.83	
106+68	355.35		387.71	360.44		459.70	359.61		1444.91	359.65	
113+39	355.56		399.90	358.91		459.70	359.61		1454.97	359.65	
120+70	355.68		415.16	358.58		459.70	359.61		1464.94	359.47	
125+88	355.74		428.85	359.61		459.70	359.61		1474.52	359.50	
131+06	355.80		442.57	358.21		459.70	359.61		1484.25	359.44	
137+77	355.92		471.05	358.58		459.70	359.61		1494.25	359.39	
143+87	356.02		501.51	358.61		459.70	359.61		1504.27	359.34	
149+96	356.11		536.01	358.79		459.70	359.61		1514.27	359.35	
156+06	356.17		570.77	358.94		459.70	359.61		1524.27	359.35	
161+85	356.20		559.92	357.30		459.70	359.61		1534.27	359.35	
174+15	356.38		570.59	357.17		459.70	359.61		1544.27	359.35	
180+44	356.50		576.21	356.81		459.70	359.61		1554.27	359.35	
186+84	356.60		581.25	356.35		459.70	359.61		1564.27	359.35	
190+50	356.68		587.78	356.87		459.70	359.61		1574.27	359.35	
192+94	356.69		601.07	358.54		459.70	359.61		1584.27	359.35	
199+03	356.69		631.55	357.91		459.70	359.61		1594.27	359.35	
205+44	356.81		649.83	359.01		459.70	359.61		1604.27	359.35	
206+96	356.84		675.74	358.58		459.70	359.61		1614.27	359.35	
210+31	356.87		678.79	359.60		459.70	359.61		1624.27	359.35	
216+71	356.96		691.54	359.42		459.70	359.61		1634.27	359.35	
222+81	356.84		694.89	359.52		459.70	359.61		1644.27	359.35	
228+90	356.53		696.81	359.16		459.70	359.61		1654.27	359.35	
235+00	356.38		700.13	359.54		459.70	359.61		1664.27	359.35	
239+88	356.32		710.79	358.14		459.70	359.61		1674.27	359.35	
244+45	355.96		710.61	358.35		459.70	359.61		1684.27	359.35	
250+85	355.50		761.02	357.71		459.70	359.61		1694.27	359.35	
256+64	355.44		791.57	359.00		459.70	359.61		1704.27	359.35	
265+79	355.25		802.73	361.44		459.70	359.61		1714.27	359.35	

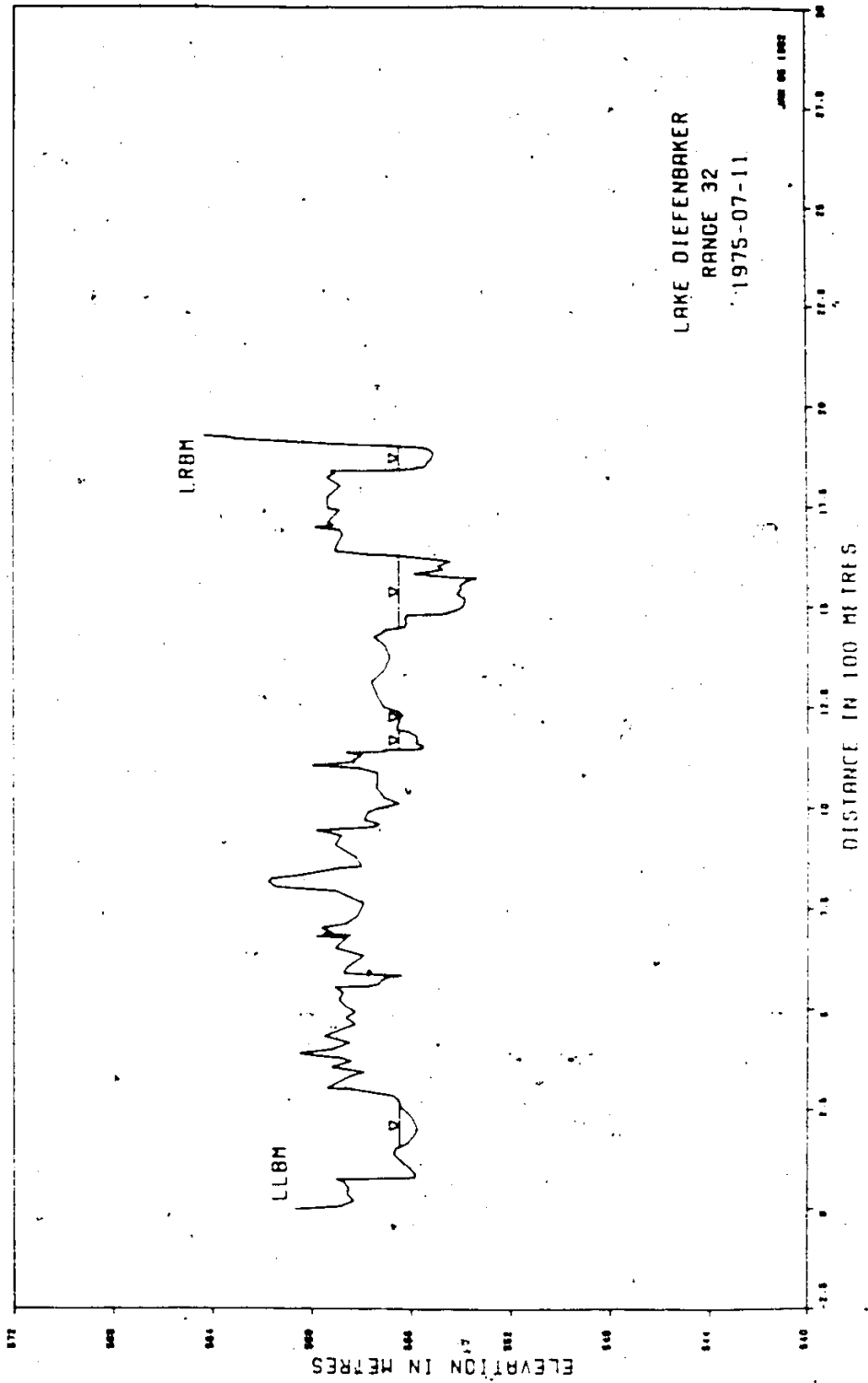
176

SEDIMENT SURVEY SECTION
 JAN 4 1982, PAGE 1
 OTTAWA, ONT.

LAKE DISTANCE
 ELEVATION - AREA TABLE

RANGE NO. - 12
 SURVEYED 22/ 6/1972
 MINIMUM ELEVATION - 555.00
 ASSUMED MINIMUM DATUM - 554.50

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
554.50	6.8						
555.00	21.6						
555.50	72.3						
556.00	262.2						
556.50	574.7						
557.00	923.3						
557.50	1310.9						
558.00	1783.5						
558.50	2320.0						
559.00	3025.3						
559.50	3835.0						
560.00	4815.8						
560.50	5751.1						



WATER SURVEY OF CANADA
JAN 05 1942
OTTAWA, ONT.

LAKE OUFELIMAKER

PROFILE DATA

RANGE NO 37 SURVEY DATE 1973-07-31

STA	ELEV	RMKS	STA	ELEV	RMKS	STA	ELEV	RMKS	STA	ELEV	RMKS
0+00	560.42		10+75	557.33		20+50	556.17		30+25	559.19	
6+71	558.82		1085.09	557.16		1667.92	556.71		1835.91	558.67	
21+34	558.33		1107.28	556.01		1672.37	556.16		1835.81	558.67	
36+58	558.55		1103.38	555.75		1674.58	555.94		1836.12	558.92	
51+82	558.52		1112.52	556.27		1674.58	556.71		1836.42	558.36	
68+58	558.73		1115.57	556.31		1681.61	556.61		1836.72	557.57	
72+24	558.86		1127.28	557.97		1687.24	556.46		1837.03	557.19	
74.37	557.00		1134.90	557.61		1691.96	556.99		1837.33	557.08	
74.98	554.00		1137.82	557.07		1691.39	556.07		1837.64	556.72	ML
77+11	556.87		1141.48	557.08		1698.70	553.88		1838.00	556.47	
79+25	557.86		1143.00	556.97	AL	1516.99	553.79		1838.25	556.47	
86+87	555.93		1144.52	555.62		1530.13	553.13		1843.13	555.80	
102+11	556.05		1146.05	555.65		1540.46	551.97		1845.26	555.74	
117+35	556.35		1149.10	555.47		1551.74	554.00		1846.17	555.44	
126+49	556.53		1155.19	555.56		1561.72	553.73		1846.17	555.44	
137+16	556.72		1156.24	555.77		1569.98	553.13		1846.17	555.44	
149+35	556.63		1161.29	555.77		1570.94	553.19		1846.17	555.44	
154.00	556.47	AL	1164.34	555.74		1580.31	553.86		1846.17	555.44	
164.59	556.14		1167.38	555.77		1591.05	554.88		1846.17	555.44	
182.08	555.89		1170.43	555.77		1598.98	554.80		1846.17	555.44	
198.12	555.74		1176.53	555.74		1610.87	554.90		1846.17	555.44	
212.46	555.89		1188.72	556.11		1616.96	555.01		1846.17	555.44	
231.48	556.05		1190.00	556.47	ML	1623.35	556.14		1846.17	555.44	
252.98	556.38		1190.55	556.47		1625.00	556.97	AL	1846.17	555.44	
263.00	556.47		1194.92	556.55		1625.13	556.97		1846.17	555.44	
265.96	556.47		1213.30	556.47	ML	1625.53	556.97		1846.17	555.44	
274.32	556.56		1213.20	556.44		1627.53	557.17		1846.17	555.44	
282.55	556.75		1214.70	556.44		1627.59	557.66		1846.17	555.44	
299.01	556.36		1228.04	556.32		1629.85	557.88		1846.17	555.44	
301.45	559.37		1235.96	556.46		1632.51	558.92		1846.17	555.44	
311.93	558.42		1236.00	556.47	AL	1636.17	559.03		1846.17	555.44	
341.68	557.48		1236.57	556.47		1643.92	559.00		1846.17	555.44	
353.57	558.19		1249.64	557.11		1646.40	558.73		1846.17	555.44	
368.81	558.39		1260.16	557.17		1648.54	558.85		1846.17	555.44	
376.43	558.82		1313.64	557.60		1649.69	559.05		1846.17	555.44	
384.05	560.13		1314.12	557.05		1649.69	559.05		1846.17	555.44	
388.01	562.47		1315.50	556.94		1649.69	559.05		1846.17	555.44	
397.76	559.19		1317.36	557.05		1649.69	559.05		1846.17	555.44	
414.53	558.45		1317.41	557.49		1649.69	559.05		1846.17	555.44	
430.58	559.49		1317.56	557.14		1649.69	559.05		1846.17	555.44	
461.16	558.24		1317.56	557.14		1649.69	559.05		1846.17	555.44	
474.40	554.51		1317.56	557.14		1649.69	559.05		1846.17	555.44	
491.64	558.24		1317.56	557.14		1649.69	559.05		1846.17	555.44	
504.98	558.67		1317.56	557.14		1649.69	559.05		1846.17	555.44	

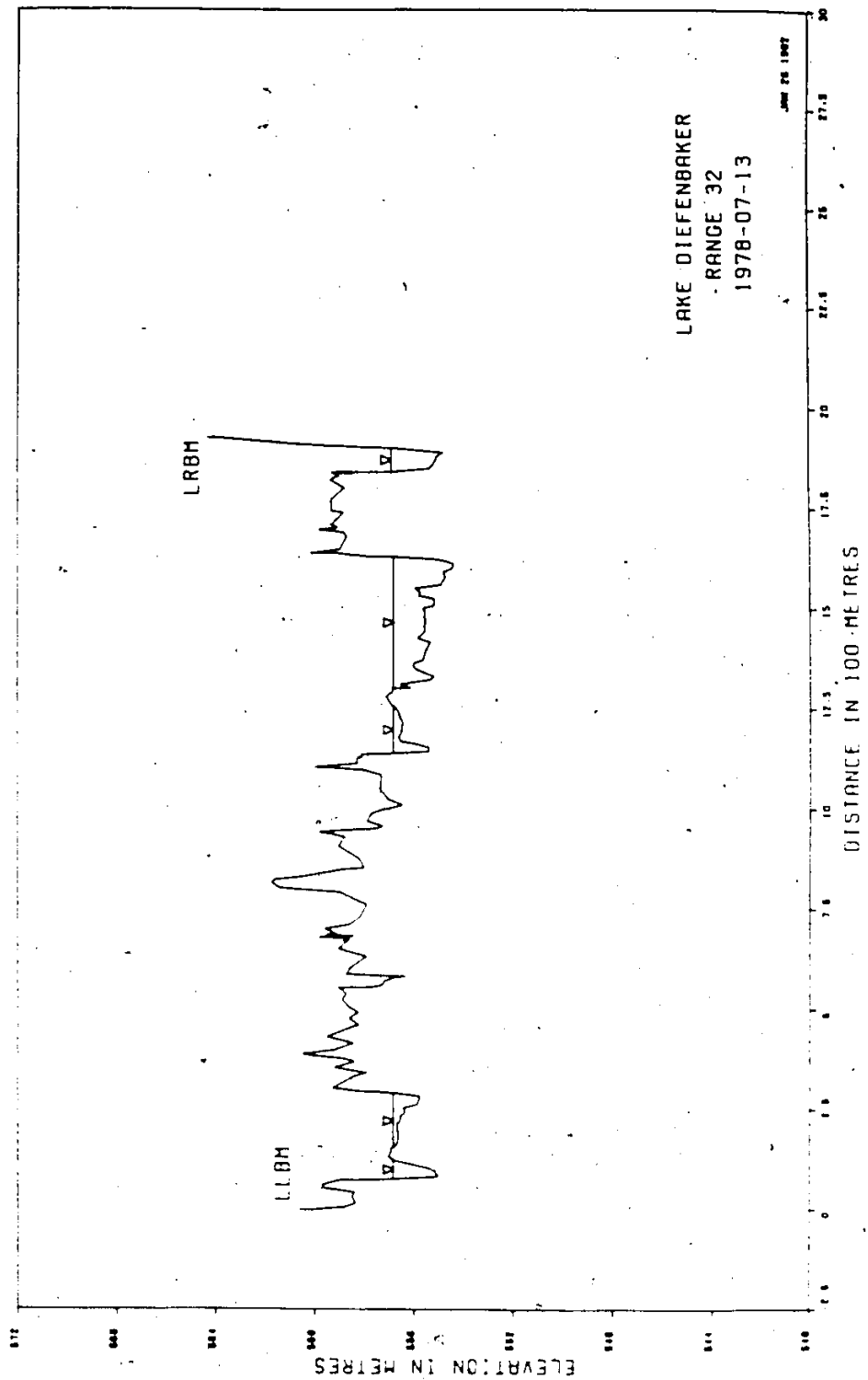
48M

RANGE NO. 32
 3/4/75 11/ 7/1975
 MINIMUM ELEVATION = 551.00
 ASSUMED MINIMUM DATUM = 554.00

LAKE SUPERIOR
 ELEVATION - AREA TABLE

SEDIMENT SURVEY SECTION
 JAN 5 1987, PAGE 1
 UTTARA, ONT.

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
554.00	1.8	554.50	50.9	555.00	105.9
554.50		555.00		555.50	184.8
555.00		555.50		556.00	302.8
555.50		556.00		556.50	438.7
556.00		556.50		557.00	780.1
556.50		557.00		557.50	1157.0
557.00		557.50		558.00	1622.0
557.50		558.00		558.50	2165.1
558.00		558.50		559.00	2861.4
558.50		559.00		559.50	3725.2
559.00		559.50		560.00	4645.7
559.50		560.00		560.50	5578.4



LAKE DIEFFENBARGER

PROFILE DATA

RANGE MU 32 SURVEY DATE 1978-07-13

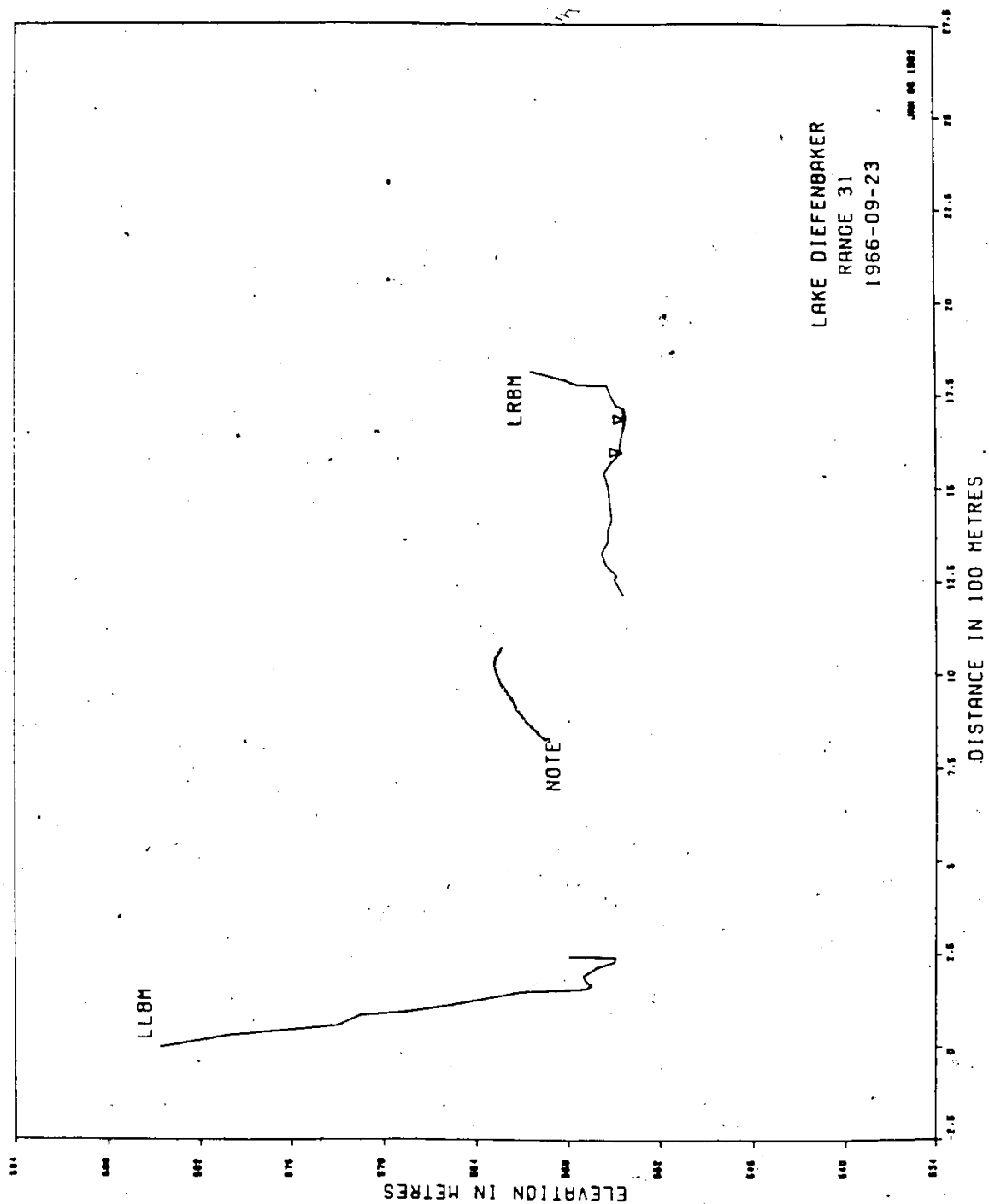
STA	ELEV	RMS	STA	ELEV	RMS	STA	ELEV	RMS	STA	ELEV	RMS
0+00	550.63	LLS	950+74	557.94		1310+00	555.20		1699+87	559.09	
0+00	550.10		957+01	557.27		1341+00	555.65		1706+88	559.34	
5+60	556.80		967+26	557.88		1349+00	555.95		1737+36	558.85	
16+20	556.35		987+56	557.14		1357+00	556.05		1742+24	559.34	
30+50	556.30		996+70	557.33		1363+00	556.00		1767+84	559.37	
43+10	556.40		999+74	557.05		1371+00	555.65		1798+32	558.82	
54+30	559.70		1006+89	556.87		1380+00	555.60		1818+44	559.17	
61+00	559.70		1024+11	557.08		1391+00	555.35		1825+45	559.19	
73+50	559.00		1048+51	557.39		1404+00	555.45		1828+80	559.03	
75+50	556.85		1057+66	557.36		1415+00	555.35		1832+76	559.16	
78+00	556.85	ML	1078+99	557.33		1426+00	555.85		1835+51	559.19	
82+00	555.05		1085+09	557.36		1437+00	555.65		1835+81	558.67	
92+00	555.15		1097+28	556.03		1444+00	555.55		1836+12	558.42	
102+00	555.15		1103+38	559.95		1454+00	555.60		1836+40	559.32	
112+00	556.05		1114+52	558.27		1462+00	555.55		1836+40	559.10	ML
122+00	556.81		1115+57	558.33		1471+00	555.55		1837+10	559.10	
128+00	556.85	ML	1127+70	558.24		1480+00	555.60		1840+00	558.95	
132+00	557.05		1127+90	558.10		1491+00	555.55		1841+00	558.70	
142+00	556.95		1136+00	558.10		1499+00	555.65		1849+00	558.75	
152+00	556.95		1137+90	556.85	ML	1506+00	555.20		1859+00	555.40	
153+00	556.85	ML	1141+10	556.85		1517+00	555.20		1859+00	555.15	
162+00	556.70		1149+10	556.40		1524+00	555.20		1879+00	555.10	
172+00	556.65		1151+00	555.40		1532+00	555.80		1889+00	554.85	
182+00	556.65		1152+00	555.40		1541+00	555.75		1899+00	556.75	
192+00	556.65		1161+00	555.85		1550+00	555.95		1899+00	556.95	
202+00	556.70		1168+00	556.35		1559+00	556.95	ML	1900+00	556.95	ML
212+00	556.70		1168+00	556.35		1569+00	556.85		1902+60	558.50	
222+00	556.55		1177+00	556.65		1579+00	554.75		1903+20	559.40	
232+00	556.55		1185+00	556.65		1590+00	554.85		1908+40	560.70	
242+00	556.35		1191+00	556.50		1601+00	554.45		1911+70	561.50	
252+00	556.45		1201+00	556.50		1612+00	554.45		1920+20	561.30	
262+00	555.85		1211+00	556.45		1618+00	554.75		1923+00	561.00	LRBM
272+00	555.85		1225+00	556.55		1623+00	555.10		1923+00	564.29	LRBM
282+00	555.85		1230+00	556.60		1628+00	556.70				
289+00	556.60		1240+00	556.65		1628+90	556.85	ML			
290+00	556.85	ML	1250+00	556.75		1629+00	556.85				
291+20	557.10		1250+00	556.85		1629+20	557.80				
295+70	558.10		1260+00	556.95		1632+20	557.20				
298+70	558.70		1270+00	557.05		1633+14	558.60				
302+10	559.20		1280+00	557.15		1636+20	559.00				
307+10	559.27		1290+00	556.90		1636+20	560.16				
311+93	558.42		1300+00	556.85	ML	1645+72	559.00				
341+68	557.66		1301+00	556.15		1676+40	558.73				
351+57	559.10		1310+00	556.55		1682+59	558.85				
364+01	558.10		1321+00	557.15		1694+64	559.83				

SEDIMENT SURVEY SECTION
 JAN 26 1982, PAGE 1
 UTTAHO, UTAH

RANGE NO. - 12
 SURVEYED 13/ 771978
 MINIMUM ELEVATION - 554.45
 ASSUMED MINIMUM DATUM - 555.00

LAKE DIFFERENCE
 ELEVATION - AREA TABLE
 ELEVATION (M.) ACC. AREA (SQ. M.) ELEVATION (M.) ACC. AREA (SQ. M.)

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
555.00	16.3	555.50	85.3	556.00	258.9
555.50	85.3	556.00	258.9	556.50	491.9
556.00	258.9	556.50	491.9	557.00	825.8
556.50	491.9	557.00	825.8	557.50	1249.6
557.00	825.8	557.50	1249.6	558.00	1711.3
557.50	1249.6	558.00	1711.3	558.50	2258.6
558.00	1711.3	558.50	2258.6	559.00	2793.3
558.50	2258.6	559.00	2793.3	559.50	3393.6
559.00	2793.3	559.50	3393.6	560.00	4711.8
559.50	3393.6	560.00	4711.8	560.50	5644.6
560.00	4711.8	560.50	5644.6		



WATER SURVEY OF CANADA
JAN 05 1992 PAGE 1
OTTAWA, ONT.

LAKE OJEE: MACKINAC

MAQUETTE DATA

RANGE NO 31 SURVEY DATE 1966-07-21

ELEV RRS

ELEV RRS

STA

STA

ELEV

STA

RRS

ELEV

STA

RRS

ELEV

STA

RRS

ELEV

STA

0.00 564.58 LLBM 1718.21 554.34

30.48 580.22 1721.21 554.43

57.91 572.93 1751.61 555.17

85.74 571.53 1774.55 555.41

94.49 568.56 1777.29 557.30

118.07 564.95 1782.17 557.72

144.78 561.62 1789.79 558.12

184.74 561.05 1817.65 560.41

156.97 556.84

166.12 556.44

173.74 556.78

182.88 556.93

191.11 557.02

213.76 558.11

228.60 558.95

241.10 558.89

243.84 557.84

99997.00 0.00 MJTE

1212.80 554.37

1254.56 554.92

1264.01 554.77

1294.49 555.47

1324.97 555.74

1355.45 555.32

1385.93 555.12

1416.41 555.07

1446.89 554.19

1477.37 555.25

1507.85 555.35

1538.33 555.59

1568.81 555.10

1599.29 554.58

1629.77 554.58

1660.25 554.43

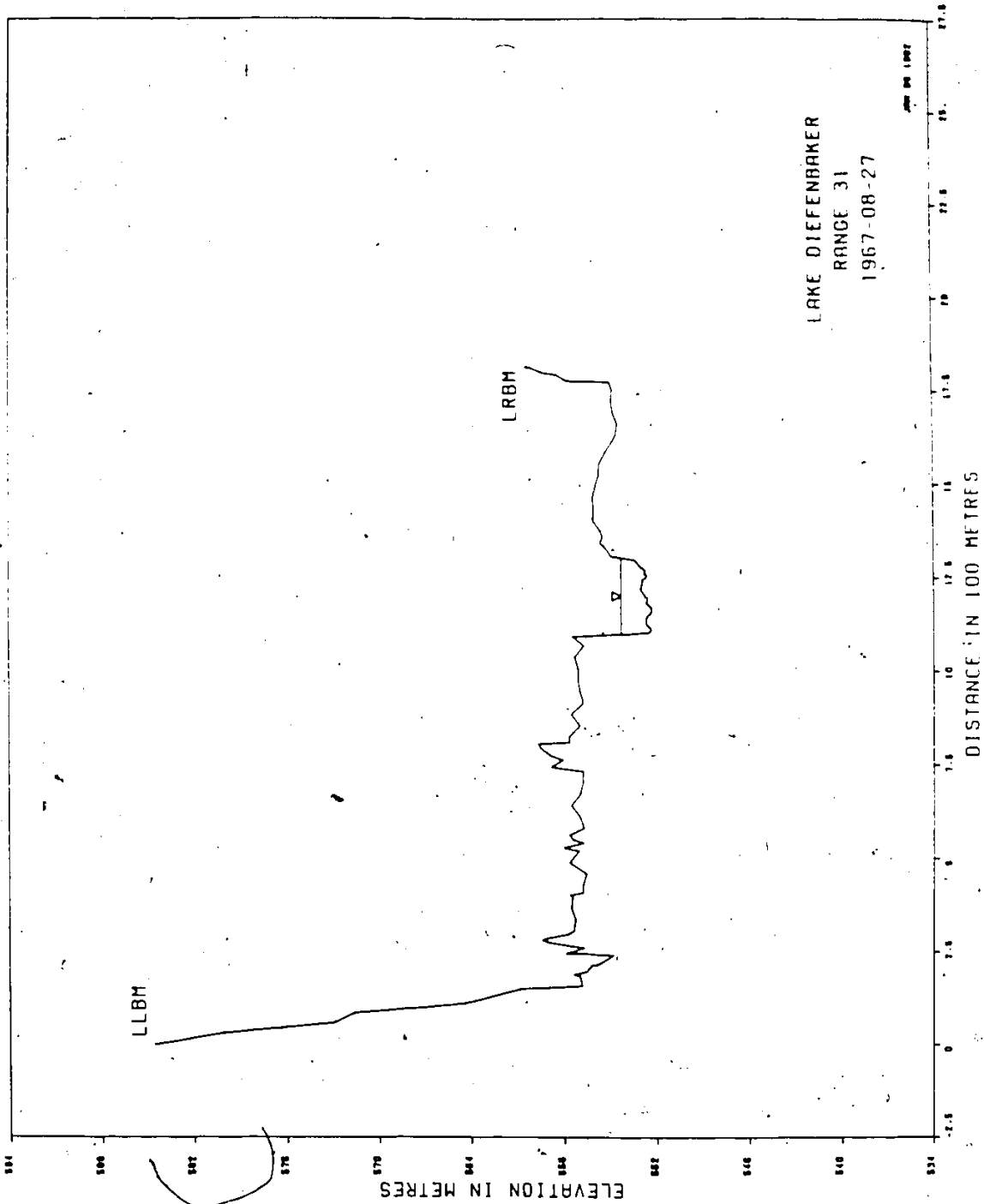
1690.73 554.16

1721.21 554.25

1751.69 554.78

1782.17 554.34

1812.65 554.34



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Page 114 - 0374

17-90-2961 3A1 4 14 PM, 11 11h 17m

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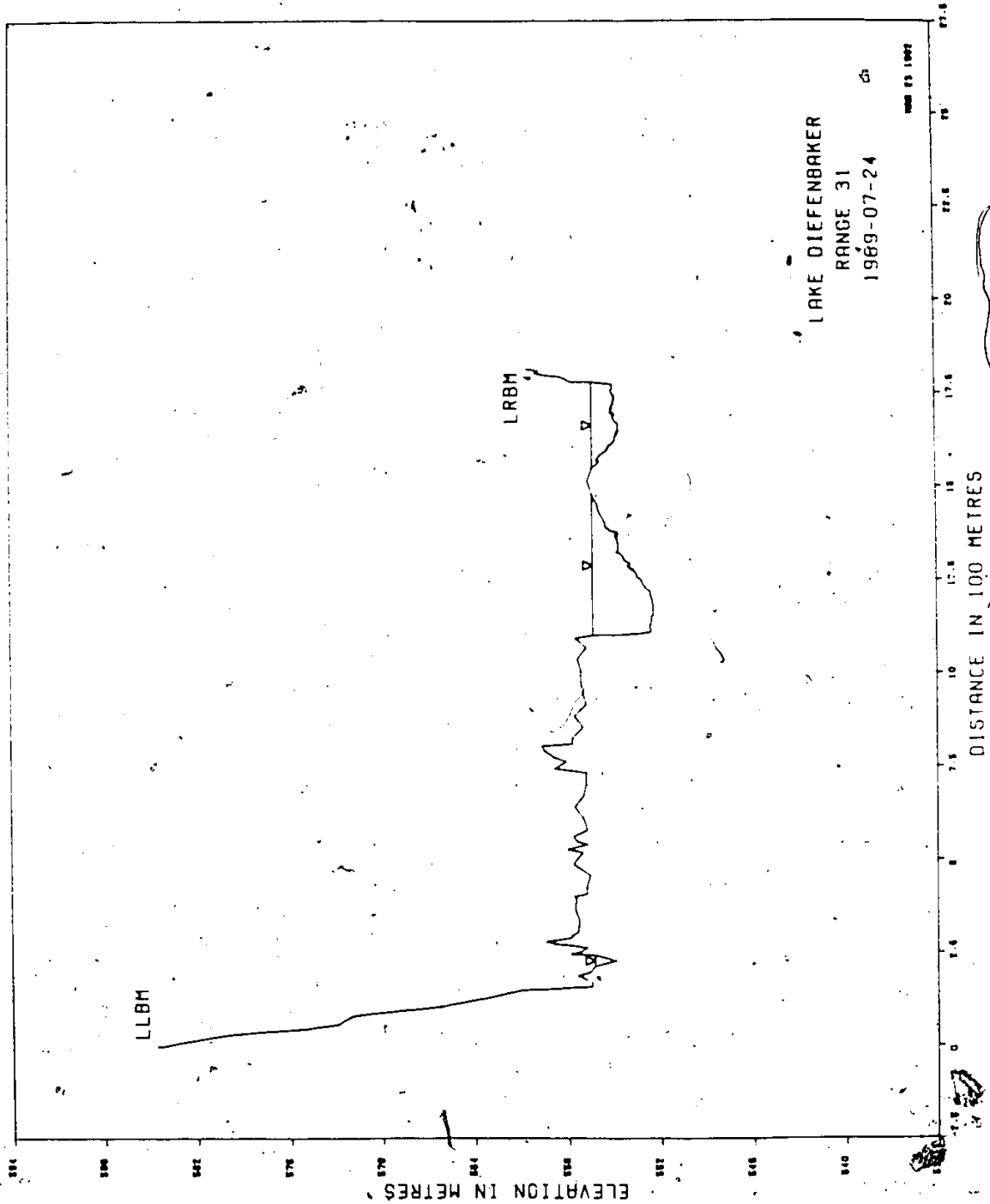
SEDIMENT SURVEY SECTION
JAN 4 1982, PAGE 1
OTTAWA, ONT.

LAKE OLFENBACHER

RANGE NO. - 91
SURVEYED 27/ 8/1987
MINIMUM ELEVATION = 552.27
ASSUMED MINIMUM DATUM = 553.00

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
553.00	52.1	553.50	156.8	554.00	257.2
553.50	156.8	554.00	257.2	554.50	359.8
554.00	257.2	554.50	359.8	555.00	505.4
554.50	359.8	555.00	505.4	555.50	723.4
555.00	505.4	555.50	723.4	556.00	998.3
555.50	723.4	556.00	998.3	556.50	1353.5
556.00	998.3	556.50	1353.5	557.00	1773.8
556.50	1353.5	557.00	1773.8	557.50	2402.3
557.00	1773.8	557.50	2402.3	558.00	3157.1
557.50	2402.3	558.00	3157.1	558.50	3933.5
558.00	3157.1	558.50	3933.5	559.00	4729.3
558.50	3933.5	559.00	4729.3	559.50	5538.9
559.00	4729.3	559.50	5538.9	560.00	6365.4
559.50	5538.9	560.00	6365.4		



WATER SURVEY OF LAKE
MAR 23 1945
OTTAWA, I.C.

LAKE OTTAWA
PROFILE DATA

STATION NO. 12 SOURCE DATE 1949-07-24

STA ELEV MMS STA ELEV MMS

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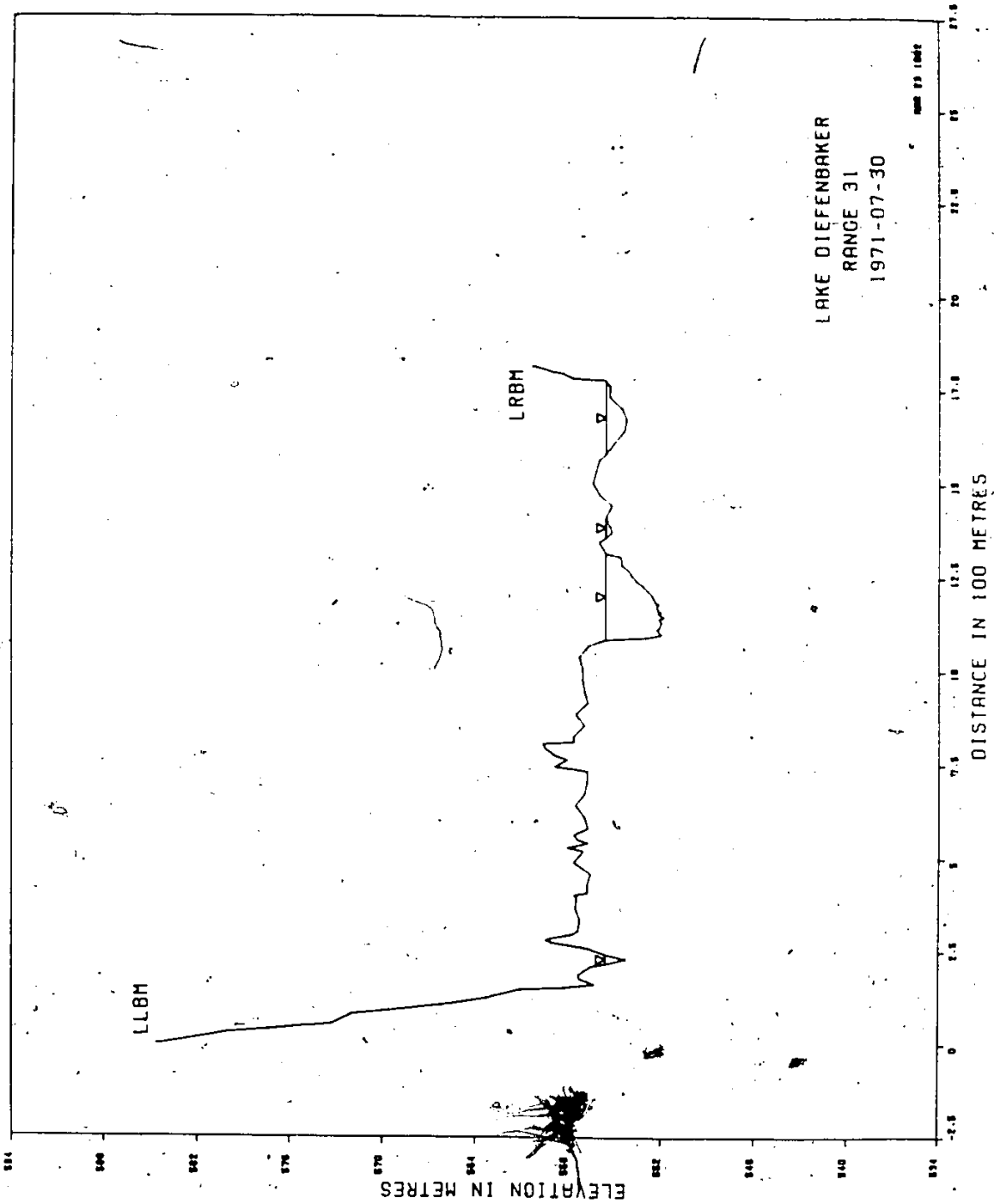
SEDIMENT SURVEY SECTION
MAR 23 1982, PAGE 1
OTTAWA, ONT.

LAKE SUPERIOR

RANGE NO. 31
SURVEYED 24/ 7/1969
MINIMUM ELEVATION = 552.30
ASSUMED MINIMUM DATUM = 553.00

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
553.00	54.3				
553.50	183.7				
554.00	233.1				
554.50	336.2				
555.00	498.2				
555.50	714.8				
556.00	1008.0				
556.50	1376.2				
557.00	1753.9				
557.50	2146.8				
558.00	3158.4				
558.50	3925.5				
559.00	4722.9				
559.50	5539.1				
560.00	6359.7				



WATER SURVEY IS (XXXX)
 PAGE 23 FROM PAGE 1
 DITMAA-001.

LAKE INFORMATION

PROFILE DATA

24000 NO 31 SURVEY DATE 1971-07-10

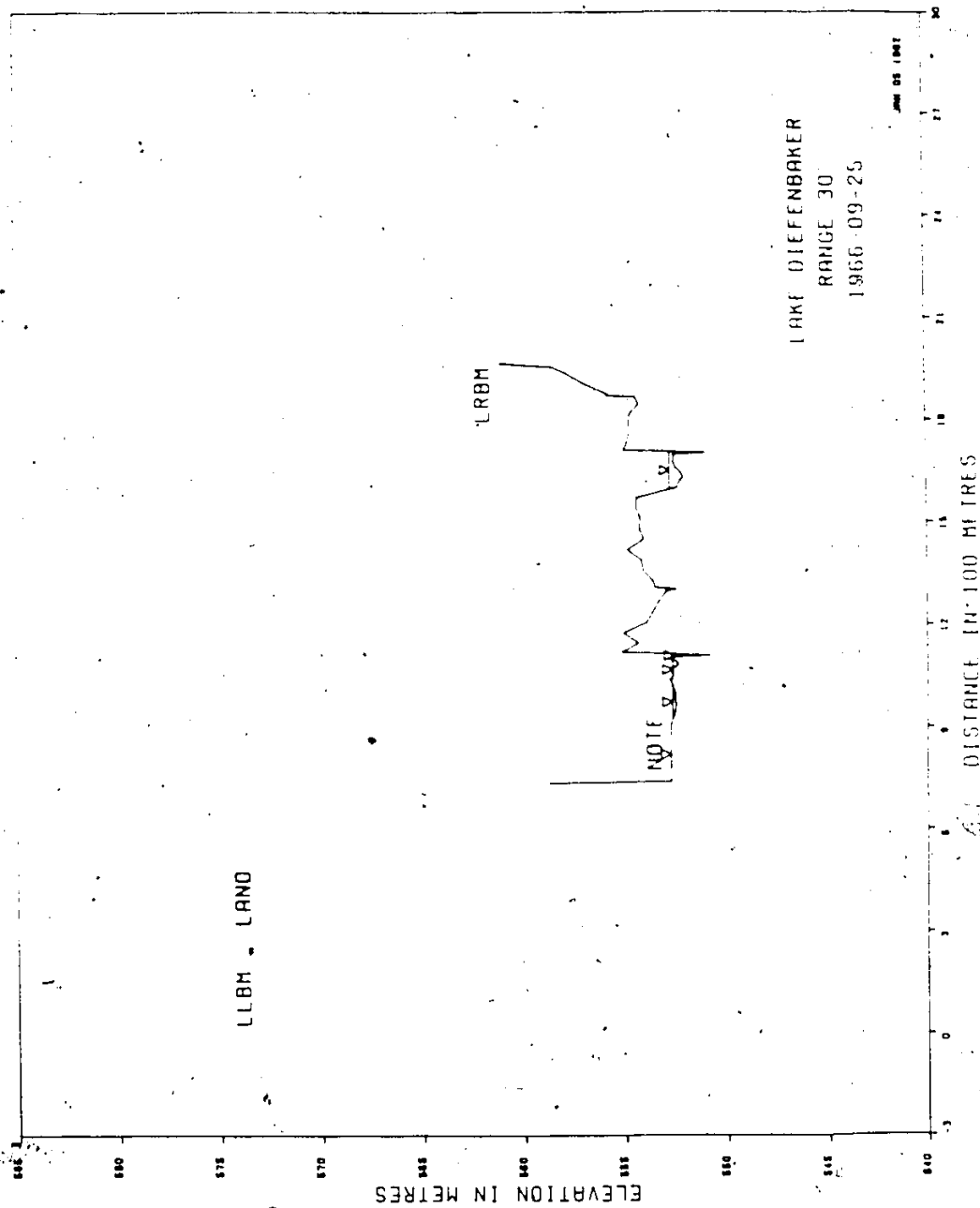
STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS
0+00	588.58	LLSM	778.19	558.65		1810.11	555.70	AL			
0+00	578.67		778.19	557.86		1810.19	555.15				
10+44	570.06		808.67	559.61		1871.27	559.97				
42+98	576.50		839.68	556.60		1901.15	556.81				
55+17	571.78		872.96	557.01		1937.73	556.20				
80+77	571.96		891.88	556.03		1967.11	555.77				
91.44	569.52		881.92	557.98		1977.95	555.70	AL			
106.08	569.07		918.40	556.72		1989.83	555.01				
124.17	561.27		948.80	556.93		1994.91	554.80				
149.05	561.05		979.36	557.05		1994.19	554.45				
151.62	559.74		1005.86	557.05		1999.87	554.59				
162.76	556.27		1016.12	557.27		1710.15	555.12				
170.00	557.27		1080.80	556.67		1760.93	555.12				
187.85	557.13		1091.70	555.55		1772.72	555.70	AL			
210.11	556.51	AL	1094.70	555.55		1776.07	555.67				
212.02	555.56	AL	1094.70	557.44		1780.07	557.77				
229.21	558.25		1099.67	557.75		1793.75	558.11				
242.61	555.56	AL	1109.70	557.27		1799.12	559.07				
259.08	556.69		1118.05	557.11		1817.65	560.17				
274.12	559.09		1124.67	557.96				LRMS			
280.82	559.40		1137.51	557.11							
286.07	557.13		1147.71	557.01							
295.66	557.72		1147.57	557.70							
308.80	557.43		1156.75	557.11							
319.76	557.28		1156.12	557.15							
365.76	557.51		1160.63	557.15							
396.74	557.87		1164.52	557.27							
400.41	557.57		1174.70	557.27							
406.91	556.75		1171.06	557.11							
426.72	556.75		1187.02	557.15							
487.70	556.51		1206.01	556.97							
487.68	557.60		1210.97	556.57							
518.16	556.39		1227.63	556.15							
527.10	557.97		1233.66	555.84							
539.50	556.69		1281.58	557.08							
568.48	557.15		1285.71	557.15							
580.41	557.50		1289.77	558.10							
579.12	556.67		1281.68	558.72							
609.60	556.73		1271.76	558.58							
680.03	557.85		1308.54	558.58							
670.56	556.20		1315.14	558.58							
701.04	556.75		1315.14	558.72							
711.52	556.77		1329.18	558.72	AL						
741.71	556.77		1370.15	558.72							
767.00	556.01		1370.15	558.72							

SEDIMENT SURVEY SECTION
 MAR 23 1962, PAGE 1
 OTTAWA, ONT.

RANGE NO. - 31
 SURVEYED 30/ 7/1971
 MINIMUM ELEVATION = 551.81
 ASSUMED MINIMUM DATUM = 552.50

AREA ELEVATION - AREA TABLE
 ELEVATION - AREA TABLE

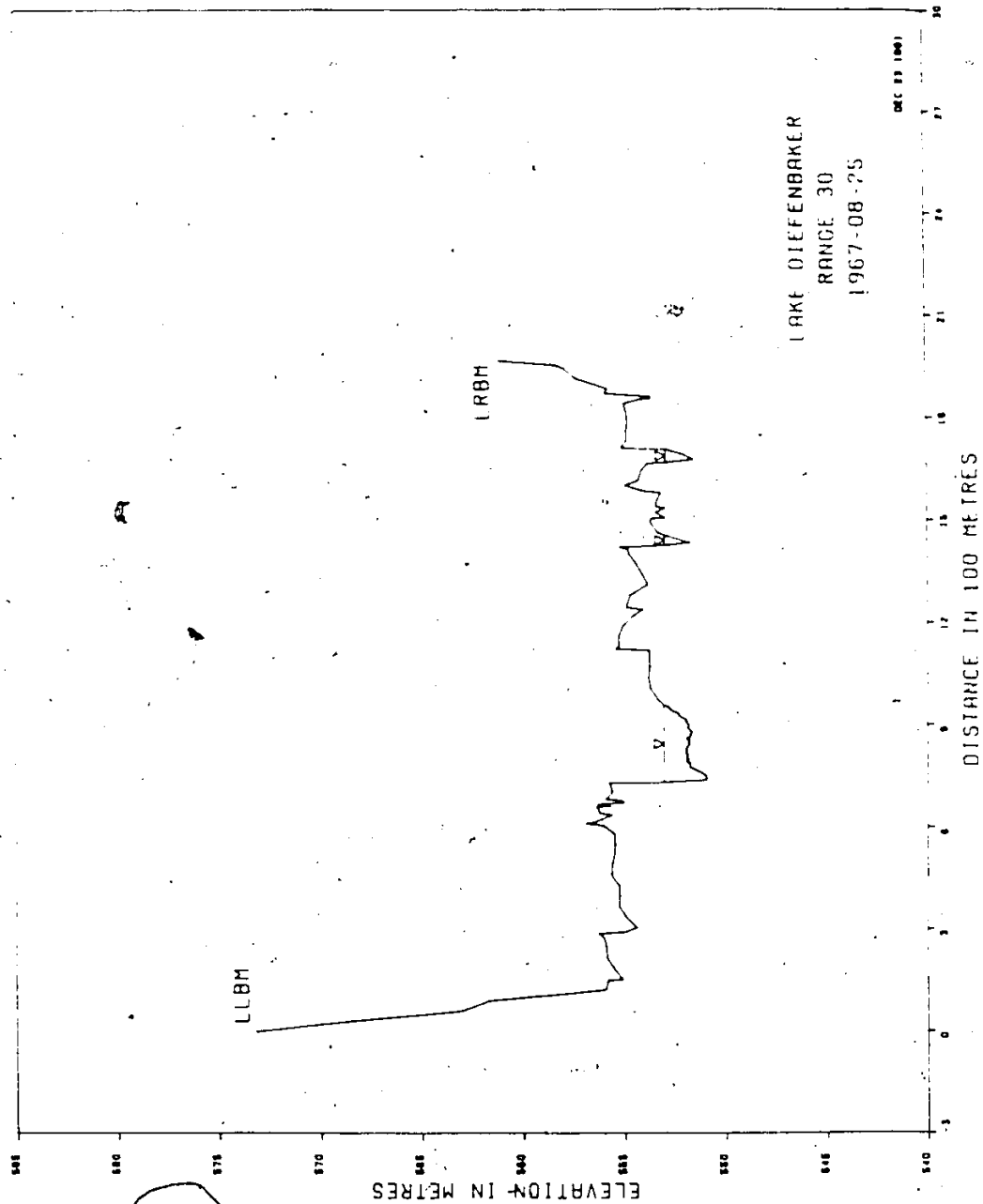
ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
552.50	195.6						
553.00	79.5						
553.50	195.1						
554.00	285.7						
554.50	147.6						
555.00	502.3						
555.50	711.9						
556.00	1010.3						
556.50	1164.8						
557.00	1404.2						
557.50	2416.6						
558.00	3171.8						
558.50	3971.7						
559.00	4757.7						
559.50	5580.0						
560.00	6507.5						



1. $\Delta x \rightarrow 0$ 2. $\Delta t \rightarrow 0$

1444. VI. IV. JUSTY JAL. 1436-JJ-25

STA	ELEV	D	WGS	STA	ELEV	D	WGS
0+00	573.05	LLCM		1+08+29	553.41		
99998+00	0+00	LAND		1+26+49	551.55		
733+65	558+67			1+56+97	558+00		
738+00	552+69	ML		1+87+45	558+10		
738+84	552+69			1+17+33	558+77		
99997+00	0+00	NOTE		1+48+41	553+97		
897+94	552+69			1+78+69	558+14		
921+00	552+60	ML		1+07+37	558+13		
921+41	552+60			1+53+85	558+14		
930+25	552+51			1+80+33	558+31		
945+49	552+45			1+25+00	552+61	ML	
980+73	552+42			1+55+51	552+67		
975+97	552+45			1+80+41	552+33		
991+21	552+45			1+16+07	552+21		
1005+45	552+51			1+31+77	552+02		
1021+00	552+60	ML		1+86+53	552+15		
1021+69	552+60			1+61+77	552+47		
1036+93	552+75			1+77+01	552+51		
1038+00	552+80	ML		1+92+25	552+49		
1039+98	552+60			1+98+35	552+51		
1052+17	552+54			1+94+87	551+97		
1067+41	552+57			1+02+97	551+17		
1073+51	552+57			1+01+53	550+46		
1075+03	552+39			1+08+44	551+60		
1082+65	552+10			1+07+00	552+67	ML	
1091+79	552+42			1+07+49	552+67		
1093+00	552+60	ML		1+10+21	558+25		
1093+32	552+60			1+22+73	558+43		
1097+89	552+72			1+53+21	558+08		
1102+00	552+51	ML		1+81+59	558+59		
1107+46	552+51			1+18+17	558+58		
1103+99	552+45			1+88+66	558+14		
1108+56	550+74			1+67+31	558+17		
1110+08	551+29			1+70+45	558+77		
1111+61	551+79			1+75+11	555+21		
1113+00	552+51	ML		1+90+61	556+30		
1117+13	552+51			1+36+09	557+74		
1117+40	555+07			1+58+38	558+43		
1143+61	558+25			1+66+57	561+34		
1178+09	558+08						
1208+57	551+05						
1235+05	551+55						
1285+53	551+27						
1298+01	552+18						
1303+63	552+39						



PR. 1611 + 147A

Page 411 17 1067-24-25

[illegible]

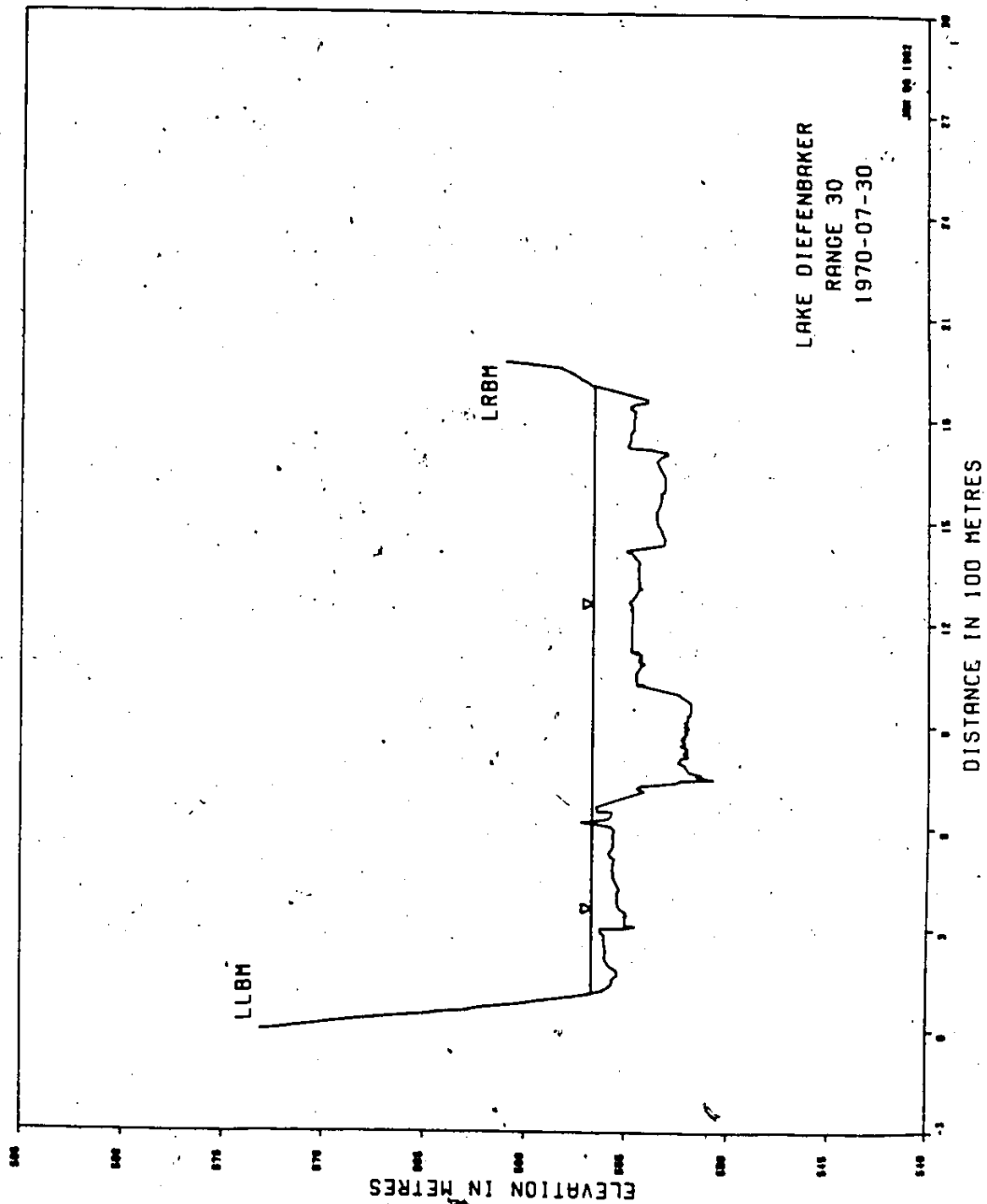
SEDIMENT SURVEY SECTION
 JAN 4 1982, PAGE 1
 OTTAWA, ONT.

LAKE DIEFENBAKER

 * ELEVATION - AREA TABLE *

RANGE NO. - 30
 SURVEYED 4/7 8/1987
 MINIMUM ELEVATION - 550.50
 ASSURED MINIMUM DATUM - 551.50

ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)
551.50	13.4						
552.00	65.6						
552.50	181.7						
553.00	321.1						
553.50	503.3						
554.00	777.8						
554.50	1143.0						
555.00	1615.0						
555.50	2238.2						
556.00	3018.7						
556.50	3893.8						
557.00	4782.6						
557.50	5682.4						
558.00	6594.6						
558.50	7515.6						
559.00	8439.8						
559.50	9368.5						
560.00	10296.0						
560.50	11228.1						
561.00	12162.8						



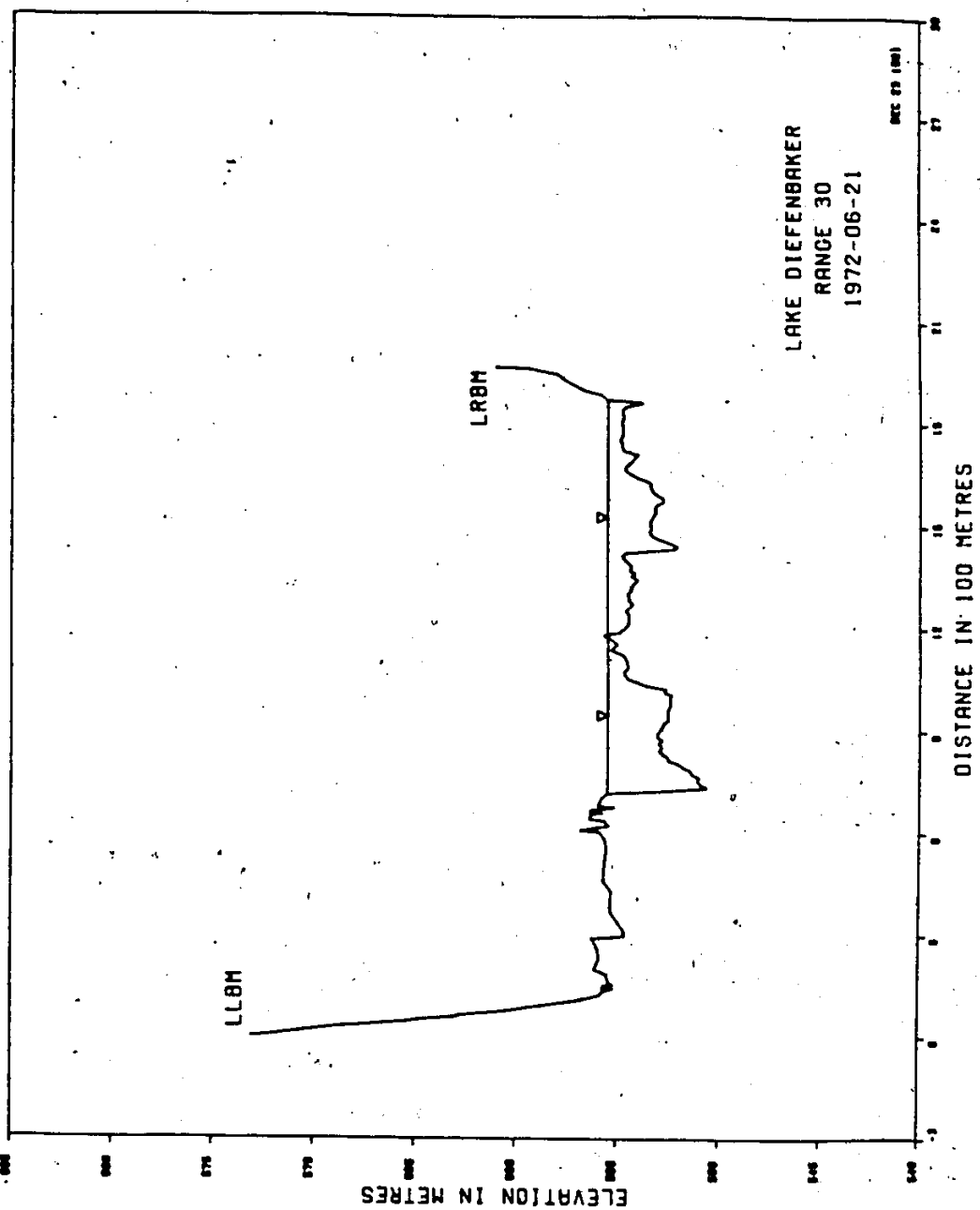
SEDIMENT SURVEY SECTION
JAN 6 1982, PAGE 1
OTTAWA, ONT.

LAKE JIFFENBASKE

ELEVATION - AREA TABLE

RANGE NO. - 33
SURVEYED 30/ 7/1970
MINIMUM ELEVATION - 550.00
ASSUMED MINIMUM DATUM - 551.50

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
551.50	5.1	551.50	5.1	551.50	5.1
552.00	28.7	552.00	28.7	552.00	28.7
552.50	143.0	552.50	143.0	552.50	143.0
553.00	273.7	553.00	273.7	553.00	273.7
553.50	466.4	553.50	466.4	553.50	466.4
554.00	751.2	554.00	751.2	554.00	751.2
554.50	1032.7	554.50	1032.7	554.50	1032.7
555.00	1602.1	555.00	1602.1	555.00	1602.1
555.50	2238.5	555.50	2238.5	555.50	2238.5
556.00	3007.7	556.00	3007.7	556.00	3007.7
556.50	3875.7	556.50	3875.7	556.50	3875.7
557.00	4769.0	557.00	4769.0	557.00	4769.0
557.50	5675.2	557.50	5675.2	557.50	5675.2
558.00	6592.3	558.00	6592.3	558.00	6592.3
558.50	7518.2	558.50	7518.2	558.50	7518.2
559.00	8445.9	559.00	8445.9	559.00	8445.9
559.50	9383.1	559.50	9383.1	559.50	9383.1
560.00	10321.0	560.00	10321.0	560.00	10321.0
560.50	11262.1	560.50	11262.1	560.50	11262.1
561.00	12205.7	561.00	12205.7	561.00	12205.7



ZAYER SURVEY OF CANADA
DEC 23 1961
OTTAWA, ONT.

LAKE DIEFENBACHER

PROFILE DATA

RANGE NO 10			SURVEY DATE 1972-73-68			72-73-68		
STA	ELEV	RMS	STA	ELEV	RMS	STA	ELEV	RMS
3.00	573.02	1.00	1110.62	550.64		1500.50	553.08	
0.00	572.18	0.80	1135.64	555.24		1570.61	552.75	
15.24	570.68		1151.22	555.40	ML	1580.62	552.75	
30.48	568.15		1173.00	555.44		1590.75	553.06	
45.20	565.50		1173.48	555.44		1600.81	553.24	
51.82	564.82		1177.44	555.59		1610.87	553.36	
57.74	562.97		1181.00	555.47	ML	1621.86	553.36	
63.62	562.72		1181.40	555.47		1630.48	553.49	
76.20	560.56		1185.67	555.83		1640.74	553.97	
91.44	558.67		1190.55	556.80		1650.80	554.31	
107.59	556.78		1200.61	556.58		1661.77	554.58	
121.92	555.08		1211.58	556.43		1671.83	555.61	
135.11	553.53		1220.72	556.40		1681.55	556.93	
148.02	553.16		1230.78	556.43		1689.81	554.28	
162.95	553.63		1240.84	556.43		1700.78	554.13	
173.66	553.59		1250.59	556.55		1709.62	556.00	
181.18	555.16		1270.71	556.22		1720.63	554.68	
198.00	555.38		1281.68	556.43		1731.07	554.77	
217.85	555.47		1280.83	556.43		1740.71	554.77	
235.12	556.05		1300.58	556.46		1750.77	554.86	
258.00	555.83		1311.55	556.28		1761.74	554.77	
279.00	555.92		1320.70	556.34		1771.80	554.74	
288.95	556.17		1329.84	556.16		1779.73	554.74	
291.19	555.28		1340.82	556.00		1782.83	554.74	
295.27	555.61		1351.62	556.28		1800.76	554.77	
308.76	554.61		1360.63	556.11		1810.82	554.74	
335.28	554.92		1369.77	556.37		1824.88	554.68	
355.76	555.28		1380.74	556.26		1830.63	554.74	
376.24	555.28		1390.80	556.43		1840.69	554.77	
426.72	555.25		1397.64	556.01		1850.75	555.55	
437.20	555.62		1410.61	556.76		1860.83	553.79	
487.08	555.59		1420.67	556.58		1871.85	553.82	
518.16	555.33		1431.55	556.58		1882.03	553.47	ML
548.44	555.47		1432.57	556.05		1892.55	553.47	
579.12	555.56		1444.63	556.42		1897.41	553.77	
601.96	555.83		1460.60	556.96		1900.73	554.72	
605.84	556.75		1470.66	556.27		1911.21	553.66	
612.95	556.11		1481.63	556.43		1926.53	553.97	
618.44	555.38		1490.78	556.33		1936.53	553.43	
632.76	555.56		1501.75	556.36		1946.57	562.86	
640.18	556.32		1510.59	556.44		1966.57	562.86	
64			1520.65	556.40		1966.57	562.86	
644.71	556.23		1530.71	556.32		1966.57	562.86	
657.17	555.68		1533.71	556.44		1966.57	562.86	
665.07	556.25		1540.76	556.52		1966.57	562.86	
672.69	555.55		1550.82	556.19		1966.57	562.86	
								RSM

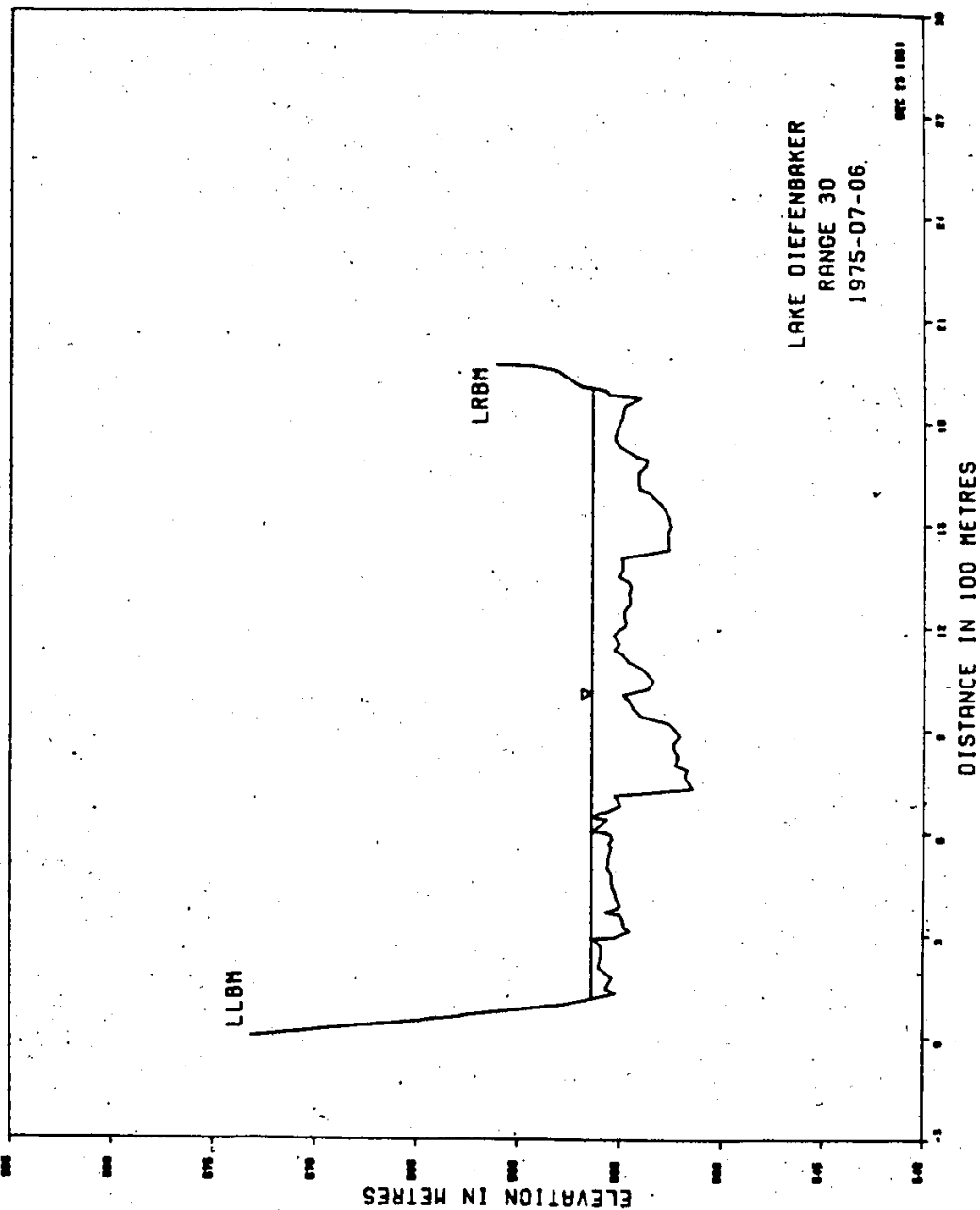
SEDIMENT SURVEY SECTION
JAN 6 1982, PAGE 1
OTTAWA, ONT.

LAKE DUFFY/5464

RANGE NO. - 30
SURVEYED 21/ 6/1972
MINIMUM ELEVATION = 552.55
ASSURED MINIMUM DATUM = 551.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
551.50	26.0				
552.00	57.4				
552.50	114.3				
553.00	247.0				
553.50	464.4				
554.00	729.6				
554.50	1055.1				
555.00	1366.3				
555.50	2148.4				
556.00	2972.1				
556.50	3857.0				
557.00	4753.7				
557.50	5662.8				
558.00	6579.2				
558.50	7506.3				
559.00	8439.5				
559.50	9375.3				
560.00	10315.6				
560.50	11259.6				
561.00	12204.1				



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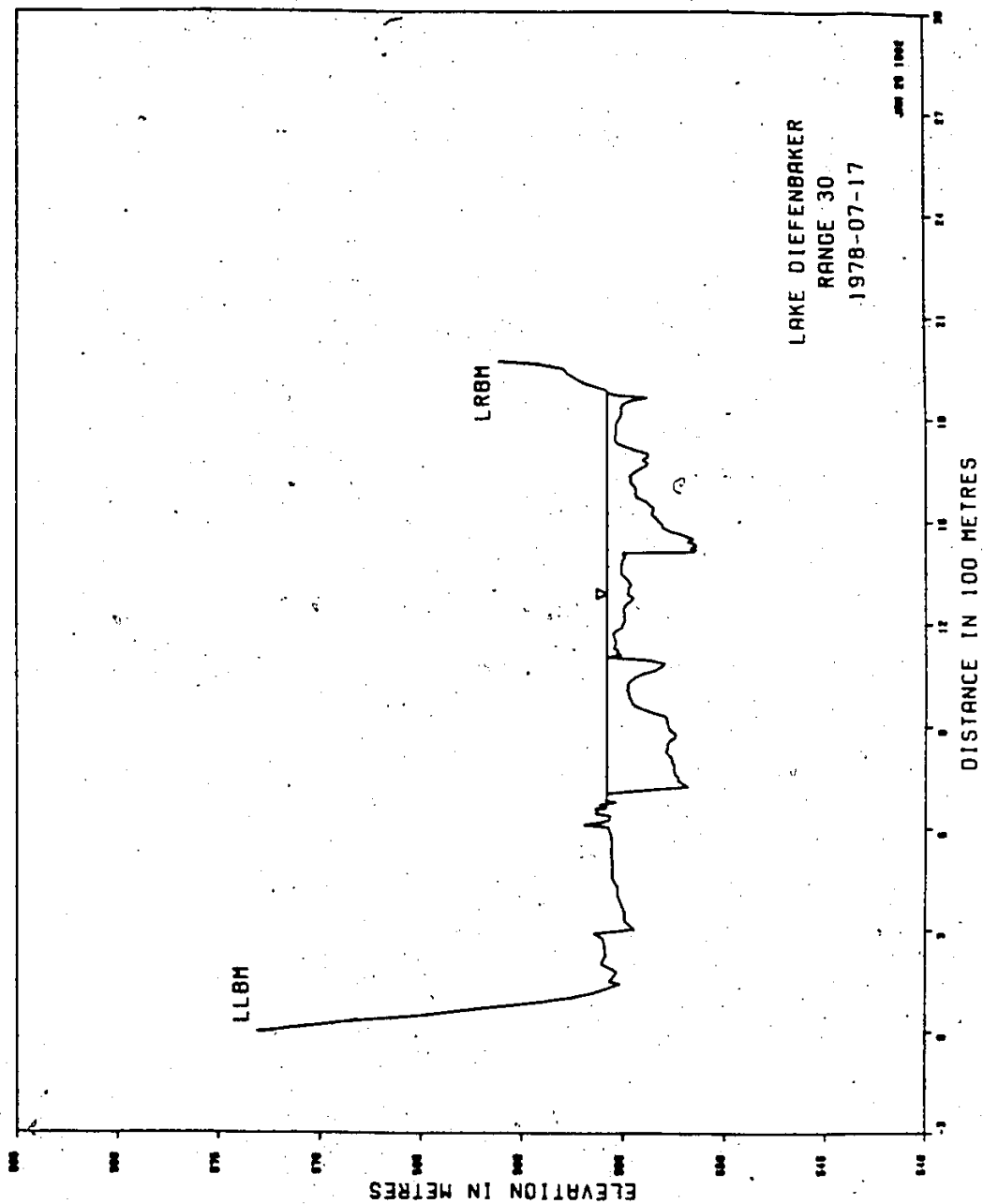
SEDIMENT SURVEY SECTION
JAN 6 1982, PAGE 1
UTTAMA, UMI.

LAKEL OILFIELD

RANGE NO. - 30
SURVEYED 6/ 7/1975
MINIMUM ELEVATION - 551.41
ASSUMED MINIMUM DATUM - 552.00

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
552.00	23.6						
552.50	43.0						
553.00	244.0						
553.50	428.5						
554.00	663.6						
554.50	975.2						
555.00	1427.1						
555.50	2080.2						
556.00	2890.7						
556.50	3774.4						
557.00	4670.9						
557.50	5577.4						
558.00	6496.3						
558.50	7424.7						
559.00	8357.5						
559.50	9294.6						
560.00	10234.5						
560.50	11176.7						
561.00	12121.1						



LAKE DIEFENBAKER
PROFILE DATA

RANGE NO 30 SURVEY DATE 1978-07-17

STA ELEV RMKS STA ELEV RMKS

0+00 573.04 LLOM 720.50 551.75 1169.00 555.45 1528.00 553.50

0+00 572.75 720.00 552.00 1176.00 555.35 1537.00 553.45

9+00 571.55 730.00 552.25 1188.00 555.00 1548.00 553.70

30+00 568.55 743.00 552.45 1198.00 554.95 1558.00 553.85

39+00 566.90 749.00 552.25 1208.00 554.65 1569.00 554.30

50+00 564.65 757.00 552.40 1219.00 554.90 1579.00 554.35

57+00 563.70 769.00 552.45 1228.00 554.85 1594.00 554.35

67+00 562.20 776.00 552.45 1238.00 554.95 1604.00 554.45

77+00 560.50 786.00 552.45 1250.00 554.65 1613.00 554.60

100+00 557.50 794.00 552.55 1257.00 554.75 1622.00 554.55

113+00 556.45 805.00 552.55 1266.00 554.95 1631.00 554.65

140+00 555.15 823.00 552.65 1274.00 554.45 1640.00 554.45

148+00 555.65 834.00 552.75 1284.00 554.70 1652.00 554.15

150+00 555.60 844.00 552.75 1292.00 554.70 1661.00 553.85

175+00 555.30 855.00 552.65 1302.00 554.70 1669.00 553.75

200+00 556.40 865.00 552.40 1311.00 554.55 1678.00 554.00

225+00 555.85 875.00 552.35 1319.00 554.65 1688.00 553.75

250+00 555.90 885.00 552.60 1328.00 554.75 1697.00 553.75

275+00 556.00 895.00 552.70 1335.00 554.85 1708.00 554.40

288+00 556.20 905.00 552.75 1345.00 555.05 1720.00 554.95

300+00 554.45 918.00 552.80 1354.00 555.05 1729.00 555.30

325+00 554.90 927.00 552.85 1361.00 555.05 1738.00 555.35

350+00 554.90 935.00 553.35 1368.00 555.05 1747.00 555.35

400+00 555.25 943.00 553.75 1376.00 555.00 1762.00 555.30

425+00 555.25 954.00 554.25 1384.00 555.00 1779.00 555.35

450+00 555.50 964.00 554.50 1394.00 555.25 1791.00 555.25

500+00 555.50 975.00 554.55 1403.00 554.95 1800.00 555.15

525+00 555.55 984.00 554.65 1408.00 554.95 1810.00 555.05

550+00 555.50 992.00 554.65 1410.00 551.45 1819.00 555.05

575+00 555.55 1003.00 554.75 1411.00 551.60 1827.00 555.05

600+00 555.70 1011.00 554.70 1416.00 551.55 1835.00 555.05

604+00 556.10 1023.00 554.70 1418.00 551.35 1842.00 554.95

607+00 556.85 1032.00 554.55 1421.00 551.60 1852.00 554.60

616+00 555.95 1043.00 554.30 1427.00 551.34 1861.00 553.80

621+00 555.65 1052.00 553.95 1434.00 551.45 1869.00 555.35

634+00 555.60 1062.00 553.35 1439.00 551.75 1876.00 555.75

641+00 556.30 1073.00 553.05 1448.00 551.50 1884.00 555.80

650+00 556.20 1082.00 552.90 1456.00 551.85 1903.00 556.35

655+00 556.30 1092.00 553.65 1463.00 552.15 1910.00 557.10

658+00 555.80 1101.00 555.70 1470.00 552.65 1932.00 557.70

662+00 555.90 1108.00 555.05 1481.00 553.00 1946.00 557.90

666+00 556.10 1116.00 555.25 1491.00 553.05 1960.00 559.15

674+00 555.30 1123.00 555.20 1502.00 553.25 1966.60 560.85

678+00 555.80 1128.00 555.40 1507.00 553.35 1966.60 561.06

700+00 555.75 ML 1144.00 555.30 1919.00 551.55

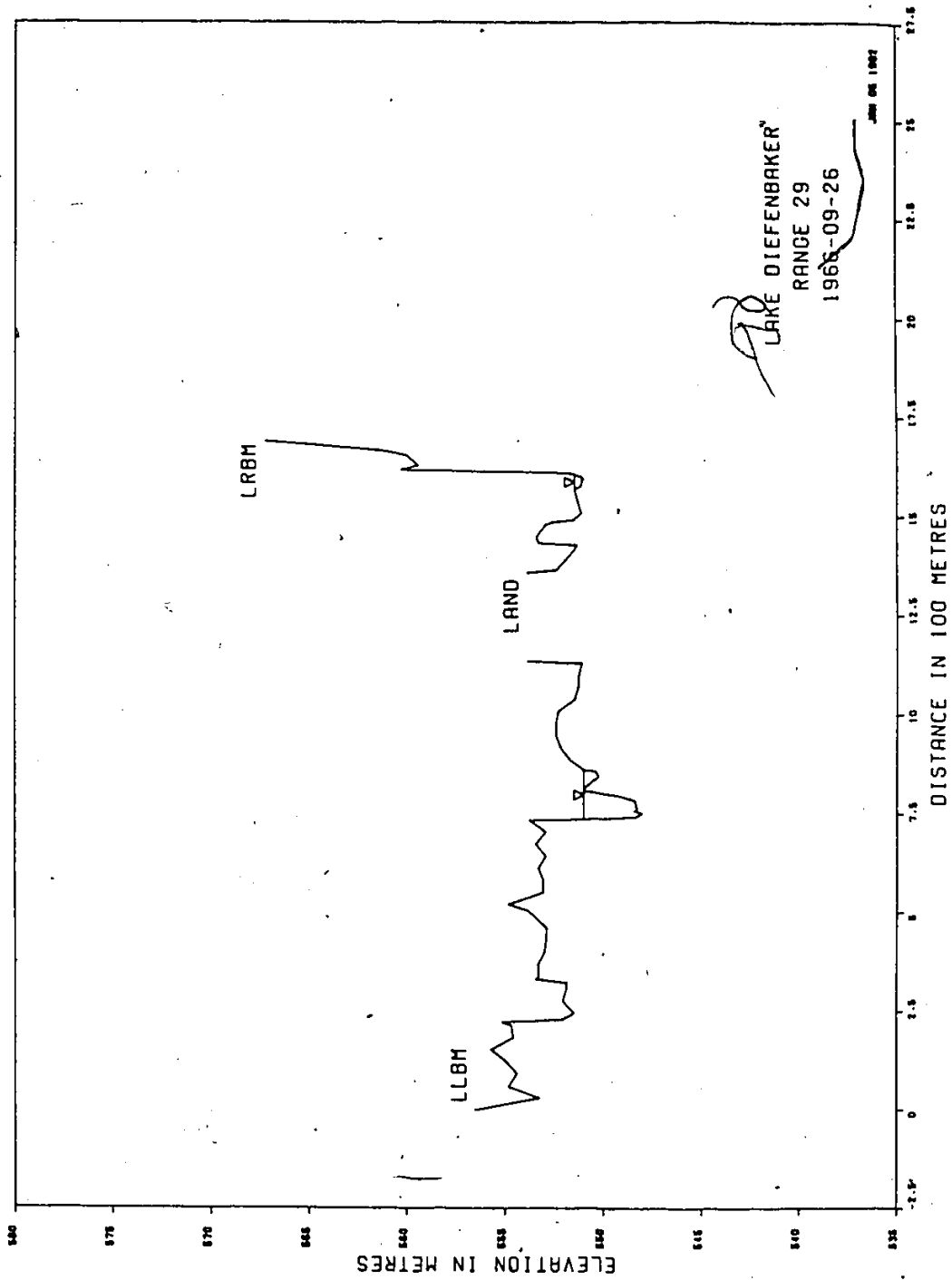
SEDIMENT SURVEY SECTION
JAN 26 1982, PAGE 1
OTTAWA, ONT.

LAKE DIEFFENBAKER

RANGE NO. - 30
SURVEYED 17/ 7/1978
MINIMUM ELEVATION - 551.34
ASSUMED MINIMUM DATUM - 552.00

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
552.00	22.5	552.50	66.9	553.00	182.6
553.00	350.6	553.50	568.3	554.00	931.7
554.00	1228.4	554.50	1819.3	555.00	2611.2
555.00	3405.8	555.50	4382.0	556.00	5288.2
556.00	6207.3	556.50	7135.2	557.00	8067.7
557.00	9004.5	557.50	9944.3	558.00	10847.0
558.00	11832.3	558.50		559.00	
559.00		559.50		560.00	
560.00		560.50		561.00	



LAKE DIEFFENBACHER

PROFILE DATA

RANGE NO 29 SURVEY DATE 1966-09-26

STA ELEV MARKS

STA ELEV MARKS

STA ELEV MARKS

STA ELEV MARKS

1508.29 567.23 LKJH

0.00 555.50 LL34

0.00 555.50

30.48 553.27

842.16 550.22

58.83 554.80

91.44 554.40

848.25 550.32

121.92 554.92

152.40 555.71

854.35 550.41

162.88 554.58

213.36 554.68

857.70 550.99

221.59 555.13

227.08 552.08

857.71 550.99

243.84 551.51

274.32 552.05

861.72 551.69

304.60 551.47

320.04 551.84

861.72 551.69

329.18 553.43

335.28 553.30

861.72 551.69

365.76 553.33

396.24 553.00

861.72 551.69

426.72 552.91

457.20 552.88

861.72 551.69

487.68 553.49

502.92 553.85

861.72 551.69

518.16 554.80

548.64 553.06

861.72 551.69

579.12 553.06

609.60 553.30

861.72 551.69

670.56 553.43

701.04 552.94

861.72 551.69

730.61 553.73

733.00 550.99

861.72 551.69

733.04 550.99

739.14 548.30

861.72 551.69

748.59 548.00

754.38 548.40

861.72 551.69

755.90 548.27

768.10 548.30

861.72 551.69

780.29 548.37

784.25 548.61

861.72 551.69

794.00 549.31

801.93 550.53

861.72 551.69

803.15 550.96

811.99 550.93

861.72 551.69

822.35 550.68

832.41 550.47

861.72 551.69

842.16 550.22

848.25 550.32

861.72 551.69

854.35 550.41

857.70 550.99

861.72 551.69

861.72 551.69

861.72 551.69

861.72 551.69

861.72 551.69

861.72 551.69

861.72 551.69

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861.72 551.69

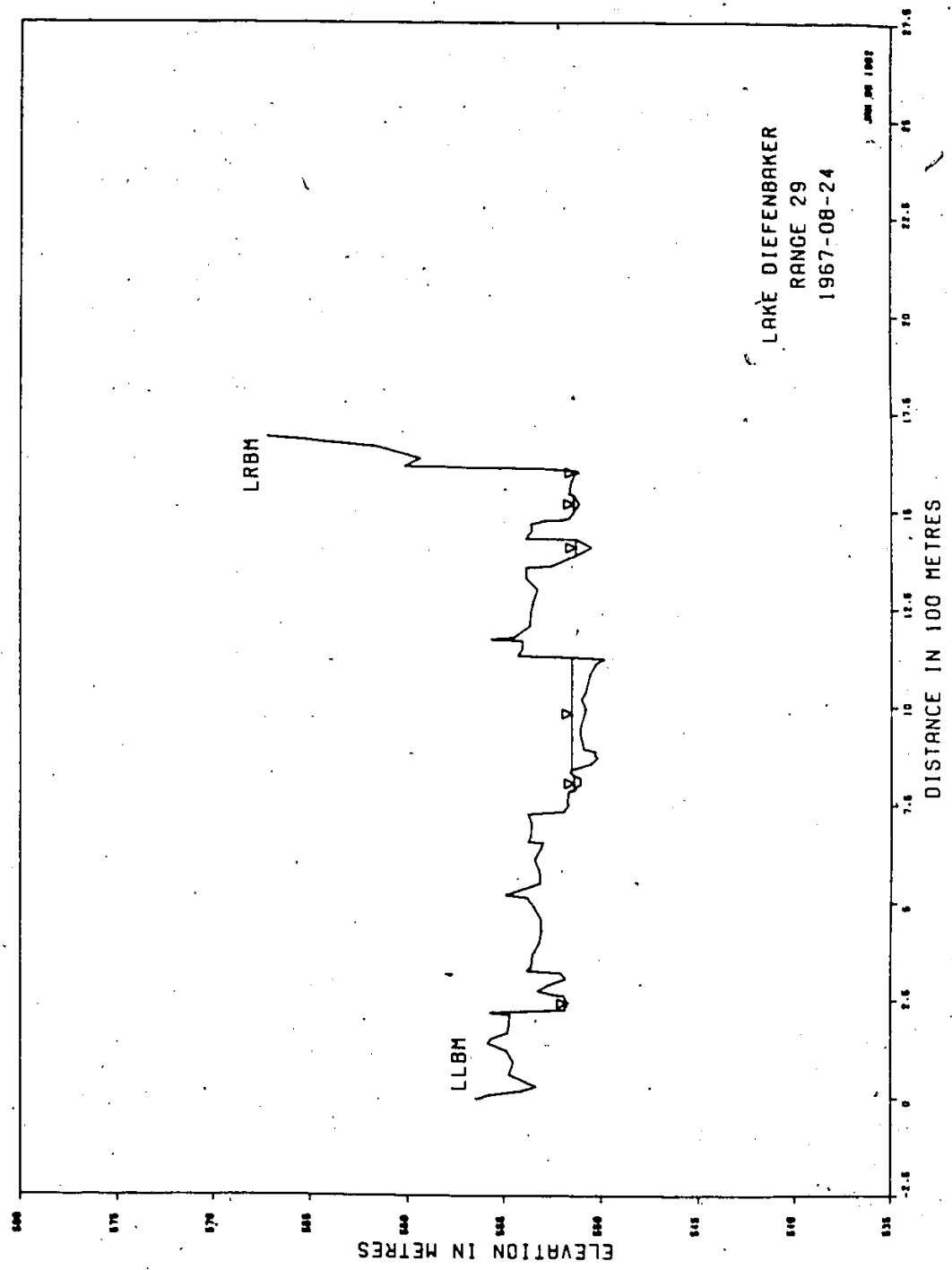
861.72 551.69

861.72 551.69

861.72 551.69

861.72 551.69

861.72 551.69



LAKE DUFFENBACHER
PROFILE DATA

RANGE NO 29 SURVEY DATE 1967-03-29

STA	ELEV	RKMS	STA	ELEV	RKMS	STA	ELEV	RKMS	STA	ELEV	RKMS
0.00	553.30	LLRM	746.76	551.69		1429.51	553.83				
0.00	556.29		762.03	551.72		1450.85	553.58				
7.62	555.52		783.34	551.63		1466.09	553.64				
18.29	554.13		785.00	551.36	HL	1475.23	552.97				
30.48	553.36		785.16	551.36		1476.76	552.05				
60.96	554.74		792.48	551.29		1481.33	551.66				
91.44	554.52		801.62	551.05		1496.00	551.44	HL			
121.92	554.89		816.86	551.08		1496.57	551.44				
141.73	555.86		824.00	551.36	HL	1517.90	551.17				
152.40	555.21		822.96	551.36		1540.00	551.44	HL			
167.64	554.53		830.58	551.57		1540.76	551.44				
182.88	554.77		838.00	551.51	HL	1542.29	551.66				
213.36	554.71		838.00	551.51		1542.29	551.57				
219.46	555.74		853.44	550.53		1593.00	551.38	HL			
225.55	551.90		868.68	550.19		1593.80	551.35				
240.00	551.78	HL	876.10	550.35		1598.07	551.20				
240.79	551.78		883.92	550.29		1602.00	551.38	HL			
243.64	551.69		891.54	550.90		1602.64	551.38				
245.00	551.78	HL	927.64	551.08		1608.43	553.04				
245.06	551.78		943.35	551.08		1613.31	560.14				
262.74	551.96		992.12	550.80		1633.73	559.40				
263.65	552.39		1019.55	551.02		1664.21	561.69				
274.32	553.27		1036.32	550.80		1688.29	567.23	LRM			
289.56	552.72		1080.52	550.59							
304.80	551.81		1107.95	550.29							
320.04	552.11		1121.64	549.86							
326.14	553.82		1126.00	551.51	HL						
335.28	553.61		1126.24	551.51							
365.76	553.55		1129.59	554.28							
396.24	553.21		1166.05	554.07							
426.72	553.09		1167.38	554.03							
457.20	553.12		1171.95	555.68							
487.68	553.46		1176.53	554.49							
512.06	553.82		1207.01	553.67							
518.16	554.89		1237.49	553.64							
548.64	553.15		1267.77	553.52							
579.12	553.18		1298.45	553.30							
609.60	553.43		1328.93	553.88							
640.08	553.09		1355.14	553.85							
652.27	553.00		1359.41	552.60							
655.12	553.73		1366.00	551.32	HL						
670.56	553.61		1366.23	551.32							
701.04	553.56		1406.96	550.53							
725.42	553.76		1427.03	551.32	HL						
731.52	551.90		1427.08	551.32							

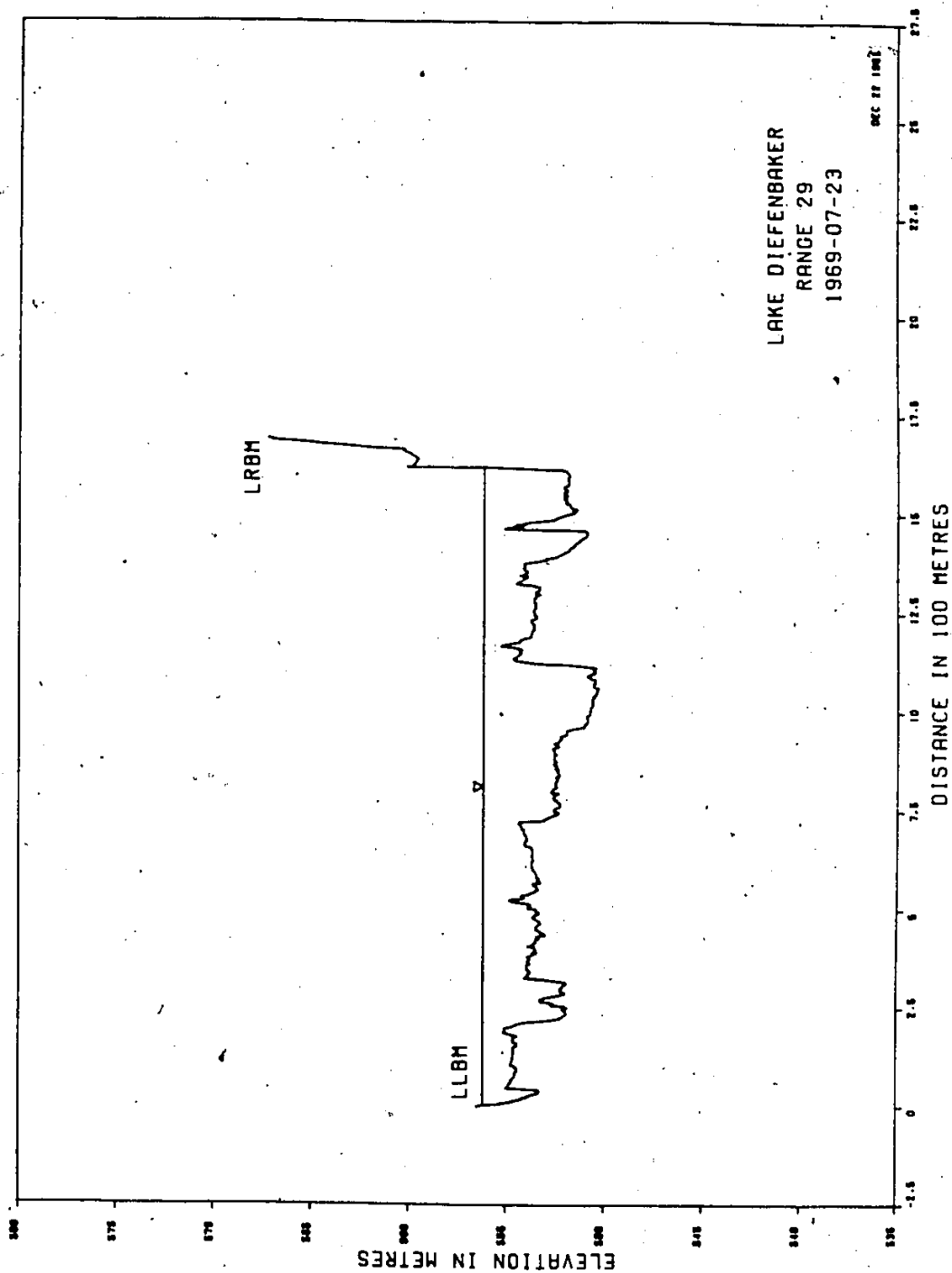
SEDIMENT SURVEY SECTION
JAN 5 1982, PAGE 1
UTTAWA, ONT.

LAKE DUFFENBARGER

ELEVATION - AREA TABLE

RANGE NO. - 29
SURVEYED 24/ 8/1967
MINIMUM ELEVATION - 549.86
ASSUMED MINIMUM DATUM - 550.50

ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)
550.50	14.0				
551.00	83.0				
551.50	269.8				
552.00	540.1				
552.50	864.2				
553.00	1203.3				
553.50	1625.0				
554.00	2229.8				
554.50	2919.6				
555.00	3663.6				
555.50	4444.0				
556.00	5239.7				
556.50	6044.1				



LAKE DUFFENBARGER

PROFILE DATA

RANGE NO 29 SURVEY DATE 1969-07-23

STA	ELEV	RMS	LLBM	STA	ELEV	RMS	STA	ELEV	RMS	STA	ELEV	RMS
0+00	556.30			365.46	553.91		523.95	554.71		739.14	552.42	
1+00	556.17			371.55	553.73		526.33	554.10		744.63	552.30	
2+00	556.17			373.99	553.73		531.27	554.10		747.35	552.54	
3+00	555.44			376.43	553.88		533.73	554.22		753.47	552.54	
4+00	555.28			378.87	553.88		536.14	553.94		757.73	552.30	
5+00	555.13			383.74	553.64		537.97	553.79		762.00	552.24	
6+00	554.86			385.18	553.61		540.41	553.73		768.43	552.24	
7+00	554.86			388.62	553.45		545.23	553.49		770.93	552.35	
8+00	554.86			391.30	553.66		547.73	553.46		774.83	552.45	
9+00	554.86			393.50	553.66		550.15	553.33		776.94	552.45	
10+00	554.86			402.25	553.55		552.63	553.43		779.07	552.57	
11+00	554.86			405.69	553.85		557.48	553.46		785.47	552.57	
12+00	554.86			408.13	553.61		559.92	553.58		788.82	552.51	
13+00	554.86			412.39	553.61		564.73	553.61		790.95	552.39	
14+00	554.86			413.61	553.49		567.23	553.21		793.07	552.33	
15+00	554.86			422.15	553.45		569.67	553.39		795.22	552.69	
16+00	554.86			424.59	553.33		572.11	553.36		801.75	552.60	
17+00	554.86			427.32	553.12		576.94	553.30		805.12	552.42	
18+00	554.86			428.24	553.43		579.42	553.43		810.36	552.46	
19+00	554.86			429.46	553.43		589.15	553.46		820.83	552.48	
20+00	554.86			431.90	553.27		601.98	553.64		828.75	552.33	
21+00	554.86			434.34	552.97		606.25	553.64		833.63	552.45	
22+00	554.86			435.56	553.00		610.51	553.70		836.07	552.39	
23+00	554.86			437.28	553.03		619.05	553.67		838.53	552.27	
24+00	554.86			441.18	553.27		623.62	553.61		848.25	552.39	
25+00	554.86			446.23	553.33		634.57	553.67		851.16	552.33	
26+00	554.86			449.28	553.49		651.35	553.67		855.37	552.46	
27+00	554.86			452.37	553.45		655.54	553.70		858.71	552.39	
28+00	554.86			464.52	553.21		659.26	553.94		862.89	552.42	
29+00	554.86			473.66	553.46		662.03	554.07		865.33	552.51	
30+00	554.86			475.71	553.59		670.26	554.03		869.95	552.57	
31+00	554.86			479.26	553.61		673.02	553.94		871.73	552.42	
32+00	554.86			482.85	553.49		686.71	553.97		876.63	552.54	
33+00	554.86			485.85	553.49		688.85	554.07		880.80	552.54	
34+00	554.86			488.90	553.30		701.65	554.10		881.49	552.42	
35+00	554.86			491.95	553.30		703.73	554.22		893.87	552.51	
36+00	554.86			494.69	553.46		713.54	554.25		900.39	552.54	
37+00	554.86			499.57	553.45		715.37	554.37		905.87	552.63	
38+00	554.86			502.21	553.68		719.02	554.31		908.32	552.51	
39+00	554.86			504.44	553.68		720.85	554.22		913.74	552.39	
40+00	554.86			508.88	553.73		722.65	553.30		916.23	552.39	
41+00	554.86			511.76	553.79		724.51	553.03		918.37	552.54	
42+00	554.86			514.20	554.07		728.17	553.00		923.94	552.30	
43+00	554.86			519.37	554.68		731.82	552.85		925.95	552.30	
44+00	554.86			521.51	554.63		735.48	552.66		930.85	552.15	

LAKE DUFFENBARGER

PROFILE DATA

RANGE NO 29 SURVEY DATE 1969-07-23

STA ELEV RMKS STA ELEV RMKS

935.74	552.24		1138.47	554.55	
938.17	552.15		1147.27	554.42	
940.61	551.93		1151.84	554.37	
943.37	551.90		1156.41	554.22	
946.80	551.78		1160.98	554.52	
950.07	551.44		1165.56	554.28	
953.21	551.17		1170.13	554.95	
956.34	551.02		1174.70	554.34	
959.61	551.02		1179.27	554.31	
962.74	550.93		1183.84	554.13	
965.27	550.83		1188.42	553.76	
968.54	550.83		1202.13	553.70	
972.58	550.87		1206.70	553.61	
975.08	550.87		1220.42	553.61	
978.34	550.71		1224.97	553.73	
1000.89	550.71		1230.17	553.76	
1015.29	550.50		1237.49	553.46	
1019.56	550.57		1242.35	553.47	
1020.22	550.52		1248.82	553.61	
1016.42	550.50		1249.68	553.58	
1039.76	550.56		1254.56	553.64	
1043.03	550.41		1264.31	553.49	
1052.17	550.38		1266.75	553.58	
1058.57	550.29		1271.63	553.52	
1062.84	550.33		1274.35	553.52	
1069.24	550.56		1277.11	553.61	
1073.51	550.44		1286.87	553.58	
1077.77	550.44		1289.33	553.49	
1082.04	550.53		1294.18	553.49	
1084.17	550.71		1296.62	553.50	
1090.57	550.87		1299.35	553.49	
1095.45	550.56		1303.93	553.47	
1100.33	550.44		1306.37	553.33	
1102.77	550.56		1313.67	553.30	
1107.64	550.53		1318.55	553.61	
1110.08	550.41		1321.00	554.14	
1112.52	550.85		1323.44	554.52	
1114.96	551.17		1340.82	553.91	
1117.40	551.81		1343.85	554.34	
1119.84	552.77		1346.91	554.03	
1122.27	553.67		1353.31	553.74	
1124.71	554.00		1356.35	554.07	
1127.15	554.42		1362.15	554.16	
1129.59	554.22		1365.22	554.07	
1132.03	554.68		1374.34	554.10	

1383.49	552.94		1516.38	551.75	
1386.54	551.03		1523.73	551.78	
1389.58	552.54		1526.13	551.99	
1398.73	552.11		1534.67	551.93	
1401.17	552.05		1537.11	552.08	
1406.65	551.81		1539.54	552.08	
1412.14	551.78		1541.98	551.96	
1414.88	551.65		1546.86	551.93	
1420.37	551.54		1549.33	552.11	
1425.85	551.44		1554.18	552.05	
1428.80	551.32		1556.61	551.96	
1434.28	551.26		1559.05	551.90	
1439.57	551.05		1561.49	552.05	
1445.06	550.93		1564.37	552.08	
1450.34	550.87		1568.81	551.99	
1456.94	550.93		1571.24	551.84	
1458.16	551.78		1581.03	551.84	
1459.38	551.00		1587.43	551.90	
1460.50	554.52		1593.82	551.81	
1461.62	555.13		1600.20	551.84	
1463.04	555.10		1602.31	551.93	
1464.26	554.43		1606.60	551.93	
1465.98	554.22		1608.73	552.08	
1466.70	554.68		1610.87	552.24	
1467.92	554.19		1611.73	552.69	
1469.14	554.19		1617.03	553.17	4L
1470.36	554.54		1617.27	556.17	
1471.57	554.52		1617.27	556.19	
1472.79	554.19		1618.49	559.32	
1474.31	554.07		1619.71	559.83	
1476.45	554.07		1638.30	559.58	
1479.80	553.49		1651.13	559.98	
1482.24	553.03		1657.81	563.28	
1484.68	552.54		1663.29	563.31	
1485.81	552.54		1666.34	552.32	
1489.56	552.39		1676.13	564.61	
1494.31	552.11		1678.53	565.10	
1496.67	551.93		1685.24	567.02	
1499.31	551.81		1688.29	567.38	
1501.75	551.60		1588.29	567.23	ARM
1504.19	551.51				
1506.63	551.63				
1509.06	551.44				
1511.50	551.41				
1513.94	551.68				

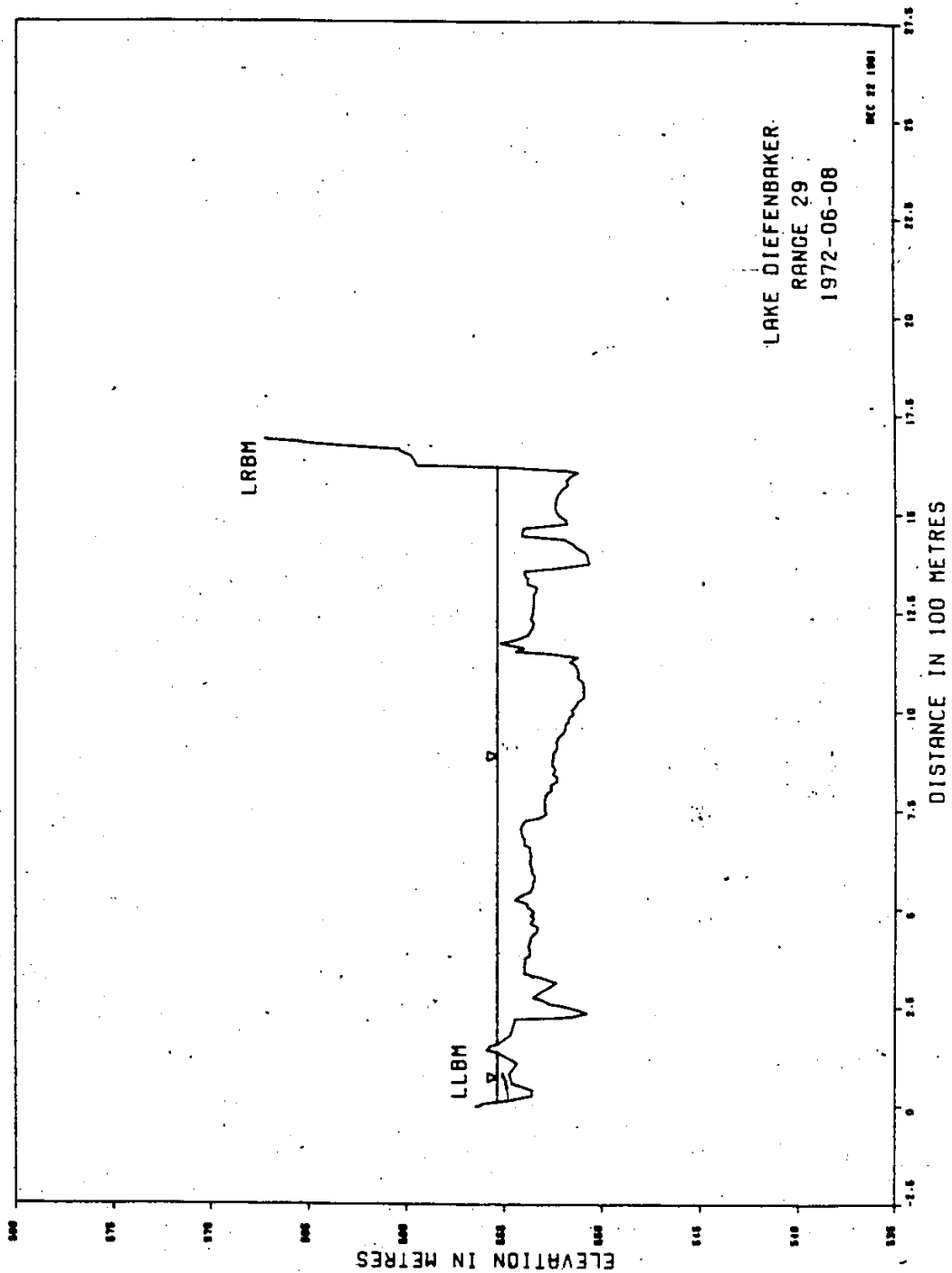
SEDIMENT SURVEY SECTION
JAN 5 1981, PAGE 1
DITANA-ONT.

LAKE JILFENBAKER

RANGE NO. - 29
SURVEYED 23/ 7/1969
MINIMUM ELEVATION - 550.29
ASSUMED MINIMUM DATUM - 551.00

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
551.00	58.1				
551.50	148.8				
552.00	271.5				
552.50	497.1				
553.00	829.3				
553.50	1203.3				
554.00	1745.7				
554.50	2413.0				
555.00	3179.4				
555.50	3981.9				
556.00	4788.0				
556.50	5593.5				



LAKE DIEFENBAKER

PROFILE DATA

RANGE NO 29 SURVEY DATE 1972-35-08

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

0.00	555.57	LLBM	474.85	553.45	321.72	552.30	1371.93	553.62
0.40	555.29		482.50	553.64	433.91	552.10	1381.65	553.74
6.40	555.11		491.54	553.46	443.06	551.96	1392.63	553.74
10.00	555.35	4L	504.75	553.92	454.03	551.84	1401.78	553.70
10.67	555.35		512.67	553.82	465.91	551.84	1412.75	553.72
14.94	554.68		521.32	554.43	472.62	551.69	1422.81	551.91
21.13	553.58		529.74	554.22	481.76	551.67	1433.79	551.93
41.15	553.58		542.05	553.67	491.82	551.44	1442.62	551.10
57.91	554.61		554.74	553.52	1001.88	551.54	1452.68	554.07
80.77	554.74		563.88	553.52	1008.89	551.38	1461.82	553.97
108.20	554.34		572.72	553.43	1022.91	551.23	1472.79	551.78
135.00	555.35	4L	581.86	553.43	1033.98	550.93	1481.63	551.81
135.25	555.35		591.62	553.58	1048.42	550.93	1491.69	552.11
137.16	555.41		601.68	553.58	1061.62	550.93	1501.75	552.30
142.04	555.89		612.65	553.67	1073.81	550.94	1512.72	552.35
151.79	555.71		620.88	553.67	1082.65	551.23	1523.70	552.36
158.00	555.35	4L	631.85	553.61	1091.79	551.20	1531.62	552.34
158.36	555.35		642.82	553.67	1104.90	551.25	1541.68	552.27
179.22	555.68		653.80	553.67	1116.79	551.38	1549.91	552.18
219.76	554.43		661.72	553.77	1123.80	551.63	1562.71	551.96
224.64	551.60		674.83	553.77	1134.77	551.23	1571.85	551.72
233.78	553.77		683.67	554.07	1144.83	552.60	1581.61	551.91
239.08	551.08		694.64	554.13	1149.71	554.40	1593.80	551.97
242.58	551.99		702.47	554.13	1158.24	553.97	1602.64	551.23
255.78	552.86		711.71	554.07	1173.43	553.19	1607.82	551.81
288.83	553.06		721.77	553.91	1178.56	553.43	1616.03	553.35
274.62	553.52		729.69	553.12	1183.84	554.13	1616.65	553.35
285.90	553.18		739.75	552.82	1192.68	553.75	1617.57	553.17
301.75	552.63		750.72	552.91	1202.74	553.64	1619.49	557.30
311.81	552.30		762.91	552.88	1212.80	553.52	1620.31	559.46
328.92	553.06		771.75	552.91	1222.86	553.43	1645.92	559.77
335.89	553.97		784.85	552.85	1231.70	553.64	1650.72	562.34
340.77	553.94		793.73	552.72	1242.67	553.55	1662.68	562.37
353.87	553.97		798.58	552.54	1252.73	553.52	1667.25	562.38
363.63	553.91		811.63	552.60	1261.87	553.49	1673.65	563.94
373.68	553.94		822.56	552.27	1269.80	553.49	1678.23	555.22
380.70	553.70		832.71	552.27	1281.68	553.49	1680.36	565.43
392.89	551.67		840.64	552.48	1292.66	553.49	1686.46	567.14
401.86	551.75		851.32	552.36	1302.72	553.36	1695.21	567.05
412.70	553.67		862.89	552.31	1312.77	553.33	1698.29	567.20
422.76	553.64		873.85	552.51	1321.61	553.82		
431.90	553.55		882.73	552.45	1332.84	553.79		
441.66	553.30		892.75	552.45	1342.64	553.94		
452.63	553.27		902.32	552.30	1352.70	551.97		
462.69	553.64		913.77	552.27	1362.76	551.96		

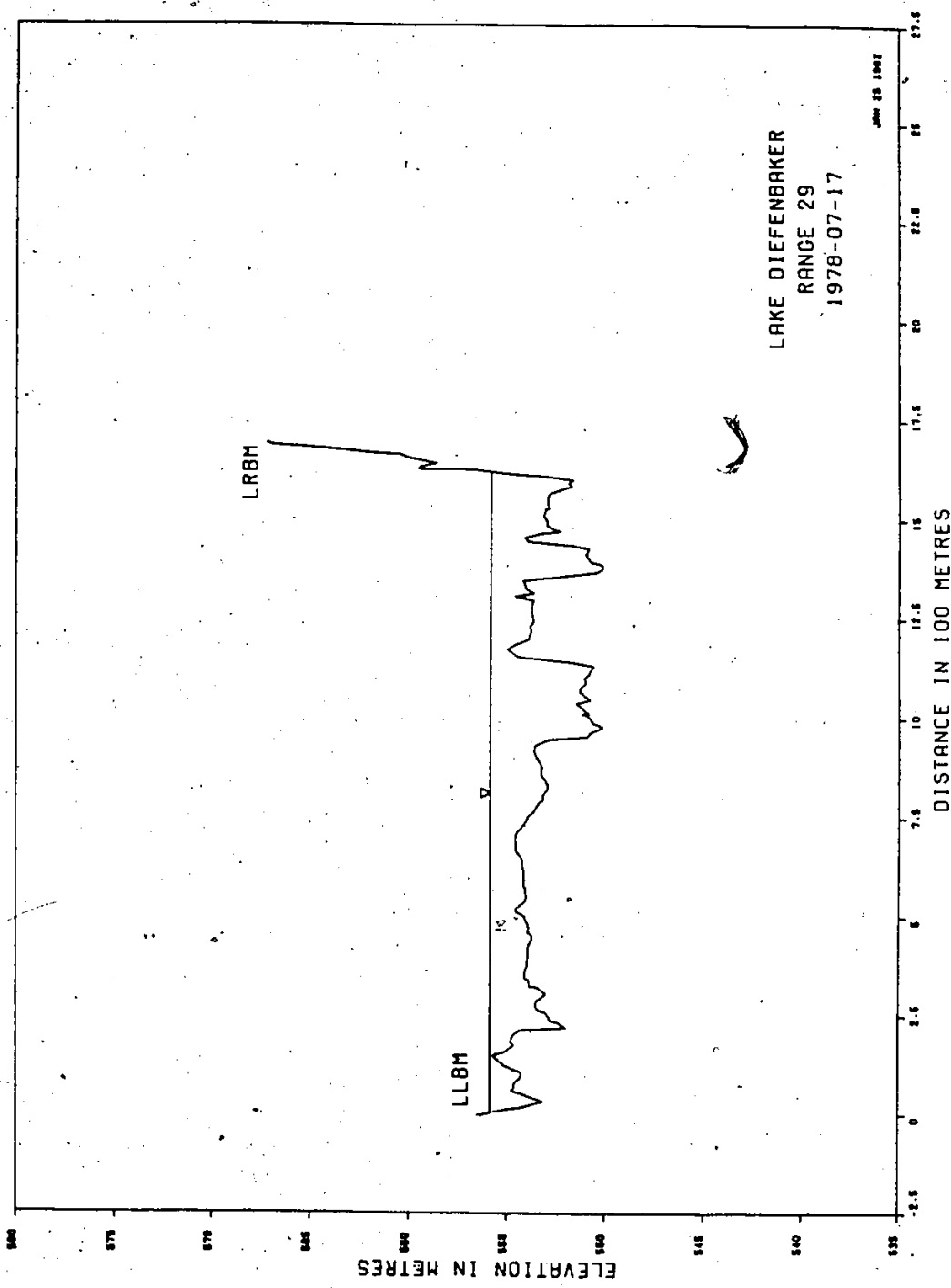
SEDIMENT SURVEY SECTION
 JAN 4 1982, PAGE 1
 UTTAMA, ONT.

LAKE DIEFENBAKER

RANGE NO. - 29
 SURVEYED 07/6/1972
 MINIMUM ELEVATION = 550.62
 ASSUMED MINIMUM DATUM = 551.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
551.50	93.2	552.00	229.1	552.50	452.3	553.00	774.2
553.50	1152.3	554.00	1714.2	554.50	2407.8	555.00	3166.9
555.50	3955.6	556.00	4755.9				



LAKE OIEFENBAKER

PROFILE DATA

RANGE NO 29 SURVEY DATE 1978-07-17

STA	ELEV	RKKS	STA	ELEV	RKKS	STA	ELEV	RKKS
0.00	556.50	LLBM	433.00	553.85		946.00	552.85	
0.00	556.25		439.00	553.75		953.00	550.90	
2.50	556.15		451.00	553.70		962.00	550.75	
2.70	556.00		462.00	553.95		977.00	550.10	
5.00	555.85	WL	465.00	553.90		989.00	550.65	
14.00	555.00		474.00	553.90		993.00	550.65	
17.00	554.40		484.00	553.95		1006.00	550.90	
38.00	553.15		491.00	554.05		1010.00	550.85	
50.00	554.05		502.00	554.10		1023.00	551.10	
58.00	554.55		512.00	554.50		1037.00	551.45	
61.00	554.75		520.00	554.55		1045.00	550.75	
69.00	554.60		539.00	554.05		1068.00	551.30	
77.00	554.60		550.00	554.00		1078.00	551.20	
85.00	554.50		561.00	554.05		1088.00	550.95	
93.00	554.30		572.00	554.05		1099.00	551.05	
100.00	554.25		578.00	554.15		1110.00	550.80	
108.00	554.30		591.00	554.10		1118.00	550.75	
116.00	554.70		603.00	554.15		1130.00	550.55	
124.00	555.10		608.00	554.15		1140.00	551.55	
140.00	555.50		618.00	554.15		1154.00	551.45	
150.00	555.70		625.00	554.20		1173.00	555.00	
160.00	555.10		636.00	554.20		1185.00	554.55	
176.00	554.65		648.00	554.25		1198.00	553.90	
184.00	554.80		660.00	554.45		1210.00	553.85	
200.00	554.70		668.00	554.55		1219.00	553.75	
215.00	554.30		682.00	554.50		1231.00	553.85	
219.00	552.45		692.00	554.55		1243.00	553.65	
221.00	552.00		700.00	554.55		1254.00	553.70	
238.00	552.40		710.00	554.50		1266.00	553.75	
239.00	552.80		723.00	554.25		1279.00	553.75	
247.00	552.85		741.00	554.00		1290.00	553.70	
260.00	553.05		754.00	553.90		1298.00	553.65	
264.00	553.40		762.00	553.65		1306.00	554.60	
276.00	553.55		786.00	553.35		1314.00	553.65	
289.00	553.45		793.00	553.15		1325.00	554.05	
305.00	553.00		806.00	553.15		1335.00	554.10	
323.00	553.45		818.00	552.95		1345.00	554.20	
325.00	553.85		830.00	552.90		1355.00	553.45	
341.00	553.90		844.00	553.05		1366.00	550.45	
347.00	554.10		858.00	553.25		1374.00	550.45	
364.00	554.05		876.00	553.20		1385.00	550.15	
377.00	553.95		891.00	553.35		1393.00	550.75	
390.00	553.90		903.00	554.50		1403.00	550.90	
403.00	553.90		916.00	553.60		1411.00	551.00	
415.00	553.55		930.00	553.55		1418.00	550.90	

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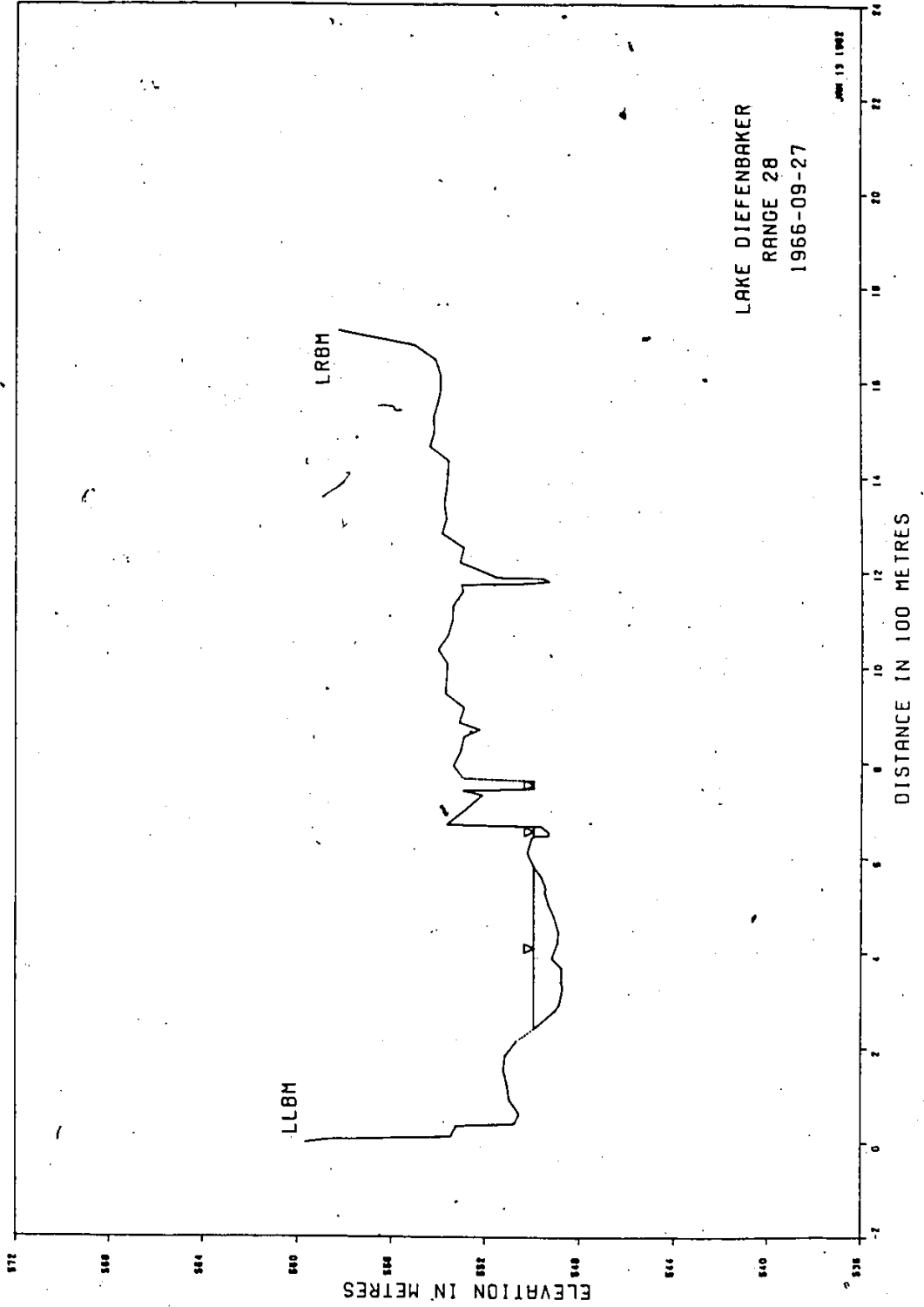
SEDIMENT SURVEY SECTION
 JAN 26 1982, PAGE 1
 UTTAHO, ONT.

LAKE DUFFENBAKER

RANGE NO. - 29
 SURVEYED 17/ 7/1978
 MINIMUM ELEVATION = 550.10
 ASSUMED MINIMUM DATUM = 551.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
551.50	172.9				
552.00	310.4				
552.50	467.2				
553.00	651.4				
553.50	866.1				
554.00	1104.9				
554.50	1399.0				
555.00	1752.4				
555.50	2140.9				
556.00	2545.8				
556.50	2955.9				



DATE: 5/24/77
 JAN 13 1977
 OFFICIAL COPY

LAKE UHLENHUTCH

Profile Data

STATION DATA 1750-04-27

STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS
0.00	553.64		73.13	557.11				
6.10	553.72		74.77	557.71				
13.72	553.81		76.00	557.72	AL			
16.97	553.21		76.64	557.92				
23.84	553.78		76.93	558.32	AL			
30.96	553.53		77.51	558.92				
31.48	550.36		77.83	558.94				
121.97	551.05		78.23	553.33				
157.40	551.70		82.27	553.03				
182.44	551.14		84.05	552.84				
213.16	553.64		86.77	552.24				
240.00	549.32	AL	88.24	551.27				
240.18	549.32		91.31	551.91				
278.59	549.31		92.87	551.77				
290.17	548.45		97.57	551.04				
297.79	549.42		100.45	551.61				
310.90	546.75		103.64	554.33				
326.75	540.70		106.84	553.54				
336.18	541.76		107.57	553.17				
348.20	540.75		114.47	551.35				
389.23	543.16		119.05	547.94				
421.54	548.31		117.57	551.30				
447.87	549.28		117.57	550.17				
459.64	548.74		118.17	548.31				
474.84	549.37		118.74	549.27				
507.11	549.31		118.74	551.26				
525.59	543.96		119.02	551.21				
537.36	549.84		121.81	551.25				
560.22	549.56		123.77	552.71				
580.00	549.32	AL	128.77	553.43				
580.95	549.92		131.22	551.67				
610.71	550.17		131.73	551.76				
640.69	550.01		137.21	551.07				
645.00	549.72	AL	140.56	551.01				
645.57	549.92		143.17	551.24				
646.79	543.31		146.05	554.47				
652.44	549.28		148.13	554.17				
658.98	543.86		152.61	554.21				
658.07	543.54		155.37	554.73				
665.00	549.97	AL	155.57	553.91				
665.59	543.72		161.25	551.44				
666.60	540.54		164.73	548.41				
669.25	543.61		167.71	551.11				
671.17	551.24		170.77	551.11				
701.44	543.12							

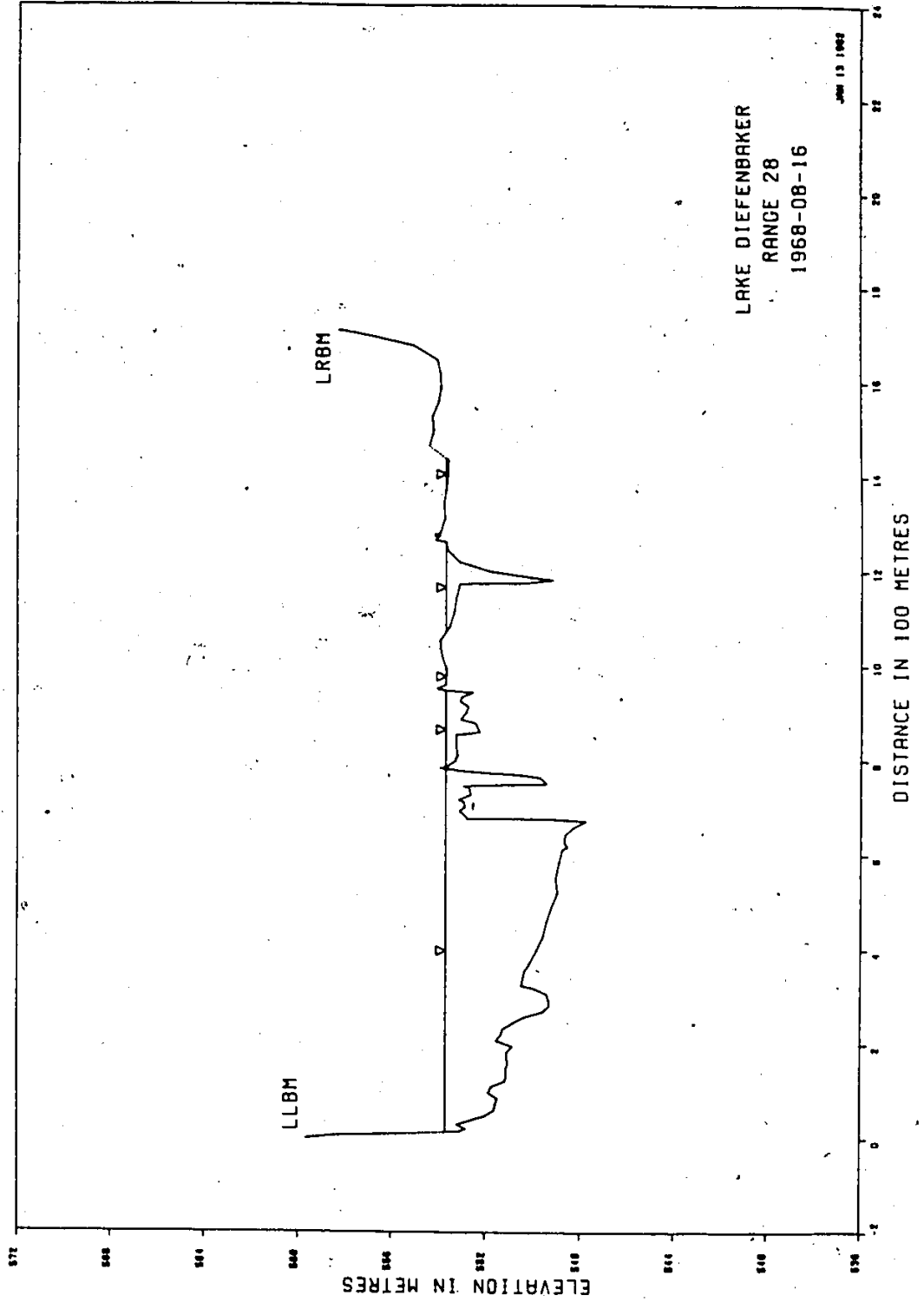
SEDIMENT SURVEY SECTION
DEC 22 1981, PAGE 1
OTTAWA, ONT.

LAKE DIEFENBAKER

RANGE NO. - 24
SURVEYED 27/ 9/1985
MINIMUM ELEVATION - 549.73
ASSUMED MINIMUM DATUM - 549.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
549.50	139.9	550.00	315.1	550.50	544.6	551.00	805.5
551.50	1126.5	552.00	1462.2	552.50	1813.2	553.00	2191.9
553.50	2691.0	554.00	3347.0	554.50	4145.8	555.00	4973.9
555.50	5807.9	556.00	6644.6	556.50	7464.0	557.00	8325.0
557.50	9172.8	558.00	10018.1				



WATER SURVEY OF CANADA
JAN 13 1992 8:46 AM
OTTAWA, ONT.

CARE OF THE WATER

WATER DATA

RANGE 40 20 SURVEY DATE 1990-05-16

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

0.00	551.64	LLM	901.50	582.73		994.00	551.67	ML
6.40	551.72		915.70	584.57		1194.25	551.67	
7.52	551.77		928.88	586.64		1320.87	551.33	
9.14	552.03		940.05	588.30		1420.87	551.65	
10.67	552.16		955.16	589.30		1522.75	551.74	
14.00	551.67	ML	970.52	591.76		1670.00	551.67	ML
14.52	551.67		975.13	589.75		1772.75	551.67	
15.54	551.72		975.44	582.75		1871.83	551.72	
21.94	552.07		977.21	553.04		2111.71	551.33	
30.48	551.19		977.92	552.85		2192.19	551.29	
35.66	552.85		977.11	552.53		2222.87	551.07	
48.77	551.72		975.76	551.13		2274.09	550.87	
62.96	551.50		975.36	552.03		2304.59	550.87	
73.15	551.74		975.77	552.57		2374.08	551.81	
85.14	551.97		978.73	552.70		2421.14	552.09	
77.54	551.84		975.59	552.30		2474.20	551.12	
109.73	551.72		974.30	547.30		2494.17	551.61	
121.92	551.14		974.91	546.77		2504.20	551.67	ML
138.11	551.73		975.83	550.53		2574.26	551.67	
146.30	551.71		978.53	552.83		2604.53	551.13	
158.50	551.02		981.33	551.67	ML	2674.67	551.98	
170.59	551.08		981.23	551.67		2744.67	551.15	
182.88	551.05		981.33	551.67	ML	2804.77	551.91	
195.07	550.93		981.33	551.94		2811.25	551.73	
207.76	551.51		981.98	551.67		2841.73	551.79	
219.46	551.32		984.53	551.27		2872.00	551.67	ML
231.55	551.23		985.67	551.27		2922.21	551.67	
243.84	550.83		987.74	551.74		2972.67	551.61	
256.03	550.38		987.74	551.74		3022.17	551.59	
268.22	547.55		987.74	551.74		3072.00	551.67	ML
280.42	547.20		987.27	552.72		3122.13	551.67	
292.61	547.11		987.27	552.72		3172.13	551.67	
304.80	547.40		987.27	552.72		3222.13	551.67	
316.99	547.72		987.75	553.13		3272.13	551.67	
329.09	550.44		987.75	553.13		3322.13	551.67	
341.38	550.14		987.75	553.13		3372.13	551.67	
353.57	550.32		987.75	553.13		3422.13	551.67	
365.76	551.15		987.75	553.13		3472.13	551.67	
377.95	547.33		987.75	553.13		3522.13	551.67	
390.14	547.57		987.75	553.13		3572.13	551.67	
402.33	547.40		987.75	553.13		3622.13	551.67	
414.52	547.14		987.75	553.13		3672.13	551.67	
426.71	547.14		987.75	553.13		3722.13	551.67	
438.90	547.14		987.75	553.13		3772.13	551.67	
451.09	547.14		987.75	553.13		3822.13	551.67	
463.28	547.14		987.75	553.13		3872.13	551.67	
475.47	547.14		987.75	553.13		3922.13	551.67	
487.66	547.14		987.75	553.13		3972.13	551.67	
500.00	547.14		987.75	553.13		4022.13	551.67	
512.19	547.14		987.75	553.13		4072.13	551.67	
524.38	547.14		987.75	553.13		4122.13	551.67	
536.57	547.14		987.75	553.13		4172.13	551.67	
548.76	547.14		987.75	553.13		4222.13	551.67	
560.95	547.14		987.75	553.13		4272.13	551.67	
573.14	547.14		987.75	553.13		4322.13	551.67	
585.33	547.14		987.75	553.13		4372.13	551.67	
597.52	547.14		987.75	553.13		4422.13	551.67	
609.71	547.14		987.75	553.13		4472.13	551.67	
621.90	547.14		987.75	553.13		4522.13	551.67	
634.09	547.14		987.75	553.13		4572.13	551.67	
646.28	547.14		987.75	553.13		4622.13	551.67	
658.47	547.14		987.75	553.13		4672.13	551.67	
670.66	547.14		987.75	553.13		4722.13	551.67	
682.85	547.14		987.75	553.13		4772.13	551.67	
695.04	547.14		987.75	553.13		4822.13	551.67	
707.23	547.14		987.75	553.13		4872.13	551.67	
719.42	547.14		987.75	553.13		4922.13	551.67	
731.61	547.14		987.75	553.13		4972.13	551.67	
743.80	547.14		987.75	553.13		5022.13	551.67	
756.00	547.14		987.75	553.13		5072.13	551.67	
768.19	547.14		987.75	553.13		5122.13	551.67	
780.38	547.14		987.75	553.13		5172.13	551.67	
792.57	547.14		987.75	553.13		5222.13	551.67	
804.76	547.14		987.75	553.13		5272.13	551.67	
816.95	547.14		987.75	553.13		5322.13	551.67	
829.14	547.14		987.75	553.13		5372.13	551.67	
841.33	547.14		987.75	553.13		5422.13	551.67	
853.52	547.14		987.75	553.13		5472.13	551.67	
865.71	547.14		987.75	553.13		5522.13	551.67	
877.90	547.14		987.75	553.13		5572.13	551.67	
890.09	547.14		987.75	553.13		5622.13	551.67	
902.28	547.14		987.75	553.13		5672.13	551.67	
914.47	547.14		987.75	553.13		5722.13	551.67	
926.66	547.14		987.75	553.13		5772.13	551.67	
938.85	547.14		987.75	553.13		5822.13	551.67	
951.04	547.14		987.75	553.13		5872.13	551.67	
963.23	547.14		987.75	553.13		5922.13	551.67	
975.42	547.14		987.75	553.13		5972.13	551.67	
987.61	547.14		987.75	553.13		6022.13	551.67	
1000.00	547.14		987.75	553.13		6072.13	551.67	

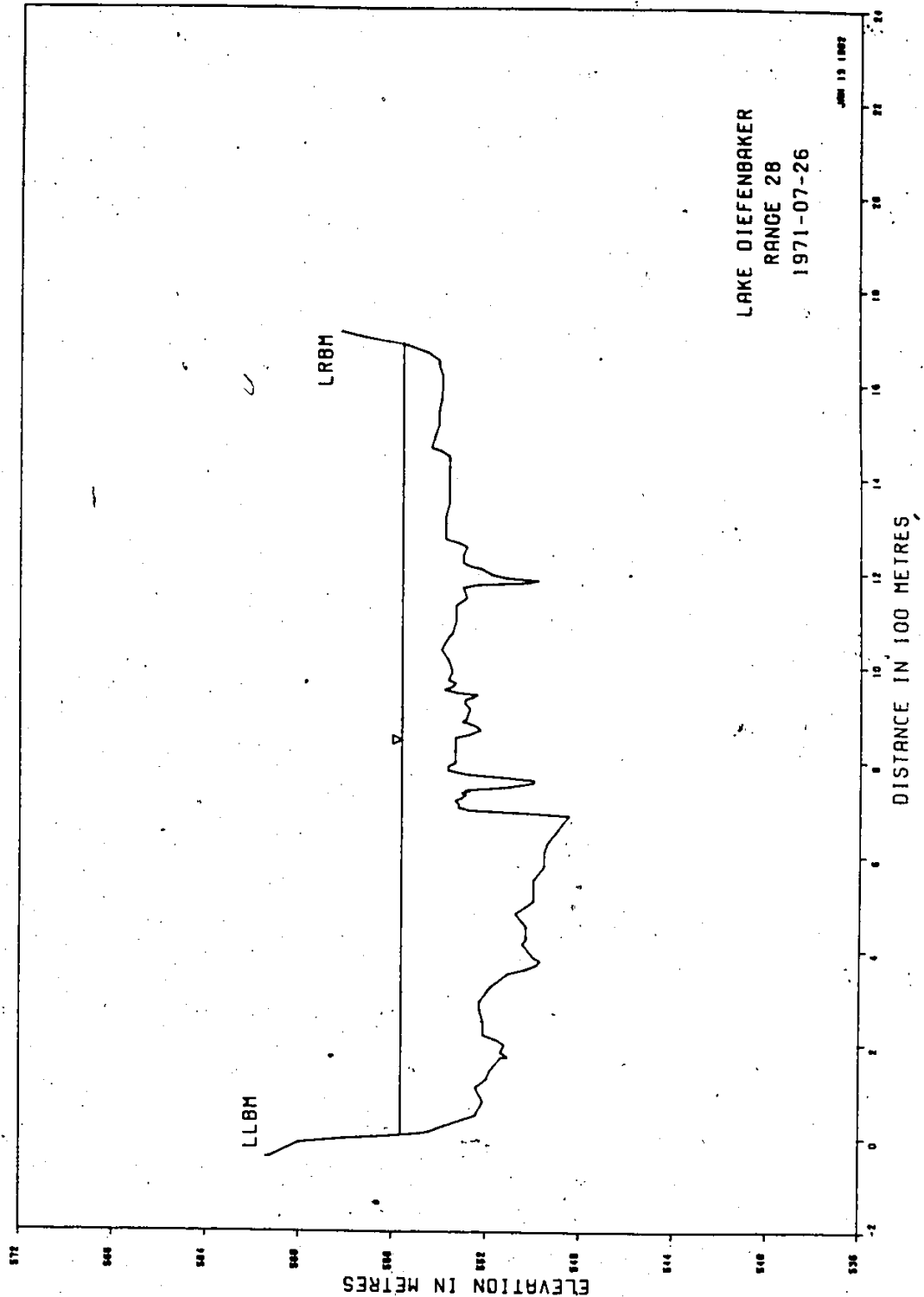
SEDIMENT SURVEY SECTION
 DEC 22 1981, PAGE 1
 OTTAWA, ONT.

LAKE DIEFFENBACHER

RANGE NO. - 28
 SURVEYED 16/ 8/1968
 MINIMUM ELEVATION - 547.75
 ASSUMED MINIMUM DATUM - 548.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
548.50	0.0				
549.00	45.4				
549.50	150.0				
550.00	318.2				
550.50	525.6				
551.00	763.8				
551.50	1045.3				
552.00	1373.9				
552.50	1723.1				
553.00	2109.9				
553.50	2577.2				
554.00	3233.7				
554.50	4027.1				
555.00	4854.5				
555.50	5685.2				
556.00	6525.0				
556.50	7364.9				
557.00	8207.5				
557.50	9052.7				
558.00	9902.5				



WATER SURVEY OF CANADA
JAN 15 1972 PAS
UTAH, INT.

LAKE JEFFERSON

PROFILE DATA

STATION NO. 28 SURVEY DATE 1971-07-26

STA ELEV CHKS

STA ELEV CHKS

STA ELEV CHKS

STA ELEV CHKS

STA ELEV CHKS

1127.28 553.33

557.77

553.33

1125.13 552.84

553.13

552.84

1107.28 553.03

553.13

553.03

1173.18 552.42

553.33

552.42

1173.05 550.29

553.03

550.29

1142.12 549.41

552.83

549.41

1142.11 551.03

552.83

551.03

1236.27 552.03

552.83

552.03

1251.03 552.83

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552.83

1201.28 553.14

553.14

553.14

1203.10 553.79

553.79

553.79

1203.21 553.77

553.77

553.77

1307.27 553.77

553.77

553.77

1313.26 553.77

553.77

553.77

1380.30 553.64

553.64

553.64

1122.21 551.64

551.64

551.64

1393.28 553.64

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553.64

1424.28 553.64

553.64

553.64

1433.05 553.64

553.64

553.64

1483.26 553.64

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1483.12 553.94

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1483.28 554.89

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1483.28 554.89

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1511.20 554.10

554.10

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1511.20 554.10

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1534.02 554.10

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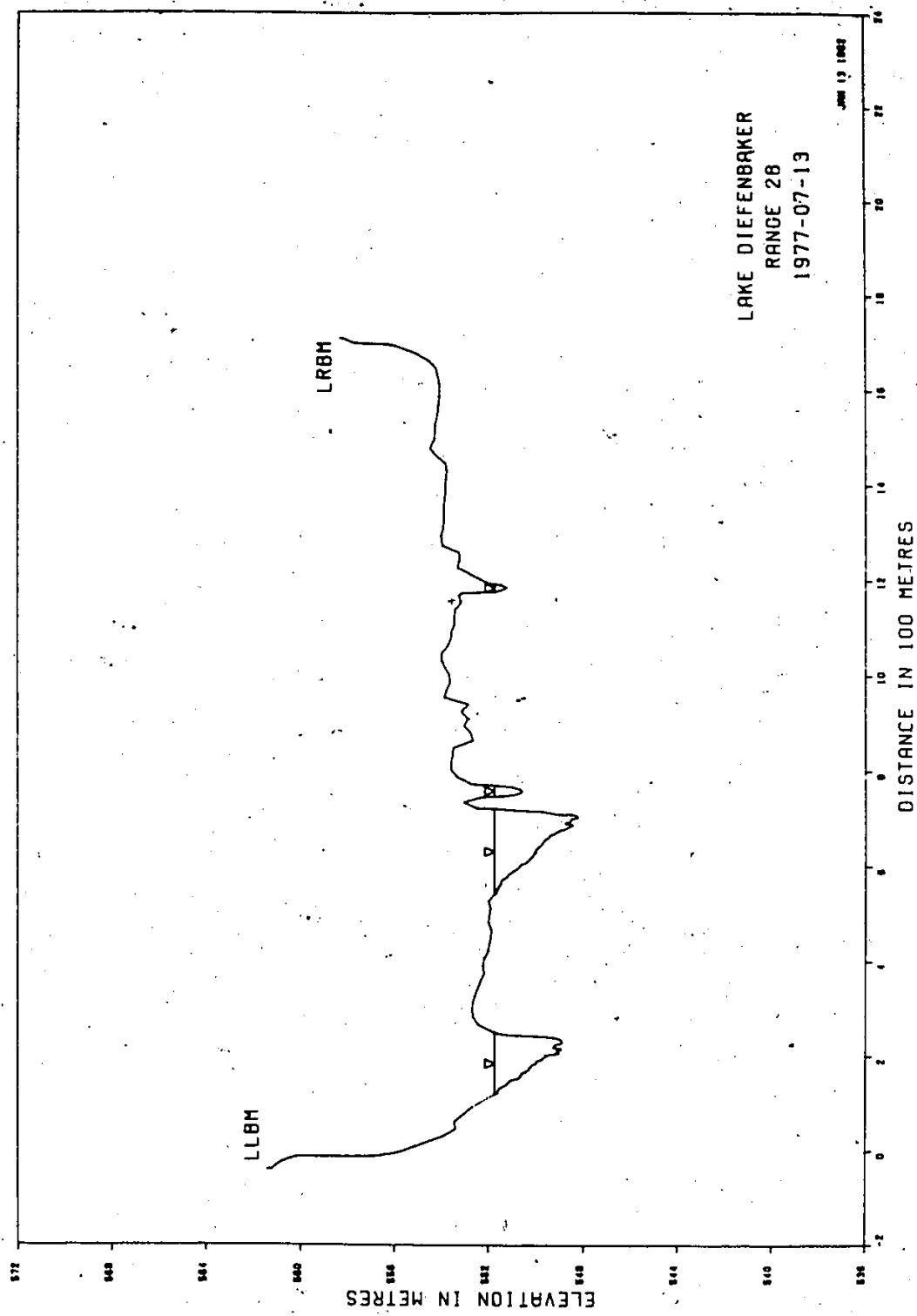
SEDIMENT SURVEY SECTION
DEC 22 1981, PAGE 1
OTTAWA, ONT.

LAKE DIEFENBAKER

RANGE NO. - 28
SURVEYED 26/ 7/1971
MINIMUM ELEVATION = 548.45
ASSUMED MINIMUM DATUM = 549.00

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
549.00	9.9	550.00	104.5	551.00	417.8
549.50	37.1	550.50	238.9	551.50	619.3
550.00	104.5	551.00	417.8	552.00	861.5
550.50	238.9	551.50	619.3	552.50	1182.5
551.00	417.8	552.00	861.5	553.00	1574.9
551.50	619.3	552.50	1182.5	553.50	2073.6
552.00	861.5	553.00	1574.9	554.00	2723.5
552.50	1182.5	553.50	2073.6	554.50	3529.1
553.00	1574.9	554.00	2723.5	555.00	4357.7
553.50	2073.6	554.50	3529.1	555.50	5191.8
554.00	2723.5	555.00	4357.7	556.00	6030.4
554.50	3529.1	555.50	5191.8	556.50	6872.1
555.00	4357.7	556.00	6030.4	557.00	7715.6
555.50	5191.8	556.50	6872.1	557.50	8564.1
556.00	6030.4	557.00	7715.6	558.00	9415.2
556.50	6872.1	557.50	8564.1		
557.00	7715.6	558.00	9415.2		
557.50	8564.1				
558.00	9415.2				



WATER SURVEY OF CANADA
JAN 13 1962
OTTAWA, ONT.

LAKE OPELUNDAWACA

PROFILE DATA

DATE: 10/17-10/18

STA	ELEV	CHRS	STA	ELEV	CHRS	STA	ELEV	CHRS	STA	ELEV	CHRS	STA	ELEV	CHRS
-100.21	551.13	UL	704.07	545.24		704.07	545.24		704.07	545.24		704.07	545.24	
-90.21	561.20		707.18	544.40		707.18	544.40		707.18	544.40		707.18	544.40	
-80.48	563.43		710.18	544.40		710.18	544.40		710.18	544.40		710.18	544.40	
-73.77	563.00		713.23	544.65		713.23	544.65		713.23	544.65		713.23	544.65	
-12.50	560.15		716.20	553.80		716.20	553.80		716.20	553.80		716.20	553.80	
-11.00	557.27		719.33	551.57		719.33	551.57		719.33	551.57		719.33	551.57	
-10.15	556.66		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
-6.71	556.27		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
-5.40	556.02		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
-5.10	555.59		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
15.26	558.77		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
40.48	553.34		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
45.72	553.37		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
60.96	553.43		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
91.48	552.69		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
119.00	551.72	UL	720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
121.02	551.50		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
124.87	551.50		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
128.02	551.57		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
131.06	551.51		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
134.11	551.46		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
137.16	551.32		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
140.21	551.23		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
143.76	551.17		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
146.51	551.11		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
149.66	551.02		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
152.70	550.76		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
155.75	550.65		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
158.00	550.65		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
161.45	550.57		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
164.90	550.53		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
167.94	550.36		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
170.99	550.27		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
174.15	550.26		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
177.19	550.21		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
180.44	550.15		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
183.49	549.76		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
186.54	549.74		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
189.59	549.44		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
192.63	549.71		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
195.68	549.59		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
198.73	549.35		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
202.04	549.44		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	
205.13	549.31		720.00	551.72		720.00	551.72		720.00	551.72		720.00	551.72	

WATER SURVEY DISTRICT
JAN 13 1962
OTTAWA, ONT.

LAND DEVELOPMENT
PROJECT DATA

PROJECT NO. 25 SURVEY DATE 1972-07-13

STA	ELEV	CHGS	STA	ELEV	CHGS	STA	ELEV	CHGS
-----	------	------	-----	------	------	-----	------	------

1697.74	557.72							
1705.97	553.07							
1707.49	553.21							
1707.49	558.30	CHG						

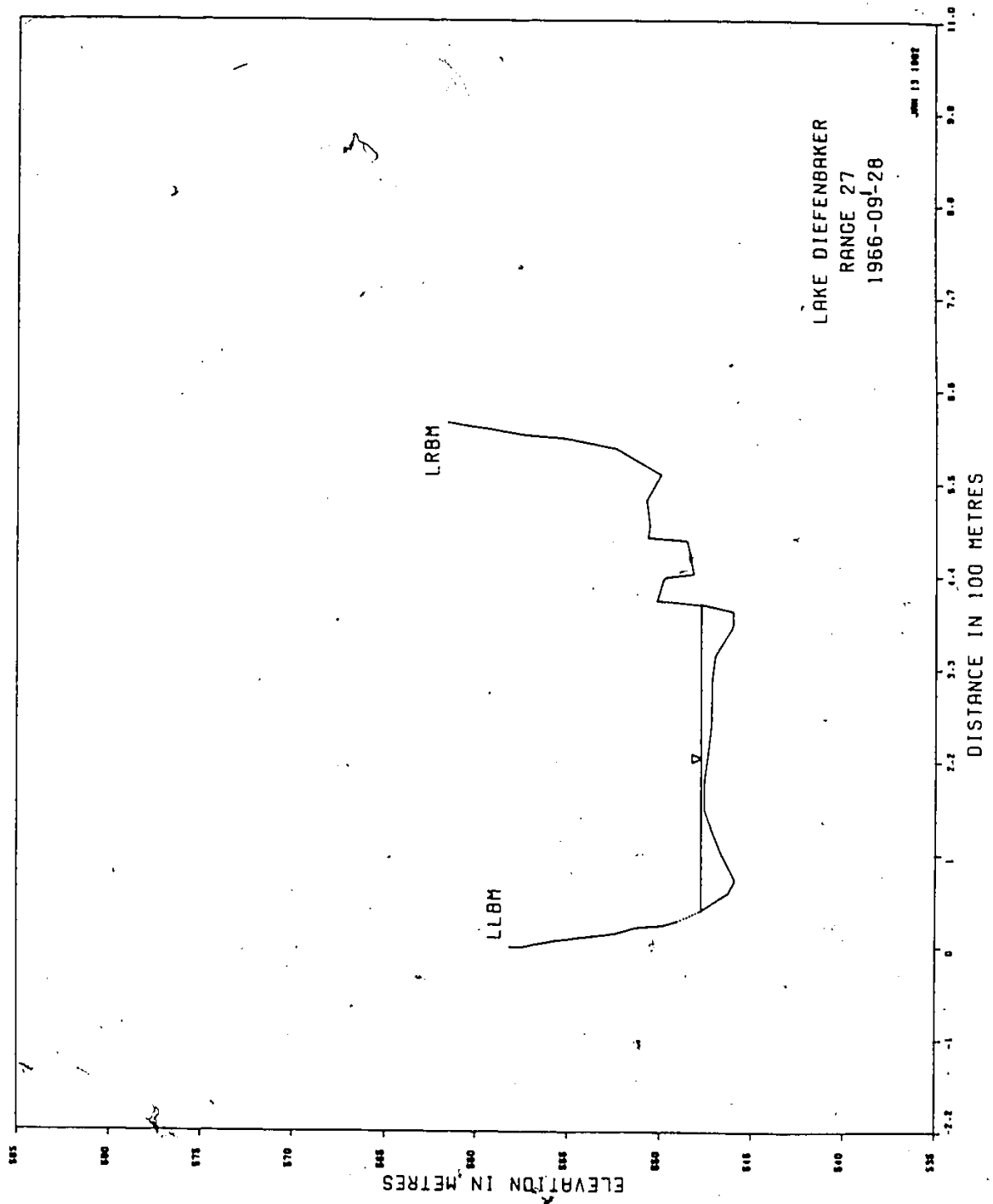
SEDIMENT SURVEY SECTION
DEC 22 1981, PAGE 1
OTTAWA, ONT.

LAKE DIEFENBAKER

RANGE NO. - 28
SURVEYED 13/ 7/1977
MINIMUM ELEVATION - 548.18
ASSUMED MINIMUM DATUM - 549.00

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)
549.00	17.9						
549.50	55.3						
550.00	114.1						
550.50	194.1						
551.00	303.0						
551.50	444.9						
552.00	633.9						
552.50	913.4						
553.00	1272.4						
553.50	1727.1						
554.00	2330.1						
554.50	3107.1						
555.00	3933.2						
555.50	4773.2						
556.00	5615.9						
556.50	6465.8						
557.00	7320.1						
557.50	8174.5						
558.00	9030.2						



DATE DIFFERENTIAL
MULTIPLY DATA

DATE: 11 JUL 68 JAL: 1706-J3-23

[illegible]

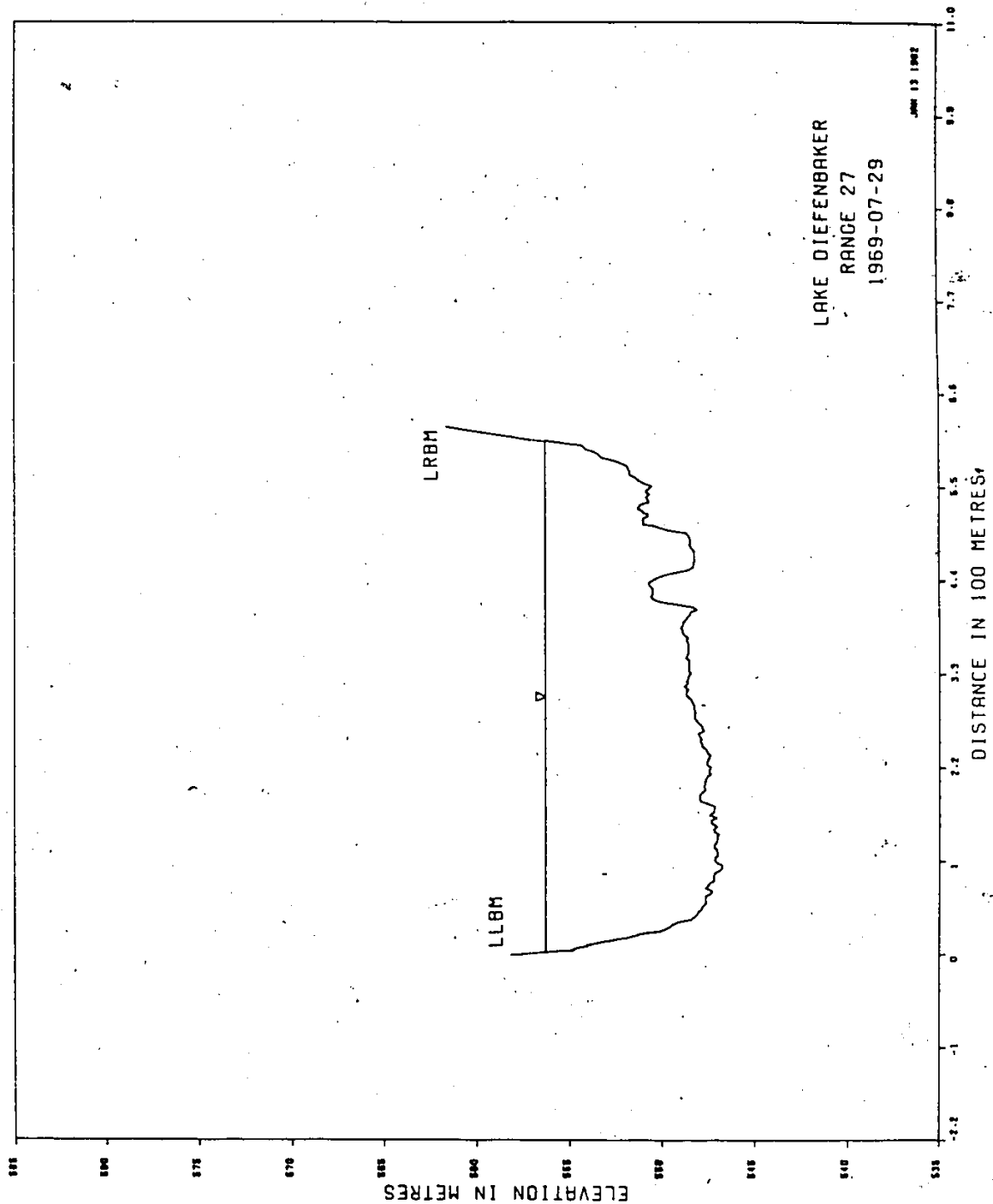
SEDIMENT SURVEY SECTION
 DEC 22 1961, PAGE 1
 OFFTAND, UMT.

LAKE DIEFENBACHER

RANGE MD.- 27
 SURVEYED 28/ 9/1965
 MINIMUM ELEVATION = 546.50
 ASSUMED MINIMUM WATER = 546.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
546.50	29.9	547.00	83.6	547.50	204.0
547.00	83.6	547.50	204.0	548.00	383.0
547.50	204.0	548.00	383.0	548.50	571.5
548.00	383.0	548.50	571.5	549.00	781.3
548.50	571.5	549.00	781.3	549.50	992.6
549.00	781.3	549.50	992.6	550.00	1209.0
549.50	992.6	550.00	1209.0	550.50	1444.6
550.00	1209.0	550.50	1444.6	551.00	1708.3
550.50	1444.6	551.00	1708.3	551.50	1984.6
551.00	1708.3	551.50	1984.6	552.00	2265.5
551.50	1984.6	552.00	2265.5	552.50	2551.1
552.00	2265.5	552.50	2551.1	553.00	2839.4
552.50	2551.1	553.00	2839.4	553.50	3129.4
553.00	2839.4	553.50	3129.4	554.00	3421.2
553.50	3129.4	554.00	3421.2	554.50	3719.7
554.00	3421.2	554.50	3719.7	555.00	4039.9
554.50	3719.7	555.00	4039.9	555.50	4375.8
555.00	4039.9	555.50	4375.8	556.00	4694.9
555.50	4375.8	556.00	4694.9	556.50	4994.3
556.00	4694.9	556.50	4994.3	557.00	5295.2
556.50	4994.3	557.00	5295.2	557.50	5597.8
557.00	5295.2	557.50	5597.8	558.00	5811.7
557.50	5597.8	558.00	5811.7		
558.00	5811.7				



WATER SURVEY OF CANADA
JAN 13 1974
OTTAWA, ONT.

LAKE OREGOON
PACIFIC DATA

DATE: 10/17/72

1959-07-27

STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS
0+00	555.17	LLSR	0+10	547.18		2+70	547.44		5+30	543.52		8+00	550.96	
0+10	547.00		0+20	547.15		2+80	547.37		5+40	543.55		8+10	550.55	
0+20	547.54		0+30	547.04		2+90	547.31		5+50	543.64		8+20	550.55	
0+30	548.00		0+40	546.84		3+00	547.45		5+60	543.72		8+30	550.55	
0+40	548.71		0+50	546.72		3+10	547.55		5+70	543.80		8+40	550.55	
0+50	549.11		1+00	546.55		3+20	547.65		5+80	543.88		8+50	550.55	
1+00	549.55		1+10	546.41		3+30	547.75		5+90	543.96		8+60	550.55	
1+10	549.95		1+20	546.27		3+40	547.85		6+00	544.04		8+70	550.55	
1+20	550.11		1+30	546.13		3+50	547.95		6+10	544.12		8+80	550.55	
1+30	550.27		1+40	546.00		3+60	548.05		6+20	544.20		8+90	550.55	
1+40	550.43		1+50	545.86		3+70	548.15		6+30	544.28		9+00	550.55	
1+50	550.59		2+00	545.72		3+80	548.25		6+40	544.36		9+10	550.55	
2+00	550.75		2+10	545.59		3+90	548.35		6+50	544.44		9+20	550.55	
2+10	550.91		2+20	545.45		4+00	548.45		6+60	544.52		9+30	550.55	
2+20	551.07		2+30	545.32		4+10	548.55		6+70	544.60		9+40	550.55	
2+30	551.23		2+40	545.18		4+20	548.65		6+80	544.68		9+50	550.55	
2+40	551.39		2+50	545.05		4+30	548.75		6+90	544.76		9+60	550.55	
2+50	551.55		2+60	544.91		4+40	548.85		7+00	544.84		9+70	550.55	
2+60	551.71		2+70	544.78		4+50	548.95		7+10	544.92		9+80	550.55	
2+70	551.87		2+80	544.64		4+60	549.05		7+20	545.00		9+90	550.55	
2+80	552.03		2+90	544.51		4+70	549.15		7+30	545.08		10+00	550.55	
2+90	552.19		3+00	544.37		4+80	549.25		7+40	545.16				
3+00	552.35		3+10	544.24		4+90	549.35		7+50	545.24				
3+10	552.51		3+20	544.10		5+00	549.45		7+60	545.32				
3+20	552.67		3+30	543.97		5+10	549.55		7+70	545.40				
3+30	552.83		3+40	543.83		5+20	549.65		7+80	545.48				
3+40	552.99		3+50	543.70		5+30	549.75		7+90	545.56				
3+50	553.15		3+60	543.56		5+40	549.85		8+00	545.64				
3+60	553.31		3+70	543.43		5+50	549.95		8+10	545.72				
3+70	553.47		3+80	543.29		5+60	550.05		8+20	545.80				
3+80	553.63		3+90	543.16		5+70	550.15		8+30	545.88				
3+90	553.79		4+00	543.02		5+80	550.25		8+40	545.96				
4+00	553.95		4+10	542.89		5+90	550.35		8+50	546.04				
4+10	554.11		4+20	542.75		6+00	550.45		8+60	546.12				
4+20	554.27		4+30	542.62		6+10	550.55		8+70	546.20				
4+30	554.43		4+40	542.48		6+20	550.65		8+80	546.28				
4+40	554.59		4+50	542.35		6+30	550.75		8+90	546.36				
4+50	554.75		4+60	542.21		6+40	550.85		9+00	546.44				
4+60	554.91		4+70	542.08		6+50	550.95		9+10	546.52				
4+70	555.07		4+80	541.94		6+60	551.05		9+20	546.60				
4+80	555.23		4+90	541.81		6+70	551.15		9+30	546.68				
4+90	555.39		5+00	541.67		6+80	551.25		9+40	546.76				
5+00	555.55		5+10	541.54		6+90	551.35		9+50	546.84				
5+10	555.71		5+20	541.40		7+00	551.45		9+60	546.92				
5+20	555.87		5+30	541.27		7+10	551.55		9+70	547.00				
5+30	556.03		5+40	541.13		7+20	551.65		9+80	547.08				
5+40	556.19		5+50	541.00		7+30	551.75		9+90	547.16				
5+50	556.35		5+60	540.86		7+40	551.85							
5+60	556.51		5+70	540.73		7+50	551.95							
5+70	556.67		5+80	540.59		7+60	552.05							
5+80	556.83		5+90	540.46		7+70	552.15							
5+90	556.99		6+00	540.32		7+80	552.25							
6+00	557.15		6+10	540.19		7+90	552.35							
6+10	557.31		6+20	540.05		8+00	552.45							
6+20	557.47		6+30	539.92		8+10	552.55							
6+30	557.63		6+40	539.78		8+20	552.65							
6+40	557.79		6+50	539.65		8+30	552.75							
6+50	557.95		6+60	539.51		8+40	552.85							
6+60	558.11		6+70	539.38		8+50	552.95							
6+70	558.27		6+80	539.24		8+60	553.05							
6+80	558.43		6+90	539.11		8+70	553.15							
6+90	558.59		7+00	538.97		8+80	553.25							
7+00	558.75		7+10	538.84		8+90	553.35							
7+10	558.91		7+20	538.70		9+00	553.45							
7+20	559.07		7+30	538.57										
7+30	559.23		7+40	538.43										
7+40	559.39		7+50	538.30										
7+50	559.55		7+60	538.16										
7+60	559.71		7+70	538.03										
7+70	559.87		7+80	537.89										
7+80	559.99		7+90	537.76										
7+90	560.15		8+00	537.62										
8+00	560.31		8+10	537.49										
8+10	560.47		8+20	537.35										
8+20	560.63		8+30	537.22										
8+30	560.79		8+40	537.08										
8+40	560.95		8+50	536.95										
8+50	561.11		8+60	536.81										
8+60	561.27		8+70	536.68										
8+70	561.43		8+80	536.54										
8+80	561.59		8+90	536.41										
8+90	561.75		9+00	536.27										
9+00	561.91													
9+10	562.07													
9+20	562.23													
9+30	562.39													
9+40	562.55													
9+50	562.71													
9+60	562.87													
9+70	563.03													
9+80	563.19													
9+90	563.35													
10+00	563.51													

HL

LLSR

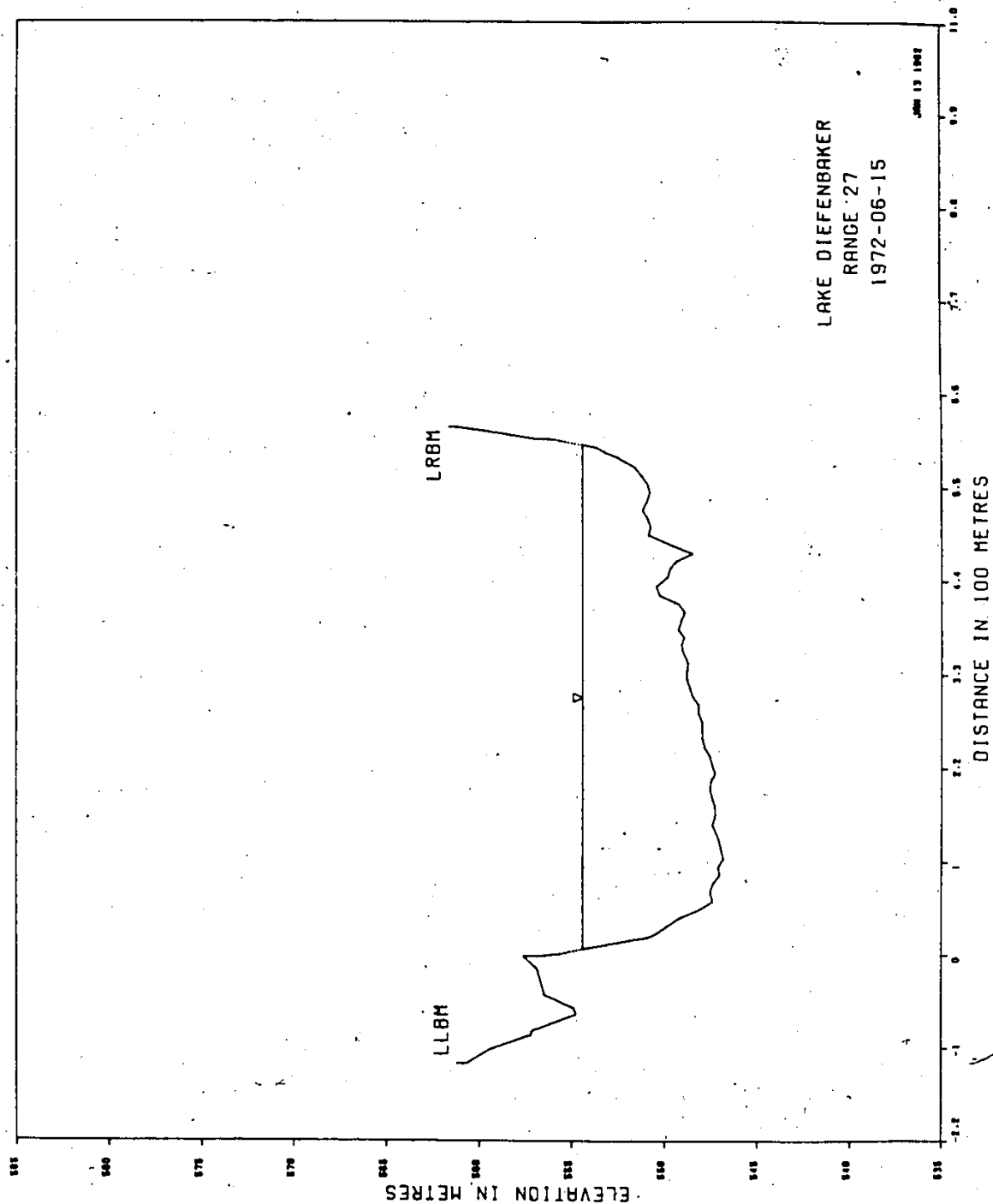
SEDIMENT SURVEY SECTION
DEC 22 1981, PAGE 1
JITAMA, ONT.

LAKE DIEPENBOKER

RANGE NO. - 27
SURVEYED 29/ 7/1969
MINIMUM ELEVATION = 546.72
ASSUMED MINIMUM DATUM = 547.53

ELEVATION - AREA TAB-E
ELEVATION (M.)

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
547.50	44.9				
548.00	135.1				
548.50	253.6				
549.00	466.8				
549.50	678.8				
550.00	897.0				
550.50	1122.8				
551.00	1370.8				
551.50	1637.2				
552.00	1911.3				
552.50	2191.3				
553.00	2474.1				
553.50	2759.7				
554.00	3049.6				
554.50	3343.7				
555.00	3642.8				
555.50	3939.5				
556.00	4237.2				
556.50	4540.0				
557.00	4841.5				
557.50	5143.9				
558.00	5447.7				



DATE 5/14/77 BY A. A. 15 B. J. W.

LAN: J-L-F: N6A6E4

9218 IL: 042A

51-5C-7441 : IVO A 7/705 1? PA 4/24/74

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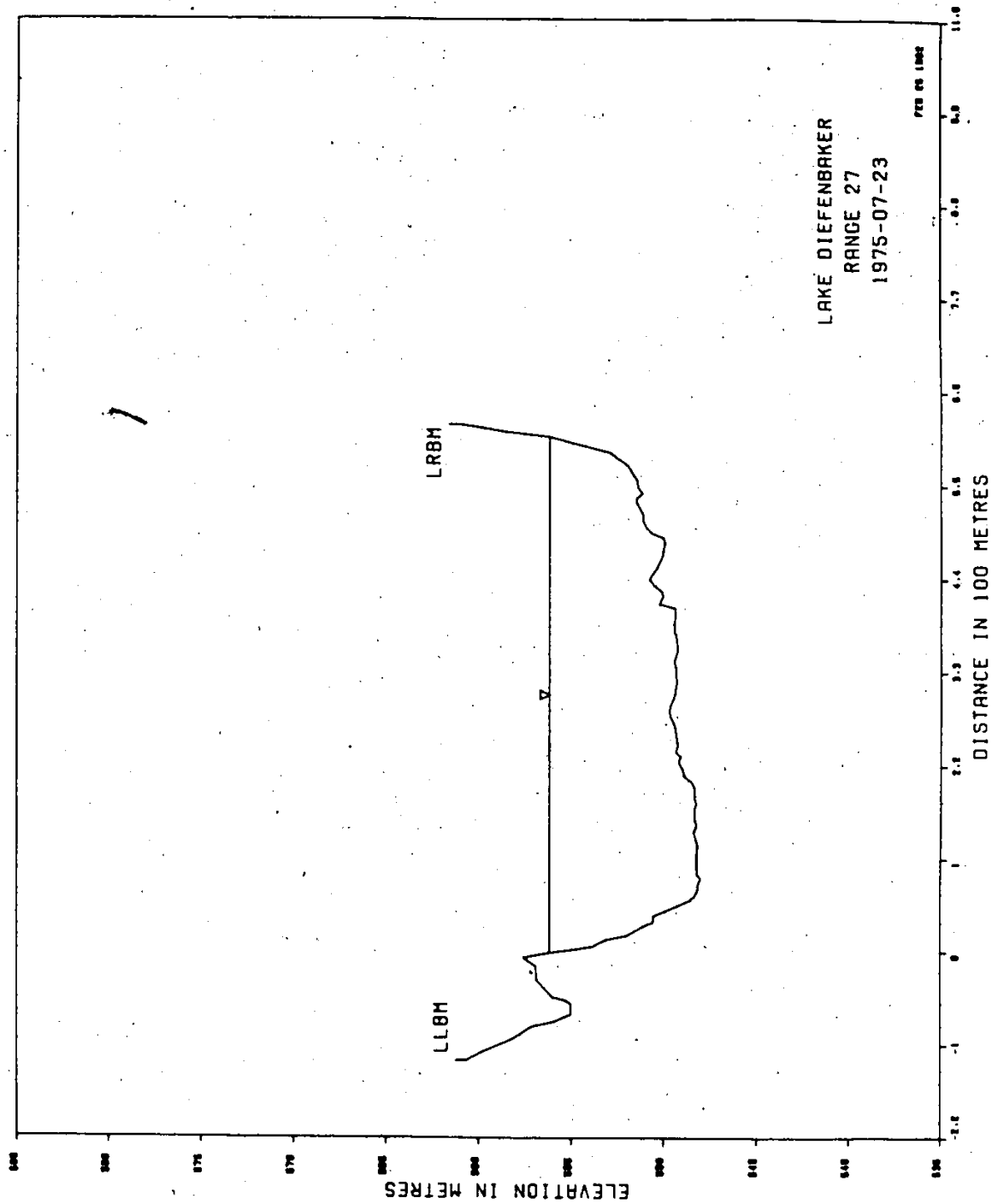
SEDIMENT SURVEY SECTION
 DEC 22 1981, PAGE 1
 JITTAWA,ONT.

LAKE DUFFENSAKER

RANGE NO. - 27
 SURVEYED 15/ 6/1972
 MINIMUM ELEVATION = 546.79
 ASSUMED MINIMUM DATUM = 547.53

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
547.50	46.4	560.30	7013.4		
548.00	141.4	560.50	7383.7		
548.50	253.5	561.00	7757.3		
549.00	413.2				
549.50	605.3				
550.00	815.2				
550.50	1040.9				
551.00	1285.1				
551.50	1557.5				
552.00	1837.2				
552.50	2121.0				
553.00	2408.3				
553.50	2699.0				
554.00	2993.3				
554.50	3289.7				
555.00	3589.9				
555.50	3898.2				
556.00	4212.7				
556.50	4533.0				
557.00	4855.9				
557.50	5214.0				
558.00	5568.1				
558.50	5924.9				
559.00	6254.6				
559.50	6547.2				



WATER SURVEY OF CANADA
 1111 26 1957
 OTTAWA, ONT.

LAKE MICHIGAN

PROFILE DATA

STATION NO. 27 SURVEY DATE 1975-07-23

STA	ELEV	4+00	STA	ELEV	4+00	STA	ELEV	4+00	STA	ELEV	4+00
-128.00	561.17	191.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-128.00	560.56	187.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-118.00	559.29	178.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-107.50	558.26	200.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-97.50	557.78	207.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-88.00	557.15	215.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-82.70	555.75	223.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-72.70	555.47	230.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-74.70	555.17	230.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-73.50	555.02	241.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-61.00	555.01	250.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-56.40	555.38	257.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-53.30	556.02	264.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-33.50	556.96	270.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-17.10	556.92	277.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-9.10	557.43	283.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-6.10	557.56	290.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
-1.00	558.17	297.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
6.00	557.86	308.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
14.00	557.16	317.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
19.00	557.01	328.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
24.00	551.61	339.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
30.00	551.11	350.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
35.00	550.56	362.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
42.00	550.56	378.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
48.00	549.71	385.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
54.00	549.26	396.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
61.00	548.56	406.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
66.00	548.31	417.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
73.00	548.15	426.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
78.00	548.16	436.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
86.00	548.01	446.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
92.00	548.21	455.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
99.00	548.21	465.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
104.00	548.21	475.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
109.00	548.21	485.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
115.00	548.21	495.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
124.00	548.10	505.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
129.00	548.21	515.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
141.00	548.36	525.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
149.00	548.21	535.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
156.00	548.31	545.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
162.00	548.31	555.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
169.00	548.31	565.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50
175.00	548.21	575.00	555.31	550.50	550.50	550.50	550.50	550.50	550.50	550.50	550.50

AL

LRBM

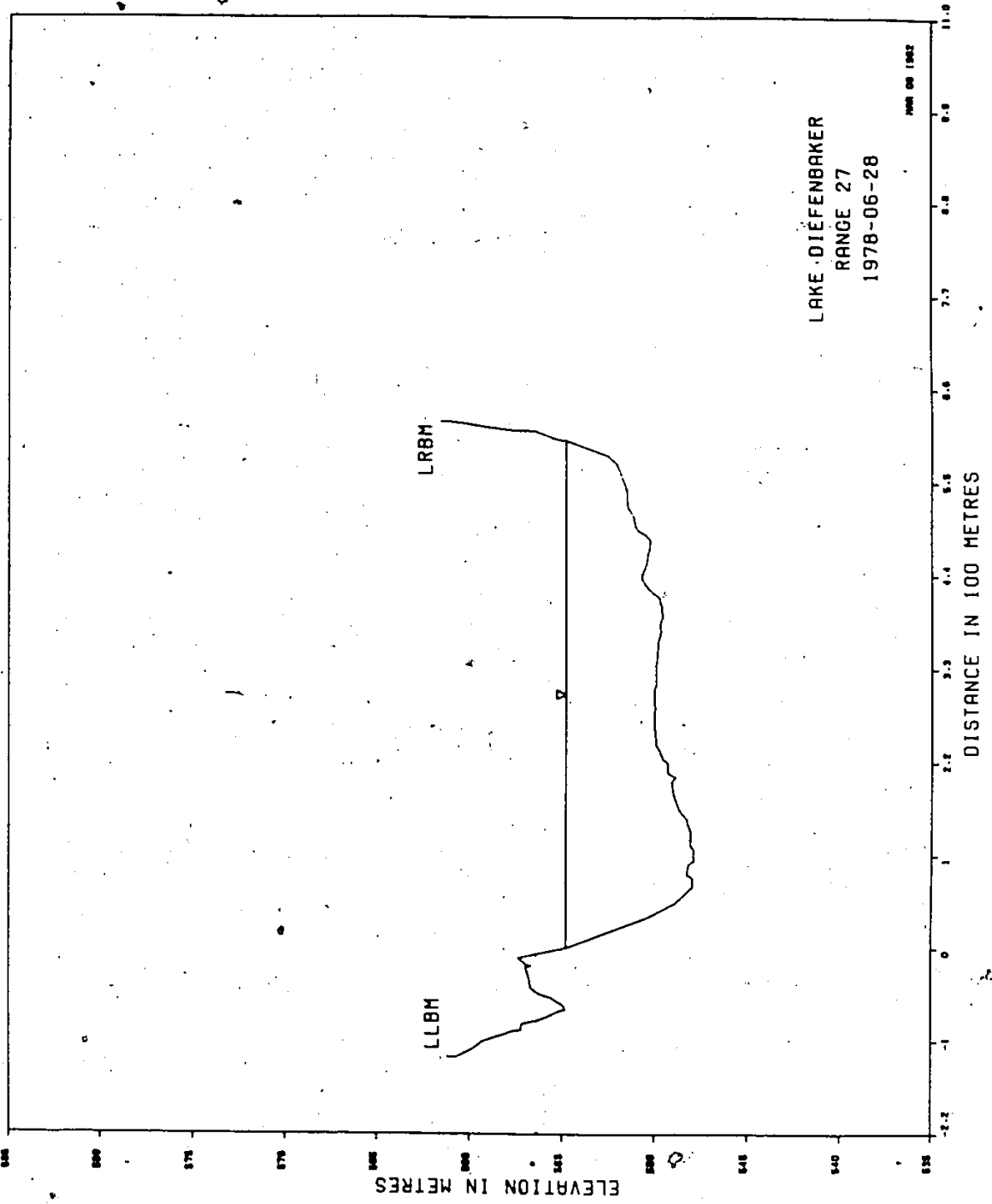
SEDIMENT SURVEY SECTION
MAR 4 1982, PAGE 1
OTTAWA, ONT.

LAKE OJIBEWAN

RANGE NO. - 27
SURVEYED 23/ 7/1975
MINIMUM ELEVATION = 548.01
ASSUMED MINIMUM DATUM = 548.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
548.50	35.2	561.00	7266.2		
549.00	108.7				
549.50	222.7				
550.00	399.9				
550.50	606.2				
551.00	835.3				
551.50	1084.0				
552.00	1355.8				
552.50	1635.5				
553.00	1920.3				
553.50	2208.8				
554.00	2501.5				
554.50	2797.0				
555.00	3094.6				
555.50	3402.8				
556.00	3717.7				
556.50	4039.7				
557.00	4372.2				
557.50	4718.6				
558.00	5072.3				
558.50	5429.8				
559.00	5790.5				
559.50	6154.5				
560.00	6521.6				
560.50	6892.4				



WATER SUPPLY OF CANADA
 4400 1974
 OTTAWA, ONT.

LAST DISPERSED

PROFILE DATA

24 JUL 77 SURVEY DATE 1978-06-28

STA ELEV MKS STA ELEV MKS

STA	ELEV	MKS	STA	ELEV	MKS	STA	ELEV	MKS
-128.00	551.14	LL	475.00	547.05		472.00	550.65	
-128.00	550.70		476.00	548.55		473.00	550.51	
-119.00	559.45		477.00	549.20		474.00	550.91	
-119.00	559.11		478.00	549.85		475.00	551.05	
-106.00	559.81		479.00	550.50		476.00	551.11	
-100.00	557.97		480.00	551.15		477.00	551.16	
-97.50	557.97		481.00	551.80		478.00	551.40	
-96.50	557.75		482.00	552.45		479.00	551.51	
-89.00	557.14		483.00	553.10		480.00	551.51	
-85.00	556.11		484.00	553.75		481.00	551.55	
-78.00	555.36		485.00	554.40		482.00	551.60	
-74.00	555.15		486.00	555.05		483.00	551.65	
-72.00	555.95		487.00	555.70		484.00	551.70	
-68.00	555.91		488.00	556.35		485.00	551.75	
-64.00	555.71		489.00	557.00		486.00	551.80	
-54.00	556.21		490.00	557.65		487.00	551.85	
-53.00	556.31		491.00	558.30		488.00	551.90	
-50.00	556.52		492.00	558.95		489.00	551.95	
-45.00	556.75		493.00	559.60		490.00	552.00	
-40.00	556.75		494.00	560.25		491.00	552.05	
-22.00	556.99		495.00	560.90		492.00	552.10	
-20.50	556.70		496.00	561.55		493.00	552.15	
-19.00	556.97		497.00	562.20		494.00	552.20	
-11.00	557.36		498.00	562.85		495.00	552.25	
2.70	558.41	HL	499.00	563.50		496.00	552.30	
36.00	550.46		500.00	564.15		497.00	552.35	
41.00	550.01		501.00	564.80		498.00	552.40	
53.00	549.91		502.00	565.45		499.00	552.45	
73.00	547.36		503.00	566.10		500.00	552.50	
83.00	547.95		504.00	566.75		501.00	552.55	
98.00	548.26		505.00	567.40		502.00	552.60	
99.00	548.15		506.00	568.05		503.00	552.65	
104.00	547.66		507.00	568.70		504.00	552.70	
109.00	547.91		508.00	569.35		505.00	552.75	
115.00	547.46		509.00	569.95		506.00	552.80	
122.00	548.06		510.00	570.60		507.00	552.85	
130.00	548.96		511.00	571.25		508.00	552.90	
136.00	548.01		512.00	571.90		509.00	552.95	
142.00	548.11		513.00	572.55		510.00	553.00	
147.00	548.21		514.00	573.20		511.00	553.05	
153.00	548.76		515.00	573.85		512.00	553.10	
159.00	549.51		516.00	574.50		513.00	553.15	
164.00	549.96		517.00	575.15		514.00	553.20	
169.00	549.76		518.00	575.80		515.00	553.25	
182.00	549.96		519.00	576.45		516.00	553.30	

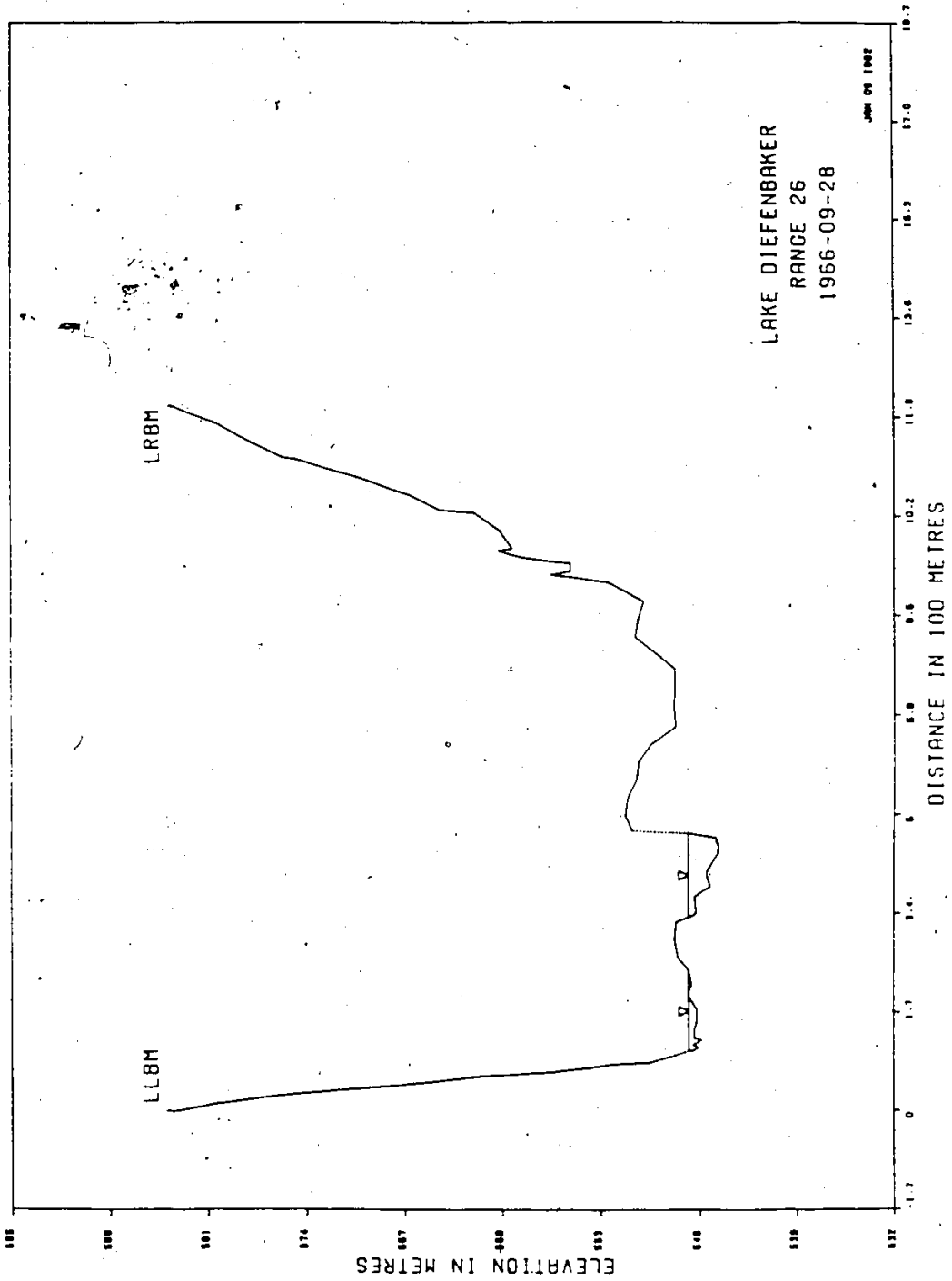
CRDM

RANGE NO. - 27
 SURVEYED 28/ 6/1978
 MINIMUM ELEVATION = 547.86
 ASSUMED MINIMUM DATUM = 548.00.

SURVEYED 28/ 6/1978
 MINIMUM ELEVATION = 547.86
 ASSUMED MINIMUM DATUM = 548.00.

SURVEYED 28/ 6/1978
 MINIMUM ELEVATION = 547.86
 ASSUMED MINIMUM DATUM = 548.00.

ELEVATION (M)	AREA (SQ M)	PERCENTAGE (%)	ACC. AREA (SQ M)	ELEVATION (M)	ACC. AREA (SQ M)
548.00	400.00	50.00	500.00		
549.50	110.00	51.00	710.00		
549.00	0.00				
549.50	120.00				
550.00	0.00				
550.50	0.00				
551.00	120.00				
551.50	0.00				
552.00	120.00				
552.50	150.00				
553.00	170.00				
553.50	0.00				
554.00	230.00				
554.50	0.00				
555.00	0.00				
555.50	120.00				
556.00	0.00				
556.50	100.00				
557.00	0.00				
557.50	0.00				
558.00	0.00				
558.50	0.00				
559.00	0.00				
559.50	0.00				
560.00	0.00				



LAKE DIEFENDAGER
PROFILE DATA

PAGE NO 26 SURVEY DATE 1966-J9-28

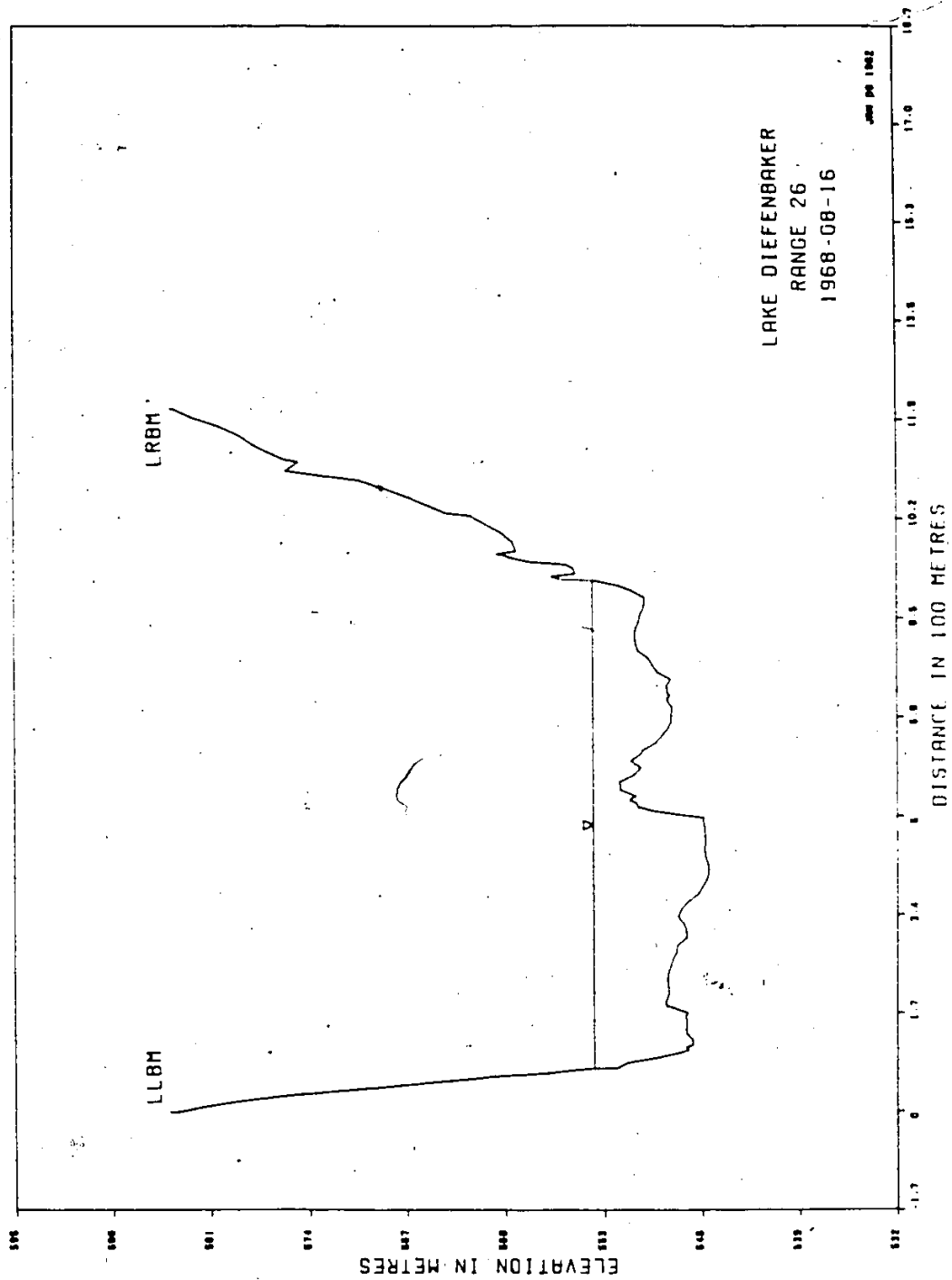
[illegible]

SEDIMENT SURVEY SECTION
DEC 27 1961, PAGE 1
OTTAWA, ONT.

LAKE DIFFERENTIAL

RANGE NO. - 26
SURVEYED 28/ 9/1965
MINIMUM ELEVATION - 544.85
ASSUMED MINIMUM JATON - 545.50

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
545.50	36.6	558.00	4345.8	570.50	20571.5
546.00	36.4	559.50	8787.7	571.00	21097.3
546.50	150.9	559.50	9231.1	571.50	21625.4
547.00	293.3	559.50	9478.2	572.00	22155.7
547.50	441.6	560.00	10136.4	572.50	22688.3
548.00	645.2	560.50	10604.2	573.00	23223.1
548.50	837.8	561.00	11076.7	573.50	23760.3
549.00	1162.1	561.50	11553.6	574.00	24299.7
549.50	1437.7	562.00	12034.9	574.50	24841.5
550.00	1727.6	562.50	12519.1	575.00	25385.4
550.50	2052.9	563.00	13004.5	575.50	25931.0
551.00	2420.1	563.50	13491.0	576.00	26478.7
551.50	2819.4	564.00	13978.7	576.50	27030.0
552.00	3225.9	564.50	14467.7	577.00	27584.9
552.50	3638.9	565.00	14959.4	577.50	28143.4
553.00	4051.5	565.50	15454.7	578.00	28705.5
553.50	4469.9	566.00	15953.4	578.50	29271.6
554.00	4888.0	566.50	16455.6	579.00	29841.5
554.50	5307.7	567.00	16961.0	579.50	30416.0
555.00	5728.9	567.50	17469.0	580.00	30994.3
555.50	6157.6	568.00	17979.5	580.50	31575.7
556.00	6590.9	568.50	18492.8	581.00	32162.5
556.50	7027.4	569.00	19008.6	581.50	32751.8
557.00	7465.7	569.50	19527.0	582.00	33344.6
557.50	7905.2	570.00	20048.0	582.50	33941.0



WATER SURVEY OF CANADA
JAN 08 1992 PAGE 1
OTTAWA, ONT.

LAKE OPELONDAKE

PROFILE DATA

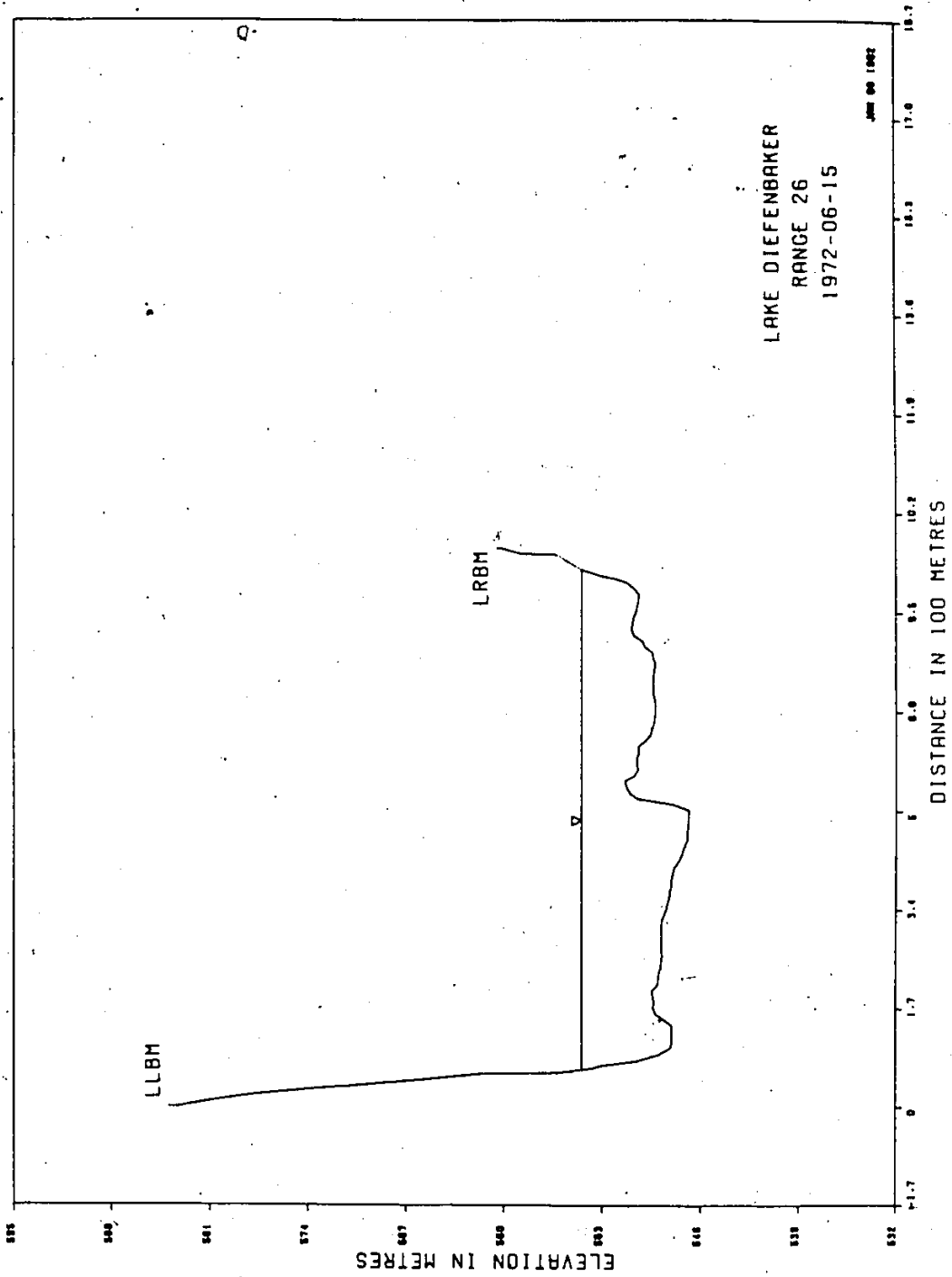
STA	ELEV	RMKS	STA	ELEV	RMKS	STA	ELEV	RMKS	STA	ELEV	RMKS
0.00	583.91	LLBM	187.10	545.90		365.63	550.10				
0.00	583.33		191.74	545.51		377.62	550.01				
7.62	581.65		211.84	545.44		401.42	550.01				
15.24	579.73		223.67	545.47		406.11	550.91				
22.86	577.44		235.06	545.65		405.26	551.90	WL			
30.48	574.49		248.05	545.74		419.00	551.70				
38.10	570.59		260.25	545.71		418.40	553.70				
45.72	567.42		272.44	545.71		415.92	555.96				
53.34	563.97		284.63	545.74		421.11	555.56				
60.96	560.81		299.97	545.84		425.37	554.92				
68.58	558.97		305.97	545.81		438.21	555.04				
76.20	555.90		318.15	545.55		441.22	555.56				
74.30	553.70	WL	324.25	550.47		446.40	558.12				
74.68	554.00		330.35	550.62		454.02	559.58				
74.98	553.70		336.45	551.08		459.21	560.17				
75.29	552.08		342.54	550.65		459.21	560.47				
83.82	551.18		354.74	551.81		464.69	559.09				
92.96	549.25		360.43	551.75		479.93	559.14				
102.11	547.57		366.93	551.87		495.17	560.13				
108.68	546.96		374.12	550.77		505.65	562.10				
111.25	547.12		391.31	550.29		510.22	564.15				
115.82	546.66		403.52	550.99		510.89	565.16				
124.97	546.59		415.70	550.26		516.13	566.65				
134.11	547.06		421.79	550.16		517.37	568.36				
143.26	547.12		431.98	549.25		528.61	570.34				
152.40	547.06		446.18	548.74		531.85	575.55				
164.59	547.15		458.37	548.37		537.09	574.64				
170.69	546.99		470.55	548.09		541.16	575.65				
182.88	548.49		482.75	548.09		542.33	576.54				
188.98	548.58		494.94	548.03		547.57	577.87				
201.17	548.34		507.14	548.37		552.81	578.82				
213.36	548.37		510.19	548.43		556.05	580.22				
225.55	548.43		516.28	548.15		559.29	582.09				
237.74	548.37		517.31	548.34		568.51	583.96	LRM			
249.94	548.18		531.52	548.46		570.53	583.72				
262.13	548.03		543.71	548.12							
274.32	547.76		555.90	549.10							
286.51	547.70		568.13	549.96							
298.70	547.06		580.29	549.77							
310.90	547.06		592.48	550.47							
323.09	547.24		604.67	550.65							
335.28	547.63		616.86	550.71							
347.47	547.82		629.05	550.65							
359.66	547.02		641.25	550.44							
374.90	546.20		653.44	550.32							

LAKE DUFFENBARGER

RANGE NO. - 25
SURVEYED 15/ 8/1968
MINIMUM ELEVATION = 565.44
ASSUMED MINIMUM DATION = 566.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
566.50	105.6	559.00	8791.5	571.50	21379.2
567.00	182.6	559.50	9440.8	572.00	21706.4
567.50	304.9	560.00	9900.1	572.50	22434.9
568.00	459.1	560.50	10366.9	573.00	22964.7
568.50	663.6	561.00	10838.3	573.50	23495.7
569.00	925.2	561.50	11313.8	574.00	24027.9
569.50	1200.4	562.00	11793.4	574.50	24561.5
570.00	1490.3	562.50	12276.9	575.00	25097.7
570.50	1803.0	563.00	12762.2	575.50	25640.3
571.00	2179.8	563.50	13248.6	576.00	26188.3
571.50	2574.7	564.00	13736.3	576.50	26739.2
572.00	2982.0	564.50	14225.5	577.00	27294.2
572.50	3397.9	565.00	14718.1	577.50	27852.4
573.00	3815.1	565.50	15213.7	578.00	28414.6
573.50	4233.6	566.00	15712.5	578.50	28981.4
574.00	4653.3	566.50	16214.4	579.00	29552.9
574.50	5073.7	567.00	16719.2	579.50	30128.3
575.00	5495.1	567.50	17226.9	580.00	30707.2
575.50	5923.5	568.00	17737.4	580.50	31289.7
576.00	6355.6	568.50	18250.6	581.00	31875.3
576.50	6790.8	569.00	18766.4	581.50	32464.0
577.00	7229.9	569.50	19284.7	582.00	33055.7
577.50	7667.9	570.00	19805.4	582.50	33650.7
578.00	8107.8	570.50	20328.5	583.00	34249.7
578.50	8548.9	571.00	20853.2	583.50	34852.6



LAKE DUFFENBARGER

PROFILE DATA

NAME NO 26 SURVEY DATE 1972-06-15

STA	ELEV	RMS	STA	ELEV	RMS	STA	ELEV	RMS
0+00	583.87	LLHM	350.82	548.30		810.77	550.71	
0+00	583.27		361.80	548.14		820.83	550.90	
7+02	581.65		370.64	548.15		830.58	550.80	
15+24	579.64		380.70	548.03		840.64	550.74	
22+86	577.29		390.75	548.03		850.70	550.55	
28+96	574.76		400.81	547.94		860.76	550.47	
33+53	572.75		410.57	547.85		870.85	550.34	
38+10	570.16		420.62	547.57		879.85	550.32	
42+07	568.06		430.68	547.35		890.53	550.68	
47+24	565.86		441.66	547.21		900.64	551.20	
51+82	563.73		450.83	547.06		907.64	552.05	
57+30	561.72		458.72	546.90		911.66	552.97	
59+44	558.26		469.73	546.93		922.30	554.43	HL
62+48	555.19		480.87	546.84		922.63	554.43	
64+00	554.43	HL	498.65	546.81		947.93	556.14	
64+62	554.43		510.54	546.78		949.15	556.47	
66+75	553.64		520.60	547.91		949.76	558.70	
70+71	553.15		530.66	550.44		960.12	560.27	
79+53	550.47		539.80	550.44		960.12	560.27	LRHM
90+53	548.91		549.55	551.20				
101+80	548.15		560.83	551.35				
109+73	548.03		569.67	550.65				
120+70	548.06		580.64	550.41				
129+54	548.03		589.73	550.50				
140+82	548.06		600.76	550.47				
150+57	548.61		609.60	550.32				
160+63	548.19		620.57	550.38				
170+69	549.37		630.53	549.83				
179+53	549.28		640.69	549.52				
188+67	549.37		649.83	549.40				
199+64	549.46		659.59	549.28				
210+62	549.01		671.78	549.19				
220+68	548.98		680.62	549.16				
232+56	548.91		683.75	549.16				
239+57	548.79		700.74	549.22				
251+76	548.76		710.77	549.34				
259+69	548.70		720.55	549.34				
269+75	548.76		730.51	549.34				
280+72	548.76		740.56	549.31				
290+78	548.73		750.72	549.25				
299+62	548.73		760.78	549.14				
309+68	548.76		770.84	549.14				
321+56	548.70		780.57	549.40				
330+71	548.55		790.55	549.92				
340+77	548.40		797.33	550.10				

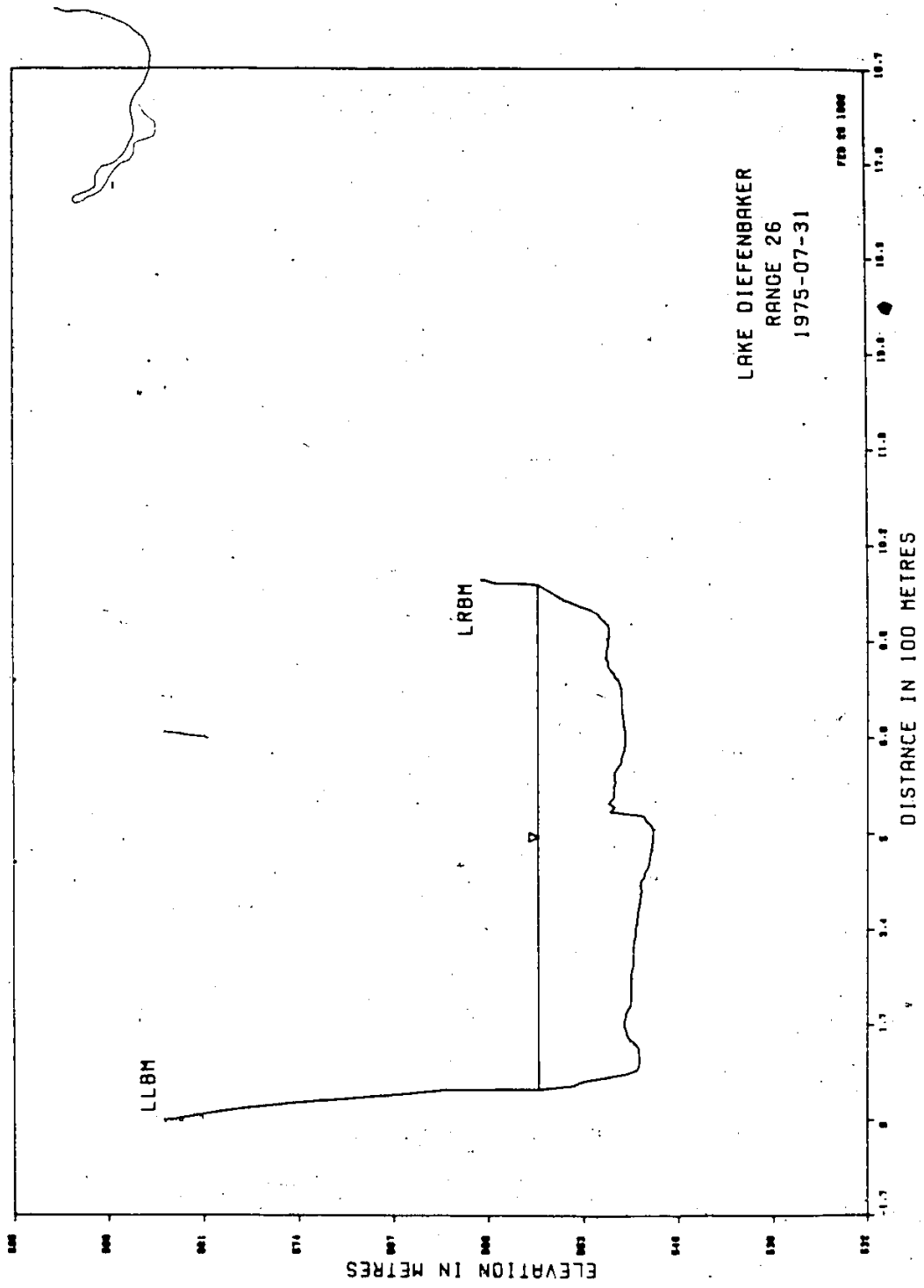
SEDIMENT SURVEY SECTION
JEC 22 1961, PAGE 1
JITAWA, UNT.

LAKE DIEPENHAKER

RANGE NO. - 25
SURVEYED IS/ 6/1972
MINIMUM ELEVATION - 505.78
ASSUMED MINIMUM JATAM - 507.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
547.50	46.2	560.00	9395.9		
548.00	92.5				
548.50	201.5				
549.00	354.1				
549.50	587.6				
550.00	885.1				
550.50	1205.2				
551.00	1554.7				
551.50	1921.7				
552.00	2406.6				
552.50	2924.1				
553.00	3243.4				
553.50	3665.4				
554.00	4090.9				
554.50	4513.0				
555.00	4952.8				
555.50	5387.0				
556.00	5827.7				
556.50	6271.9				
557.00	6715.9				
557.50	7152.1				
558.00	7507.4				
558.50	8052.9				
559.00	8495.8				
559.50	8946.4				



—A— — — — —

P-001C DATA											
1975-07-31											
STA	ELEV	4465	STA	CLIP	4465	STA	ELEV	RMS	STA	ELEV	RMS
0.00	551.91	134.05	557.10	705.00	550.00						
0.00	551.77	145.00	557.05	715.00	550.05						
7.50	551.66	151.00	557.03	725.00	550.10						
15.00	550.68	161.00	556.73	755.00	550.15						
21.30	552.85	167.00	556.97	767.00	550.20						
21.40	552.68	170.00	556.80	775.00	550.10						
32.00	552.61	141.00	556.80	779.00	550.15						
35.10	552.06	147.00	556.75	767.00	550.05						
36.10	550.61	140.00	556.70	763.00	550.75						
42.70	555.72	147.00	556.05	794.00	550.95						
47.20	556.11	115.00	556.73	796.00	551.15						
51.40	553.95	123.00	556.70	813.00	551.15						
54.00	553.72	131.00	556.65	827.00	551.10						
55.20	555.26	139.00	556.60	825.00	551.00						
61.00	553.75	147.00	556.60	835.00	551.75						
66.00	553.15	151.00	556.10	852.00	551.15						
77.00	551.20	151.00	556.05	851.00	551.15						
83.00	549.80	157.00	557.53	859.00	551.05						
89.00	549.05	167.00	557.49	871.00	551.10						
97.00	548.90	172.00	557.49	874.00	551.15						
105.00	548.85	177.00	557.43	885.00	551.80						
113.00	548.90	181.00	557.43	893.00	551.75						
120.00	548.90	178.00	557.43	905.00	551.85						
128.00	549.45	175.00	557.35	905.00	552.85						
136.00	549.70	173.00	557.35	912.00	553.25						
144.00	549.60	181.00	557.30	915.00	553.25						
151.00	549.60	181.00	557.30	921.00	553.25						
159.00	549.85	186.00	556.99	921.00	552.80						
167.00	550.00	194.00	557.10	921.00	552.80						
175.00	550.00	197.00	556.73	920.70	552.60						
181.00	549.70	175.00	557.17	925.20	552.81						
189.00	549.85	181.00	557.17	925.00	552.67						
197.00	549.70	190.00	556.99	925.10	552.63						
204.00	549.50	197.00	556.73	925.00	552.63						
212.00	549.50	195.00	556.73	925.00	552.63						
220.00	549.85	195.00	556.73	925.00	552.63						
228.00	549.85	195.00	556.73	925.00	552.63						
236.00	549.45	195.00	556.73	925.00	552.63						
243.00	549.45	195.00	556.73	925.00	552.63						
258.00	549.45	195.00	556.73	925.00	552.63						
266.00	549.40	195.00	556.73	925.00	552.63						
274.00	549.40	195.00	556.73	925.00	552.63						
306.00	549.25	195.00	556.73	925.00	552.63						
315.00	549.25	195.00	556.73	925.00	552.63						
324.00	549.15	195.00	556.73	925.00	552.63						
329.00	549.10	195.00	556.73	925.00	552.63						

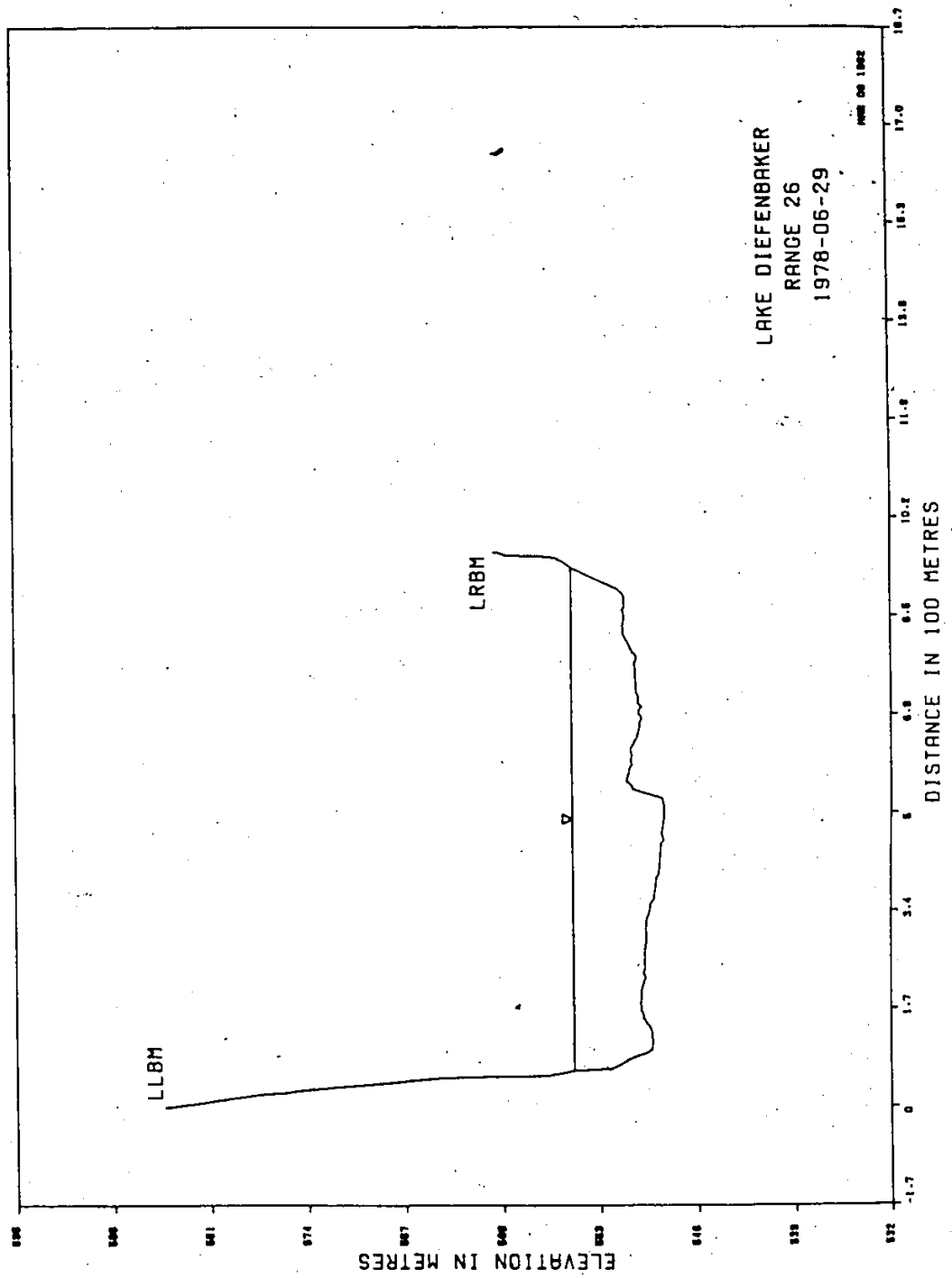
SEDIMENT SURVEY SECTION
MAR 4 1982, PAGE 1
OTTAWA, ONT.

LAKE OLEMBANE

RANGE NO. - 26
SURVEYED 31/ 7/1975
MINIMUM ELEVATION = 547.80
ASSUMED MINIMUM DATUM = 548.00

ELEVATION - AREA TABLE

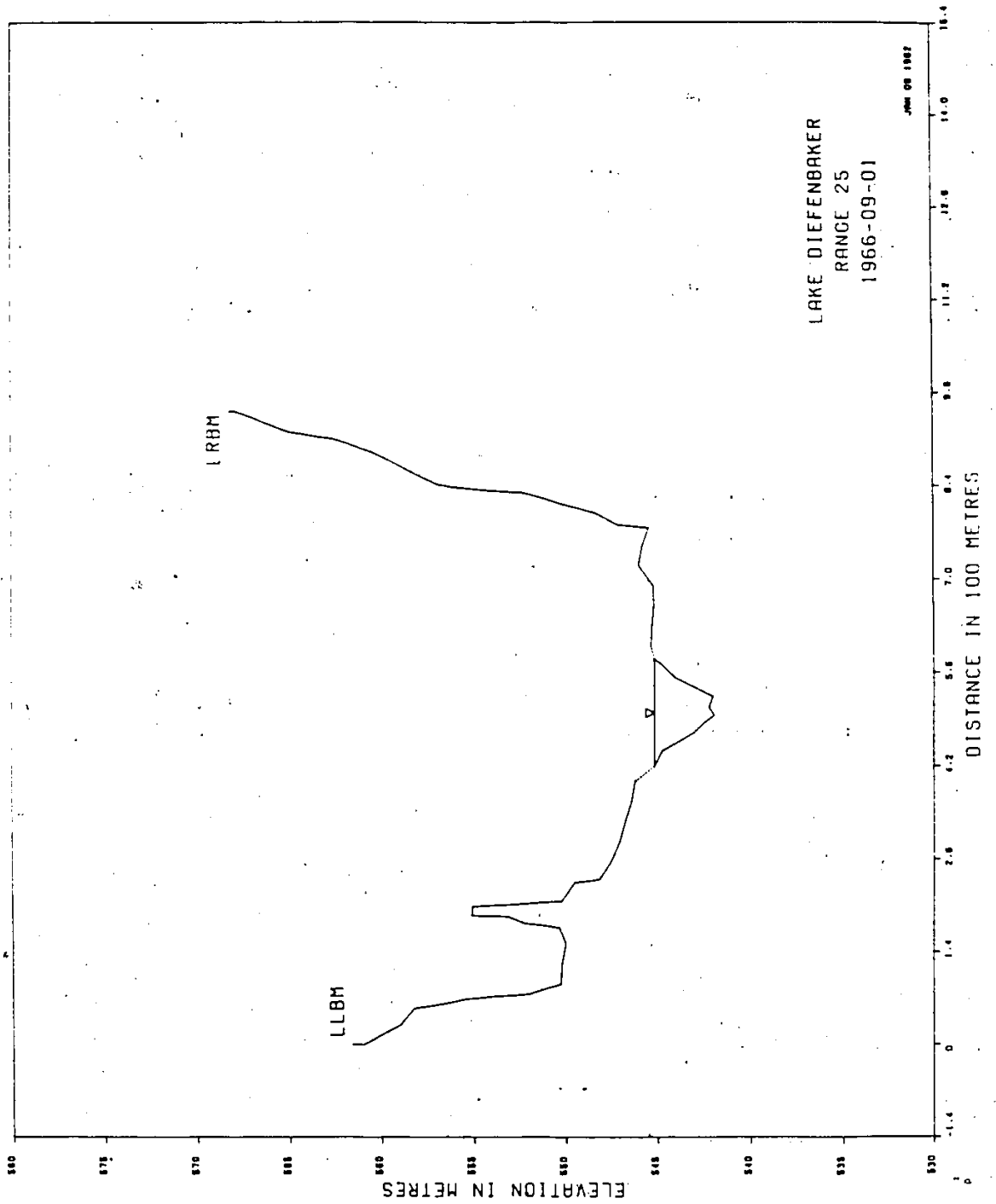
ELEVATION (M.)	ACC. AREA (SU M.)	ELEVATION (M.)	ACC. AREA (SU M.)	ELEVATION (M.)	ACC. AREA (SU M.)
548.00	6.6				
548.50	48.6				
549.00	124.1				
549.50	271.7				
550.00	486.6				
550.50	781.2				
551.00	1119.4				
551.50	1509.1				
552.00	1918.8				
552.50	2334.4				
553.00	2753.6				
553.50	3176.4				
554.00	3604.2				
554.50	4035.2				
555.00	4470.2				
555.50	4909.4				
556.00	5352.9				
556.50	5800.1				
557.00	6248.2				
557.50	6696.7				
558.00	7145.4				
558.50	7594.1				
559.00	8042.9				
559.50	8492.0				
560.00	8942.4				



RANGE NO. - 26
 SURVEYED 2/7 6/1978
 MINIMUM ELEVATION - 548.20
 ASSUMED MINIMUM DATUM - 548.50

SEDIMENT SURVEY OF THE
 ASH POND, POND
 OTTAWA, ONT.

ELEVATION (M)	AREA (SQ M)	PERCENTAGE (%)	AREA (SQ M)	ELEVATION (M)	AREA (SQ M)	ELEVATION (M)	AREA (SQ M)
548.50	11.0						
549.00	18.1						
549.50	17.7						
550.00	11.2						
550.50	9.1						
551.00	9.1						
551.50	13.0						
552.00	17.6						
552.50	21.7						
553.00	25.9						
553.50	30.2						
554.00	34.4						
554.50	38.7						
555.00	43.0						
555.50	47.3						
556.00	51.6						
556.50	55.9						
557.00	60.2						
557.50	64.5						
558.00	68.8						
558.50	73.1						
559.00	77.4						
559.50	81.7						
560.00	86.0						



PROFILE DATA

RANGE NO 25 SURVIV DATE 1966-03-01

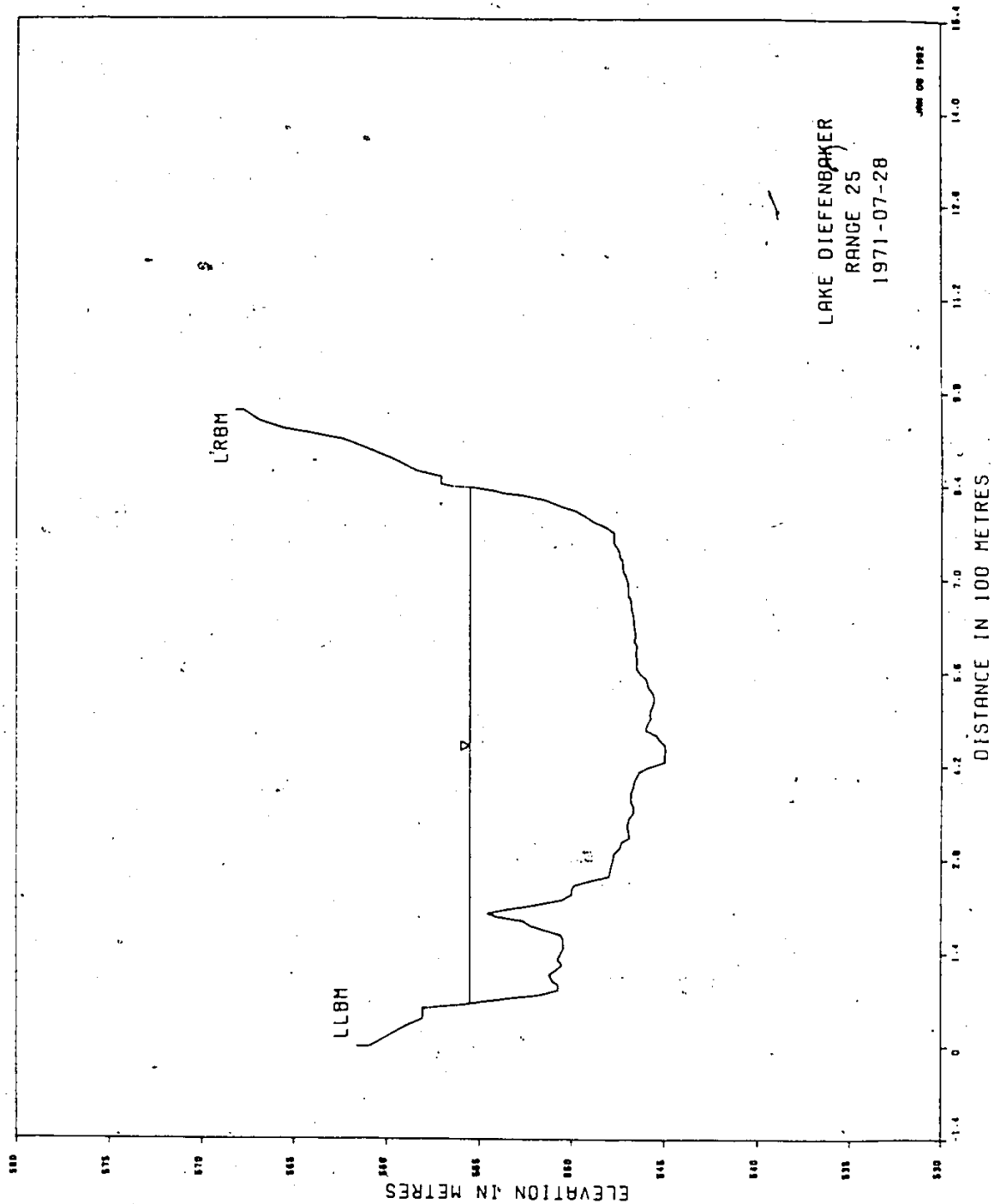
[illegible]

RANGE NO. - 25
 SURVEYED - 1/ 9/1965
 MINIMUM ELEVATION - 541.87
 ASSUMED MINIMUM DATUM - 542.50

LAKE DUFFENBARGER
 ELEVATION - AREA TABLE

SEDIMENT SURVEY SECTION
 DEC 27 1981, PAGE 1
 UTIARA, UMT.

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
542.50	19.5	555.00	6191.7		
543.00	49.1	555.50	6574.3		
543.50	87.3	556.00	6959.5		
544.00	133.0	556.50	7347.1		
544.50	187.8	557.00	7737.4		
545.00	255.4	557.50	8131.5		
545.50	372.8	558.00	8530.0		
546.00	539.9	558.50	8934.0		
546.50	737.6	559.00	9349.2		
547.00	961.7	559.50	9773.6		
547.50	1208.0	560.00	10205.3		
548.00	1471.1	560.50	10644.4		
548.50	1745.5	561.00	11089.9		
549.00	2023.4	561.50	11539.3		
549.50	2304.0				
550.00	2571.9				
550.50	2917.2				
551.00	3265.7				
551.50	3617.6				
552.00	3774.9				
552.50	4337.0				
553.00	4703.3				
553.50	5073.0				
554.00	5444.1				
554.50	5815.9				



LAKE OJEEBENACEE

PROFILE DATA

RANGE NO 25		SURVEY DATE 1971-07-20		STA		ELEV		RMS		STA		ELEV		RMS	
STA	ELEV	RMS	STA	ELEV	RMS	STA	ELEV	RMS	STA	ELEV	RMS	STA	ELEV	RMS	STA
0+00	561.57	LL94	318+82	546.93		644+05	546.66								
0+00	560.86		325+83	546.43		654+71	546.75								
10+48	559.00		327+50	546.73		664+77	546.70								
42+06	558.06		331+76	546.91		670+86	546.81								
57+30	558.03		341+68	546.87		674+83	546.71								
64+00	555.50	WL	343+91	546.83		681+94	545.93								
64+62	555.50		353+87	546.83		685+30	545.93								
68+88	554.40		358+75	546.83		684+35	546.93								
69+80	554.07		360+67	546.78		695+86	546.96								
73+76	553.03		376+73	546.75		703+78	547.06								
77+72	551.66		378+87	546.78		712+62	547.21								
84+73	550.71		386+79	546.65		721+77	547.24								
92+66	550.71		394+72	546.60		727+86	547.24								
98+76	551.05		401+73	546.51		731+82	547.36								
107+90	551.20		403+86	546.45		741+88	547.42								
115+82	550.77		410+87	546.32		753+77	547.70								
122+83	550.50		417+86	545.84		761+70	547.70								
130+76	550.74		425+81	544.95		769+94	547.70								
136+88	550.62		433+73	544.95		771+75	547.85								
145+49	550.44		442+87	544.92		777+85	546.15								
153+92	550.44		450+85	544.95		786+69	546.86								
160+63	550.44		458+72	545.23		793+70	549.25								
167+64	550.59		465+73	545.41		801+62	549.74								
175+87	551.60		473+66	545.94		808+53	550.56								
181+66	552.24		481+57	545.70		817+78	551.41								
188+67	552.63		491+64	545.71		824+79	552.54								
194+77	554.10		496+92	545.77		828+75	553.74								
199+64	554.55		503+43	545.71		831+60	554.14								
205+74	553.43		513+83	545.56		837+00	555.50								
212+75	551.93		521+82	545.53		847+27	555.50								
219+76	550.50		528+93	545.62		858+54	556.56								
227+69	549.98		536+89	545.07		862+16	557.08								
234+70	549.98		549+86	545.96		872+83	557.05								
241+71	549.63		557+79	546.27		881+67	558.42								
247+80	549.07		565+71	546.44		894+43	559.54								
254+81	547.97		574+85	546.44		904+71	562.30								
261+52	547.91		582+78	546.43		924+15	565.53								
269+75	547.85		597+65	546.54		936+15	566.90								
277+67	547.76		599+79	546.51		951+59	567.72								
284+68	547.70		599+85	546.45		951+59	567.72								
288+65	547.70		606+95	546.43		951+59	567.72								
292+91	547.51		611+87	546.51											
298+70	547.33		616+32	546.54											
305+71	547.27		623+75	546.63											
312+72	546.84		633+95	546.63											

LABM

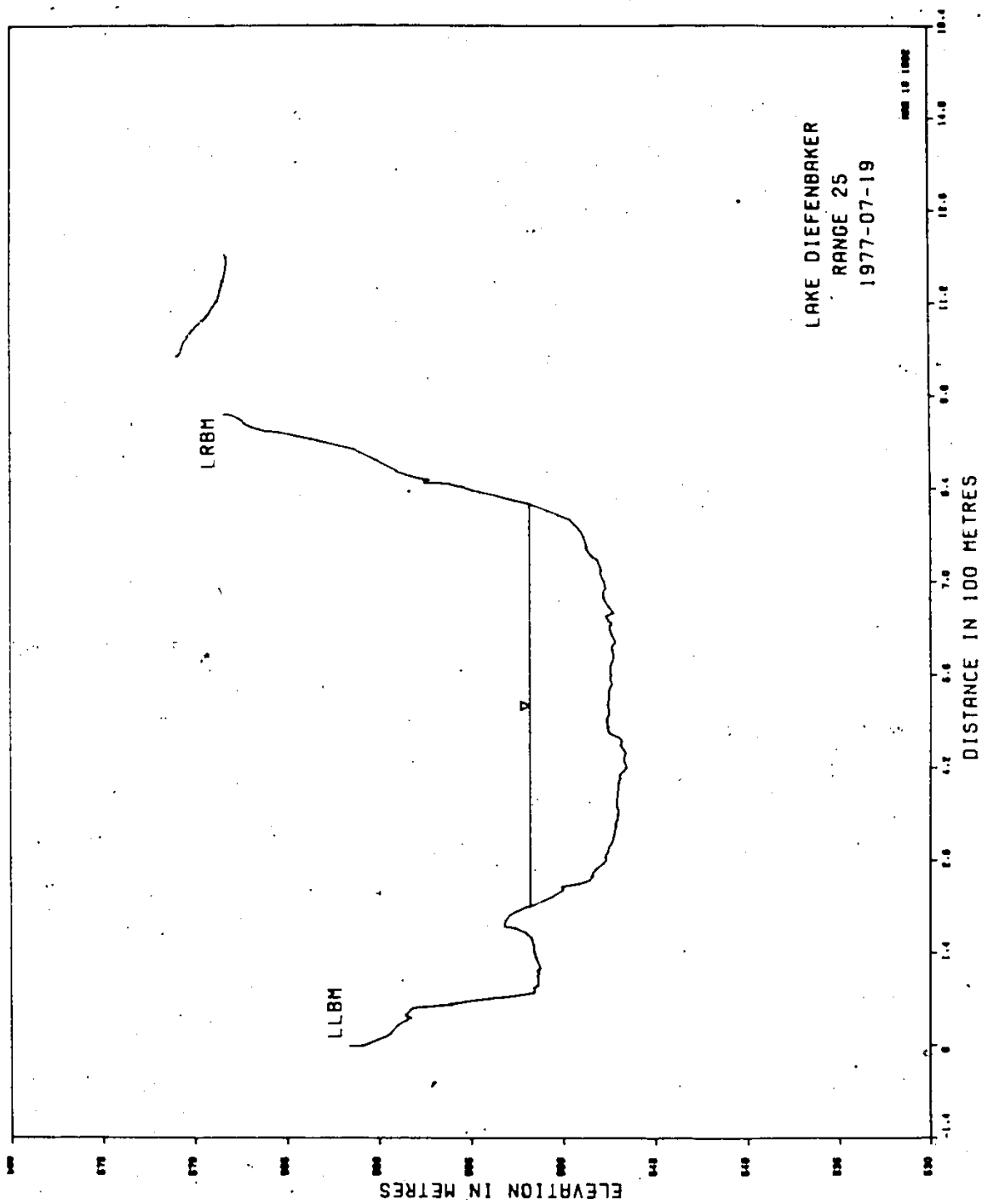
SEDIMENT SURVEY SECTION
DEC 22 1961, PAGE 1
OTTAWA, ONT.

LAKE DUFFIN

RANGE NO. - 25
SURVEYED 28/ 7/1971
MINIMUM ELEVATION = 546.92
ASSUMED MINIMUM DATA = 545.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
545.50	12.9	556.50	7711.6		
546.00	67.1	556.50	8121.6		
546.50	137.3	559.00	8337.8		
547.00	286.6	559.50	8961.4		
547.50	496.3	560.00	9392.4		
548.00	719.2	560.50	9830.3		
548.50	1002.1	561.00	10274.8		
549.00	1259.8	561.50	10723.2		
549.50	1563.4				
550.00	1821.6				
550.50	2115.9				
551.00	2438.8				
551.50	2783.3				
552.00	3136.3				
552.50	3495.4				
553.00	3863.8				
553.50	4230.2				
554.00	4603.8				
554.50	4982.7				
555.00	5365.0				
555.50	5751.3				
556.00	6138.2				
556.50	6525.0				
557.00	6915.4				
557.50	7312.0				



WATER SURVEY OF CANADA
MAR 10 1982 PAGE 1
OTTAWA, ONT.

LAKE DIEPENHAKER

PROFILE DATA

STA		ELEV	RMKS	STA	ELEV	RMKS	STA	ELEV	RMKS	STA	ELEV	RMKS
0+00		561.57	LLBM	250+00	548.55		540+00	547.50		848+00	557.46	
0+00		560.88		255+00	548.50		545+00	547.30		851+00	557.46	
3+10		560.60		260+00	548.40		550+00	547.40		851+00	557.19	
15+20		559.57		267+00	548.20		555+00	547.35		855+00	557.71	
18+30		559.42		275+00	547.80		560+00	547.40		861+00	558.50	
30+50		559.02		280+00	547.65		565+00	547.25		865+00	558.99	
40+50		558.41		286+00	547.70		570+00	547.25		867+00	558.99	
42+10		558.26		292+00	547.55		575+00	547.20		868+00	560.14	
45+70		558.59		299+00	547.50		580+00	547.30		869+00	561.30	
56+40		558.20		305+00	547.35		585+00	547.30		872+00	563.25	
57+90		557.86		311+00	547.25		590+00	547.10		875+00	563.53	
59+40		557.13		318+00	547.20		595+00	547.40		875+00	563.39	
61+00		556.70		330+00	547.10		600+00	547.45		875+00	563.06	
61+90		556.03		337+00	547.10		605+00	547.50		875+00	563.06	
62+00		556.25		342+00	547.00		610+00	547.50		875+00	563.18	
64+30		555.83		348+00	547.00		615+00	547.50		875+00	563.18	
66+10		555.42		355+00	546.95		620+00	547.50		875+00	563.18	
67+10		555.29		361+00	547.05		625+00	547.50		875+00	563.18	
71+00		553.98		369+00	547.05		630+00	547.50		875+00	563.18	
75+90		552.46		380+00	547.00		635+00	547.50		875+00	563.18	
79+90		551.57		393+00	546.95		640+00	547.50		875+00	563.18	
83+50		551.54		398+00	546.95		645+00	547.50		875+00	563.18	
87+20		551.60		403+00	546.85		650+00	547.50		875+00	563.18	
90+80		551.36		409+00	546.94		655+00	547.50		875+00	563.18	
106+10		551.39		415+00	546.65		660+00	547.50		875+00	563.18	
109+70		551.30		421+00	546.50		665+00	547.50		875+00	563.18	
113+40		551.42		430+00	546.65		670+00	547.50		875+00	563.18	
117+00		551.24		436+00	546.55		675+00	547.50		875+00	563.18	
132+90		551.48		442+00	546.55		680+00	547.50		875+00	563.18	
140+20		551.57		448+00	546.70		685+00	547.50		875+00	563.18	
151+20		551.60		454+00	546.95		690+00	547.50		875+00	563.18	
163+90		551.73		460+00	546.75		695+00	547.50		875+00	563.18	
170+70		552.03		465+00	546.90		700+00	547.50		875+00	563.18	
177+70		552.50		472+00	547.45		705+00	547.50		875+00	563.18	
180+40		553.18		477+00	547.55		710+00	547.50		875+00	563.18	
187+50		553.13		482+00	547.50		715+00	547.50		875+00	563.18	
197+50		552.88		488+00	547.60		720+00	547.50		875+00	563.18	
201+20		552.64		493+00	547.60		725+00	547.50		875+00	563.18	
204+60		552.31		498+00	547.50		730+00	547.50		875+00	563.18	
209+70		551.97		503+00	547.45		735+00	547.50		875+00	563.18	
210+30		551.75		509+00	547.50		740+00	547.50		875+00	563.18	
225+00		550.55		515+00	547.55		745+00	547.50		875+00	563.18	
235+00		550.00		520+00	547.50		750+00	547.50		875+00	563.18	
240+00		550.05		526+00	547.45		755+00	547.50		875+00	563.18	
245+00		549.10		534+00	547.50		760+00	547.50		875+00	563.18	

LLBM

ML

ML

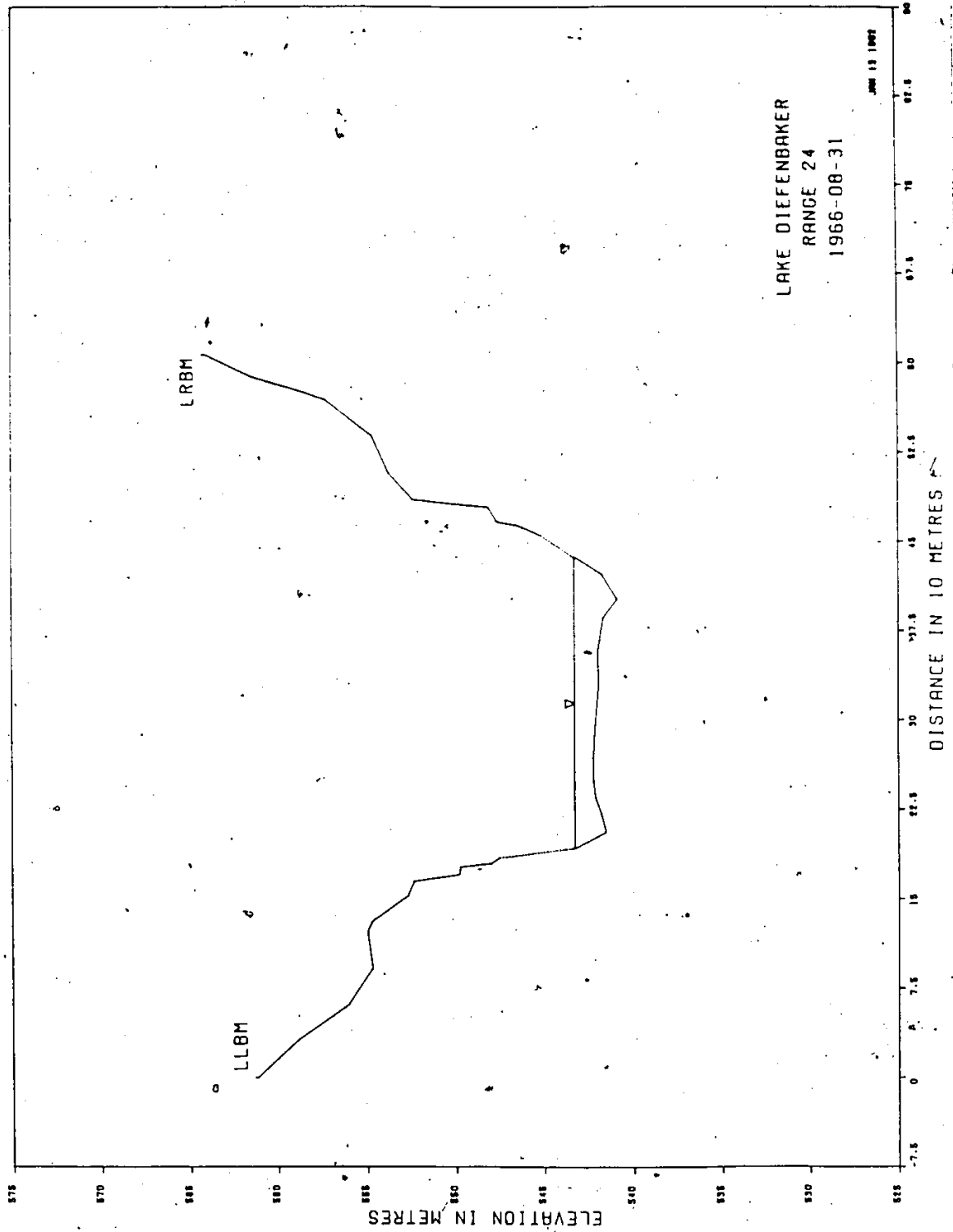
SEDIMENT SURVEY SECTION
MAR 10 1982, PAGE 1
UTTAWA, ONT.

LAKE DUFFENBARK

RANGE NO. - 25
SURVEYED IN/ 7/1977
MINIMUM ELEVATION = 546.50
ASSURED MINIMUM DATUM = 547.00

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
547.00	20.0	559.50	8421.4		
547.50	117.7	560.00	8854.0		
548.00	320.6	560.50	9293.1		
548.50	556.2	561.00	9738.2		
549.00	811.2	561.50	10187.4		
549.50	1081.1				
550.00	1358.0				
550.50	1643.2				
551.00	1935.1				
551.50	2238.9				
552.00	2581.3				
552.50	2937.1				
553.00	3301.3				
553.50	3676.8				
554.00	4056.3				
554.50	4434.2				
555.00	4822.5				
555.50	5209.7				
556.00	5599.7				
556.50	5992.5				
557.00	6386.3				
557.50	6781.6				
558.00	7180.4				
558.50	7581.6				
559.00	7997.7				



WATER SURVEY OF CANADA
JAN 13 1962 PAGE 1
OTTAWA, ONT.

LAKE DIFFERENTIAL

PROJECT DATA

CANAL NO 24 SURVEY DATE 1960-09-31

STA	ELEV	RMS	STA	ELEV	RMS	STA	ELEV	RMS
0.00	561.29	LLHM						
0.00	561.14							
30.48	558.94							
60.96	555.02							
91.44	554.68							
121.92	554.95							
131.06	554.68							
152.40	552.65							
164.59	552.33							
170.69	549.77							
176.78	549.71							
179.83	547.94							
184.40	547.31							
192.00	543.25	ML						
192.33	543.25							
205.74	541.48							
220.98	541.75							
235.00	542.09							
249.34	542.21							
267.61	542.21							
290.78	542.12							
329.18	541.90							
356.01	541.76							
385.57	541.63							
403.81	540.84							
422.15	541.72							
436.00	543.25	ML						
436.74	543.25							
453.85	545.04							
462.99	545.41							
466.04	547.50							
478.23	548.12							
481.28	550.29							
484.33	552.35							
507.19	553.73							
537.67	554.64							
568.15	557.27							
575.77	558.77							
587.96	561.47							
606.25	564.00							
606.25	564.22	L444						

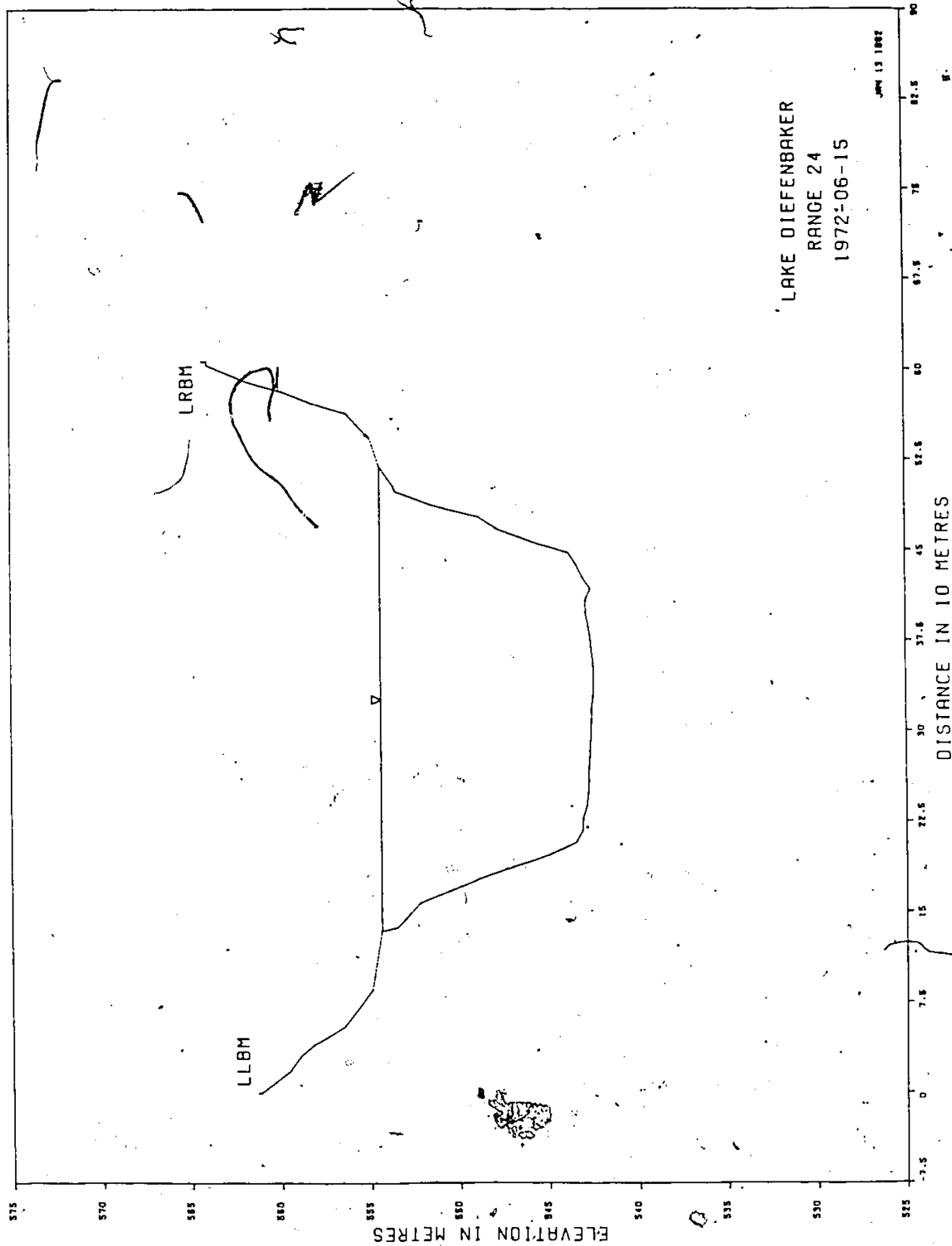
SEDIMENT SURVEY SECTION
DEC 22 1981, PAGE 1
UTTAWA, ONT.

LAKE DIEFFENBAKER

RANGE NO. = 24
SURVEYED 31/ 8/1968
MINIMUM ELEVATION = 540.84
ASSUMED MINIMUM DATUM = 541.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
541.50	7.5	554.00	3523.2		
542.00	44.2	554.50	3717.6		
542.50	145.8	555.00	3929.8		
543.00	264.8	555.50	4162.9		
543.50	386.9	556.00	4404.7		
544.00	512.0	556.50	4653.6		
544.50	639.9	557.00	4908.0		
545.00	770.7	557.50	5167.8		
545.50	904.0	558.00	5431.6		
546.00	1039.4	558.50	5699.3		
546.50	1177.0	559.00	5970.8		
547.00	1315.0	559.50	6246.7		
547.50	1455.1	560.00	6527.1		
548.00	1600.0	560.50	6812.1		
548.50	1749.4	561.00	7101.8		
549.00	1899.8				
549.50	2050.9				
550.00	2204.4				
550.50	2360.2				
551.00	2517.0				
551.50	2674.8				
552.00	2833.5				
552.50	2993.8				
553.00	3162.9				
553.50	3339.3				



WATER SUPPLY OF CANADA
JAN 13 1972 PAGE 1
OTTAWA, ONT.

LAKE JILK-MACKER

PROJ. ILL. DATA

SURVEY DATE 1972-JUN-15

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

0.00 501.23 LLHM 479.35 553.46

0.00 501.11 502.31 553.34

18.29 559.72 518.00 554.34 AL

30.48 559.91 518.77 554.34

34.62 550.21 541.32 554.45

54.86 550.44 502.66 556.17

85.34 552.87 571.83 559.21

134.00 554.34 ML 580.75 559.77

134.11 554.34 590.73 562.02

137.16 553.43 601.34 563.94

147.22 552.79 606.23 563.21

157.28 552.16 505.23 564.22 LHM

167.34 550.50

177.39 549.85

187.15 549.39

197.21 544.97

207.26 543.86

217.32 541.09

227.38 543.05

237.44 542.45

245.41 542.76

257.25 542.73

267.31 542.73

277.37 542.67

287.43 542.64

296.27 542.60

307.24 542.57

317.30 542.57

327.36 542.46

336.19 542.45

348.39 542.45

357.23 542.45

357.29 542.57

377.14 542.64

386.18 542.73

397.15 542.83

408.43 542.95

417.27 542.50

426.42 543.03

437.39 543.60

447.45 543.42

455.24 543.81

467.75 547.77

477.32 545.69

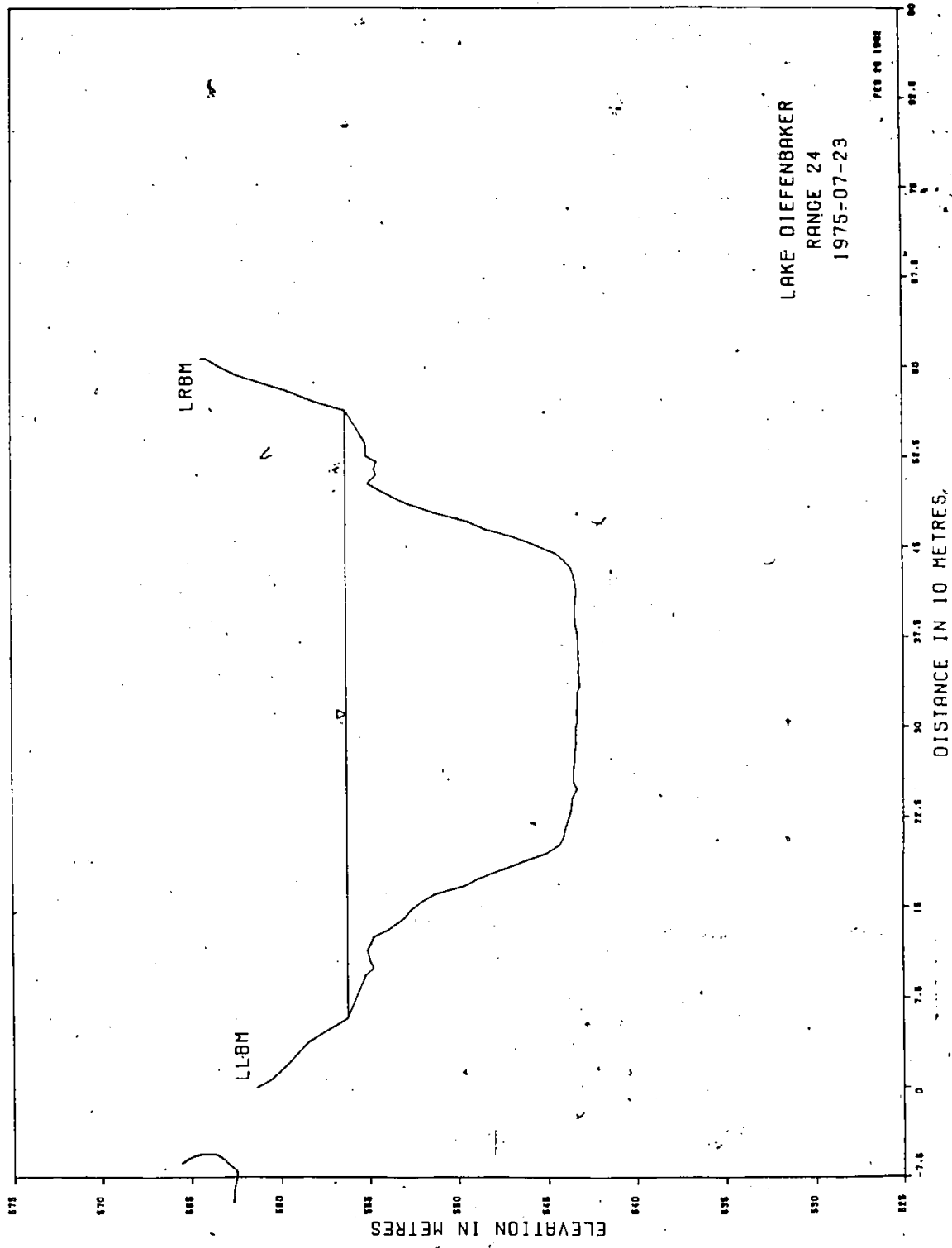
487.35 551.57

SEDIMENT SURVEY SECTION
DEC 22 1981, PAGE 1
OTTAWA, ONT.

LAKE OIEFFENBACHER

RANGE NO. = 24
SURVEYED 15/ 6/1972
MINIMUM ELEVATION = 542.45
ASSUMED MINIMUM DATUM = 543.50

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
543.50	175.4	556.00	4195.8		
544.00	295.4	556.50	4447.8		
544.50	419.2	557.00	4704.4		
545.00	545.9	557.50	4964.2		
545.50	675.0	558.00	5227.2		
546.00	806.5	558.50	5493.8		
546.50	943.6	559.00	5765.0		
547.00	1077.2	559.50	6042.1		
547.50	1216.4	560.00	6324.7		
548.00	1358.4	560.50	6611.3		
548.50	1504.0	561.00	6901.8		
549.00	1653.1				
549.50	1805.0				
550.00	1959.4				
550.50	2116.2				
551.00	2275.5				
551.50	2437.2				
552.00	2601.5				
552.50	2769.3				
553.00	2942.5				
553.50	3121.1				
554.00	3305.0				
554.50	3498.6				
555.00	3717.4				
555.50	3952.1				



WATER SURVEY OF CANAL
 FEB 26 1962 PAGE 1
 OTTAWA, ONT.

CANAL NO. 28

PROFILE DATA

SURVEY DATE 1975-07-23

STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS
0+00	561.13	LLHM	3+72	561.14				
0+00	561.31		3+90	561.14				
7+60	560.44		3+50	561.28				
22+90	559.38		3+10	561.14				
38+10	558.80		3+70	561.28				
50+30	557.06		3+20	561.28				
53+30	556.72		3+00	561.28				
58+00	556.20	ML	3+80	561.39				
93+00	555.19		3+40	561.39				
99+00	554.74		3+10	561.48				
105+00	554.24		3+80	561.48				
118+00	553.09		4+00	561.39				
119+00	552.59		4+10	561.34				
125+00	554.74		4+80	561.39				
131+00	553.89		4+20	561.47				
136+00	553.44		4+32	561.68				
141+00	552.99		4+80	561.99				
148+00	552.59		4+40	561.44				
155+00	551.99		4+71	561.59				
161+00	551.29		4+84	561.70				
166+00	549.64		4+80	561.34				
174+00	548.99		4+71	561.39				
182+00	547.39		4+80	561.24				
189+00	546.24		4+95	561.04				
195+00	545.04		4+71	561.59				
202+00	544.29		4+97	561.34				
208+00	544.09		5+02	561.98				
215+00	543.79		5+07	561.81				
222+00	543.94		5+18	561.59				
229+00	543.69		5+20	561.44				
235+00	543.68		5+25	561.04				
241+00	543.59		5+30	561.04				
248+00	543.34		5+36	561.04				
254+00	543.54		5+41	561.29				
261+00	543.54		5+41	561.29	ML			
268+00	543.49		5+47	561.70				
275+00	543.44		5+71	561.19				
285+00	543.19		5+79	561.10				
293+00	543.39		5+86	561.09				
299+00	543.19		5+92	561.31				
305+00	543.29		6+00	561.49				
312+00	543.78		6+06	561.70	LRM			
318+00	543.29							
328+00	541.29							

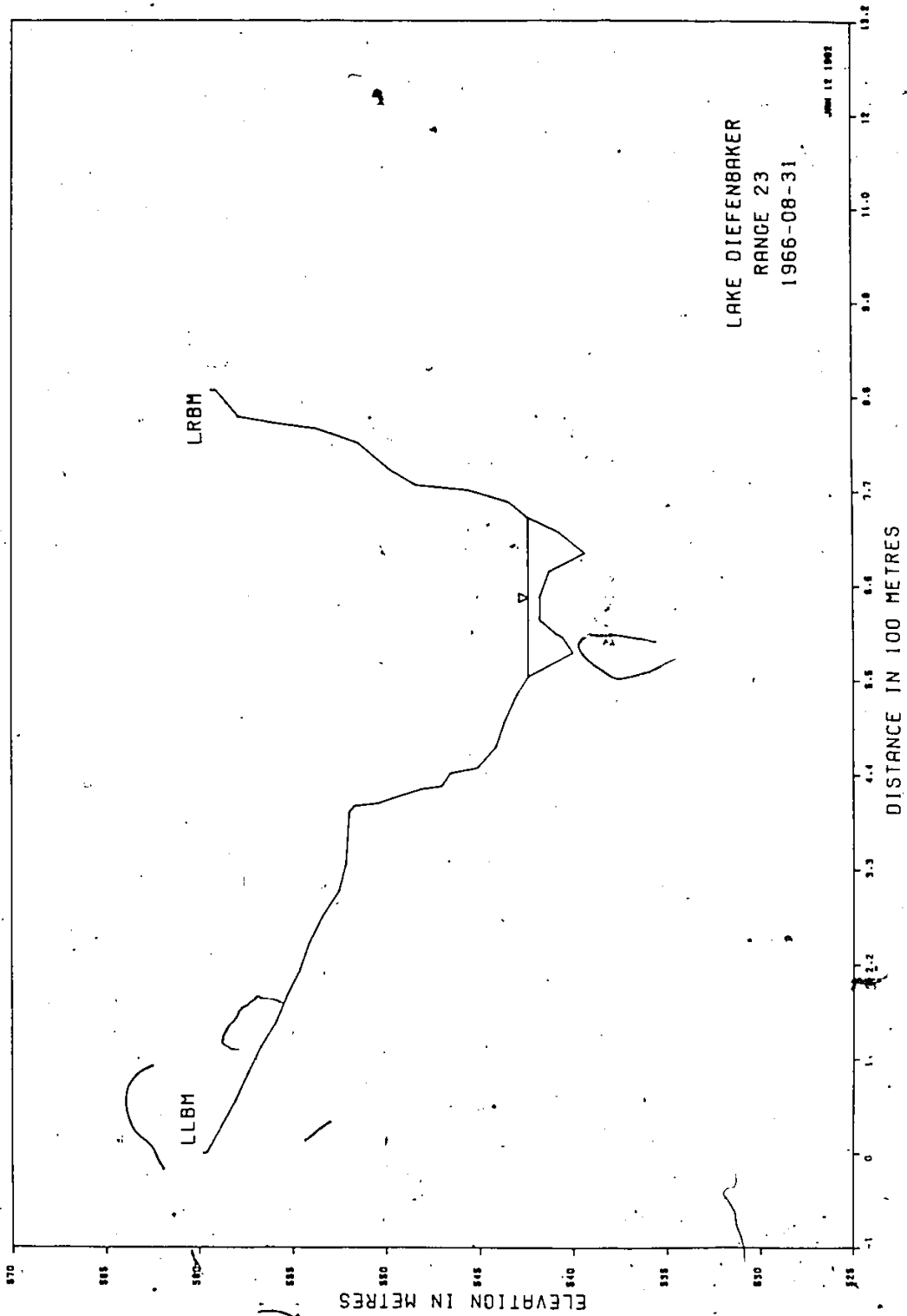
SEDIMENT SURVEY SECTION
MAR 4 1982, PAGE 1
OTTAWA, ONT.

LAKE OLFENBAKES

RANGE NO. - 24
SURVEYED 23/ 7/1975
MINIMUM ELEVATION = 543.14
ASSURED MINIMUM DATUM = 543.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
543.50	27.3	556.00	3937.0		
544.00	129.5	556.50	4188.9		
544.50	248.0	557.00	4444.9		
545.00	372.1	557.50	4704.2		
545.50	499.6	558.00	4967.0		
546.00	629.9	558.50	5233.2		
546.50	762.8	559.00	5504.3		
547.00	898.7	559.50	5780.9		
547.50	1037.2	560.00	6062.3		
548.00	1178.0	560.50	6348.6		
548.50	1321.2	561.00	6638.7		
549.00	1467.2				
549.50	1616.6				
550.00	1769.0				
550.50	1923.4				
551.00	2079.9				
551.50	2238.4				
552.00	2400.2				
552.50	2565.7				
553.00	2736.0				
553.50	2911.4				
554.00	3091.2				
554.50	3275.0				
555.00	3471.6				
555.50	3697.7				



WATER SURVEY OF CANADA
JAN 12 1962 PAGE 1
OTTAWA, ONT.

LAKE JEFFERSON

PROFILE DATA

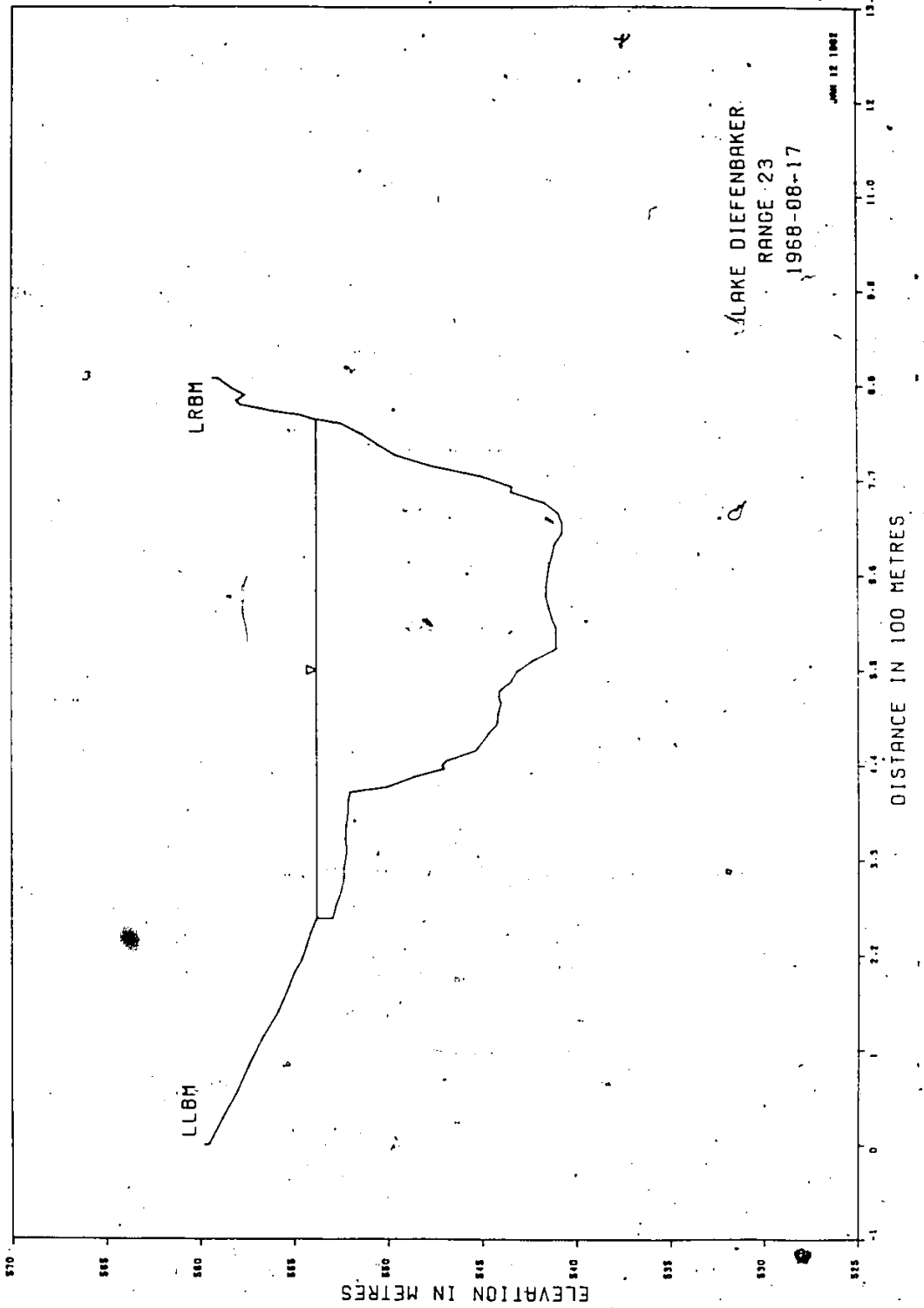
RANGE NO 23 SURVEY DATE 1966-09-31

STA	ELEV	RMS	STA	ELEV	RMS	STA	ELEV	RMS
0+00	559.77	LLRM	8+88	559.03	LRM			
0+00	559.58		8+88	559.31	LRM			
30+48	558.82							
60+96	558.03							
91+44	557.34							
121+92	556.74							
152+40	555.86							
182+88	555.24							
213+36	554.58							
243+84	554.10							
274+32	553.34							
304+80	552.48							
335+28	552.11							
365+76	552.02							
396+24	551.93							
426+72	551.66							
457+20	550.84							
487+68	549.05							
518+16	547.32							
548+64	546.54							
579+12	545.10							
609+60	544.10							
640+08	543.61							
670+56	543.61							
701+04	542.97							
731+52	542.36	HL						
762+00	542.36							
792+48	542.36							
822+96	542.36							
853+44	542.36	HL						
883+92	542.36							
914+40	542.36							
944+88	542.36							
975+36	542.36							
1005+84	542.36							
1036+32	542.36							
1066+80	542.36							
1097+28	542.36							
1127+76	542.36							
1158+24	542.36							
1188+72	542.36							
1219+20	542.36							
1249+68	542.36							
1280+16	542.36							
1310+64	542.36							
1341+12	542.36							
1371+60	542.36							
1402+08	542.36							
1432+56	542.36							
1463+04	542.36							
1493+52	542.36							
1524+00	542.36							
1554+48	542.36							
1585+96	542.36							
1615+44	542.36							
1646+00	542.36							
1676+48	542.36							
1707+00	542.36							
1737+48	542.36							
1768+00	542.36							
1798+48	542.36							
1829+00	542.36							
1859+48	542.36							
1890+00	542.36							
1920+48	542.36							
1951+00	542.36							
1981+48	542.36							
2012+00	542.36							
2042+48	542.36							
2073+00	542.36							
2103+48	542.36							
2134+00	542.36							
2164+48	542.36							
2195+00	542.36							
2225+48	542.36							
2256+00	542.36							
2286+48	542.36							
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3903+00	542.36							
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4452+00	542.36							
4482+48	542.36							
4513+00	542.36							
4543+48	542.36							
4574+00	542.36							
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4757+00	542.36							
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5245+00	542.36							
5275+48	542.36							
5306+00	542.36							
5336+48	542.36							
5367+00	542.36							
5397+48	542.36							
5428+00	542.36							

REPLY TO THE FOLLOWING

SURVEYED 31/ 8/1966
 MINIMUM ELEVATION - 532.34
 ASSUMED MINIMUM DATUM - 540.00

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
540.00	5.2	552.50	3753.9		
540.50	25.1	553.00	4023.9		
541.00	39.8	553.50	4306.1		
541.50	100.6	554.00	4596.0		
542.00	185.2	554.50	4901.1		
542.50	275.9	555.00	5220.8		
543.00	373.6	555.50	5552.2		
543.50	497.1	556.00	5897.0		
544.00	630.1	556.50	6252.7		
544.50	777.1	557.00	6618.7		
545.00	931.9	557.50	6996.9		
545.50	1092.8	558.00	7388.1		
546.00	1255.9	558.50	7795.3		
546.50	1423.7	559.00	8218.6		
547.00	1589.9				
547.50	1764.3				
548.00	1939.9				
548.50	2117.3				
549.00	2298.8				
549.50	2485.3				
550.00	2677.0				
550.50	2874.6				
551.00	3075.3				
551.50	3287.1				
552.00	3501.6				



WATER SURVEY OF CANADA
JAN 12 1992
OTTAWA, ONT.

LAKE JEFFERSON

PROFILE DATA

GAUGE NO. 23 SURVEY DATE 1980-03-17

STA ELEV CHRS STA ELEV CHRS

STA	ELEV	CHRS	STA	ELEV	CHRS
0.00	559.77	LLM	613.95	541.60	
0.00	559.55		614.18	541.60	
30.48	558.52		658.37	541.51	
60.96	558.03		670.75	541.42	
91.44	557.39		687.25	541.25	
121.92	556.72		694.94	541.14	
152.40	555.45		707.14	540.75	
182.88	555.25		719.33	540.72	
198.12	554.98		731.52	540.96	
213.36	554.58		743.71	541.66	
228.60	554.34		755.90	541.85	
243.84	554.13		762.22	541.80	
261.00	553.79	WL	774.17	542.31	
261.82	553.79		775.31	542.76	
262.13	552.94		775.53	542.58	
277.37	552.75		810.77	550.56	
292.61	552.44		822.46	551.41	
307.85	552.33		835.15	552.44	
320.04	552.33		839.20	551.77	WL
338.33	552.18		839.72	553.77	
353.57	552.24		844.63	554.64	
368.81	552.21		848.87	556.02	
384.05	552.11		852.53	556.91	
399.29	552.08		856.17	557.84	
408.43	551.79		860.15	558.03	
414.53	550.04		867.85	557.57	
428.72	548.58		876.03	558.33	
435.86	546.79		886.97	559.00	
438.91	547.12		895.77	559.31	LRM
445.01	545.90				
451.20	545.32				
475.49	544.68				
487.68	544.19				
499.87	544.13				
512.06	543.78				
518.16	544.10				
525.78	544.07				
536.45	543.46				
548.64	543.15				
560.83	542.33				
574.55	541.05				
591.31	541.04				
597.41	541.25				
609.40	541.77				
621.79	541.45				

UTYAMA, DMT.

LAKE JEFFERSON

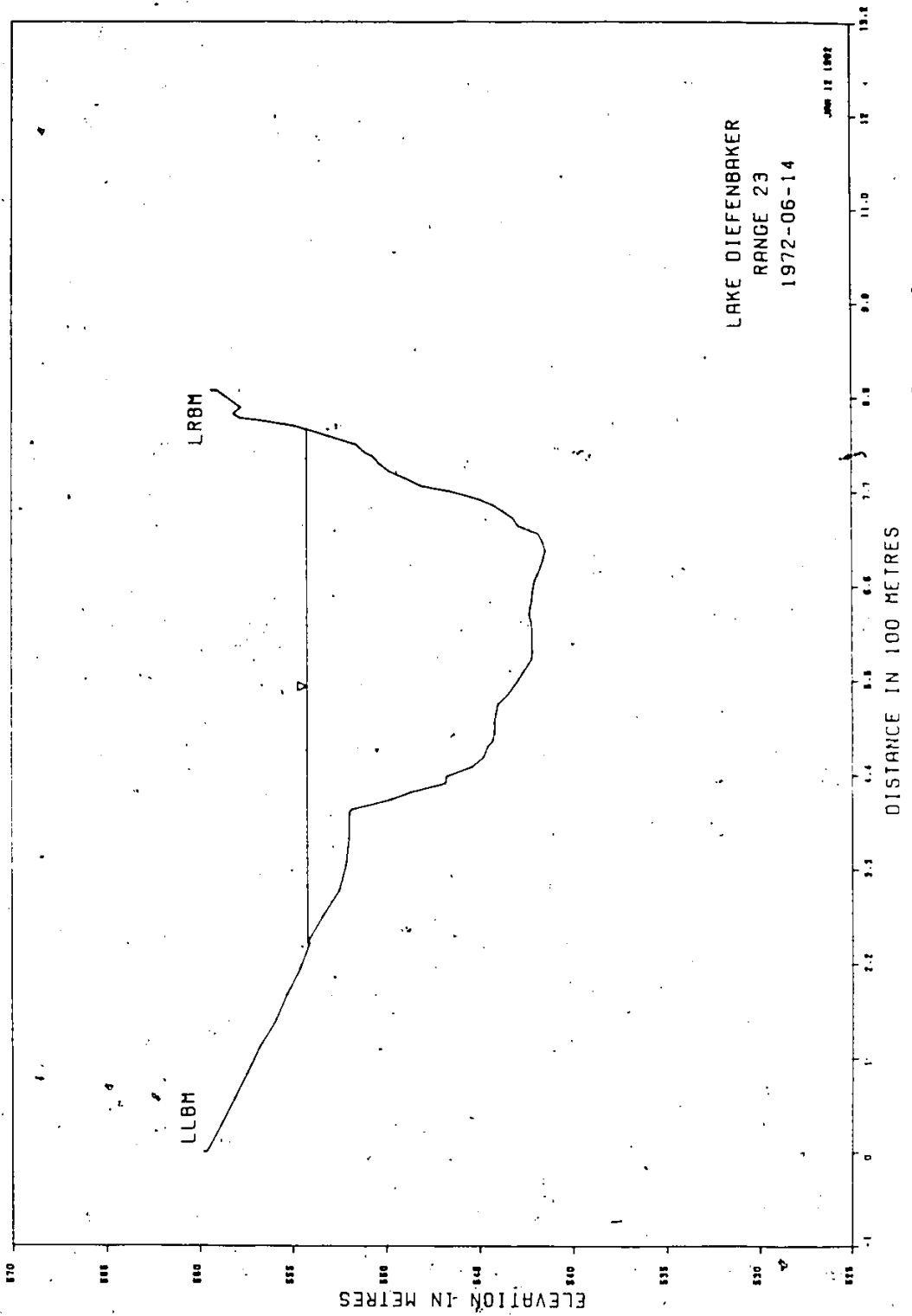
EXHIBIT 10-23

SURVEYED 17/ 0/1968

71-065 - MOBILE 3 W/BLIND
DAY/0 /17 0713400

NOTHING IS MISSING
05-145
05-045

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
541.50	47.5	554.00	4498.1		
542.00	135.8	554.50	4801.8		
542.50	228.8	555.00	5120.7		
543.00	327.1	555.50	5452.2		
543.50	432.7	556.00	5797.1		
544.00	549.4	556.50	6152.7		
544.50	667.4	557.00	6518.9		
545.00	835.9	557.50	6897.1		
545.50	994.6	558.00	7290.8		
546.00	1156.4	558.50	7702.2		
546.50	1321.2	559.00	8127.1		
547.00	1487.2				
547.50	1653.7				
548.00	1831.2				
548.50	2021.7				
549.00	2205.6				
549.50	2373.2				
550.00	2585.0				
550.50	2781.5				
551.00	2982.1				
551.50	3187.1				
552.00	3395.9				
552.50	3643.2				
553.00	3923.1				
553.50	4203.0				



WATER SURVEY OF CANADA
JAN 12 1992 PAGE 1
OTTAWA, ONT.

LAKES JEREMHACER

PROFILE DATA

RANGE 00 23 SURVEY DATE 1972-06-14

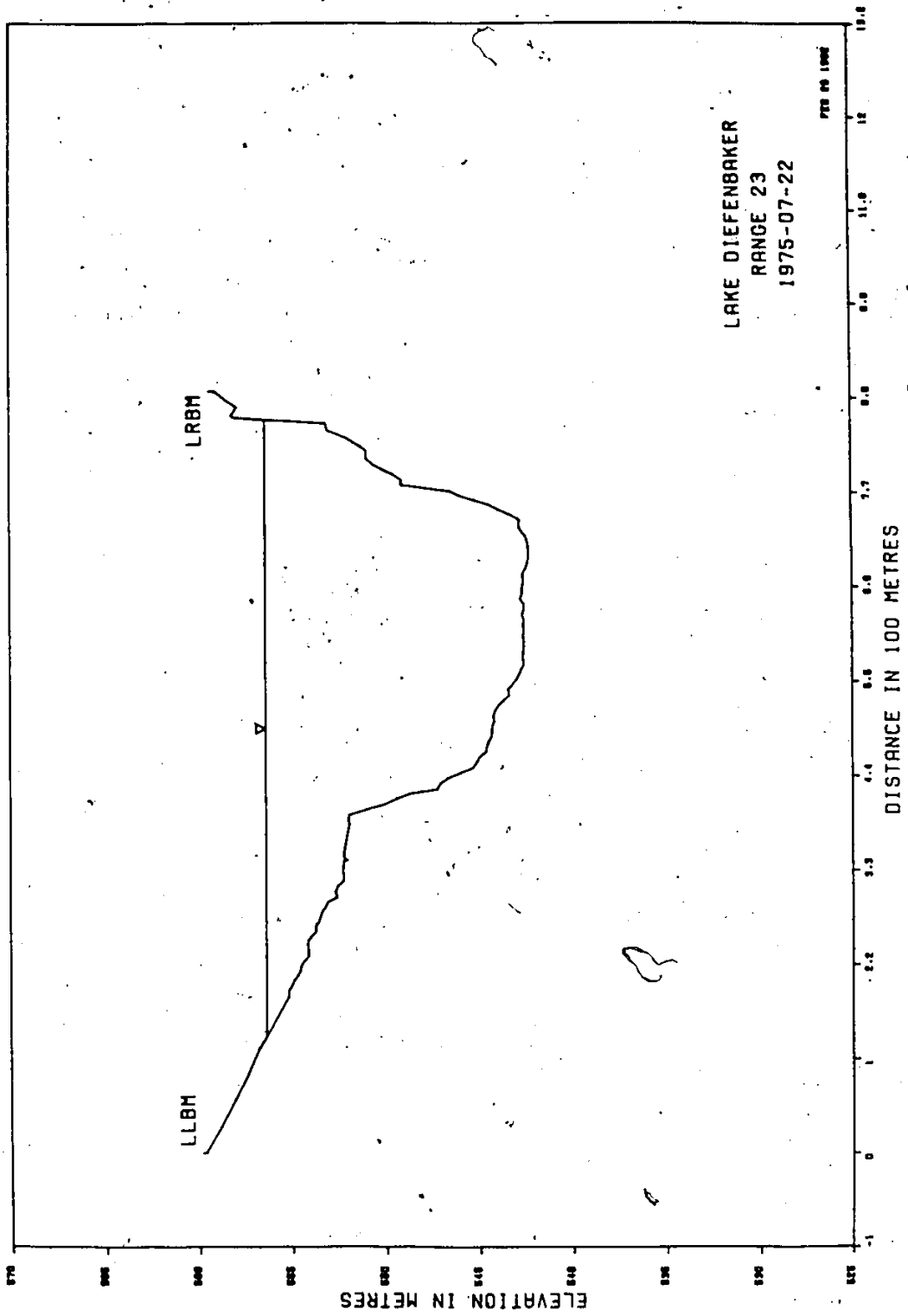
STA ELEV RMKS STA ELEV RMKS STA ELEV RMKS

0+00	559.77	LLWM	657.75	542.05	
0+00	559.58		662.63	542.00	
30+48	553.82		672.53	541.84	
60+06	558.09		680.62	541.67	
91+44	557.39		690.53	541.54	
121+92	555.75		694.42	541.42	
152+40	555.69		710.79	541.57	
182+88	554.28		720.95	541.91	
213+36	554.58		722.63	542.21	
243+84	554.07		738.84	543.19	
244+00	554.19	HL	745.55	543.64	
244.75	554.19		753.77	544.13	
274.32	553.39		760.79	544.95	
304.90	552.48		770.94	546.00	
335.28	552.11		776.53	549.09	
365.76	551.96		784.95	548.84	
396.24	551.93		793.70	547.81	
399.90	551.81		802.94	550.32	
410.37	549.77		810.77	556.66	
419.71	549.73		815.34	551.11	
430.68	549.81		821.74	551.44	
438.61	546.75		824.73	551.60	
449.98	545.35		838.20	553.51	
460+06	544.74		842.00	554.17	HL
472.74	544.53		842.87	554.13	
479.74	544.25		845.32	554.80	
488.90	544.16		847.34	555.25	
500.79	544.15		855.27	557.75	
511.76	544.07		859.58	558.09	
521.82	543.98		867.15	557.59	
533.70	543.46		886.77	558.77	
540.72	543.21		896.77	559.31	LRM
549.86	542.91				
558.70	542.54				
566.62	542.39				
574.85	542.15				
582.78	542.12				
589.79	542.15				
599.85	542.15				
607.77	542.15				
616.61	542.14				
625.75	542.10				
633.84	542.14				
642.82	542.15				
650.75	542.12				

~~LAKE OXFORD PARK~~

SURVEYED 14/ 6/1972
 MINIMUM ELEVATION = 541.42
 ASSIGNED MINIMUM DATUM = 542.00
 SHEET NO. = 23

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
542.00	13.9	554.50	4604.4				
542.50	82.7	555.00	4924.1				
543.00	167.5	555.50	5255.7				
543.50	263.2	556.00	5600.3				
544.00	379.5	556.50	5955.7				
544.50	512.1	557.00	6321.2				
545.00	660.1	557.50	6699.0				
545.50	815.4	558.00	7090.7				
546.00	974.9	558.50	7501.3				
546.50	1137.9	559.00	7926.3				
547.00	1305.9						
547.50	1478.5						
548.00	1653.5						
548.50	1831.4						
549.00	2013.4						
549.50	2199.9						
550.00	2393.9						
550.50	2587.4						
551.00	2792.2						
551.50	2997.8						
552.00	3212.6						
552.50	3444.4						
553.00	3732.8						
553.50	4011.1						
554.00	4303.2						



WATER SURVEY OF CANADA
FEB 26 1942 PASCO
ONTARIO, ONT.

LAKE ULEPCHUKER

PROFILE DATA

RANGE NO. 23 SURVEY DATE 1915-07-22

STA ELEV WPKS STA ELEV WPKS STA ELEV WPKS STA ELEV WPKS

0.00	559.78	LLBN	405.00	550.11	601.00	542.46
0.00	559.62		413.00	549.41	607.00	542.36
30.50	558.80		419.00	548.65	613.00	542.31
61.00	558.07		424.00	547.26	619.00	542.31
91.40	557.36		431.00	547.06	625.00	542.31
121.90	556.75		437.00	546.66	631.00	542.35
152.50	556.15	HL	443.00	546.01	637.00	542.46
182.00	555.16		449.00	545.31	643.00	542.66
198.00	555.16		455.00	545.11	649.00	542.81
198.00	555.01		461.00	544.96	655.00	542.81
201.00	554.86		467.00	544.61	661.00	543.31
208.00	554.71		473.00	544.55	667.00	543.76
211.00	554.56		479.00	544.46	673.00	544.41
217.00	554.51		485.00	544.31	679.00	545.16
223.00	554.36		491.00	544.26	685.00	546.06
229.00	554.11		497.00	544.26	691.00	546.51
235.00	554.11		503.00	544.16	697.00	547.11
243.00	554.16		509.00	544.21	703.00	549.11
248.00	554.11		515.00	544.11	709.00	549.56
253.00	553.91		521.00	543.91	715.00	550.06
258.00	553.71		527.00	543.66	721.00	550.61
264.00	553.71		533.00	543.16	727.00	550.96
269.00	553.56		540.00	543.41	733.00	550.96
275.00	553.46		546.00	543.21	739.00	551.26
281.00	553.36		552.00	542.96	745.00	551.66
287.00	553.16		558.00	542.41	751.00	552.01
292.00	553.06		563.00	542.71	757.00	553.01
298.00	552.56		569.00	542.56	763.00	553.11
304.00	552.66		575.00	542.61	769.00	553.11
311.00	552.51		581.00	542.61	775.00	556.36
317.00	552.71		587.00	542.56	781.00	556.00
323.00	552.21		593.00	542.56	787.00	553.13
330.00	552.26		602.00	542.61	793.00	552.85
336.00	552.21		608.00	542.56	799.00	552.47
342.00	552.16		614.00	542.61	805.00	559.01
347.00	552.21		620.00	542.56	811.00	559.52
353.00	552.16		627.00	542.06		
359.00	552.11		633.00	542.56		
365.00	552.06		639.00	542.56		
371.00	552.01		645.00	542.75		
377.00	551.96		651.00	542.66		
383.00	551.91		657.00	542.66		
389.00	551.96		663.00	542.61		
395.00	551.91		669.00	542.61		
401.00	551.01		675.00	542.61		

HL

HL

HL

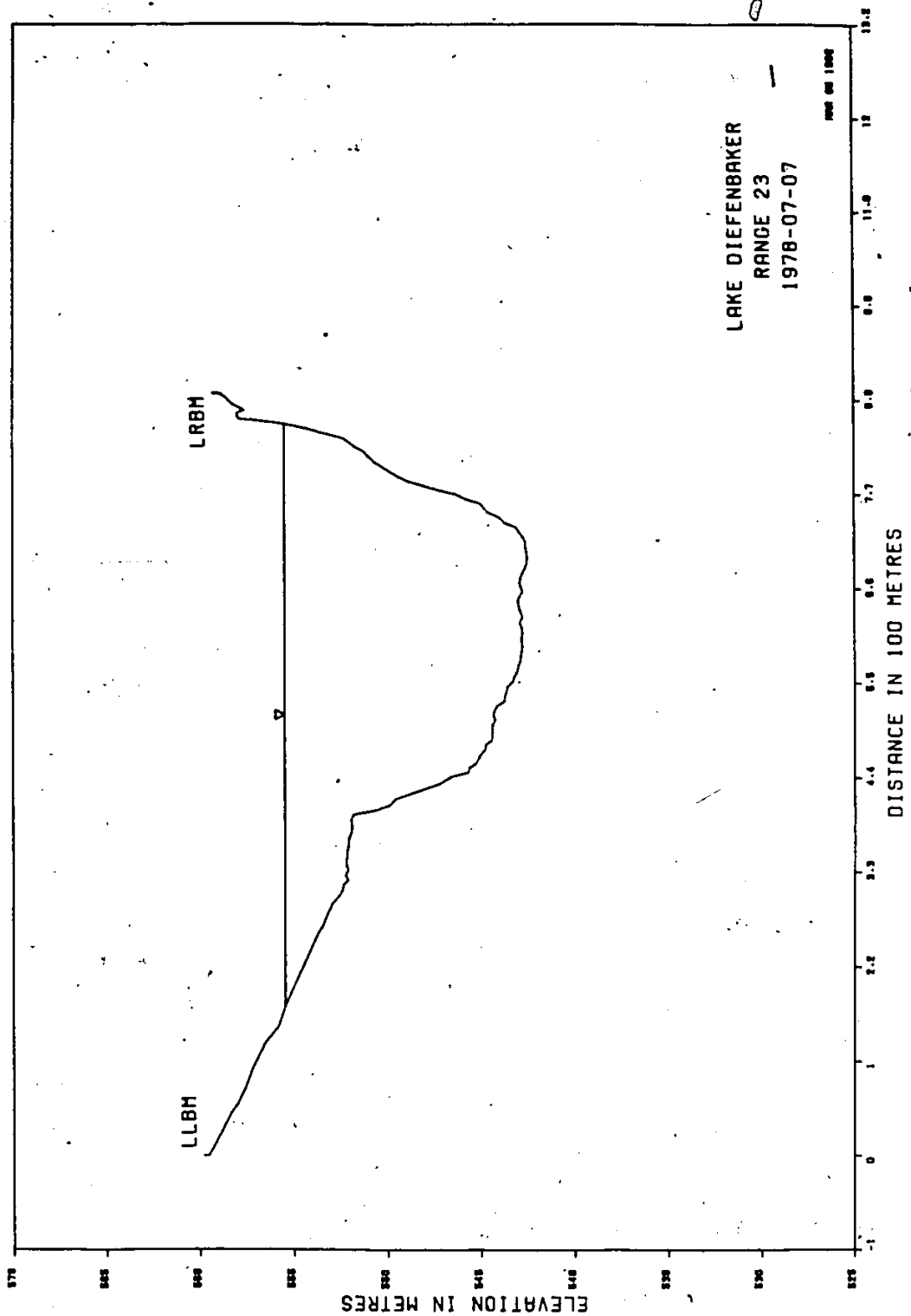
SEDIMENT SURVEY SECTION
MAR 4 1982, PAGE 1
OTTAWA, ONT.

LAKE DUEFENBAKER

RANGE NO. - 23
SURVEYED 22/ 7/1975
MINIMUM ELEVATION = 542.31
ASSUMED MINIMUM DATUM = 542.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
542.50	5.5	555.00	4855.7		
543.00	78.1	555.50	5191.7		
543.50	178.6	556.00	5538.8		
544.00	290.0	556.50	5895.8		
544.50	418.1	557.00	6262.6		
545.00	563.9	557.50	6641.8		
545.50	718.4	558.00	7031.2		
546.00	877.7	558.50	7433.3		
546.50	1041.4	559.00	7848.1		
547.00	1209.5				
547.50	1382.9				
548.00	1558.9				
548.50	1736.4				
549.00	1916.0				
549.50	2101.4				
550.00	2293.0				
550.50	2489.5				
551.00	2691.4				
551.50	2903.5				
552.00	3121.8				
552.50	3372.8				
553.00	3643.5				
553.50	3926.1				
554.00	4221.5				
554.50	4532.1				



LAKE OIEFENBAKER

PROFILE DATA

RANGE NO 23 SURVEY DATE 1978-07-07

STA	ELEV	RKKS	STA	ELEV	RKKS	STA	ELEV	RKKS
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0.00	539.77	LLBM	472.00	544.75		732.00	543.10	
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0.00	539.52		478.00	544.70		737.00	543.70	
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15.00	539.14		483.00	544.40		743.00	543.95	
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30.00	538.78		489.00	544.35		749.00	544.60	
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50.00	538.31		495.00	544.35		759.00	545.00	
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60.00	537.97		501.00	544.32		764.00	545.75	
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80.00	537.54		507.00	544.20		770.00	546.30	
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100.00	537.20		512.00	544.30		775.00	547.30	
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115.00	536.86		517.00	544.25		780.00	548.85	
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130.00	536.54		523.00	544.10		791.00	549.40	
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150.00	535.82		529.00	543.70		796.00	549.80	
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165.00	535.38		534.00	543.70		802.00	550.25	
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173.50	535.45	ML	540.00	543.60		808.00	550.70	
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237.00	535.75		546.00	543.55		815.00	551.05	
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268.00	535.45		552.00	543.25		820.00	551.25	
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282.00	535.20		557.00	543.20		826.00	551.75	
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288.00	535.05		562.00	543.05		835.00	552.30	
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293.00	532.95		571.00	542.95		842.00	553.60	
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298.00	532.75		576.00	542.85		847.00	554.35	
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303.00	532.55		581.00	542.85	ML	851.40	555.45	
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309.00	532.40		586.00	542.80		856.00	557.05	
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315.00	532.35		593.00	542.75		857.00	557.82	
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321.00	532.10		598.00	542.80		860.00	557.93	
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326.00	532.25		603.00	542.80		864.00	557.93	
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332.00	532.10		605.00	542.75		867.50	557.56	
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338.00	532.20		615.00	542.80		875.00	558.23	
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343.00	532.20		620.00	542.98		880.00	558.46	
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348.00	532.15		627.00	542.75		887.00	558.85	
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354.00	532.15		635.00	542.90		897.00	559.22	LRBM
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359.00	532.10		640.00	542.95				
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370.00	532.05		646.00	543.00				
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375.00	531.95		651.00	542.90				
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380.00	531.90		656.00	542.75				
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385.00	531.90		662.00	542.85				
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391.00	531.95		667.00	542.90				
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397.00	531.80		673.00	542.85				
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403.00	530.85		678.00	542.75				
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408.00	549.85		687.00	542.55				
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415.00	549.55		693.00	542.50				
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433.00	547.15		698.00	542.50				
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441.00	546.55		704.00	542.55				
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446.00	545.65		709.00	542.60				
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451.00	545.00		715.00	542.60				
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456.00	545.25		721.00	542.75				
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466.00	545.00		727.00	542.95				
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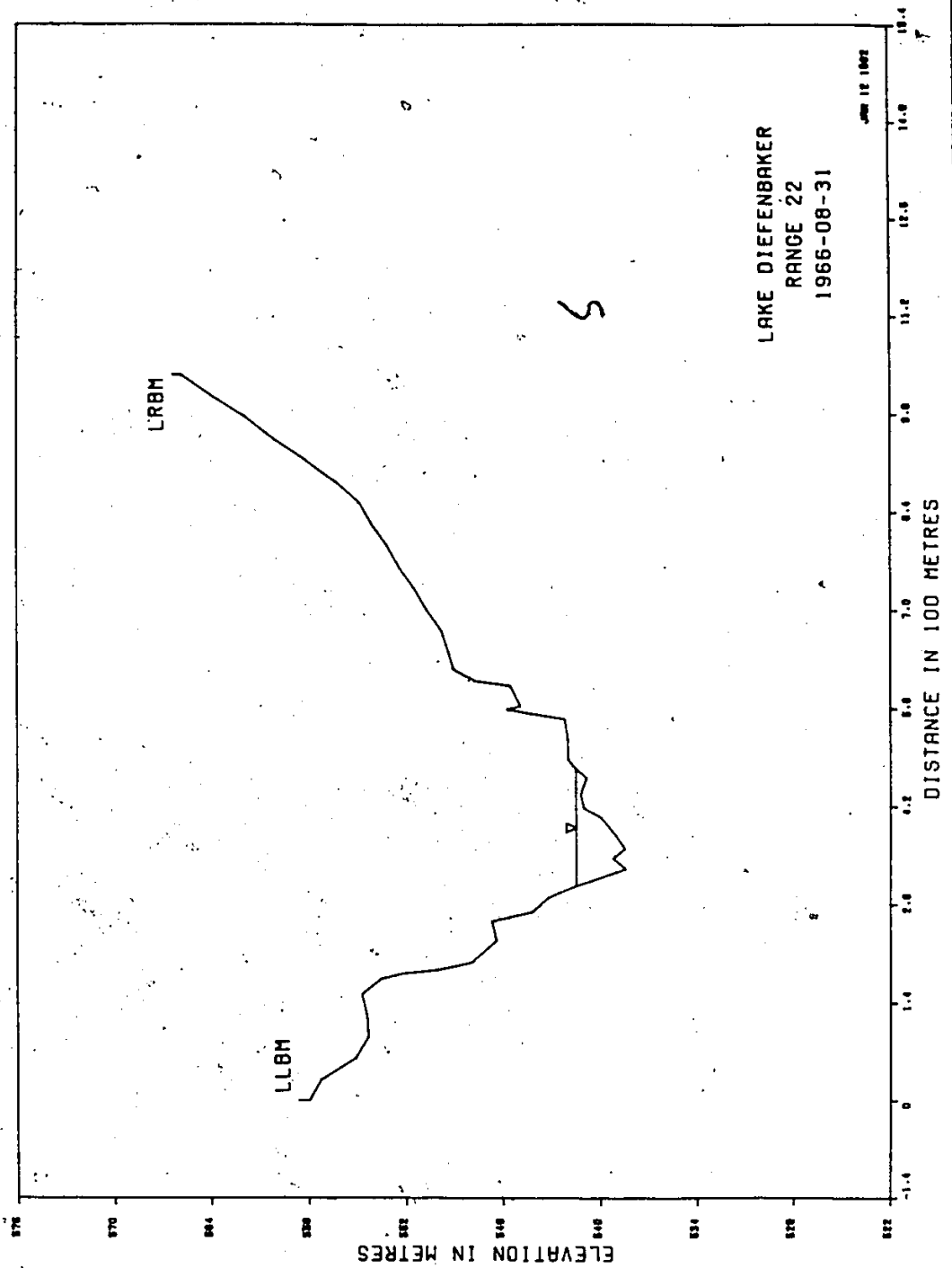
SEDIMENT SURVEY SECTION
MAR 8 1982, PAGE 1
UTTAWA-ONT.

LAKE DUFFERIN

RANGE NO. - 23
SURVEYED 7/ 7/1978
MINIMUM ELEVATION = 542.50
ASSURED MINIMUM DATUM = 543.00

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
543.00	15.0	545.50	5097.9		
543.50	125.3	546.00	5446.2		
544.00	226.5	546.50	5604.1		
544.50	344.1	547.00	6171.1		
545.00	487.6	547.50	6551.1		
545.50	639.1	548.00	6947.1		
546.00	777.9	548.50	7339.4		
546.50	961.2	549.00	7786.2		
547.00	1124.2				
547.50	1299.4				
548.00	1474.1				
548.50	1652.3				
549.00	1833.0				
549.50	2020.0				
550.00	2212.4				
550.50	2410.9				
551.00	2614.7				
551.50	2824.6				
552.00	3041.2				
552.50	3293.1				
553.00	3552.8				
553.50	3843.5				
554.00	4130.9				
554.50	4443.9				
555.00	4733.2				



LAKE DUFFINBARGER

PROFILE DATA

RANGE NO. 22 SURVEY DATE 1966-08-31

STA ELEV RMKS STA ELEV RMKS

0+00	558.61	LRBM	883.01	556.29	
0+00	557.94		913.49	558.15	
30+48	557.20		943.97	560.13	
60+96	555.07		974.45	561.81	
91+44	554.28		1004.93	563.88	
121+92	554.37		1035.41	565.77	
152+40	554.68		1065.91	566.32	LRBM
175+26	553.46				
182+88	551.99				
187+45	549.98				
198+12	547.88				
228+60	546.35				
256+03	545.63				
269+75	544.13				
289+56	543.18				
306+00	541.42	WL			
306+32	541.42				
330+40	538.34				
345+64	539.13				
359+36	538.40				
377+04	534.92				
403+86	539.89				
417+88	540.96				
436+78	541.14				
449+78	540.76				
460+25	540.78				
473+00	541.42	WL			
473+66	541.42				
486+77	541.20				
517+25	541.93				
544+68	542.12				
558+39	545.65				
562+97	544.86				
591+92	545.47				
599+54	547.66				
608+69	548.43				
618+31	547.01				
639+17	549.31				
669+65	549.74				
700+13	550.65				
730+61	551.41				
761+09	552.36				
791+57	553.07				
822+05	554.00				
852+53	554.77				

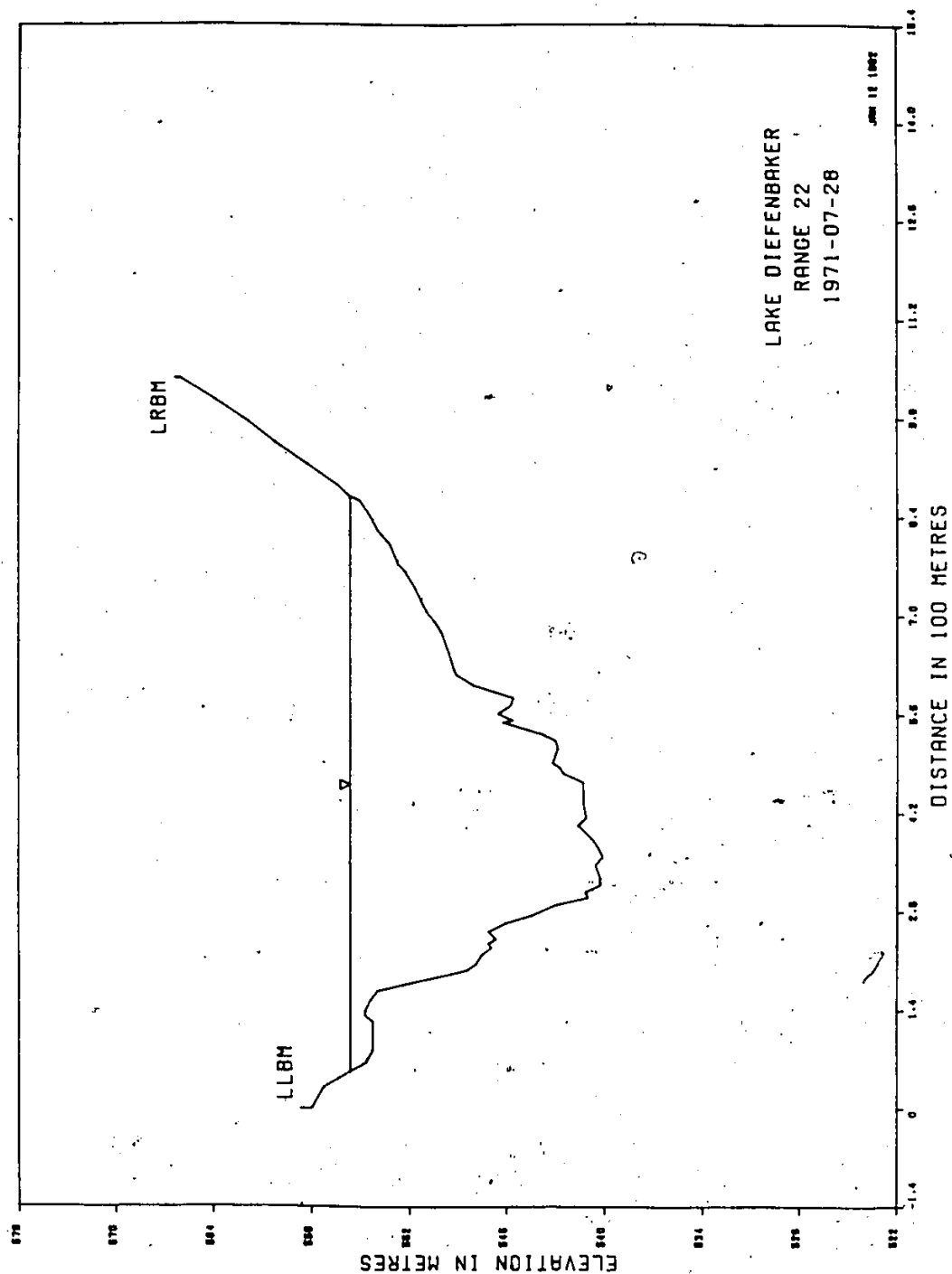
SEDIMENT SURVEY SECTION
 DEC 10 1981, PAGE 1
 DIT44A.ONT.

LAKE DEPEWATER

RANGE NO. 22
 SURVEYED 31/ 8/1966
 MINIMUM ELEVATION = 530.30
 ASSUMED MINIMUM DATUM = 539.03

ELEVATION - AREA TABLE
 ELEVATION (M.)

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
539.00	15.5	551.50	3890.3		
539.50	46.6	552.00	4169.3		
540.00	83.8	552.50	4457.6		
540.50	133.4	553.00	4756.7		
541.00	187.3	553.50	5066.9		
541.50	265.8	554.00	5388.8		
542.00	359.2	554.50	5731.7		
542.50	481.6	555.00	6118.6		
543.00	608.3	555.50	6520.4		
543.50	737.0	556.00	6930.9		
544.00	875.6	556.50	7349.9		
544.50	1017.4	557.00	7776.8		
545.00	1162.2	557.50	8212.3		
545.50	1319.2	558.00	8661.8		
546.00	1485.1	558.50	9119.3		
546.50	1654.6				
547.00	1841.6				
547.50	2035.3				
548.00	2235.3				
548.50	2443.4				
549.00	2650.1				
549.50	2871.7				
550.00	3111.4				
550.50	3361.3				
551.00	3623.6				



LAKEL DIEPPOACKER
PROFILE DATA

RANGE NO 22 SURVEY DATE 1971-07-28

STA ELEV MKS STA ELEV MKS STA ELEV MKS STA ELEV MKS

0+00 558.51 LUM 531.27 543.73

0+00 557.97 548.37 545.56

30+48 557.24 540.64 540.17

52+00 555.62 m 551.38 545.56

52+73 555.62 561.14 540.48

64+31 554.71 572.41 545.71

70+41 554.55 583.39 545.56

82+30 554.25 601.37 548.00

97+23 554.25 616.31 549.07

113+39 554.25 623.32 549.22

124+34 554.25 640.18 549.52

132+28 554.71 676.35 549.98

138+38 554.71 688.24 550.23

153+62 554.40 706.22 550.90

167+34 553.46 719.33 551.20

176+17 552.42 740.35 551.66

187+15 550.29 761.22 552.27

196+29 548.46 774.17 552.72

205+44 547.85 800.43 553.18

217+32 547.54 821.44 553.44

228+30 546.93 841.25 554.40

234+39 547.09 862.28 555.01

240+79 546.63 864.41 555.15

251+16 547.09 864.02 555.62 m

263+35 546.02 888.68 555.62

273+41 544.49 883.01 556.32

286+34 542.77 913.49 558.18

299+31 540.99 943.97 560.16

307+24 541.14 974.45 561.84

317+30 540.23 1004.93 563.88

326+14 543.23 1035.41 565.01

345+34 540.53 1035.41 566.32 LRM

357+23 540.08

371+25 540.38

381+30 540.68

402+34 541.60

412+39 541.11

435+25 541.29

463+10 541.29

476+40 542.51

483+41 542.67

490+42 543.12

501+30 547.77

511+15 542.82

522+43 542.97

SEDIMENT SURVEY SECTION
DEC 18 1981, PAGE 1
OTTAWA, ONT.

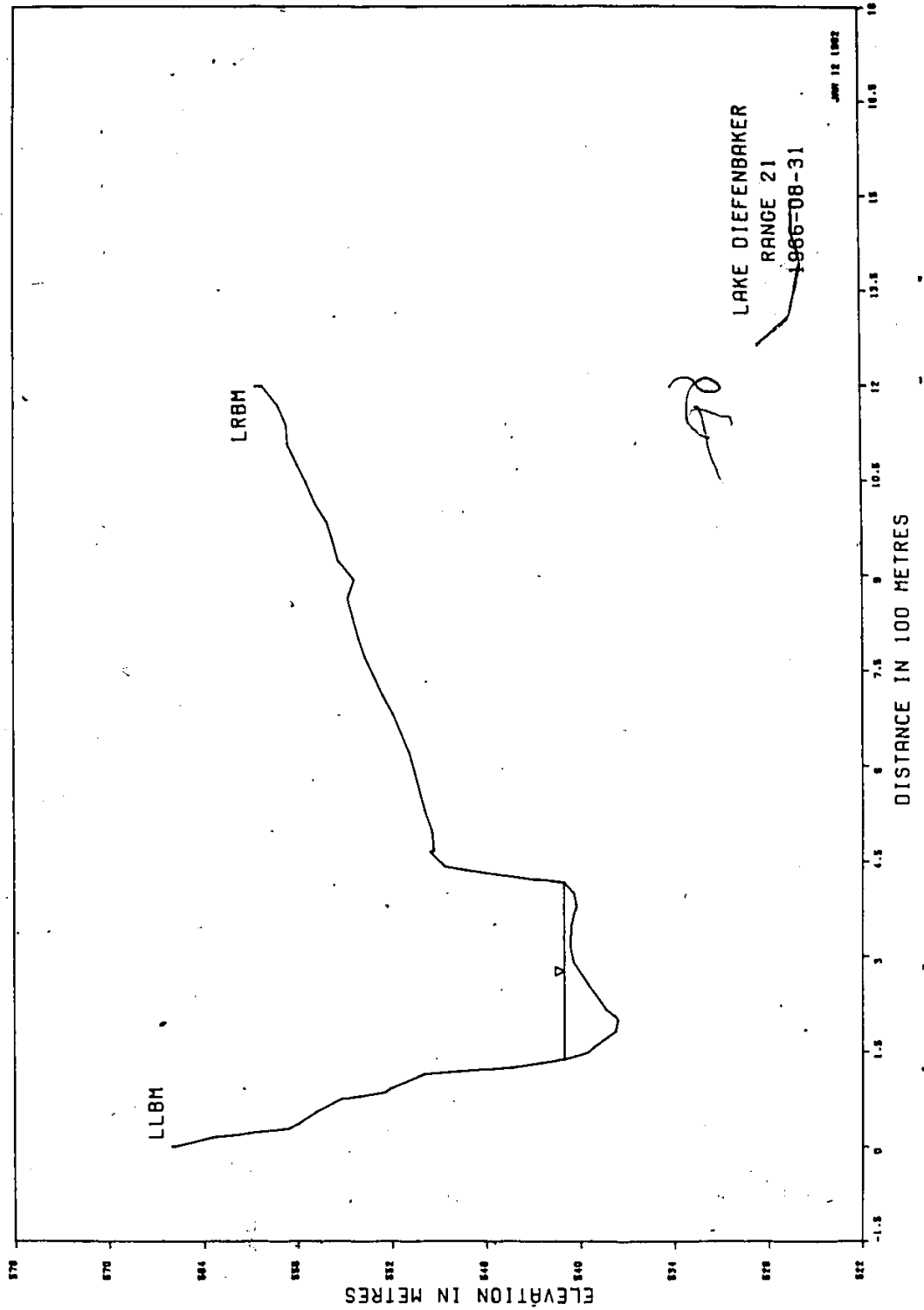
LAKE DUFFERIN

RANGE NO. - 22
SURVEYED 20/ 7/1971
MINIMUM ELEVATION = 540.00
ASSUMED MINIMUM DATUM = 541.00

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
541.00	97.0	553.50	4723.2		
541.50	109.9	554.00	5047.1		
542.00	193.2	554.50	5397.8		
542.50	285.9	555.00	5789.3		
543.00	385.3	555.50	6193.2		
543.50	504.6	556.00	6603.4		
544.00	629.9	556.50	7022.1		
544.50	759.4	557.00	7448.6		
545.00	832.9	557.50	7883.5		
545.50	1029.7	558.00	8332.2		
546.00	1176.7	558.50	8789.5		
546.50	1337.6				
547.00	1508.8				
547.50	1695.1				
548.00	1890.0				
548.50	2092.7				
549.00	2301.3				
549.50	2516.7				
550.00	2754.3				
550.50	3003.8				
551.00	3262.5				
551.50	3532.3				
552.00	3814.3				
552.50	4106.7				
553.00	4408.2				

7



LAKE OJEFENBACER

PROFILE DATA

RANGE WD 21 SURVEY DATE 1966-08-31

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

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STA ELEV RMKS

0+00 568.01 LLBN 679.40 551.84

0+00 565.80 709.05 552.21

13+72 563.48 740.35 553.05

28+96 559.52 770.84 553.61

36+58 557.91 801.32 554.03

54+86 556.81 831.80 554.37

74+58 555.25 862.28 554.71

79+25 554.00 892.76 554.28

85+34 552.42 923.24 555.35

91+44 552.08 953.72 555.68

114+30 549.89 984.20 556.05

118+87 547.65 1014.68 556.81

124+97 544.28 1045.15 557.33

131+06 542.84 1075.64 557.94

137+00 540.99 HL 1106.12 558.52

137+77 540.99 1136.60 558.61

147+52 537.50 1167.09 559.13

155+14 537.16 1197.56 560.13

181+36 537.70 1197.56 560.59

189+95 537.55

205+44 537.76

216+10 538.34

227+59 538.67

252+68 539.44

290+78 540.41

316+69 540.62

347+17 540.59

365+46 540.38

377+65 540.20

399+98 540.38

415+00 540.97 HL

416+35 540.99

419+40 542.06

420+32 542.91

427+94 545.11

435+56 547.24

441+66 548.51

464+52 549.52

486+04 549.28

496+52 549.40

527+00 549.43

557+48 550.16

587+06 550.17

618+44 550.40

648+92 551.32

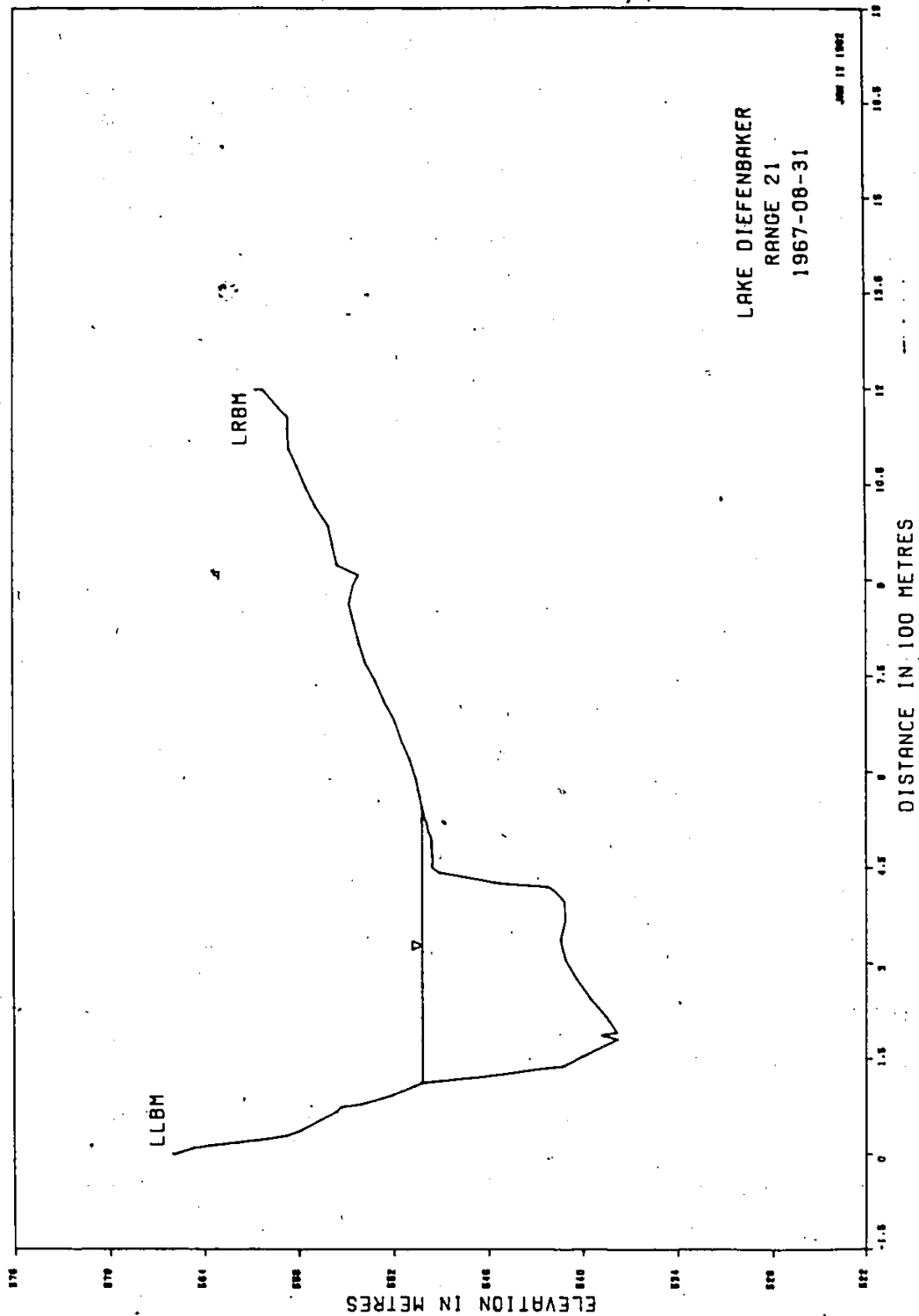
SECTION SURVEY SECTION
DEC 18 1981, PAGE 1
DITAMA,ONT.

LINE DITAFENJAREN

MINIENJA ELEVATION = 537.55
ASSUMED MINIENJA DATUM = 538.00
RANGE NO. = 21
SURVEYED 31/ 8/1986

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
538.00	12.3	550.50	3418.9				
538.50	32.0	551.00	3672.4				
539.00	65.9	551.55	3944.7				
539.50	112.7	552.00	4230.1				
540.00	172.2	552.50	4538.9				
540.50	231.7	553.00	4858.4				
541.00	303.4	553.50	5192.8				
541.50	323.6	554.00	5543.3				
542.00	355.5	554.50	5917.0				
542.50	409.0	555.00	6328.4				
543.00	453.8	555.50	6752.3				
543.50	1109.1	556.00	7197.8				
544.00	1248.3	556.50	7662.9				
544.50	1398.1	557.00	8141.7				
545.00	1548.4	557.50	8636.1				
545.50	1701.9	558.00	9151.7				
546.00	1855.9	558.50	9681.6				
546.50	2011.2	559.00	10238.5				
547.00	2167.8	559.50	10810.3				
547.50	2325.8	560.00	11390.7				
548.00	2485.4	560.50	11977.4				
548.50	2646.6						
549.00	2811.0						
549.50	2987.3						
550.00	3191.0						



WATER SURVEY OF CANADA
JAN 12 1962
PAGE 4
OTTAWA, ONT.

[illegible][illegible]

208.70	250.72	78.02	558.07	801.22	558.07
36.58	557.94				
67.06	555.62			831.63	558.40
74.68	555.26			862.28	558.71
79.25	554.00			892.76	558.43
91.44	552.15			908.00	558.10
112.00	550.15			913.34	555.87

1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	23
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185.53	538.78	1108.12	728.26
190.50	537.79	1136.80	558.58
213.36	538.43	1154.81	558.58
243.84	539.50	1167.04	554.09
274.32	540.35	1197.56	560.13
304.80	541.05	1197.56	560.59

L88M

355.76	541.05
335.28	541.36
396.24	541.11
411.48	541.66
419.10	542.12
426.72	545.50

462.07	549.13
451.10	549.55
459.64	549.49
467.56	549.52
473.96	549.55
483.11	549.58

490.73	549.55
498.65	549.62
505.97	549.77
514.20	549.83
521.21	549.84
527.30	550.01

545.00	550.16	uL
545.29	550.16	
557.48	550.29	
587.96	550.51	

555.29	550.16
557.98	550.29
587.96	550.53

557.48	550.29
587.96	550.53

587.96 550.53

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1. The first part of the document is a title page. It contains the title of the report, the author's name, and the date of the report. The title is "The Role of the State in the Development of the Economy". The author is "John Doe". The date is "January 1, 2023".

SEDIMENT SURVEY SECTION

DEC 10 1981, PAGE 1
JITANA,DNT.

LINE DISPERSEMENT

SAMPLE NO. = 72

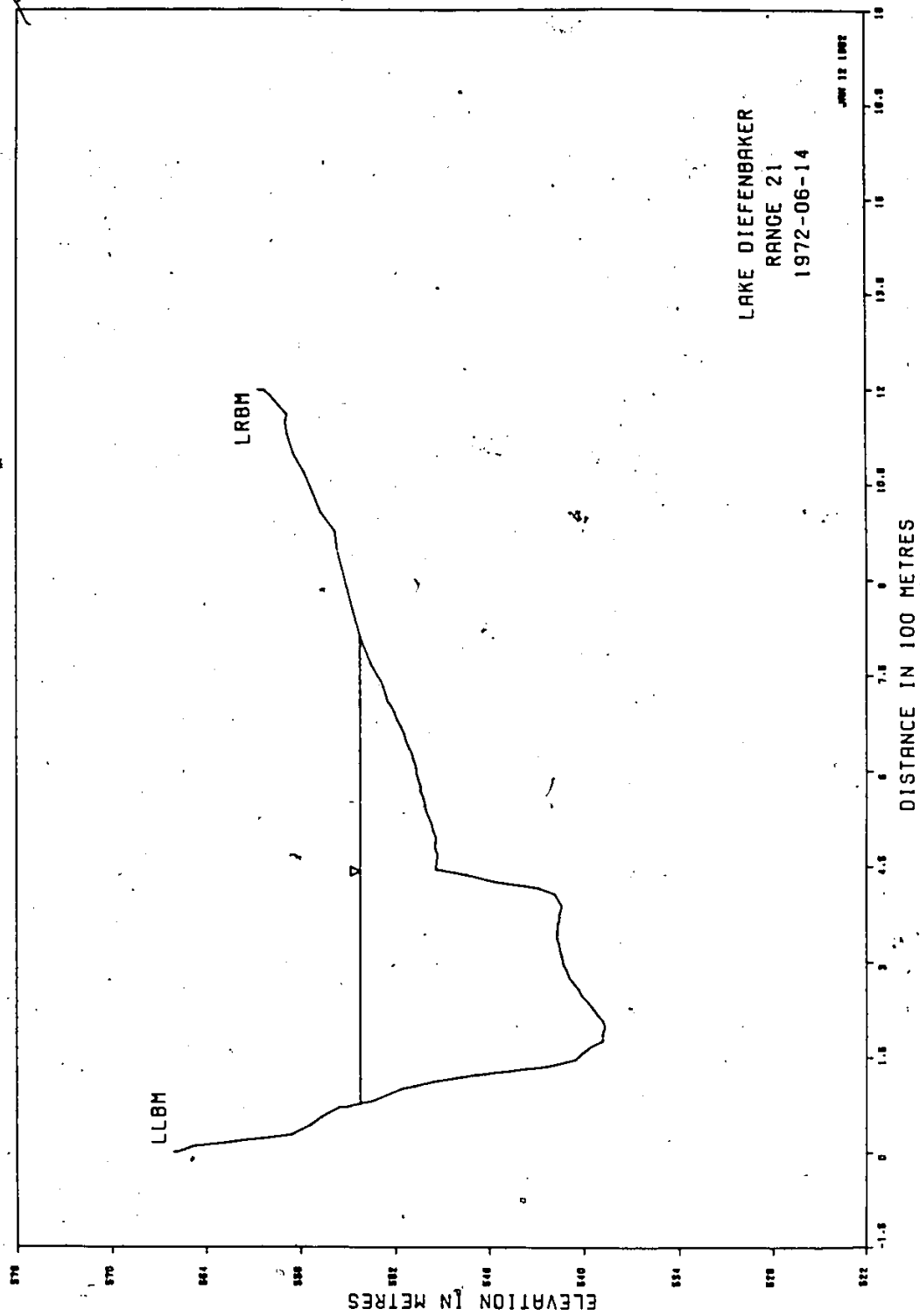
DATEIVED 31 / 8 / 1967

MENIRJM ELEVATION = 537.73

GSSJGEO GIMRJM DATUM = 539.52

O ELEVATION - AREA TABLE O

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
538.50	15.6	531.03	3482.0		
539.00	42.8	531.50	3750.6		
539.50	87.5	532.00	4038.0		
540.00	123.3	532.50	4340.9		
540.50	192.3	533.00	4658.2		
541.00	261.7	533.50	4990.8		
541.50	381.4	534.00	5338.6		
542.00	520.0	534.50	5713.3		
542.50	682.8	535.00	6128.2		
543.00	806.4	535.50	6551.7		
543.50	932.0	536.00	6995.3		
544.00	1098.7	536.50	7462.5		
544.50	1246.8	537.00	7942.9		
545.00	1396.2	537.50	8438.5		
545.50	1546.9	538.00	8951.3		
546.00	1692.2	538.50	9480.6		
546.50	1853.3	539.00	10042.7		
547.00	2007.2	539.50	10615.2		
547.50	2165.8	540.00	11196.0		
548.00	2325.0	540.50	11783.1		
548.50	2487.0				
549.00	2649.7				
549.50	2815.1				
550.00	3015.6				
550.50	3232.2				



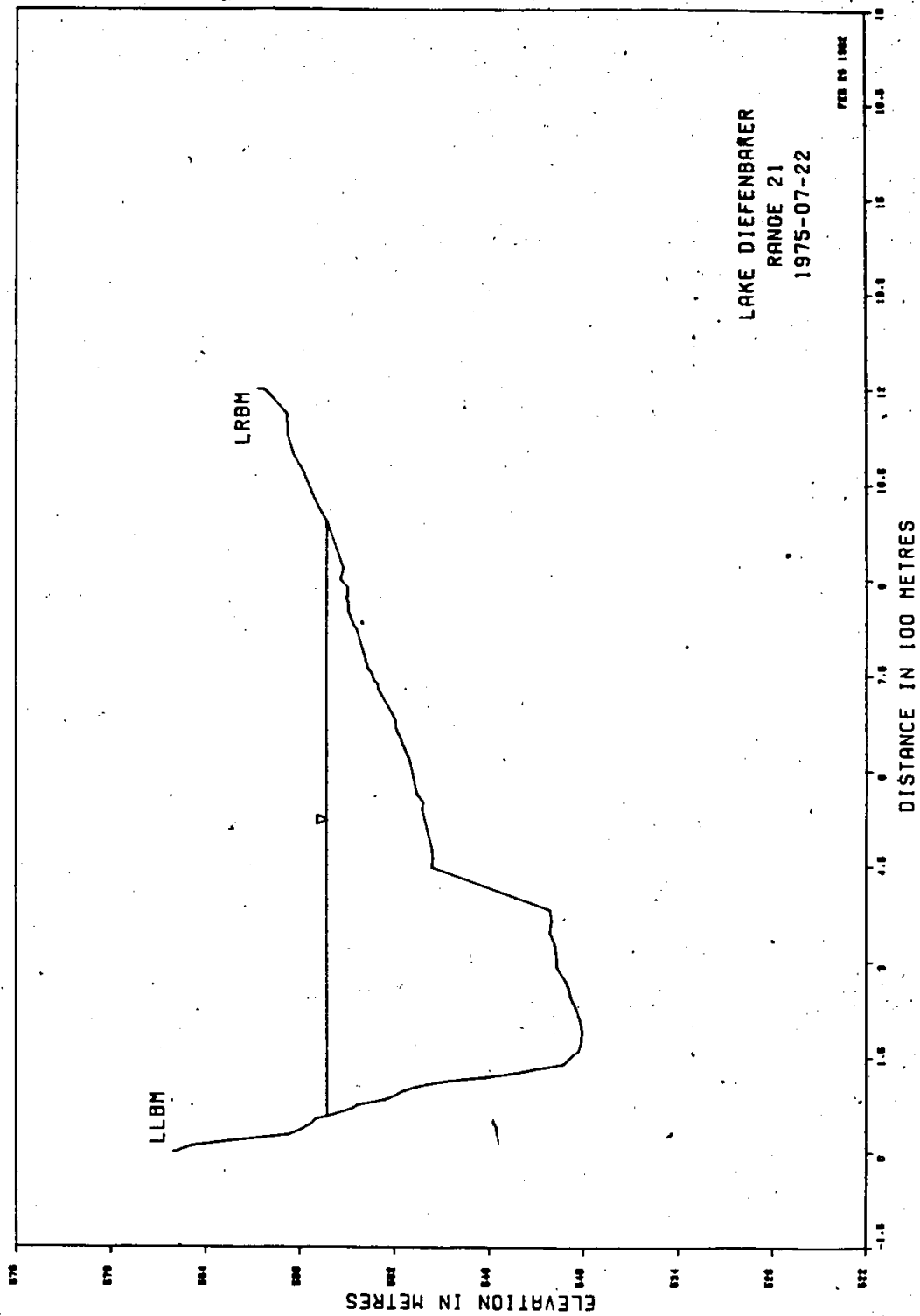
LAKE DIEFENBAKER

PROFILE DATA

RANGE NO 21 SURVEY DATE 1972-05-14

STA	ELEV	RMS	STA	ELEV	RMS	STA	ELEV	RMS
0+00	566.01	LLBM	416+05	542.91		1146+05	558.91	
0+00	565.80		425+81	545.65		1158+24	558.79	
9+14	564.73		436+78	547.48		1188+72	558.86	
13+24	562.57		445+92	549.40		1197+56	560.25	
17+37	562.08		455+98	549.34				
21+44	560.37		468+78	549.28				
27+74	558.55		477+01	549.43				
42+67	557.33		485+85	549.43				
54+86	556.69		493+78	549.37				
71+02	555.50		505+97	549.58				
71+32	555.01		518+94	549.68				
76+00	554.19	ML	527+00	549.84				
76+81	554.19		537+06	550.04				
81+38	553.36		545+93	550.10				
85+67	551.60		555+95	550.19				
103+44	550.83		568+93	550.36				
111+86	549.46		575+77	550.36				
121+92	546.72		585+83	550.53				
135+03	542.30		596+80	550.53				
146+00	540.50		606+85	550.68				
155+75	540.08		616+92	550.83				
161+81	539.56		626+97	550.93				
174+96	538.79		637+23	551.14				
183+93	538.79		646+73	551.29				
195+90	538.64		656+84	551.41				
208+96	538.79		667+82	551.60				
215+80	539.10		678+79	551.84				
225+94	539.37		690+07	552.02				
235+92	539.71		699+82	552.21				
247+80	540.14		708+96	552.48				
258+95	540.52		718+02	552.37				
265+79	540.82		730+00	552.72				
274+93	540.93		740+05	552.88				
285+90	541.08		748+87	553.12				
295+05	541.29		759+87	553.36				
307+85	541.39		766+88	553.52				
316+99	541.51		809+35	554.19	ML			
326+75	541.57		809+24	554.18				
335+89	541.69		944+88	555.65				
345+03	541.69		975+36	555.80				
355+92	541.66		1005+84	556.69				
365+76	541.54		1036+32	557.17				
376+90	541.54		1066+80	557.69				
386+79	541.39		1097+28	558.39				
405+99	541.64		1127+75	558.73				

SEDIMENT SURVEY SECTION				LINE DTFENAKEN				RANGE NO. - 21			
DEC 18 1981, PAGE 1				*****				SURVEYED IN/ 5/1072			
DITANG.ONT.				*****				MINI Q/A ELEVATION - 530.64			
*****				*****				ASSUMED MINIMUM DATUM - 539.50			
*****				*****				*****			
ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
539.50	54.7	552.50	3914.2	539.50	54.7	552.50	3914.2	539.50	54.7	552.50	3914.2
540.00	72.1	552.50	4218.0	540.00	72.1	552.50	4218.0	540.00	72.1	552.50	4218.0
540.50	122.8	553.00	4539.3	540.50	122.8	553.00	4539.3	540.50	122.8	553.00	4539.3
541.00	185.5	553.50	4879.6	541.00	185.5	553.50	4879.6	541.00	185.5	553.50	4879.6
541.50	263.7	554.00	5226.0	541.50	263.7	554.00	5226.0	541.50	263.7	554.00	5226.0
542.00	388.5	554.50	5596.3	542.00	388.5	554.50	5596.3	542.00	388.5	554.50	5596.3
542.50	525.6	555.00	5990.8	542.50	525.6	555.00	5990.8	542.50	525.6	555.00	5990.8
543.00	666.0	555.50	6409.1	543.00	666.0	555.50	6409.1	543.00	666.0	555.50	6409.1
543.50	808.6	556.00	6855.7	543.50	808.6	556.00	6855.7	543.50	808.6	556.00	6855.7
544.00	952.7	556.50	7320.7	544.00	952.7	556.50	7320.7	544.00	952.7	556.50	7320.7
544.50	1098.5	557.00	7799.4	544.50	1098.5	557.00	7799.4	544.50	1098.5	557.00	7799.4
545.00	1245.9	557.50	8297.5	545.00	1245.9	557.50	8297.5	545.00	1245.9	557.50	8297.5
545.50	1392.0	558.00	8813.1	545.50	1392.0	558.00	8813.1	545.50	1392.0	558.00	8813.1
546.00	1545.8	558.50	9343.2	546.00	1545.8	558.50	9343.2	546.00	1545.8	558.50	9343.2
546.50	1698.0	559.00	9893.4	546.50	1698.0	559.00	9893.4	546.50	1698.0	559.00	9893.4
547.00	1854.1	559.50	10468.4	547.00	1854.1	559.50	10468.4	547.00	1854.1	559.50	10468.4
547.50	2011.9	560.00	11049.4	547.50	2011.9	560.00	11049.4	547.50	2011.9	560.00	11049.4
548.00	2171.8	560.50	11636.4	548.00	2171.8	560.50	11636.4	548.00	2171.8	560.50	11636.4
548.50	2333.9			548.50	2333.9			548.50	2333.9		
549.00	2498.0			549.00	2498.0			549.00	2498.0		
549.50	2671.0			549.50	2671.0			549.50	2671.0		
550.00	2853.7			550.00	2853.7			550.00	2853.7		
550.50	3041.7			550.50	3041.7			550.50	3041.7		
551.00	3234.0			551.00	3234.0			551.00	3234.0		
551.50	3423.7			551.50	3423.7			551.50	3423.7		



WATER SURVEY OF CANADA
 FEB 26 1957 PAGE 1
 OTTAWA, ONT.

LAKE OJEWUNDAKE

PROFILE DATA

RANGE NO 21 SURVEY DATE 1975-07-22

STA ELEV RMKS

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1127.80 558.77

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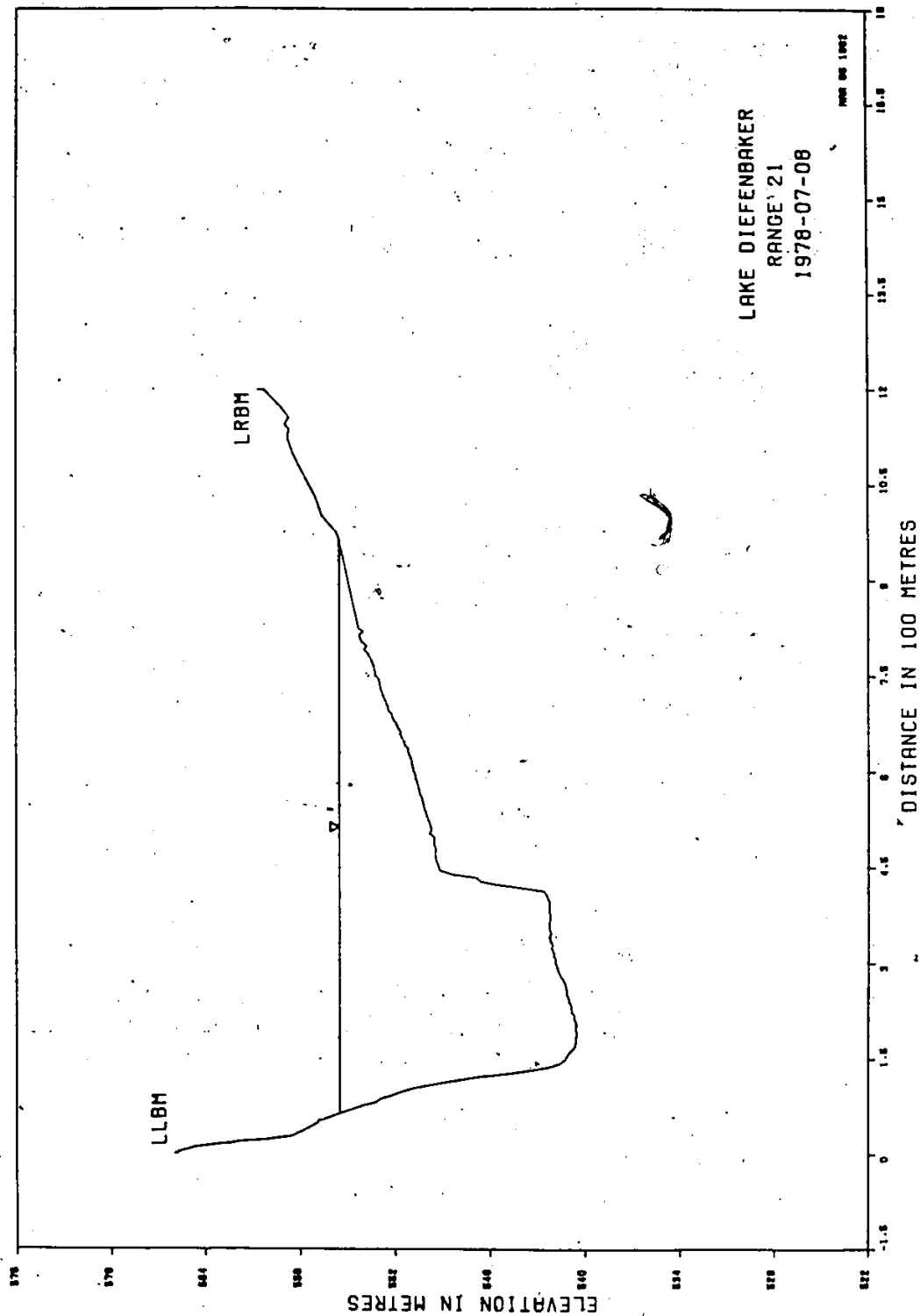
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LAKE DIEFENSAKEN

RANGE NO.- 21
SURVEYED 22/ 7/1975
MINIMUM ELEVATION = 540.05
ASSUMED MINIMUM DATUM = 540.50

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
540.50	21.3	553.00	4247.2		
541.00	67.9	553.50	4579.4		
541.50	135.2	554.00	4926.0		
542.00	226.0	554.50	5294.5		
542.50	346.1	555.00	5683.3		
543.00	473.7	555.50	6105.3		
543.50	604.7	556.00	6552.2		
544.00	739.1	556.50	7017.7		
544.50	876.8	557.00	7496.7		
545.00	1017.7	557.50	7993.5		
545.50	1161.7	558.00	8508.8		
546.00	1308.8	558.50	9038.5		
546.50	1459.0	559.00	9592.9		
547.00	1612.0	559.50	10165.7		
547.50	1768.0	560.00	10746.4		
548.00	1926.8	560.50	11333.2		
548.50	2088.5				
549.00	2253.1				
549.50	2420.9				
550.00	2611.8				
550.50	2832.4				
551.00	3075.0				
551.50	3341.2				
552.00	3626.0				
552.50	3930.4				



LAKE DIEFENBAKER

PROFILE DATA

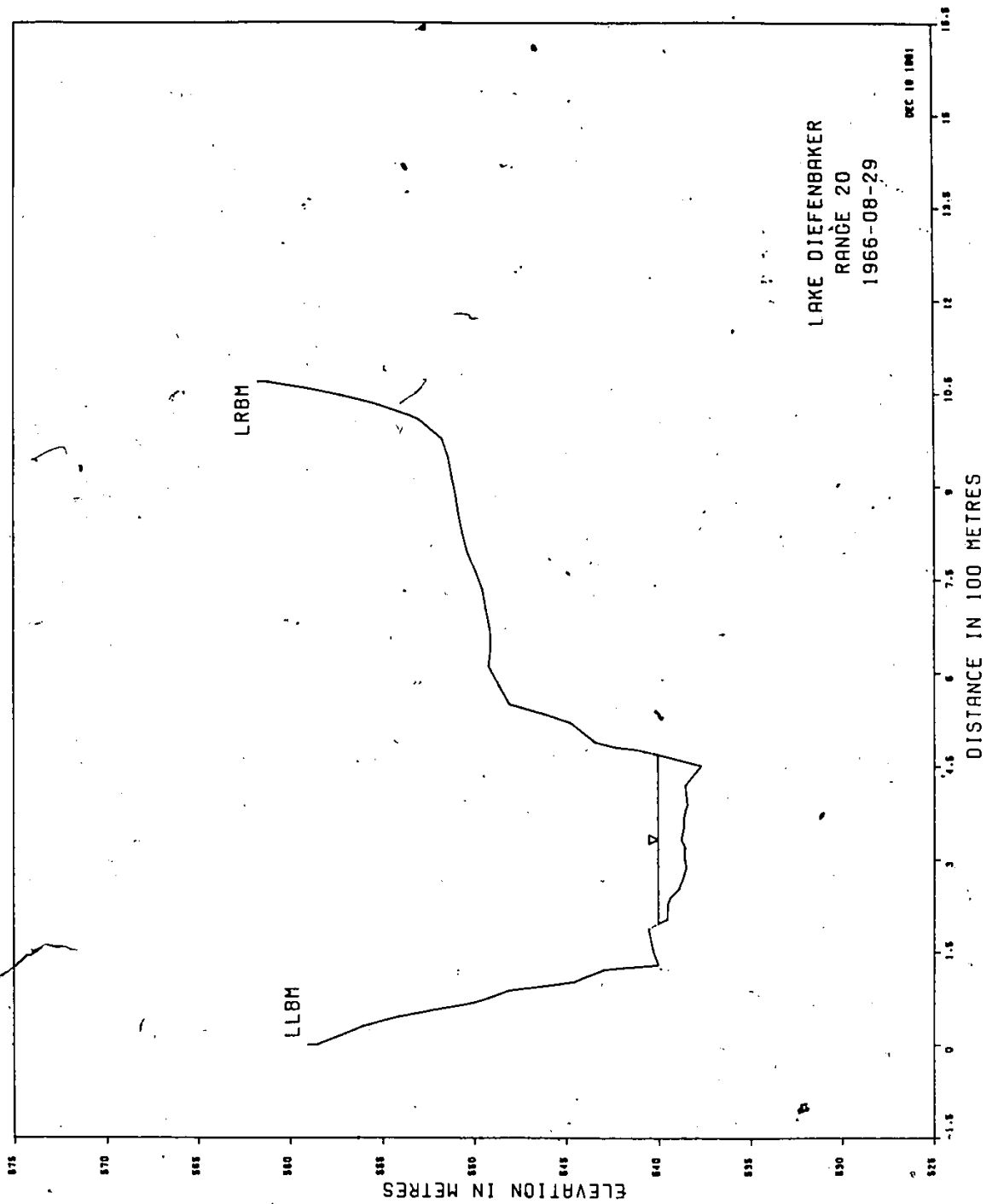
RANGE NO 21 SURVEY DATE 1978-07-08

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1.00	565.77		513.00	549.77		791.00	553.97	
2.00	565.67		518.00	549.82		796.00	553.82	
3.00	565.56		524.00	549.92		803.00	554.12	
4.00	564.91		531.00	550.02		808.00	554.22	
5.00	564.59		535.00	550.07		814.00	554.27	
6.00	563.40		542.00	550.17		819.00	554.02	
7.00	562.43		548.00	550.22		824.00	554.32	
8.00	562.22		553.00	550.27		824.00	554.32	WL
9.00	562.03		559.00	550.32		824.00	554.32	
10.00	559.87		564.00	550.42		824.00	554.32	
11.00	558.50		569.00	550.52		824.00	554.32	
12.00	557.75		574.00	550.57		824.00	554.32	
13.00	556.90		579.00	550.62		824.00	554.32	
14.00	556.68		584.00	550.67		824.00	554.32	
15.00	555.98		589.00	550.72		824.00	554.32	
16.00	555.52	WL	594.00	550.77		824.00	554.32	
17.00	554.12		599.00	550.82		824.00	554.32	
18.00	553.22		604.00	550.87		824.00	554.32	
19.00	552.27		609.00	550.92		824.00	554.32	
20.00	551.62		614.00	550.97		824.00	554.32	
21.00	550.82		619.00	551.02		824.00	554.32	
22.00	546.87		624.00	551.07		824.00	554.32	
23.00	544.82		629.00	551.12		824.00	554.32	
24.00	543.57		634.00	551.17		824.00	554.32	
25.00	542.22		639.00	551.22		824.00	554.32	
26.00	541.57		644.00	551.27		824.00	554.32	
27.00	541.22		649.00	551.32		824.00	554.32	
28.00	540.97		654.00	551.37		824.00	554.32	
29.00	540.72		659.00	551.42		824.00	554.32	
30.00	540.47		664.00	551.47		824.00	554.32	
31.00	540.22		669.00	551.52		824.00	554.32	
32.00	540.00		674.00	551.57		824.00	554.32	
33.00	539.75		679.00	551.62		824.00	554.32	
34.00	539.50		684.00	551.67		824.00	554.32	
35.00	539.25		689.00	551.72		824.00	554.32	
36.00	539.00		694.00	551.77		824.00	554.32	
37.00	538.75		699.00	551.82		824.00	554.32	
38.00	538.50		704.00	551.87		824.00	554.32	
39.00	538.25		709.00	551.92		824.00	554.32	
40.00	538.00		714.00	551.97		824.00	554.32	
41.00	537.75		719.00	552.02		824.00	554.32	
42.00	537.50		724.00	552.07		824.00	554.32	
43.00	537.25		729.00	552.12		824.00	554.32	
44.00	537.00		734.00	552.17		824.00	554.32	
45.00	536.75		739.00	552.22		824.00	554.32	
46.00	536.50		744.00	552.27		824.00	554.32	
47.00	536.25		749.00	552.32		824.00	554.32	
48.00	536.00		754.00	552.37		824.00	554.32	
49.00	535.75		759.00	552.42		824.00	554.32	
50.00	535.50		764.00	552.47		824.00	554.32	
51.00	535.25		769.00	552.52		824.00	554.32	
52.00	535.00		774.00	552.57		824.00	554.32	
53.00	534.75		779.00	552.62		824.00	554.32	
54.00	534.50		784.00	552.67		824.00	554.32	
55.00	534.25		789.00	552.72		824.00	554.32	
56.00	534.00		794.00	552.77		824.00	554.32	
57.00	533.75		799.00	552.82		824.00	554.32	
58.00	533.50		804.00	552.87		824.00	554.32	
59.00	533.25		809.00	552.92		824.00	554.32	
60.00	533.00		814.00	552.97		824.00	554.32	
61.00	532.75		819.00	553.02		824.00	554.32	
62.00	532.50		824.00	553.07		824.00	554.32	
63.00	532.25		829.00	553.12		824.00	554.32	
64.00	532.00		834.00	553.17		824.00	554.32	
65.00	531.75		839.00	553.22		824.00	554.32	
66.00	531.50		844.00	553.27		824.00	554.32	
67.00	531.25		849.00	553.32		824.00	554.32	
68.00	531.00		854.00	553.37		824.00	554.32	
69.00	530.75		859.00	553.42		824.00	554.32	
70.00	530.50		864.00	553.47		824.00	554.32	
71.00	530.25		869.00	553.52		824.00	554.32	
72.00	530.00		874.00	553.57		824.00	554.32	
73.00	529.75		879.00	553.62		824.00	554.32	
74.00	529.50		884.00	553.67		824.00	554.32	
75.00	529.25		889.00	553.72		824.00	554.32	
76.00	529.00		894.00	553.77		824.00	554.32	
77.00	528.75		899.00	553.82		824.00	554.32	
78.00	528.50		904.00	553.87		824.00	554.32	
79.00	528.25		909.00	553.92		824.00	554.32	
80.00	528.00		914.00	553.97		824.00	554.32	
81.00	527.75		919.00	554.02		824.00	554.32	
82.00	527.50		924.00	554.07		824.00	554.32	
83.00	527.25		929.00	554.12		824.00	554.32	
84.00	527.00		934.00	554.17		824.00	554.32	
85.00	526.75		939.00	554.22		824.00	554.32	
86.00	526.50		944.00	554.27		824.00	554.32	
87.00	526.25		949.00	554.32		824.00	554.32	
88.00	526.00		954.00	554.37		824.00	554.32	
89.00	525.75		959.00	554.42		824.00	554.32	
90.00	525.50		964.00	554.47		824.00	554.32	
91.00	525.25		969.00	554.52		824.00	554.32	
92.00	525.00		974.00	554.57		824.00	554.32	
93.00	524.75		979.00	554.62		824.00	554.32	
94.00	524.50		984.00	554.67		824.00	554.32	
95.00	524.25		989.00	554.72		824.00	554.32	
96.00	524.00		994.00	554.77		824.00	554.32	
97.00	523.75		999.00	554.82		824.00	554.32	
98.00	523.50		1004.00	554.87		824.00	554.32	
99.00	523.25		1009.00	554.92		824.00	554.32	
100.00	523.00		1014.00	554.97		824.00	554.32	

LAKE LIFE LITERATURE

RANGE NO.-	21
SURVEYED	8/ 7/1978
MINIMUM ELEVATION =	540.52
ASSUMED MINIMUM DATUM =	541.00

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
541.00	24.7	553.50	5586.8		
541.50	44.9	554.00	4940.0		
542.00	163.1	554.50	5312.4		
542.50	281.5	555.00	5713.8		
543.00	420.7	555.50	6146.3		
543.50	562.2	556.00	6602.4		
544.00	705.5	556.50	7068.4		
544.50	850.8	557.00	7546.7		
545.00	997.8	557.50	8044.2		
545.50	1146.3	558.00	8557.8		
546.00	1296.4	558.50	9086.8		
546.50	1443.3	559.00	9640.5		
547.00	1603.4	559.50	10213.8		
547.50	1761.3	560.00	10794.4		
548.00	1921.2	560.50	11381.4		
548.50	2081.0				
549.00	2247.5				
549.50	2418.8				
550.00	2613.8				
550.50	2842.9				
551.00	3086.7				
551.50	3352.5				
552.00	3633.9				
552.50	3917.2				
553.00	4211.4				



WATER SURVEY OF CANADA
DEC 10 1981 PAGE 1
OTTAWA, ONT.

LAKE DIEFENBALER

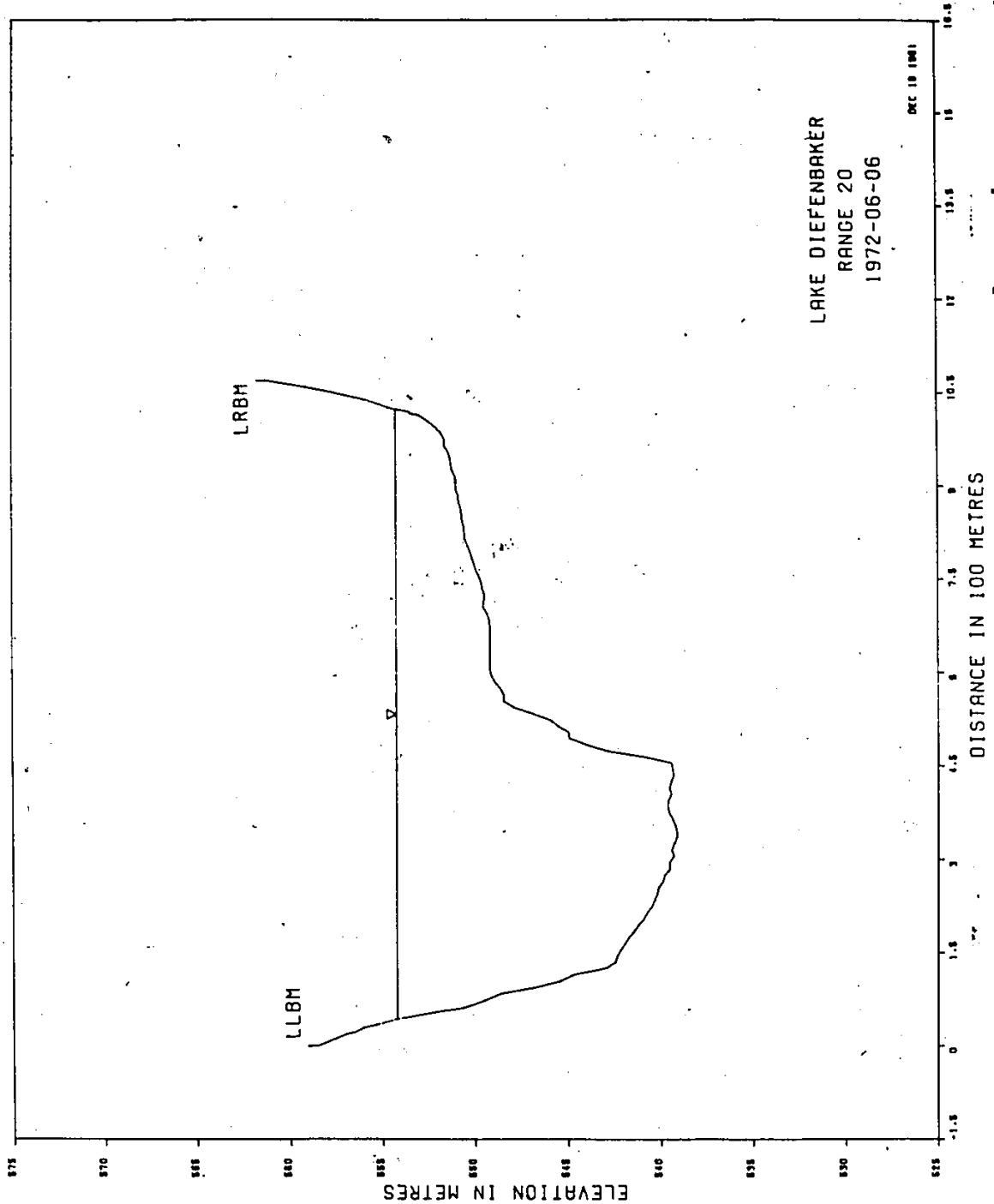
PROFILE DATA

RANGE NO 20 SURVEY DATE 1966-38-29

STA	ELEV	RKKS	STA	ELEV	RKKS	STA	ELEV	RKKS
-----	------	------	-----	------	------	-----	------	------

0.00	559.03	LLBM	641.30	549.07				
0.00	558.55		621.28	549.13				
30.48	558.02		702.20	549.34				
45.72	558.13		732.74	549.52				
54.86	552.48		763.22	549.89				
68.58	550.01		793.72	550.35				
76.20	549.22		824.18	550.62				
88.39	548.12		854.66	550.83				
96.01	548.08		885.14	550.99				
102.11	548.33		915.62	551.20				
108.20	548.07		946.10	551.38				
121.92	548.94		976.58	551.72				
127.34	549.01		1007.05	552.94				
152.40	540.29		1014.68	553.49				
187.45	540.53		1034.49	555.50				
196.00	540.01	PL	1048.68	557.17				
196.60	540.01		1057.35	559.00				
203.30	539.53		1068.02	561.11				
227.99	539.30		1088.02	561.69	LRM			
238.35	539.37							
252.37	538.89							
271.58	538.64							
287.12	538.49							
298.09	538.58							
309.58	538.61							
317.91	538.55							
331.52	538.76							
339.85	538.70							
352.05	538.61							
365.37	538.61							
378.73	538.55							
386.18	538.43							
401.42	538.49							
418.19	538.55							
450.19	537.67							
468.00	540.01	HL						
485.38	540.01							
476.40	541.20							
479.76	542.27							
488.90	543.43							
519.38	546.71							
536.62	546.23							
547.86	548.06							
580.34	548.64							
610.82	548.19							

[illegible]



WATER SURVEY OF CANADA
DEC 15 1981 11:11
OTTAWA, ONT.

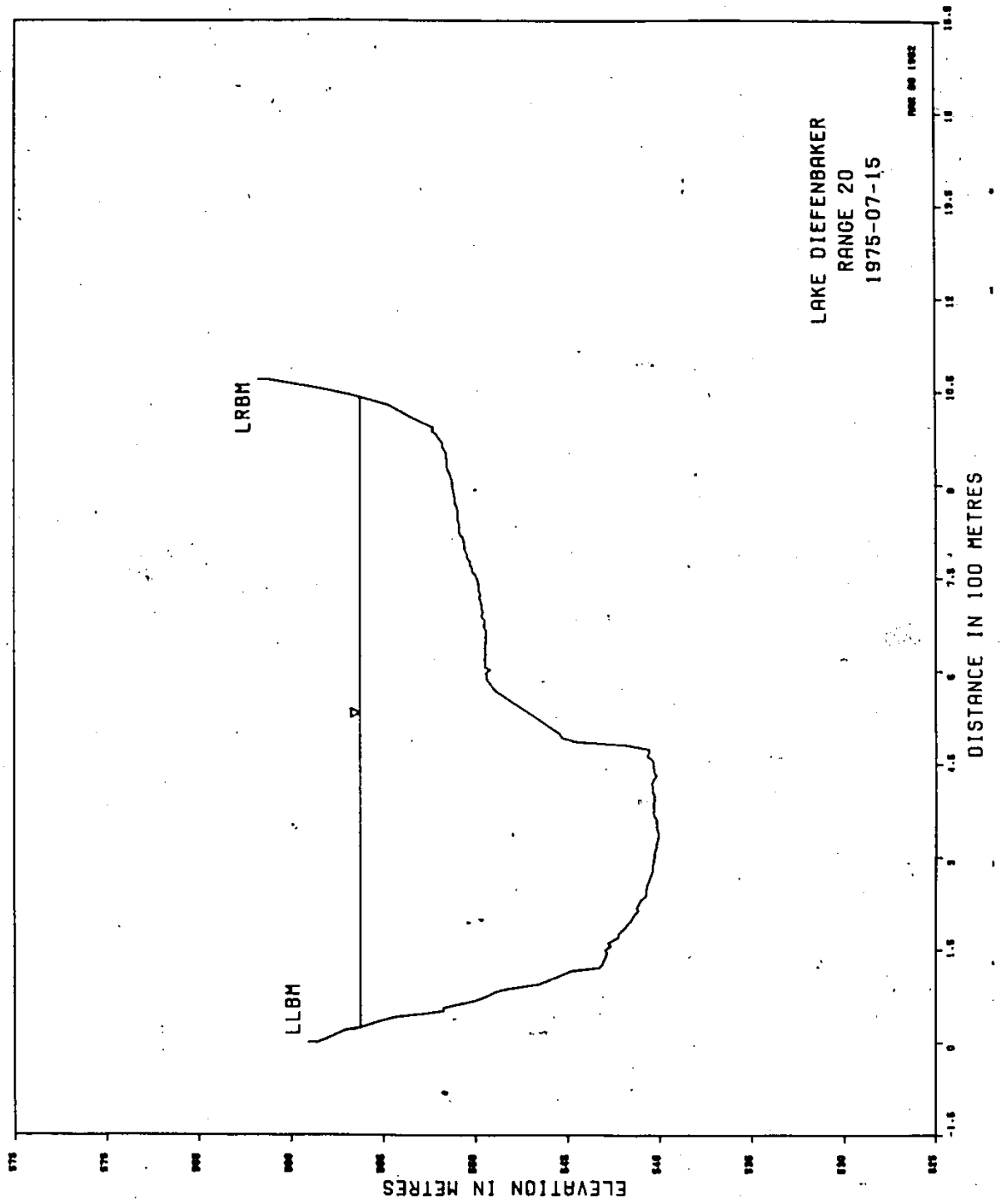
LAKE OPELUNDEN

PROFILE DATA

RANGE NO 20 SURVEY DATE 1972-06-06

STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS
0+00	559.03	LL-4	414+22	537.50		555+33	550.74				
0+00	554.55		425+20	539.40		574+47	550.83				
12+19	557.57		434+34	539.24		585+44	550.87				
19+51	557.02		444+40	539.34		595+20	550.99				
22+46	556.53		455+37	539.40		605+34	550.99				
30+48	555.02		464+21	540.78		613+18	550.99				
35+15	555.25		474+27	542.45		625+37	551.17				
44+00	554.22	HL	484+33	543.98		634+21	551.23				
44+50	554.22		495+30	544.92		645+18	551.27				
58+22	551.60		504+44	544.75		654+33	551.38				
62+19	550.65		514+20	545.50		664+39	551.60				
74+37	549.46		524+26	545.93		675+36	551.60				
85+14	548.58		534+31	546.36		684+20	551.75				
94+19	548.67		544+37	547.48		694+26	552.05				
104+24	548.87		554+43	548.43		704+32	552.51				
115+21	544.78		565+40	548.43		713+46	552.97				
126+19	542.91		576+38	548.66		724+20	553.43				
135+33	542.45		584+30	548.85		734+25	553.52				
144+17	542.16		594+36	547.07		742+00	554.22	HL			
155+45	542.15		604+33	549.16		752+60	554.22				
165+20	541.93		614+26	549.11		763+84	555.89				
175+26	541.72		625+45	549.16		774+51	557.51				
183+19	541.46		634+27	549.13		784+66	559.09				
195+38	541.20		645+26	549.16		794+02	561.14				
204+22	540.93		655+32	549.13		804+02	561.67	LMH			
215+19	540.72		665+38	549.13							
224+33	540.47		674+22	549.16							
234+39	540.32		684+26	549.19							
245+36	540.17		695+25	549.31							
254+20	540.11		705+31	549.22							
264+26	539.85		715+37	549.46							
274+32	539.77		724+20	549.43							
284+34	539.47		734+26	549.55							
294+44	539.20		744+24	549.62							
305+41	539.25		754+38	549.74							
314+25	539.37		764+22	549.67							
324+31	539.25		774+17	550.01							
334+37	539.10		784+23	550.13							
345+34	539.10		794+31	550.22							
354+18	539.17		803+45	550.35							
365+46	539.34		814+43	550.50							
375+21	539.23		825+40	550.53							
384+35	539.27		834+24	550.59							
394+41	539.56		844+10	550.69							
404+16	539.40		854+25	550.63							

SECTION SURVEY SECTION		LARGE DIFFERENCE		RANGE NO. - 20	
USC 10 1941, PAGE 1		SURVEYED 6/ 6/1972		MINIMUM ELEVATION = 539.10	
DITAMOUNT.		ELEVATION - AREA TABLE		ASSUMED MINIMUM DATUM = 540.00	
ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
540.00	116.5	552.50	6251.3		
540.50	225.7	553.00	6729.5		
541.00	352.3	553.50	7212.7		
541.50	492.2	554.00	7699.6		
542.00	537.0	554.50	8188.9		
542.50	773.1	555.00	8682.7		
543.00	970.3	555.50	9180.9		
543.50	1147.2	556.00	9683.1		
544.00	1327.9	556.50	10189.7		
544.50	1512.7	557.00	10700.7		
545.00	1702.9	557.50	11215.7		
545.50	1704.1	558.00	11735.7		
546.00	2113.0	558.50	12260.2		
546.50	2327.6	559.00	12786.1		
547.00	2546.7				
547.50	2769.7				
548.00	2995.5				
548.50	3227.5				
549.00	3477.8				
549.50	3773.0				
550.00	4114.0				
550.50	4474.3				
551.00	4874.9				
551.50	5317.6				
552.00	5777.2				



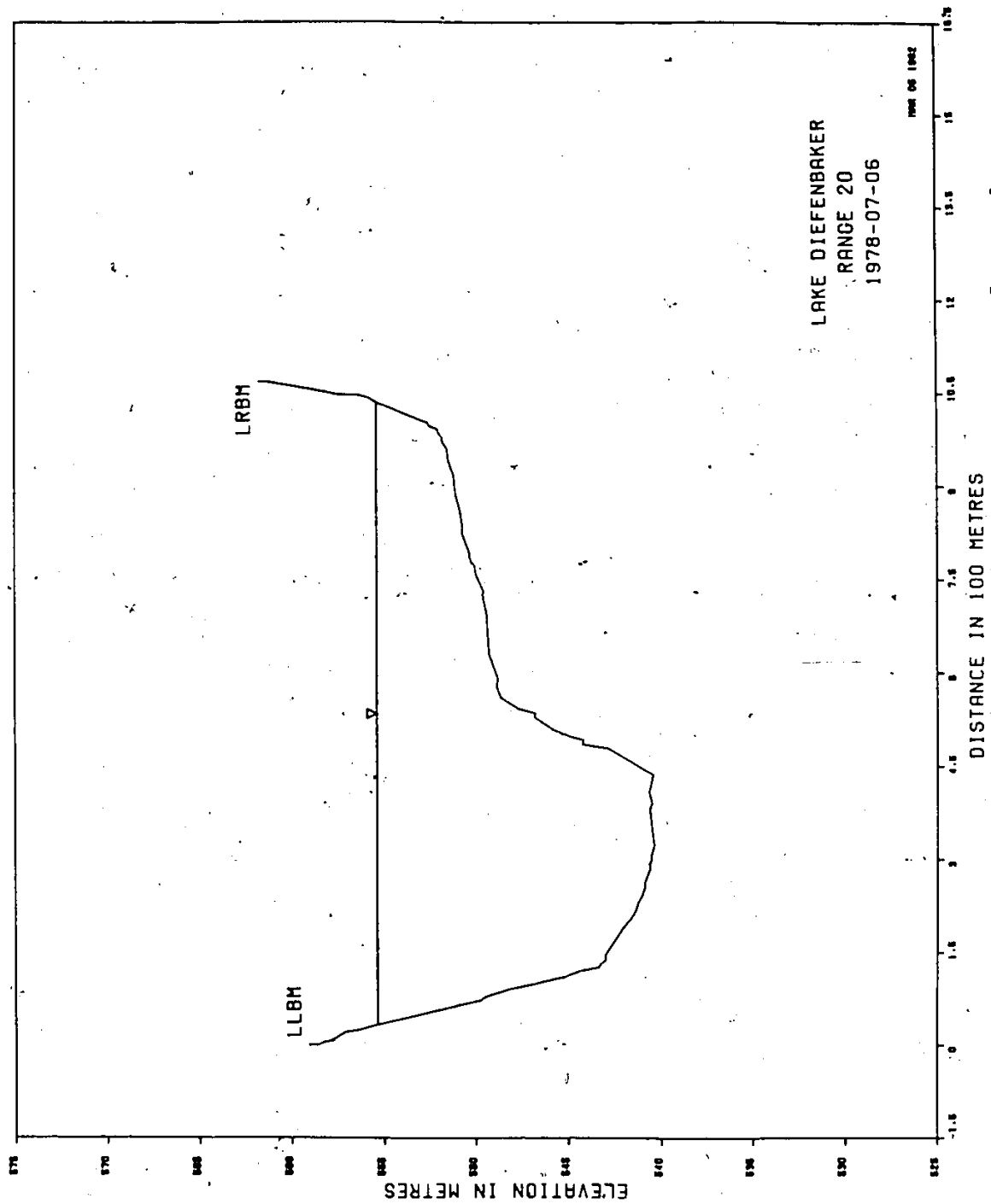
WATER SURVEY OF CANADA
MAR 08 1952 P45-1
OTTAWA, ONT.

LAKE UGIEFENBAKER

PROFILE DATA											
RAHUE NO 20			SURVEY DATE 1975-07-15								
STA	ELEV	RKKS	STA	ELEV	RKKS	STA	ELEV	RKKS	STA	ELEV	RKKS
0+00	559.05	LLRM	266+00	540.47		862+00	551.09				
0+00	558.55		273+00	540.37		869+00	551.14				
5+50	555.07		279+00	540.34		896+00	551.19				
12+20	557.58		285+00	540.34		903+00	551.19				
19+80	557.06		292+00	540.29		908+00	551.24				
21+90	556.65		299+00	540.24		917+00	551.34				
24+00	556.19	WL	305+00	540.24		923+00	551.44				
34+00	555.19		311+00	540.14		928+00	551.49				
41+00	554.34		319+00	540.14		934+00	551.49				
51+00	551.69		321+00	540.14		939+00	551.49				
56+00	551.69		331+00	540.04		944+00	551.54				
62+00	550.83		338+00	540.04		950+00	551.54				
67+00	550.09		343+00	540.04		960+00	551.74				
75+00	549.39		348+00	540.14		966+00	551.74				
82+00	548.89		355+00	540.14		973+00	551.94				
87+00	548.24		360+00	540.14		980+00	552.09				
95+00	546.54		367+00	540.24		986+00	552.34				
102+00	545.94		371+00	540.24		991+00	552.24				
109+00	545.34		380+00	540.24		1009+00	553.54				
116+00	544.79		386+00	540.24		1016+00	553.94				
121+00	543.24		392+00	540.24		1021+00	554.29				
127+00	543.09		399+00	540.24		1027+00	554.64				
134+00	542.99		404+00	540.34		1040+00	556.19	WL			
140+00	542.89		411+00	540.34		1043+00	558.73				
145+00	542.44		417+00	540.34		1047+00	557.24				
150+00	542.94		424+00	540.24		1053+00	558.25				
156+00	542.64		430+00	540.14		1060+00	559.71				
161+00	542.79		435+00	540.24		1068+00	561.14				
170+00	542.24		442+00	540.24		1068+00	561.70	LRBM			
175+00	542.24		448+00	540.24		1073+00	550.24				
180+00	542.09		455+00	540.14		1081+00	550.39				
185+00	541.89		462+00	540.64		1086+00	550.39				
191+00	541.74		467+00	540.24		1095+00	550.54				
197+00	541.54		473+00	540.24		1102+00	550.54				
203+00	541.44		480+00	541.84		1109+00	550.54				
208+00	541.24		485+00	542.57		1115+00	550.64				
213+00	541.14		492+00	545.27		1120+00	550.74				
218+00	541.24		498+00	547.37		1125+00	550.84				
224+00	541.09		507+00	548.84		1131+00	550.79				
230+00	540.39		512+00	548.99		1142+00	550.89				
236+00	540.74		519+00	549.19		1147+00	550.99				
241+00	540.64		526+00	549.14		1152+00	550.89				
247+00	540.54		531+00	549.14		1162+00	550.94				
255+00	540.64		536+00	549.34		1168+00	551.04				
261+00	540.54		541+00	549.14		1173+00	551.04				

SEDIMENT SURVEY SECTION		LAKE OLENGAK		RANGE NO. - 20	
MAR 8 1982, PAGE 1				SURVEYED 15/ 7/1975	
				MINIMUM ELEVATION = 540.04	
				ASSURED MINIMUM DATUM = 540.50	
				ELEVATION - AREA TABLE *	

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
540.50	43.8	551.00	8171.9				
541.00	133.5	553.50	6853.8				
541.50	295.4	554.00	7338.6				
542.00	480.0	554.50	7828.2				
542.50	513.8	555.00	8323.3				
543.00	757.7	555.50	8822.7				
543.50	912.4	556.00	9326.6				
544.00	1119.5	556.50	9834.9				
544.50	1302.9	557.00	10346.1				
545.00	1488.7	557.50	10861.1				
545.50	1680.3	558.00	11381.2				
546.00	1850.8	558.50	11906.0				
546.50	2033.2	559.00	12433.8				
547.00	2304.8						
547.50	2525.6						
548.00	2728.5						
548.50	2989.8						
549.00	3210.0						
549.50	3471.5						
550.00	3817.5						
550.50	4171.0						
551.00	4523.0						
551.50	4975.1						
552.00	5424.0						
552.50	5875.5						



LAKE DUFFERINAKER

PROFILE DATA

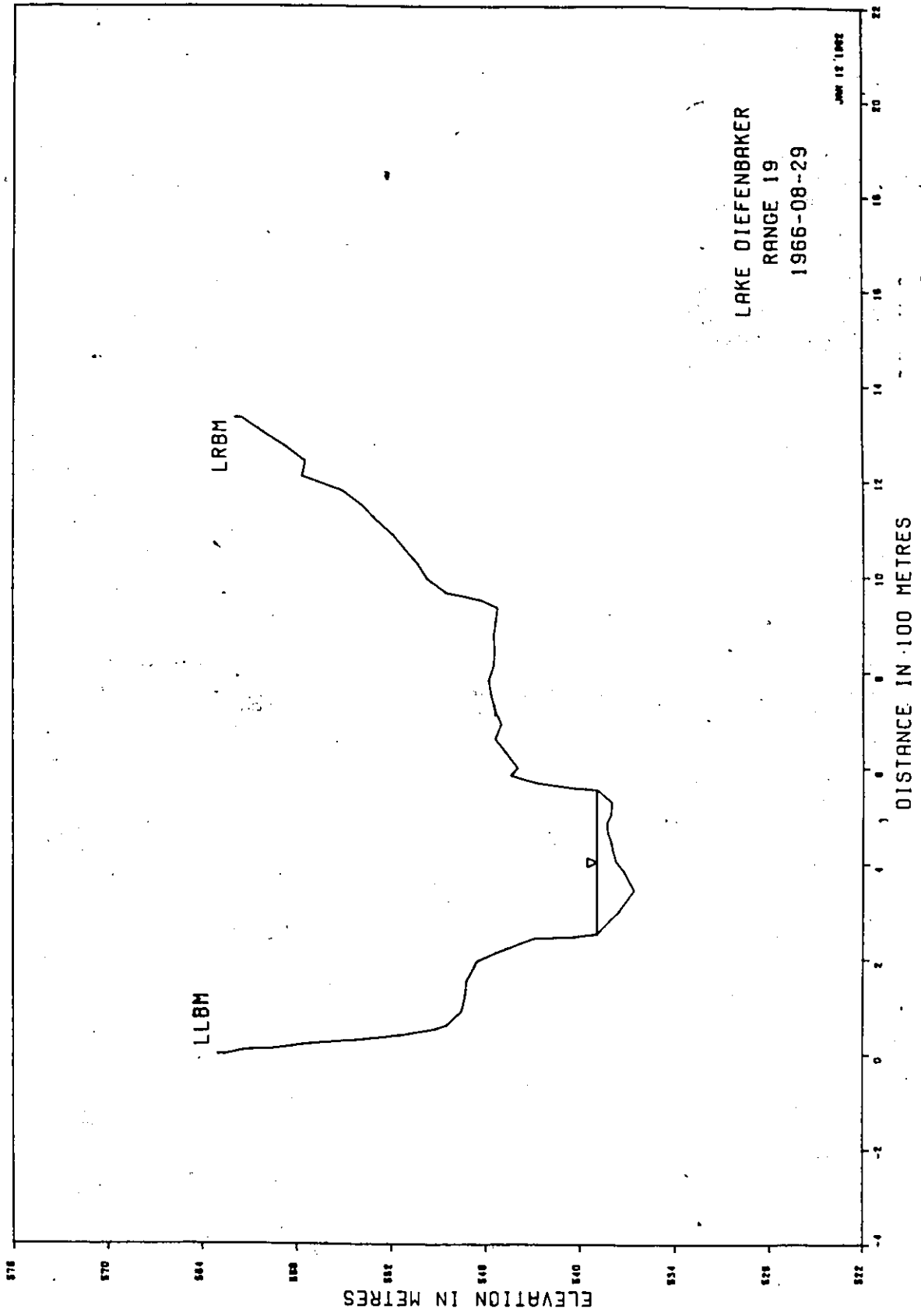
RANGE NO 20 SURVEY DATE 1978-07-06

STA	ELEV	RMS	STA	ELEV	RMS	STA	ELEV	RMS
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0+00	558.56		426+00	540.47		1034+00	555.36	WL
5+00	558.16		436+00	540.42		1042+00	555.77	
7+00	557.73		479+00	542.87		1047+00	556.34	
8+00	557.84		485+00	544.22		1048+00	557.47	
9+00	557.74		492+00	544.17		1049+00	557.66	
21+00	557.04		498+00	544.92		1054+00	558.50	
22+00	556.79		504+00	545.42		1060+00	559.64	
23+00	556.55		510+00	545.87		1068+00	561.21	
23+50	556.40		529+00	546.81		1068+00	561.69	LRBM
32+50	555.36	WL	535+00	546.77				
73+00	549.77		542+00	547.67				
79+00	549.47		560+00	548.62				
90+00	548.26		578+00	548.67				
112+00	548.12		589+00	548.77				
120+00	548.47		596+00	548.87				
127+00	548.37		630+00	549.27				
132+00	548.27		674+00	549.37				
138+00	548.02		684+00	549.37				
146+00	548.02		689+00	549.37				
179+00	548.32		725+00	549.62				
186+00	548.17		730+00	549.56				
192+00	548.02		758+00	549.97				
205+00	548.62		762+00	550.02				
212+00	548.47		771+00	550.02				
218+00	548.37		778+00	550.22				
226+00	548.27		788+00	550.32				
231+00	548.22		793+00	550.32				
241+00	548.02		821+00	550.67				
254+00	548.37		826+00	550.62				
261+00	548.47		831+00	550.67				
270+00	548.77		861+00	550.62				
278+00	548.67		897+00	551.07				
285+00	548.57		917+00	551.17				
292+00	548.62		922+00	551.22				
297+00	548.52		928+00	551.32				
304+00	548.52		933+00	551.37				
310+00	548.47		941+00	551.47				
316+00	548.42		948+00	551.52				
323+00	548.37		964+00	551.62				
331+00	548.42		970+00	551.77				
375+00	548.57		977+00	551.82				
383+00	548.57		984+00	551.77				
389+00	548.47		997+00	552.07				
402+00	548.57		997+00	552.47				

DATE 12/17/77

RANGE MU.- 20
SURVEYED 6/ 7/1978
MINIMUM ELEVATION = 540.37
ASSUMED MINIMUM DATUM = 540.30

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
540.50	1.6	551.00	6284.4				
541.00	45.8	553.50	6770.6				
541.50	177.6	554.00	7256.6				
542.00	326.0	554.50	7747.2				
542.50	469.6	555.00	8242.5				
543.00	628.6	555.50	8742.6				
543.50	801.1	556.00	9248.8				
544.00	982.2	556.50	9759.2				
544.50	1166.5	557.00	10271.8				
545.00	1356.6	557.50	10786.8				
545.50	1552.0	558.00	11307.1				
546.00	1752.4	558.50	11831.5				
546.50	1952.2	559.00	12359.2				
547.00	2171.9						
547.50	2394.8						
548.00	2619.9						
548.50	2851.4						
549.00	3097.0						
549.50	3379.5						
550.00	3712.7						
550.50	4070.4						
551.00	4452.2						
551.50	4847.2						
552.00	5241.6						
552.50	5614.0						



LAKE DUFFERIN

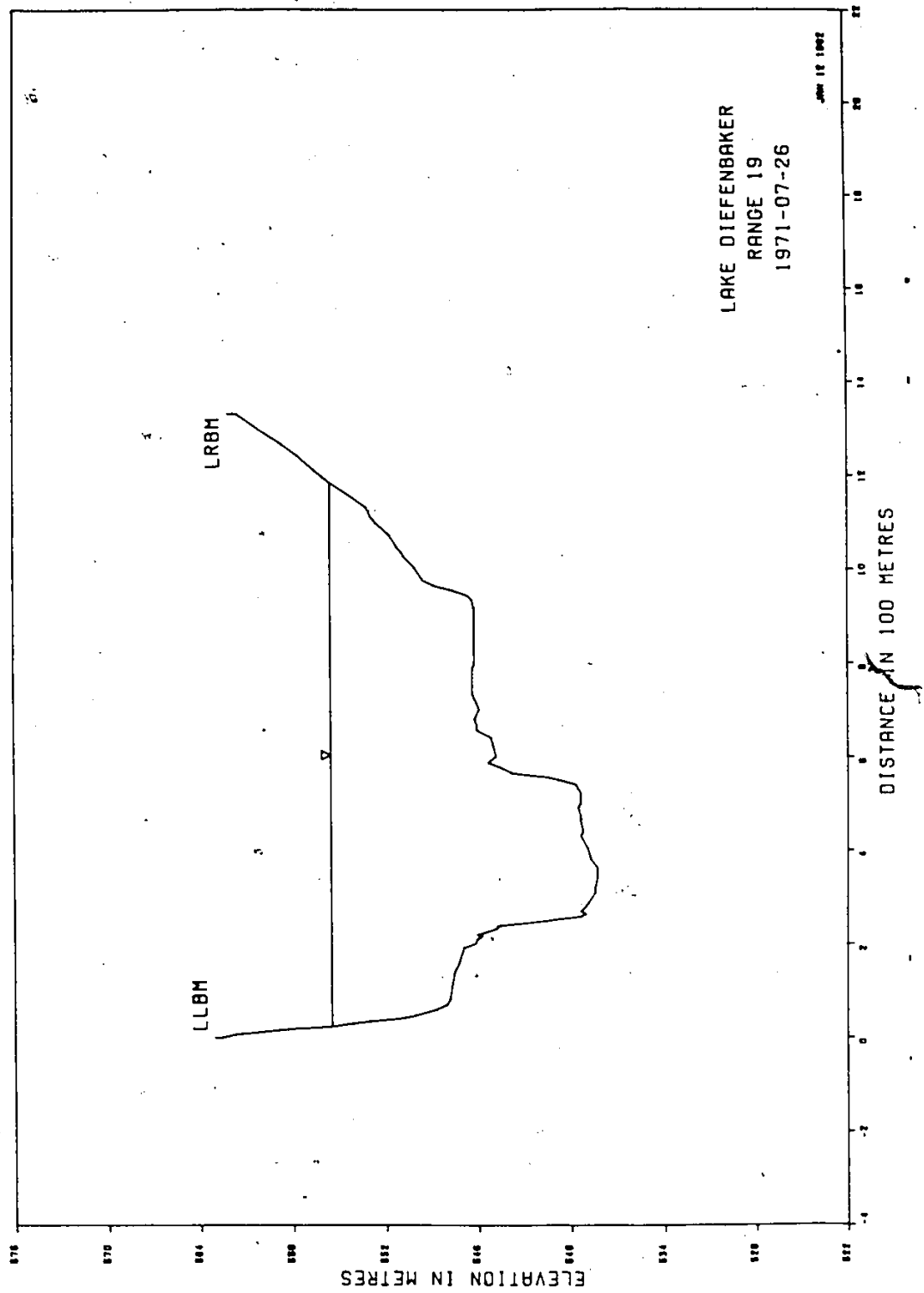
PROFILE DATA

RANGE YU 19 SURVEY DATE 1966-J8-29

STA ELEV RMKS STA ELEV RMKS

0+00	563.00	LLBM	873.25	545.50					
0+00	562.54		903.73	545.38					
9+14	561.11		934.21	545.29					
10+87	559.58		943.45	546.26					
19+51	557.60		964.89	548.52					
24+38	556.05		995.17	549.74					
30+48	553.79		1025.65	550.32					
39+62	551.41		1056.13	551.14					
53+34	549.16		1086.61	551.93					
60+96	548.46		1117.07	552.97					
91+94	547.51		1147.57	553.85					
121+22	547.30		1178.05	555.10					
152+40	547.21		1205.53	557.63					
182+88	546.72		1239.01	557.62					
195+07	546.54		1269.49	558.67					
213+36	545.32		1299.97	560.13					
243+84	542.85		1330.45	561.47					
246+59	540.32		1330.45	561.90					LRBM
252+00	538.72	HL							
252+68	538.92								
281+03	536.07								
297+79	537.55								
343+20	536.54								
381+30	537.15								
405+28	537.70								
428+55	537.91								
445+31	538.00								
463+60	538.22								
483+41	538.28								
501+22	538.00								
527+61	537.94								
554+00	538.72	HL							
554+74	538.92								
558+39	540.47								
565+45	542.76								
581+69	544.37								
598+73	543.75								
629+41	544.65								
659+59	543.38								
690+37	545.01								
720+95	545.41								
751+33	545.65								
781+81	545.81								
812+29	545.50								
842+77	545.44								

SEDIMENT SURVEY SECTION				LAKE OJIBEWAKER				RANGE NO. - 17			
DEC 18 1981, PAGE 1				SURVEYED 29/ 8/1986				MINIMUM ELEVATION - 536.54			
DITAMA,ONT.				ELEVATION - AREA TABLE				ASSUMED MINIMUM DATUM - 537.03			
ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
537.00	11.4	549.50	5952.1								
537.50	48.5	550.00	6426.0								
538.00	115.4	550.50	6913.4								
538.50	231.1	551.00	7412.5								
539.00	376.7	551.50	7922.4								
539.50	528.8	552.00	8443.0								
540.00	682.6	552.50	8972.8								
540.50	837.9	553.00	9510.9								
541.00	998.5	553.50	10058.0								
541.50	1152.5	554.00	10616.6								
542.00	1311.9	554.50	11178.6								
542.50	1472.8	555.00	11749.4								
543.00	1635.3	555.50	12325.9								
543.50	1802.4	556.00	12906.3								
544.00	1975.1	556.50	13490.3								
544.50	2164.7	557.00	14078.1								
545.00	2371.4	557.50	14670.2								
545.50	2619.5	558.00	15282.9								
546.00	2973.8	558.50	15904.1								
546.50	3348.5	559.00	16532.4								
547.00	3734.4	559.50	17167.1								
547.50	4145.3	560.00	17807.9								
548.00	4583.1	560.50	18454.3								
548.50	5030.7	561.00	19106.5								
549.00	5497.1	561.50	19765.1								



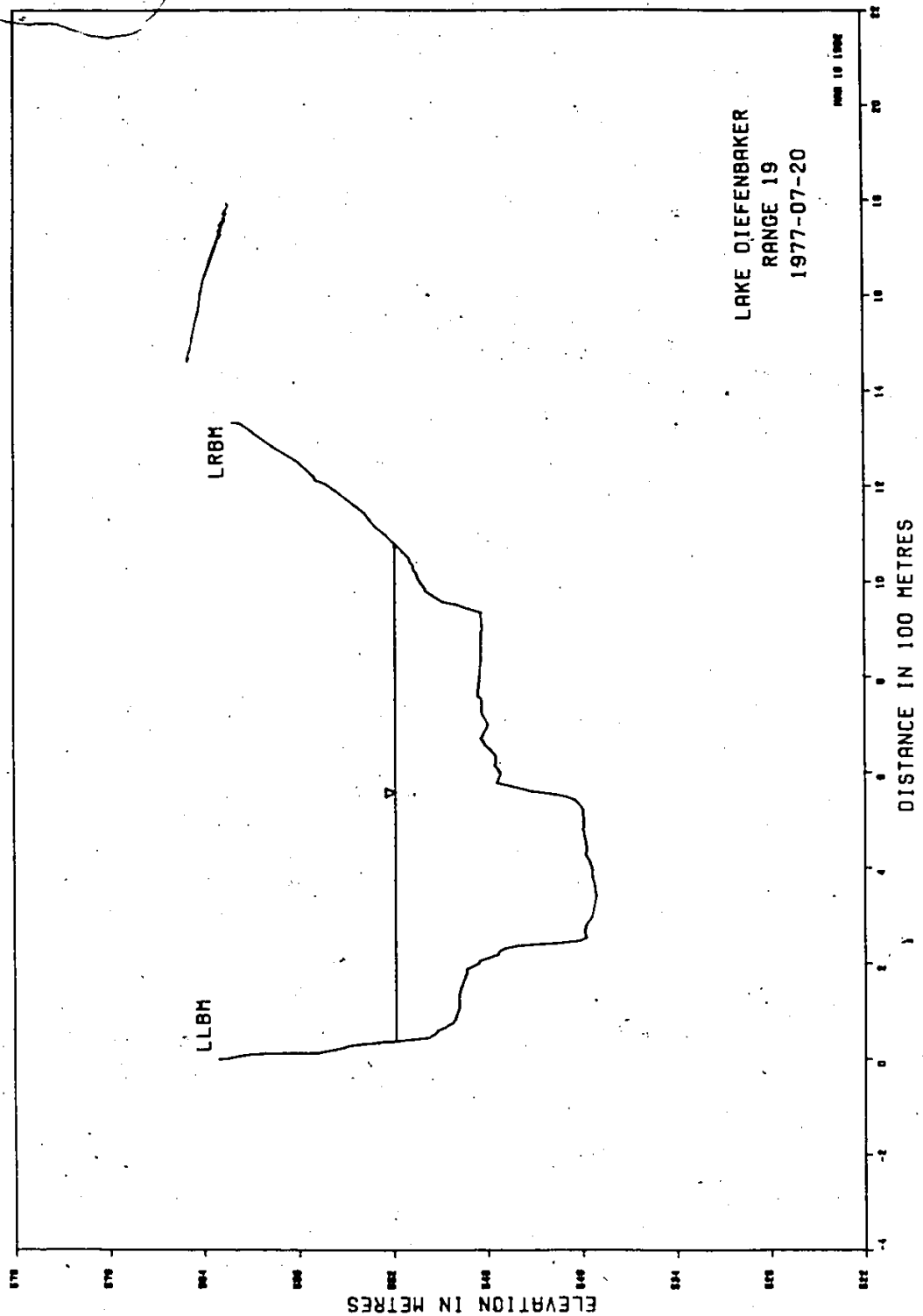
AT - 01 39671

SURVEYED 26/ 7/1971

520555 - M011VA3

DATE - 537.03

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
539.00	62.9	551.90	7119.3				
539.50	158.7	552.00	7632.8				
540.00	306.7	552.55	8158.7				
540.50	456.4	553.00	8699.0				
541.00	609.1	553.50	9242.7				
541.50	757.0	554.00	9799.2				
542.00	901.1	554.50	10362.7				
542.50	1057.0	555.00	10932.8				
543.00	1214.8	555.50	11509.6				
543.50	1374.4	556.00	12093.4				
544.00	1536.2	556.50	12684.4				
544.50	1702.5	557.00	13283.0				
545.00	1878.2	557.50	13889.2				
545.50	2083.9	558.00	14502.5				
546.00	2351.2	558.50	15122.7				
546.50	2616.8	559.00	15749.7				
547.00	2922.0	559.50	16382.8				
547.50	3306.6	560.00	17022.1				
548.00	3813.0	560.50	17667.6				
548.50	4258.9	561.00	18319.7				
549.00	4710.6	561.50	18978.3				
549.50	5168.9	562.00	19640.3				
550.00	5637.2						
550.50	6118.3						
551.00	6612.4						



LAKE DIEFENBAKER

PROFILE DATA

RANGE NO 19 SURVEY DATE 1977-07-20

STA

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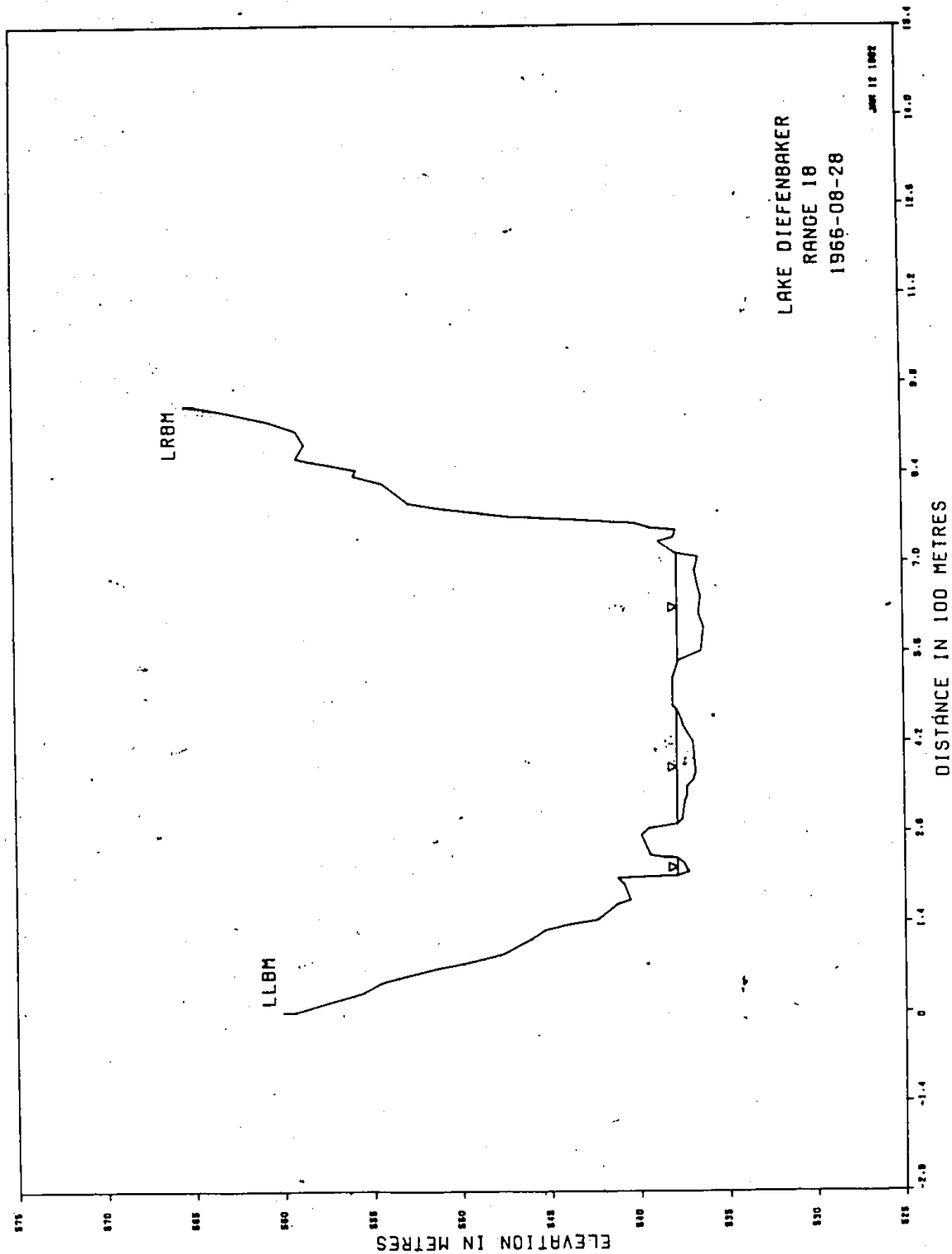
RMS

STA

ELEV

RANGE NO.-	19
SURVEYED 20/	7/1977
MINIMUM ELEVATION =	539.10
ASSUMED MINIMUM DATUM =	539.50

SEDIMENT SURVEY SECTION MAR 10 1982, PAGE 1, OTTAWA,ONT.				LAKE DIEFFENBAKER				RANGE NO.- 19 SURVEYED 20/ 7/1977 MINIMUM ELEVATION = 539.10 ASSUMED MINIMUM DATUM = 539.50			
ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
539.50	28.3	532.00	7355.0								
540.00	120.4	532.50	7882.6								
540.50	264.2	533.00	8417.9								
541.00	419.6	533.50	8941.7								
541.50	568.1	534.00	9516.3								
542.00	723.8	534.50	10078.8								
542.50	881.2	535.00	10648.9								
543.00	1040.2	535.50	11227.7								
543.50	1201.0	536.00	11814.4								
544.00	1364.4	536.50	12408.3								
544.50	1530.9	537.00	13007.5								
545.00	1701.3	537.50	13615.1								
545.50	1888.7	538.00	14239.3								
546.00	2105.6	538.50	14891.8								
546.50	2382.0	539.00	15478.6								
547.00	2732.1	539.50	16110.5								
547.50	3133.4	540.00	16746.0								
548.00	3543.9	540.50	17391.5								
548.50	3982.1	541.00	18041.5								
549.00	4427.5	541.50	18698.1								
549.50	4883.0	542.00	19360.0								
550.00	5349.7										
550.50	5829.3										
551.00	6326.2										
551.50	6836.0										

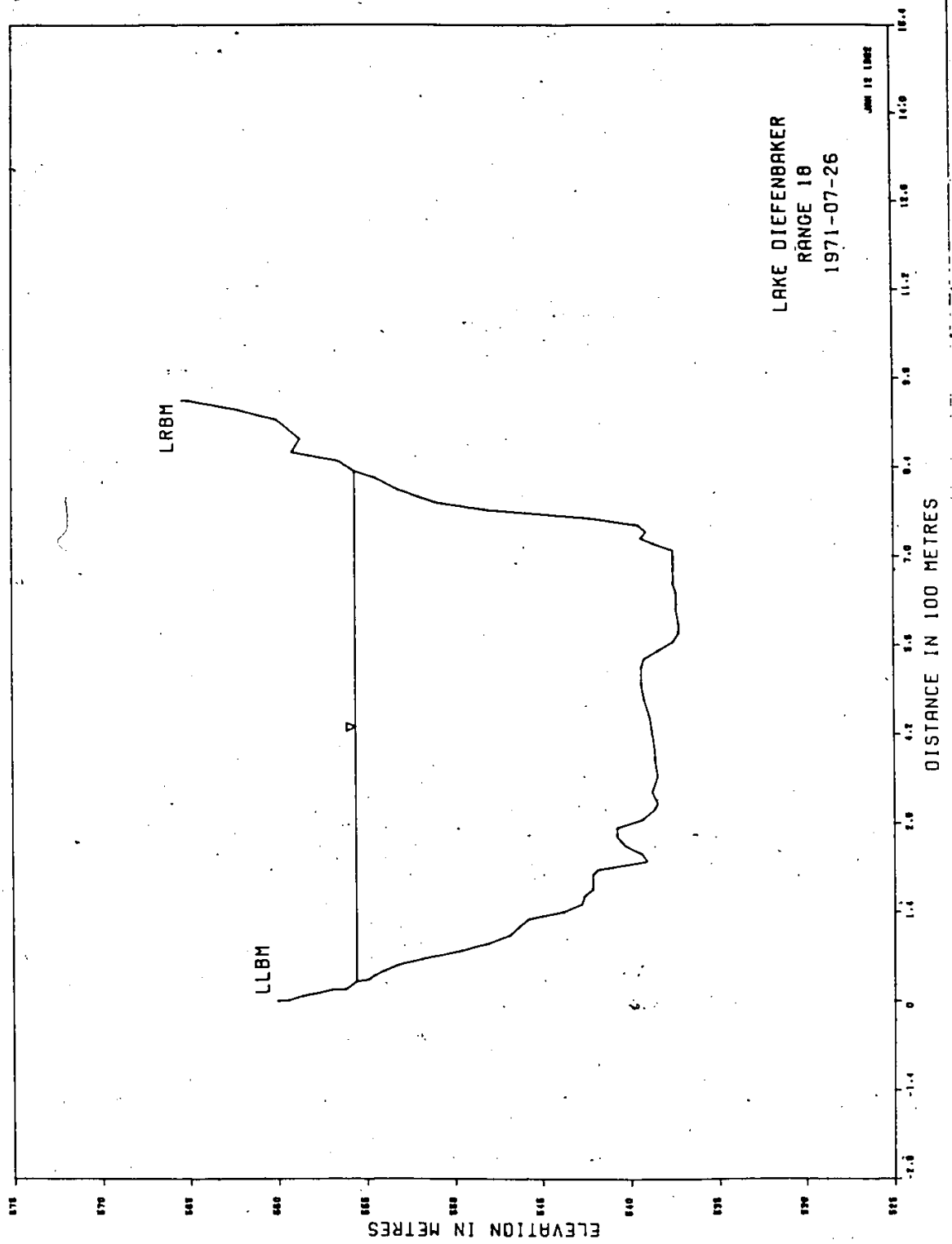


LAKE JIEFENGAKEN

PROFILE DATA

RANGE NO 10 SURVEY DATE 1966-J0-28

STA	ELEV	RKKS	STA	ELEV	RKKS	STA	ELEV	RKKS
0+00	560.01	LLSN	475+47	537.97				
0+00	559.37		518+16	537.97				
30+48	555.56		542+54	537.67	ML			
43+72	554.49		545+00	537.67				
53+34	553.52		545+39	537.67				
68+58	551.32		560+93	536.36				
75+20	549.85		597+10	536.20				
83+32	548.73		618+74	536.48				
91+44	547.57		644+96	536.35				
114+30	546.02		664+46	536.54				
128+02	545.26		685+50	536.67				
132+16	543.79		707+14	536.48				
143+26	542.33		712+09	537.67	ML			
167+64	541.17		712+93	537.67				
173+74	540.44		731+22	538.73				
198+12	540.78		737+31	537.95				
208+18	541.14		749+53	537.70				
209+40	539.66		752+55	539.13				
211+00	537.76	ML	760+17	540.01				
211+53	537.76		765+27	543.92				
217+63	537.12		770+23	546.00				
227+50	537.27		770+84	547.02				
230+12	537.39		776+94	548.61				
238+00	537.76	ML	783+03	550.65				
238+76	537.76		792+18	552.75				
240+18	535.09		822+06	554.16				
240+49	535.52		834+65	555.80				
243+84	533.31		843+74	555.65				
274+32	539.60		857+71	556.33				
285+29	539.40		862+28	559.00				
291+00	537.76	ML	883+52	556.55				
292+00	537.76		904+95	559.00				
299+01	537.48		918+67	560.44				
328+57	537.33		933+91	562.78				
334+98	537.21		944+58	564.82				
349+61	537.21		944+58	565.31	LRM			
361+49	536.81							
364+54	536.81							
370+94	536.77							
399+59	536.81							
420+01	535.87							
445+31	537.42							
452+73	537.48							
470+00	537.76	ML						
470+31	537.76							



WATER SURVEY OF CANADA
JAN 12 1982 PAGE 1
OTTAWA, ONT.

LAKE OJIBENHAKER

PROFILE DATA

CANAL NO 18 SURVEY DATE 1971-07-26

STA ELEV RMKS STA ELEV RMKS STA ELEV RMKS STA ELEV RMKS

0+00	563.01	LRM	516.61	517.35	
0+00	559.46		641.60	517.36	
7+62	555.55		955.62	517.51	
17+95	556.81		676.06	517.51	
18+59	556.08		697.63	517.51	
30+00	555.50	HL	698.60	517.51	
32+78	555.50		708.65	517.51	
33+53	554.87		718.72	518.54	
39+62	554.56		727.56	519.34	
47+55	553.97		737.62	519.04	
56+69	553.21		748.51	519.50	
66+85	551.86		759.35	518.24	
78+64	549.71		772.67	518.03	
90+53	549.03		784.56	550.93	
103+53	548.81		792.48	551.84	
115+52	545.35		804.67	553.06	
126+63	545.74		823.57	554.43	
140+51	543.76		831.00	555.50	HL
172+80	542.70		833.07	555.50	
165+51	542.54		848.07	556.35	
175+56	542.04		862.58	559.03	
198+73	542.09		893.62	558.54	
206+65	541.78		914.10	559.95	
219+46	539.04		927.34	562.05	
231+65	539.35		944.55	564.87	
244+45	540.26		944.58	565.31	LRM
258+47	540.72				
272+49	540.72				
284+68	539.34				
301+75	538.58				
310+57	538.83				
328+57	538.73				
352+45	538.43				
378+67	538.58				
391+67	533.56				
420+62	533.73				
447+45	538.59				
473+66	539.14				
497+43	539.34				
523+65	537.34				
537+67	537.19				
549+55	516.43				
584+89	537.51				
575+51	537.21				
592+53	537.21				

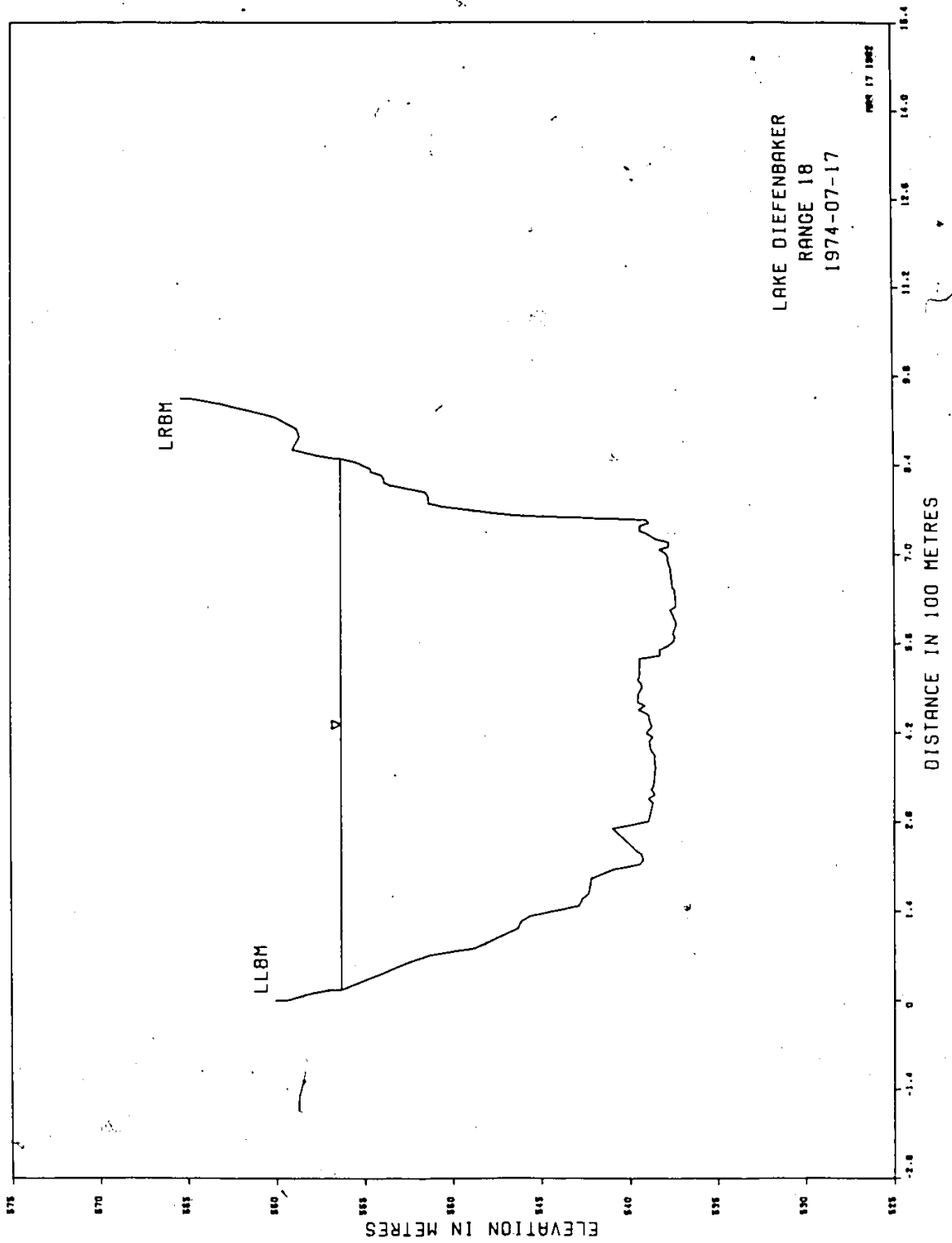
SECTION SURVEY SECTION
DEC 18 1981, PAGE 1
OTTAWA, ONT.

LAKE DUFFERIN

RANGE M-11
SURVEYED 26/ 7/1971
MINIMUM ELEVATION = 537.21
ASSUMED MINIMUM DATUM = 538.00

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
538.00	87.8	550.50	7391.6		
538.50	172.3	551.00	7747.2		
539.00	317.2	551.50	8106.0		
539.50	525.9	552.00	8468.4		
540.00	770.7	552.50	8834.9		
540.50	1024.0	553.00	9205.7		
541.00	1291.1	553.50	9581.3		
541.50	1564.3	554.00	9963.3		
542.00	1840.3	554.50	10351.9		
542.50	2132.0	555.00	10746.8		
543.00	2435.1	555.50	11146.3		
543.50	2742.9	556.00	11552.3		
544.00	3053.9	556.50	11966.2		
544.50	3367.1	557.00	12382.7		
545.00	3682.5	557.50	12801.7		
545.50	3999.9	558.00	13223.5		
546.00	4319.8	558.50	13648.0		
546.50	4645.3	559.00	14081.8		
547.00	4977.3	559.50	14530.1		
547.50	5313.3	560.00	14985.0		
548.00	5652.6				
548.50	5994.9				
549.00	6340.0				
549.50	6687.9				
550.00	7039.5				



LAKE DIEFENBAKER

PROFILE DATA

1974-07-17

RANGE NO 18

STA

ELEV

RMKS

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RMKS

0.00	560.01	LLBM	473.00	539.51	775.00	550.56			
0.00	559.44		479.00	539.51	780.00	551.31			
7.60	558.52		491.00	539.26	786.00	551.31			
12.50	557.85		496.00	539.31	792.00	551.36			
16.80	557.00		503.00	539.31	798.00	551.51			
17.40	556.32	ML	508.00	539.41	808.00	553.51			
59.00	552.61		516.00	539.41	813.00	553.86			
71.00	551.41		522.00	539.41	818.00	553.86			
83.00	548.71		528.00	539.41	824.00	554.01			
114.00	546.31		536.00	539.41	829.00	554.56			
125.00	546.11		541.00	538.26	834.00	554.61			
133.00	545.66		550.00	538.26	839.00	555.01			
149.00	542.86		557.00	537.76	844.00	555.41			
160.00	542.66		564.00	537.66	849.80	556.32	ML		
168.00	542.31		571.00	537.41	850.40	556.72			
183.00	542.21		576.00	537.51	855.00	557.67			
192.00	542.16		591.00	537.31	864.10	559.01			
206.00	540.91		607.00	537.56	883.90	558.61			
214.00	539.41		612.00	537.66	896.10	558.77			
220.00	539.21		618.00	537.36	914.40	559.95			
229.00	539.31		624.00	537.36	926.60	561.66			
235.00	539.61		631.00	537.36	935.70	563.06			
270.00	540.96		637.00	537.41	944.60	564.80			
281.00	538.91		643.00	537.51	944.60	565.31	LRBM		
287.00	538.86		649.00	537.56					
310.00	538.66		655.00	537.56					
316.00	538.91		662.00	537.61					
323.00	538.56		667.00	537.61					
331.00	538.76		673.00	537.66					
337.00	538.61		678.00	537.66					
366.00	538.51		685.00	537.76					
372.00	538.56		690.00	537.81					
385.00	538.56		695.00	537.81					
390.00	538.71		701.00	537.91					
395.00	538.81		707.00	538.26					
407.00	538.86		712.00	537.76					
413.00	538.66		719.00	537.76					
419.00	539.01		724.00	538.51					
430.00	538.71		731.00	538.91					
435.00	538.81		737.00	539.41					
441.00	538.86		744.00	539.36					
446.00	538.91		749.00	538.86					
456.00	539.46		754.00	539.06					
462.00	539.11		761.00	546.41					
468.00	539.51		769.00	546.81					

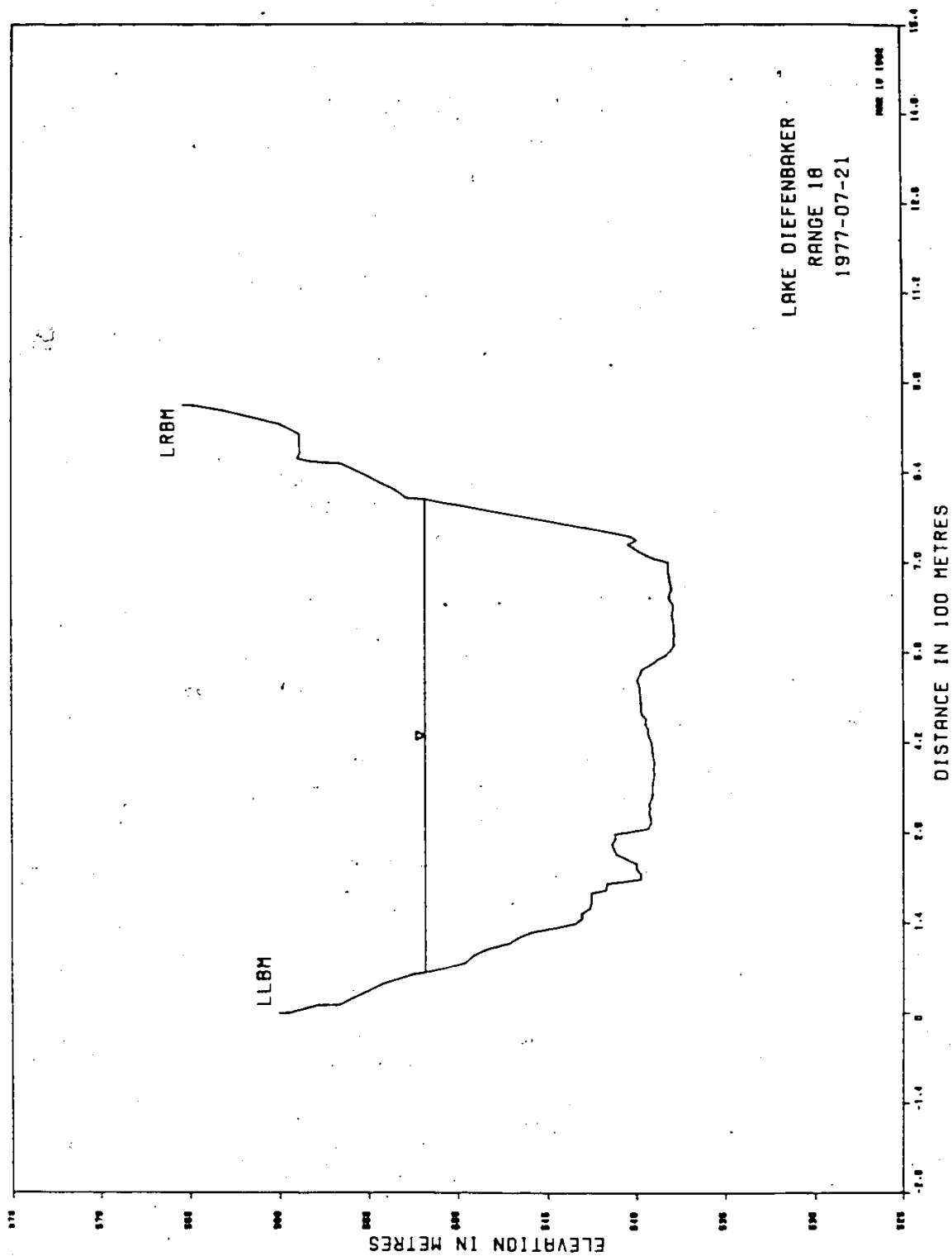
SEDIMENT SURVEY SECTION
MAR 17 1982, PAGE 1
OTTAWA, ONT.

LAKE DUFFENBARGER

RANGE NO. - 18
SURVEYED 17/ 7/1974
MINIMUM ELEVATION - 537.31
ASSUMED MINIMUM DATUM - 538.00

.....
* ELEVATION - AREA TABLE *
.....

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
538.00	69.7	550.50	7330.7		
538.50	156.7	551.00	7681.8		
539.00	299.0	551.50	8038.2		
539.50	502.1	552.00	8404.0		
540.00	754.4	552.50	8773.5		
540.50	1016.1	553.00	9146.9		
541.00	1287.2	553.50	9524.4		
541.50	1564.1	554.00	9907.9		
542.00	1844.1	554.50	10300.7		
542.50	2133.3	555.00	10700.7		
543.00	2434.5	555.50	11107.0		
543.50	2740.1	556.00	11518.2		
544.00	3047.4	556.50	11933.5		
544.50	3356.3	557.00	12350.4		
545.00	3666.9	557.50	12769.1		
545.50	3979.2	558.00	13190.4		
546.00	4293.8	558.50	13615.1		
546.50	4615.1	559.00	14051.4		
547.00	4942.0	559.50	14502.3		
547.50	5273.0	560.00	14958.0		
548.00	5608.0				
548.50	5947.1				
549.00	6289.4				
549.50	6634.8				
550.00	6981.8				



LAKE DIEFFENBACHER

PROFILE DATA

RANGE MD 10 SURVEY DATE 1977-07-21									
STA	ELEV	RMKS	STA	ELEV	RMKS	STA	ELEV	RMKS	STA
0.00	560.01	LLBM	379.00	539.01		799.80	552.79		
0.00	559.45		387.00	538.96		812.30	553.40		
7.60	558.53		402.00	539.06		823.00	559.22		
12.50	557.83		418.00	539.11		833.60	559.98		
12.80	556.64		433.00	539.31		853.40	556.48		
19.50	556.12		441.00	539.31		854.10	556.75		
30.50	555.33		448.00	539.46		854.40	557.51		
45.70	554.19		457.00	539.41		857.40	558.32		
61.00	552.46		464.00	539.66		861.10	558.93		
63.90	551.77	WL	472.00	539.71		868.70	558.76		
78.00	549.56		480.00	539.71		899.20	558.84		
90.00	549.06		502.00	539.76		914.30	559.91		
99.00	548.41		510.00	539.81		926.60	561.61		
104.00	547.76		517.00	539.91		935.70	563.05		
109.00	547.11		527.00	539.71		944.60	564.75		
117.00	546.61		533.00	539.66					
125.00	545.91		543.00	539.01					
139.00	543.41		548.00	538.81					
147.00	543.01		555.00	538.31					
154.00	543.06		563.00	538.01					
162.00	542.61		571.00	537.81					
170.00	542.51		578.00	537.86					
179.00	542.51		586.00	537.41					
186.00	542.51		601.00	537.86					
191.00	541.71		613.00	537.91					
201.00	541.61		618.00	537.95					
208.00	539.71		627.00	537.86					
216.00	539.71		635.00	537.91					
224.00	539.96		643.00	538.11					
232.00	539.96		648.00	538.11					
247.00	541.11		658.00	537.96					
255.00	541.26		669.00	538.06					
262.00	541.36		677.00	538.11					
270.00	541.16		685.00	538.16					
278.00	541.16		692.00	538.16					
286.00	539.31		700.00	538.16					
294.00	539.16		706.00	539.01					
301.00	539.16		712.00	539.46					
309.00	539.26		718.00	539.86					
317.00	539.21		723.00	540.11					
324.00	539.26		728.00	540.41					
333.00	539.11		735.00	539.91					
339.00	539.06		741.00	540.36					
354.00	538.96		746.00	541.26					
371.00	538.96		798.00	551.77	WL				

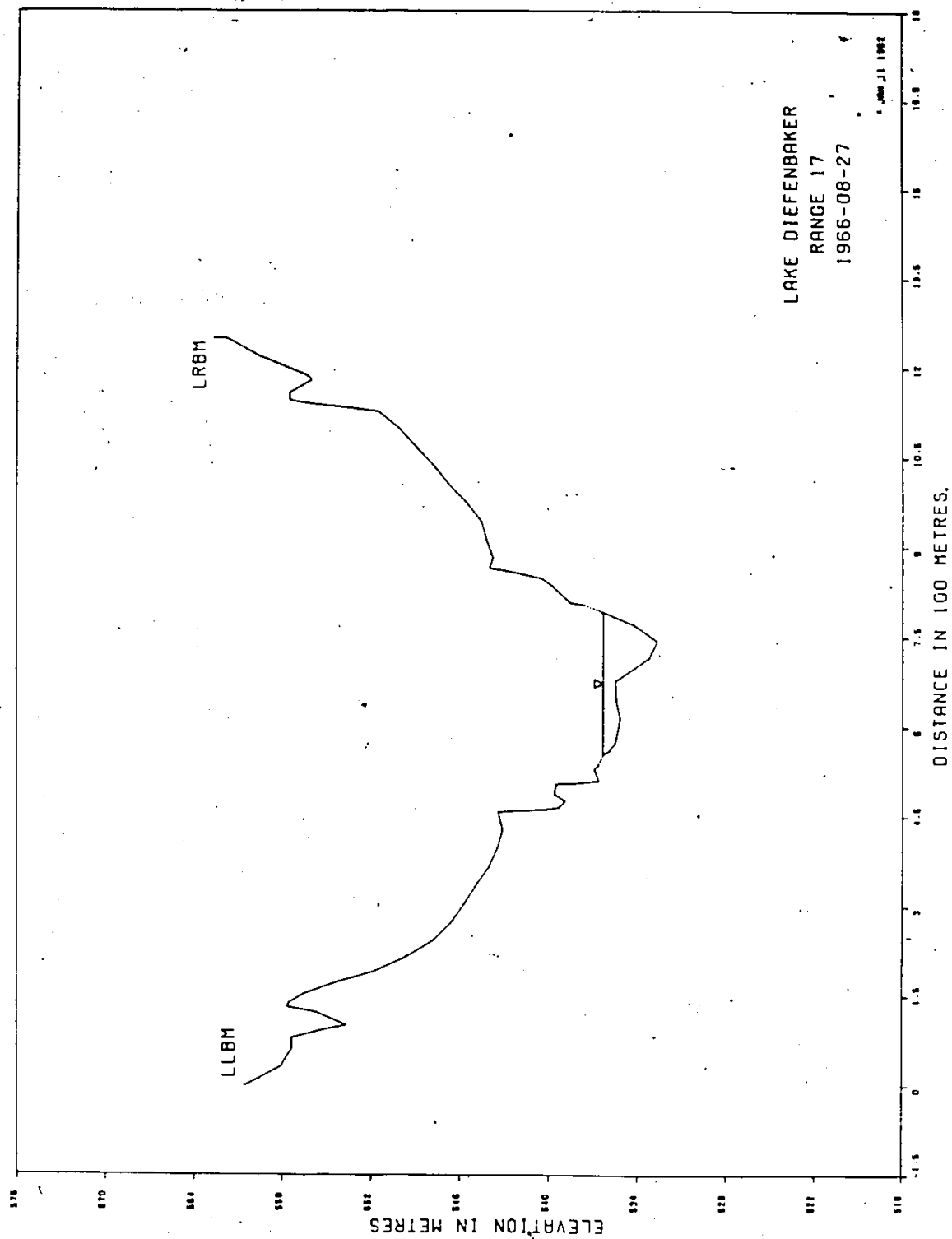
SEDIMENT SURVEY SECTION
MAR 10 1982, PAGE 1
OTTAWA, ONT.

LAKE DUFFERIN

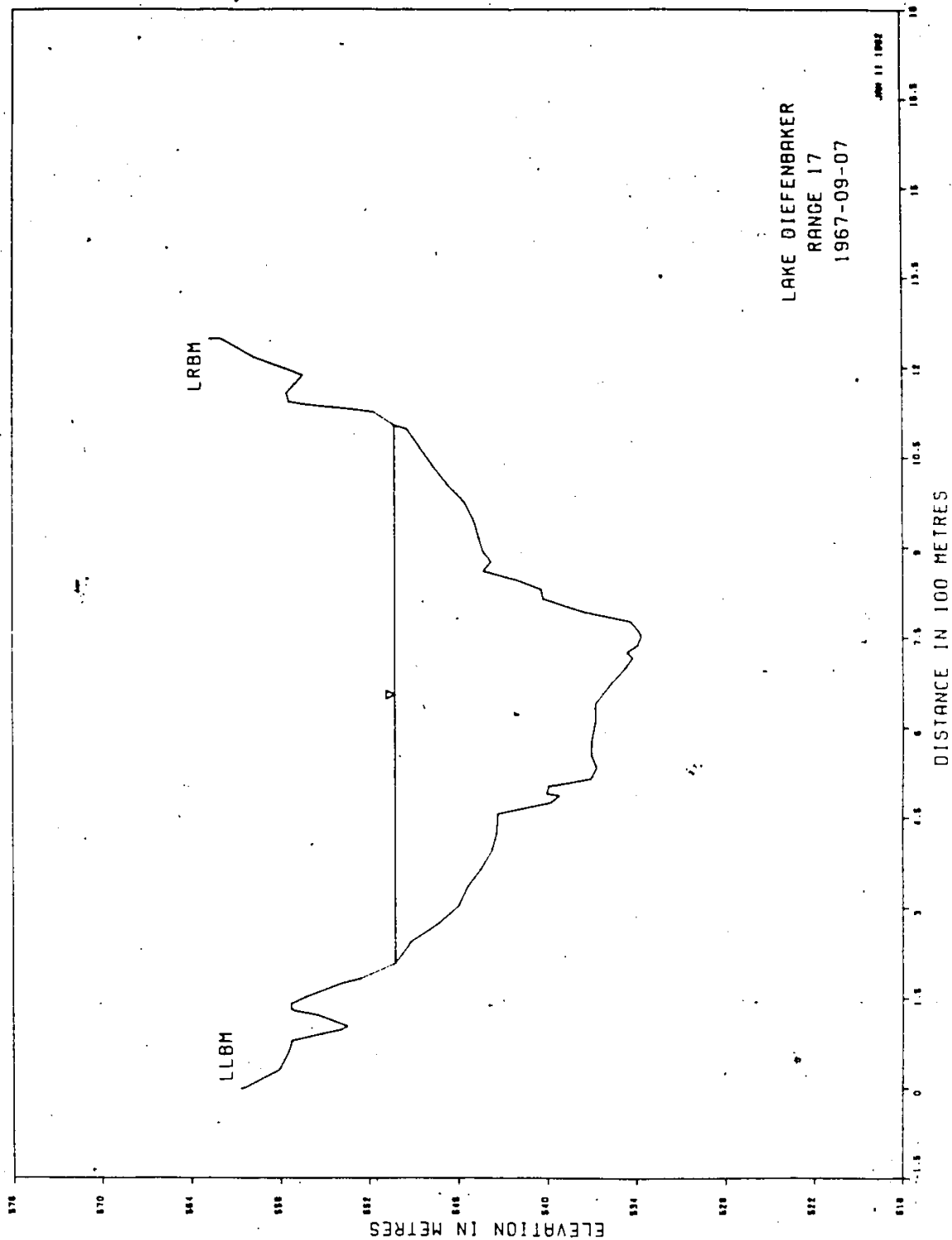
RANGE NO. - 18
SURVEYED 21/ 7/1977
MINIMUM ELEVATION - 537.81
ASSUMED MINIMUM DATUM - 538.00

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
538.00	9.4	550.50	7073.0				
538.50	75.7	551.00	7434.3				
539.00	154.1	551.50	7798.4				
539.50	299.3	552.00	8163.2				
540.00	501.8	552.50	8533.7				
540.50	742.8	553.00	8904.8				
541.00	993.6	553.50	9282.3				
541.50	1258.2	554.00	9666.0				
542.00	1535.6	554.50	10055.3				
542.50	1817.2	555.00	10451.4				
543.00	2113.6	555.50	10854.2				
543.50	2420.1	556.00	11263.8				
544.00	2730.7	556.50	11680.0				
544.50	3044.0	557.00	12100.5				
545.00	3359.8	557.50	12521.3				
545.50	3678.4	558.00	12942.8				
546.00	3999.5	558.50	13366.6				
546.50	4324.3	559.00	13800.8				
547.00	4653.6	559.50	14252.5				
547.50	4987.4	560.00	14708.5				
548.00	5324.4						
548.50	5664.6						
549.00	6009.0						
549.50	6359.0						
550.00	6714.6						



SEDIMENT SURVEY STATION				LAKES WILFRED & ELLERKER				RANGE NO. - 17			
DEC 17 1991, 0130:1				SURVEYED 27/ 8/1966				MINIMUM ELEVATION - 532.64			
OTTAWA, ONT.				ELEVATION - AREA TABLE				ASSUMED MINIMUM DATUM - 533.00			
ELEVATION (m.)	ACC. AREA (sq. m.)	ELEVATION (m.)	ACC. AREA (sq. m.)	ELEVATION (m.)	ACC. AREA (sq. m.)	ELEVATION (m.)	ACC. AREA (sq. m.)	ELEVATION (m.)	ACC. AREA (sq. m.)	ELEVATION (m.)	ACC. AREA (sq. m.)
531.00	44.4	535.50	4057.8	538.00	15557.8						
531.50	21.5	546.00	4195.9	558.50	16045.6						
534.00	51.8	546.50	4749.7	559.00	16639.2						
534.50	45.1	547.00	5137.8	559.50	17238.4						
535.00	131.8	547.50	5500.0	560.00	17843.7						
535.50	197.5	548.00	5895.5	560.50	18455.6						
536.00	312.4	548.50	6301.8								
536.50	479.7	549.00	6717.9								
537.00	565.9	549.50	7146.7								
537.50	712.3	550.00	7581.9								
538.00	861.2	550.50	8027.9								
538.50	1311.7	551.00	8481.9								
539.00	1805.7	551.50	8943.9								
539.50	1332.5	552.00	9411.3								
540.00	1517.2	552.50	9881.5								
540.50	1791.1	553.00	10354.1								
541.00	1902.2	553.50	10829.6								
541.50	2077.9	554.00	11306.3								
542.00	2222.2	554.50	11793.5								
542.50	2496.2	555.00	12285.4								
543.00	2775.8	555.50	12783.9								
543.50	2907.8	556.00	13289.1								
544.00	3173.8	556.50	13804.5								
544.50	3472.5	557.00	14331.8								
545.00	3716.2	557.50	14872.7								



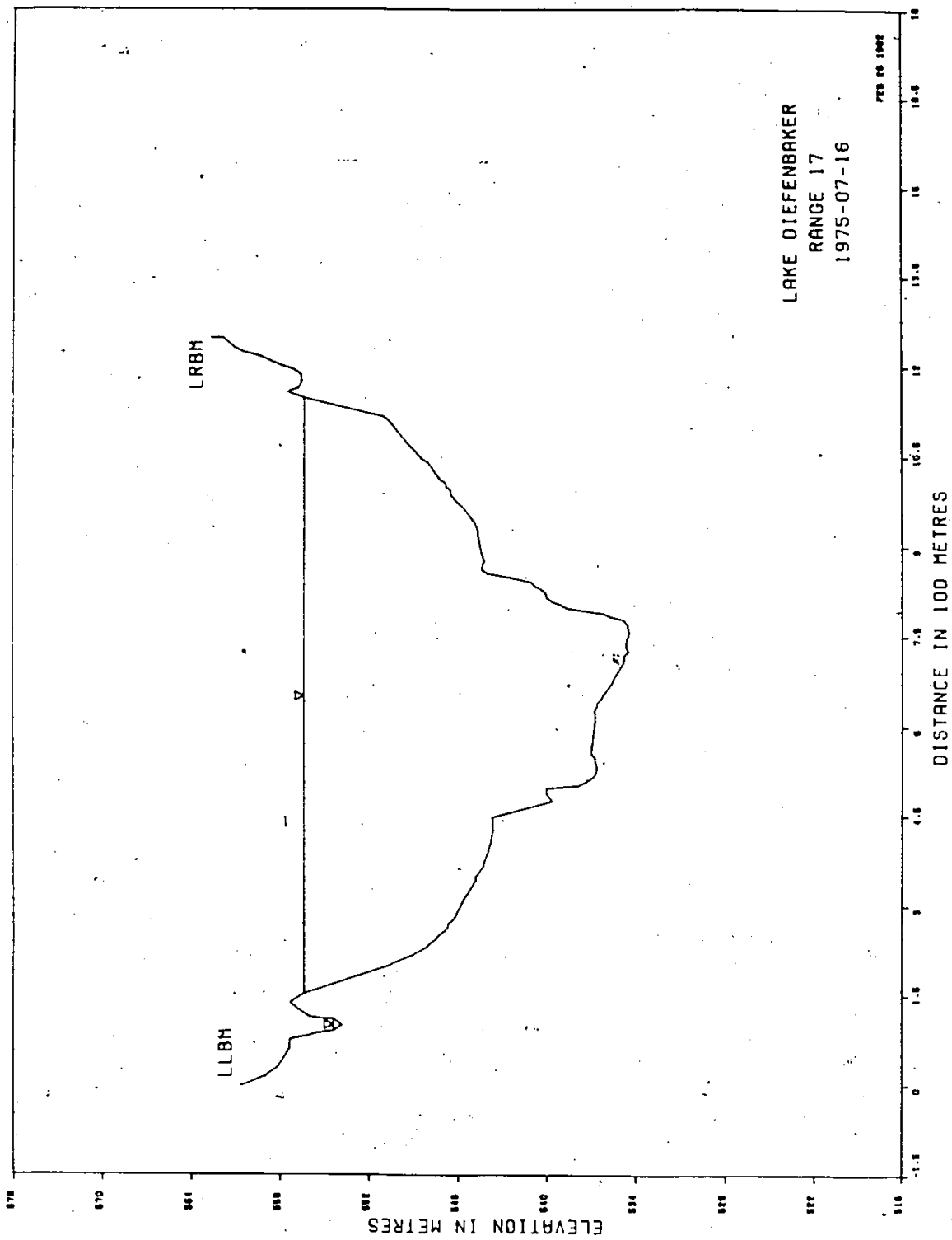
WATER SURVEY OF CANADA
JAN 11 1982 PAGE 1
OTTAWA, ONT.

LAKE DICKINSON
PROFILE DATA

RANGE NO 17 SURVEY DATE 1967-09-07

STA	ELEV	4MKS	STA	ELEV	4MKS	STA	ELEV	4MKS
0+00	560.65	LL84	815.34	540.26				
0+00	560.44		830.55	540.38				
30+48	555.06		845.82	541.93				
60+96	557.42		861.05	544.25				
79+25	557.20		876.30	543.73				
91+44	555.07		891.58	544.28				
97+54	553.85		916.83	545.51				
103+63	553.43		944.88	544.89				
121+92	555.38		975.36	545.53				
129+54	557.02		1005.84	546.69				
132+59	557.27		1036.32	547.66				
140+21	557.27		1065.93	548.55				
152+40	556.26		1097.23	549.43				
175+26	551.73		1101.03	550.19	WL			
182+88	552.57		1103.07	550.13				
208+00	550.19	WL	1125.32	551.60				
208+18	550.19		1129.04	553.04				
238+05	549.31		1132.34	554.28				
243+84	547.19		1137.51	556.14				
274+32	547.33		1142.03	557.31				
304+60	545.93		1155.80	557.46				
335+28	545.35		1166.28	556.38				
365.76	544.43		1216.75	559.67				
396+24	543.70		1247.24	561.97				
425+72	543.37		1287.24	562.66	MENT			
457+20	543.31							
475+49	539.77							
487+68	537.16							
490+73	540.01							
502+92	539.89							
515+11	537.06							
533+40	536.66							
558+74	537.00							
579+12	536.97							
609+60	536.72							
640+08	536.72							
672+56	535.75							
701+04	534.62							
715+28	534.19							
725+42	534.56							
737+52	533.86							
752+86	533.61							
762+00	533.93							
777+24	534.34							
792+48	537.42							

SLOPMENT SURVEY SECTION			LAKE JEFFERSON			RANGE NO. - 17		
DEC 17 1967, PAGE 1						SURVEYED 7/ 9/1967		
OTTAWA, ONT.						MINIMUM ELEVATION = 533.61		
						ASSUMED MINIMUM UATUM = 534.00		
ELEVATION	40% AREA	ELEVATION	ACC. AREA	ELEVATION	ACC. AREA	ELEVATION	ACC. AREA	
150 M.2	150 M.2	150 M.2	150 M.2	150 M.2	150 M.2	150 M.2	150 M.2	
534.00	7.2	546.50	8321.4	559.00	16191.0			
534.50	31.6	547.00	4681.9	559.50	16789.8			
535.00	77.4	547.50	5055.5	560.00	17394.4			
535.50	121.4	548.00	5441.5	560.50	18005.5			
536.00	172.2	548.50	5840.1					
536.50	225.1	549.00	6251.6					
537.00	317.2	549.50	6672.2					
537.50	476.5	550.00	7115.5					
538.00	518.0	550.50	7561.4					
538.50	727.5	551.00	8014.2					
539.00	910.2	551.50	8479.7					
539.50	1052.3	552.00	8946.7					
540.00	1223.3	552.50	9417.2					
540.50	1377.0	553.00	9890.8					
541.00	1574.9	553.50	10366.9					
541.50	1788.5	554.00	10846.4					
542.00	1931.4	554.50	11318.0					
542.50	2145.5	555.00	11833.5					
543.00	2342.1	555.50	12335.6					
543.50	2546.3	556.00	12843.4					
544.00	2777.2	556.50	13357.1					
544.50	3044.1	557.00	13881.4					
545.00	3327.6	557.50	14433.0					
545.50	3574.7	558.00	15004.4					
546.00	3822.2	558.50	15582.2					



WATER SURVEY OF CANADA
 FEB 26 1957
 OTTAWA-ONT.

LAKE DUFFERIN

PROFILE DATA

RANGE NO 17 SURVEY DATE 1975-07-16

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

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406.00 543.74

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768.00 534.54

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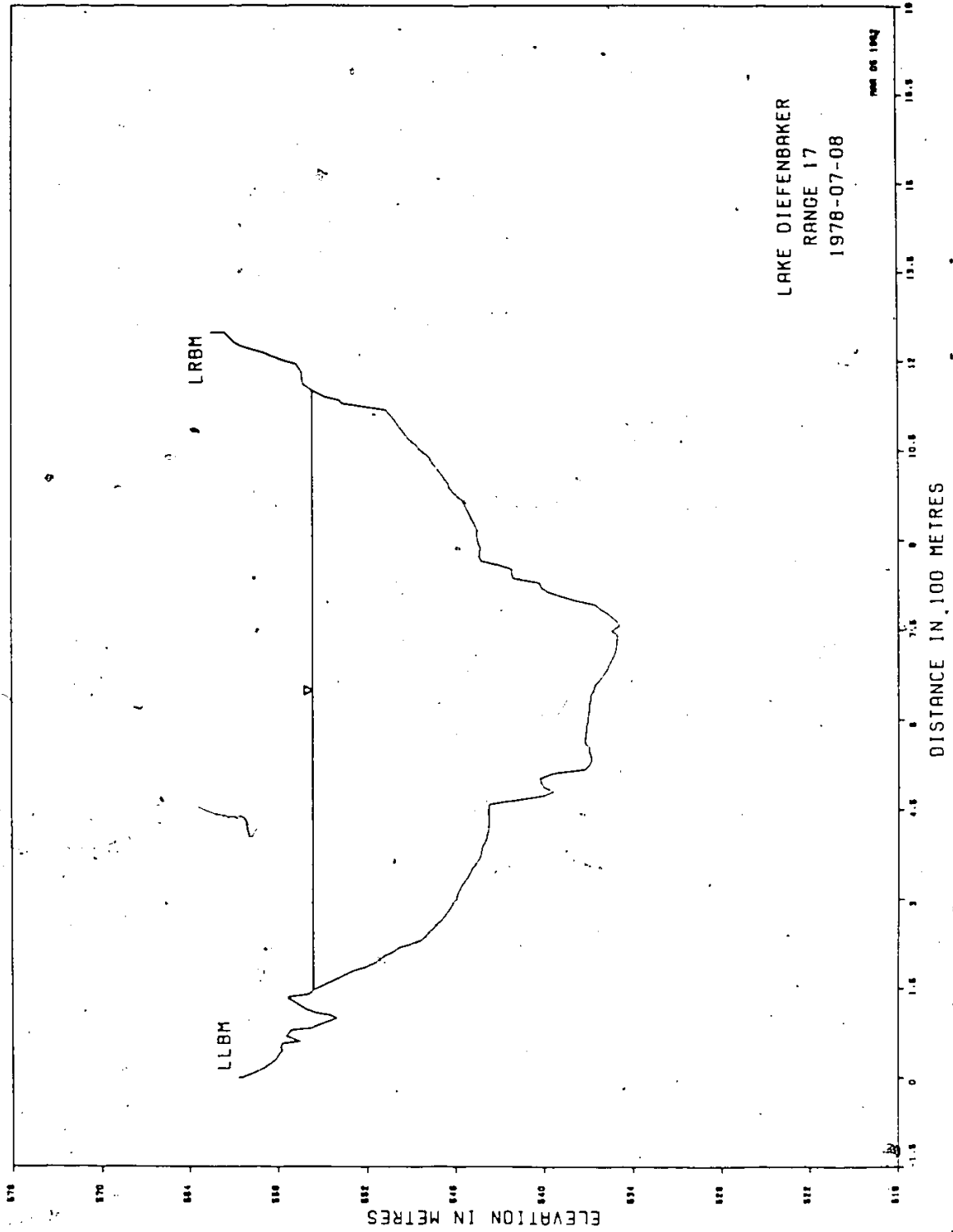
SEDIMENT SURVEY SECTION
MAR 3 1982, PAGE 1
OTTAWA, ONT.

LAKE DUFFERIN

RANGE NO. - 17
SURVEYED 16/ 7/1975
MINIMUM ELEVATION - 534.44
ASSUMED MINIMUM DATUM - 534.50

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
534.50	.3	547.00	4646.2	559.50	16792.9		
535.00	27.9	547.50	5026.7	560.00	17398.7		
535.50	73.6	548.00	5421.1	560.50	18008.5		
536.00	131.8	548.50	5827.6				
536.50	201.1	549.00	6243.8				
537.00	302.7	549.50	6669.7				
537.50	444.2	550.00	7105.2				
538.00	589.8	550.50	7550.5				
538.50	737.6	551.00	8005.8				
539.00	887.4	551.50	8466.7				
539.50	1040.5	552.00	8931.1				
540.00	1199.8	552.50	9399.1				
540.50	1376.2	553.00	9870.6				
541.00	1559.0	553.50	10345.6				
541.50	1747.6	554.00	10824.9				
542.00	1939.3	554.50	11314.7				
542.50	2133.9	555.00	11811.3				
543.00	2331.3	555.50	12312.5				
543.50	2531.4	556.00	12819.8				
544.00	2749.5	556.50	13334.7				
544.50	2996.0	557.00	13871.6				
545.00	3284.7	557.50	14429.9				
545.50	3598.0	558.00	15007.5				
546.00	3929.4	558.50	15595.7				
546.50	4278.5	559.00	16191.3				



WATER SUPPLY OF CANADA
MAR 05 1942. PAGE 1
OTTAWA, ONT.

LAKE DUFFINAKER

PROFILE DATA

RANGE NO 17 SURVEY DATE 1978-07-08

STA	ELEV	RMKS	STA	ELEV	RMKS	STA	ELEV	RMKS	STA	ELEV	RMKS
0+00	560.66	LLRM	329+00	545.33		657+00	536.48		1047+00	548.18	
0+00	560.44		336+00	545.13		668+00	536.08		1052+00	548.43	
10+00	559.18		343+00	544.78		683+00	535.64		1059+00	548.63	
15+00	558.95		351+00	544.83		689+00	535.56		1064+00	548.93	
30+00	558.15		358+00	544.54		704+00	535.24		1070+00	549.18	
40+00	557.83		366+00	544.38		712+00	535.13		1081+00	549.51	
45+00	557.71		371+00	544.28		719+00	535.06		1087+00	549.73	
50+00	557.81		379+00	544.23		734+00	535.03		1093+00	550.08	
57+00	557.67		386+00	544.18		741+00	535.03		1099+00	550.23	
60+00	556.50		393+00	544.03		748+00	535.36		1104+00	550.48	
69+00	557.44		400+00	543.88		756+00	534.88		1111+00	550.48	
79+00	557.11		408+00	543.51		764+00	535.04		1117+00	550.88	
82+00	555.76		414+00	543.73		777+00	535.68		1128+00	553.58	
85+00	555.49		422+00	543.73		784+00	536.13		1134+00	553.83	
100+00	554.01		429+00	543.66		791+00	536.46		1139+00	554.73	
105+00	554.49		437+00	543.73		806+00	536.46		1149+00	555.58	ML
108+00	555.36		443+00	543.73		813+00	539.68		1160+00	556.23	
114+00	556.07		451+00	543.73		820+00	540.13		1171+00	556.30	
119+00	556.44		458+00	543.64		828+00	540.28		1180+00	556.33	
133+00	557.31		465+00	541.73		836+00	542.03		1194+00	556.69	
135+00	557.25		472+00	539.94		843+00	542.13		1198+00	557.22	
139+00	555.96		479+00	539.24		851+00	542.13		1204+00	557.91	
147+00	555.73		487+00	539.94		857+00	542.88		1213+00	558.88	
148+00	555.78	ML	492+00	539.13		866+00	544.28		1218+00	559.59	
179+00	552.93		501+00	540.23		872+00	545.78		1225+00	560.44	
185+00	552.08		509+00	539.38		882+00	546.23		1231+00	560.88	
193+00	551.38		516+00	537.13		892+00	546.33		1247+00	561.54	
200+00	551.03		524+00	536.85		900+00	546.13		1247+00	562.45	LRM
205+00	550.73		531+00	536.73		907+00	546.53				
211+00	550.23		538+00	536.23		915+00	546.46				
218+00	549.63		545+00	536.83		923+00	546.63				
223+00	549.18		552+00	536.83		926+00	546.48				
230+00	549.38		560+00	537.13		934+00	546.53				
237+00	548.03		567+00	537.13		942+00	546.48				
243+00	547.43		573+00	537.13		950+00	546.13				
251+00	547.44		581+00	537.08		957+00	546.30				
257+00	547.25		588+00	536.93		965+00	546.46				
264+00	546.93		596+00	536.93		973+00	546.46				
272+00	546.56		603+00	536.76		981+00	546.46				
286+00	546.25		610+00	536.93		989+00	546.46				
293+00	546.13		617+00	536.88		997+00	546.46				
300+00	545.78		626+00	536.83		1005+00	547.13				
308+00	545.43		634+00	536.73		1013+00	547.26				
315+00	545.68		641+00	536.73		1021+00	547.26				
323+00	545.53		648+00	536.58		1029+00	547.26				

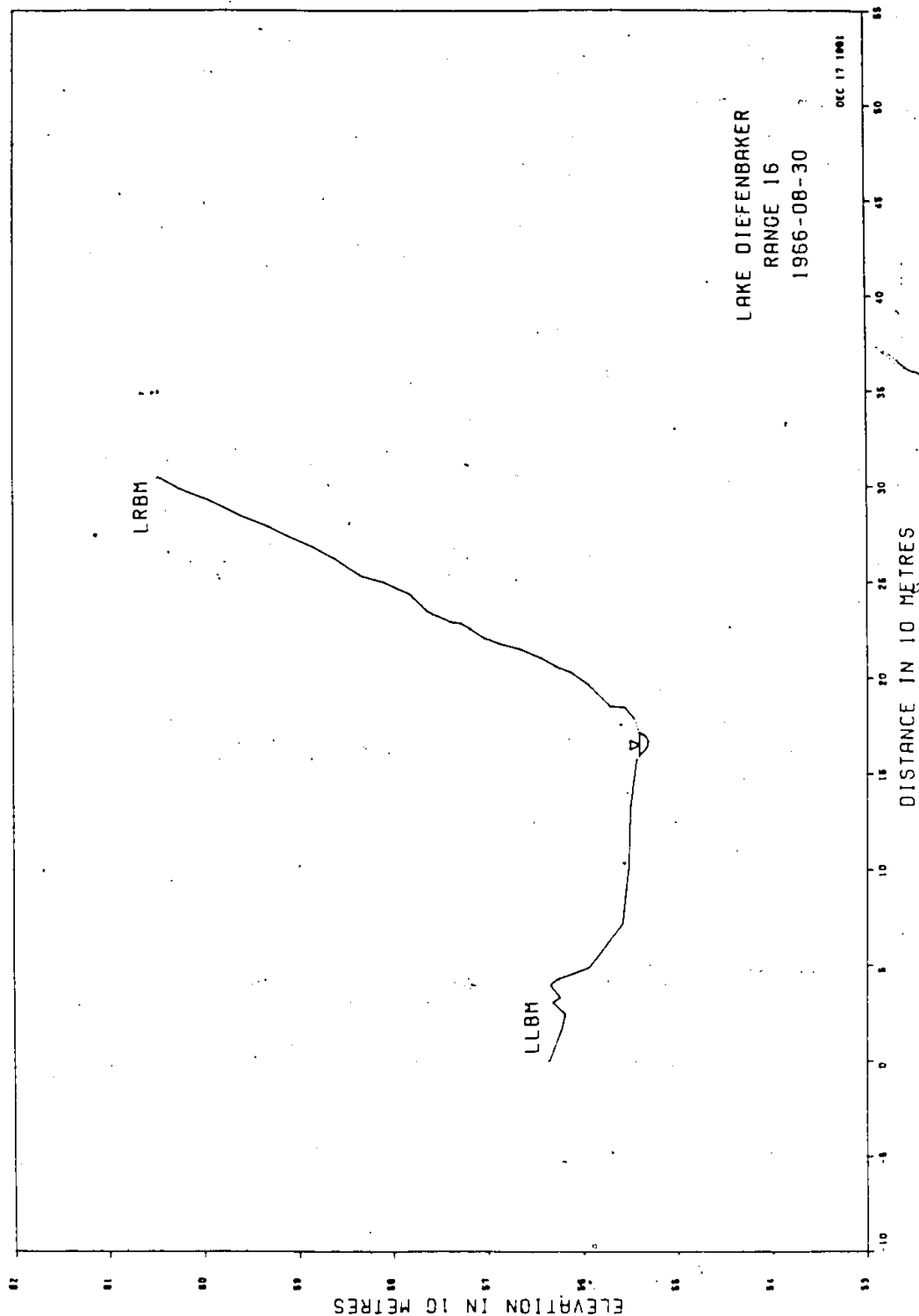
SEDIMENT SURVEY SECTION
MAR. 1987, PAGE 1
OTTAWA, ONT.

LAKE OREGANAWAY

RANGE NO. - 17
SURVEYED 07/7/1978
MINIMUM ELEVATION - 534.80
ASSUMED MINIMUM DATUM - 535.00

ELEVATION - ASL (TALL)
ELEVATION - ASL (TALL)

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
535.00	4965.1	547.50	17351.0		
535.50	5301.1	548.00	17961.8		
536.00	5768.9	548.50			
536.50	6125.9	549.00			
537.00	6550.9	549.50			
537.50	6965.5	550.00			
538.00	7432.1	550.50			
538.50	7888.1	551.00			
539.00	8349.8	551.50			
539.50	8816.0	552.00			
540.00	9285.5	552.50			
540.50	9757.8	553.00			
541.00	10233.7	553.50			
541.50	10715.1	554.00			
542.00	11204.4	554.50			
542.50	11702.7	555.00			
543.00	12210.4	555.50			
543.50	12729.6	556.00			
544.00	13262.8	556.50			
544.50	13814.8	557.00			
545.00	14379.8	557.50			
545.50	14956.8	558.00			
546.00	15546.1	558.50			
546.50	16148.6	559.00			
547.00	16764.8	559.50			



WATER SURVEY OF CANADA
DEC 17 1961
OTTAWA, ONT.

LAKE DIEPCHAMBER

PROFILE DATA

RANGE NO. 16 SURVEY DATE 1966-08-30

STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS
-----	------	-------	-----	------	-------	-----	------	-------

0+00	551.75	LLBM	278+89	543.02	
0+00	561.54		284+79	546.13	
16+76	552.26		292+61	549.22	
74+19	561.93		298+70	507.39	
10+48	561.21		304+17	504.42	
12+92	562.45		304+19	504.72	LRM

19+62	563.43				
42+57	567.72				
45+72	550.93				
48+77	557.37				
60+96	557.45				
71+61	555.77				

102+11	555.10				
132+59	556.92				
156+97	556.25				
159+00	551.88	4L			
159+41	551.94				
162+45	553.38				

164+59	553.37				
164+12	551.09				
167+54	553.06				
169+77	551.17				
170+69	551.68				
171+00	551.91	4L			

171+50	551.96				
178+31	554.46				
184+71	555.50				
185+01	557.02				
196+50	557.40				
202+63	551.17				

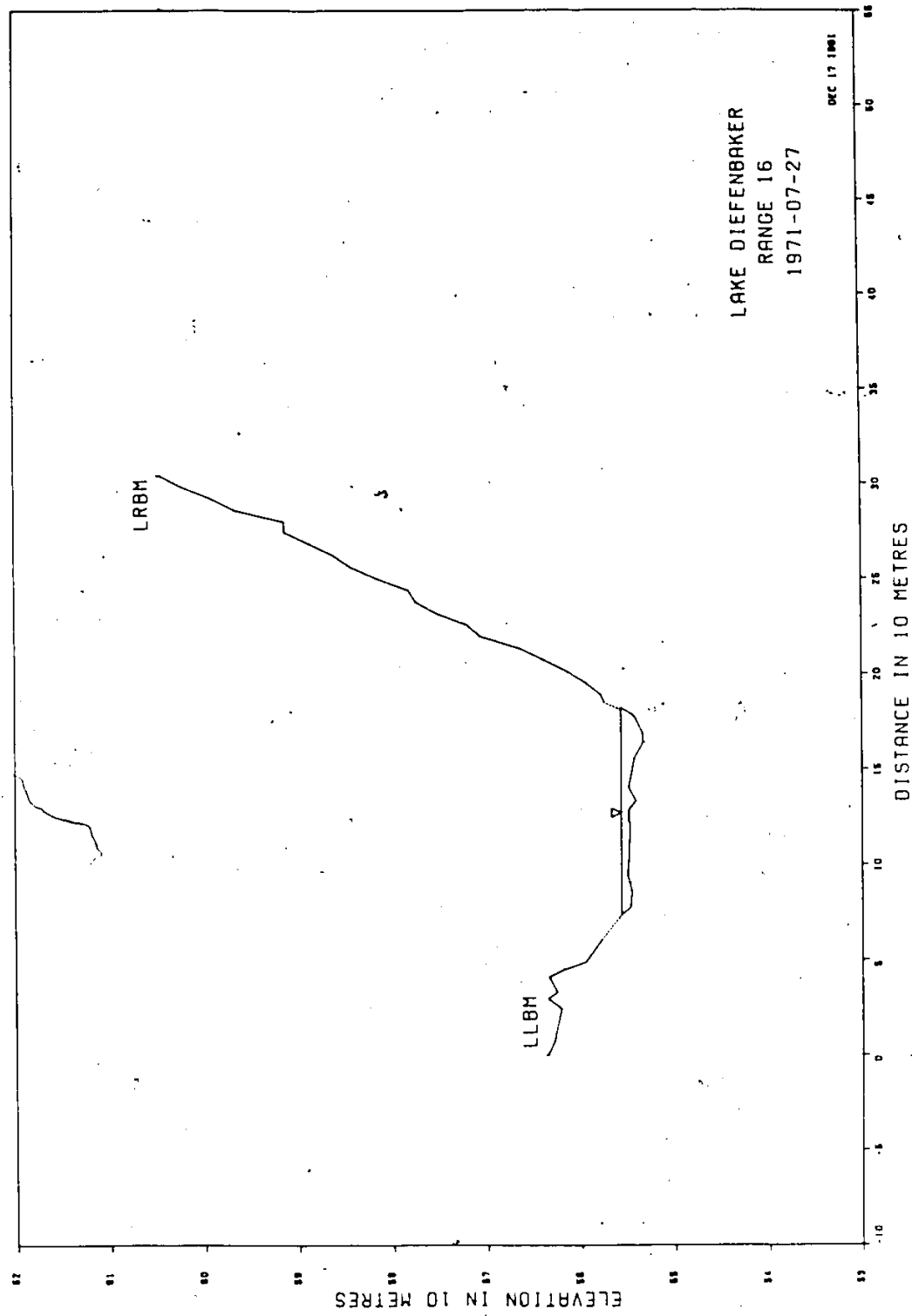
202+69	561.17				
205+74	567.72				
210+31	559.31				
214+49	569.44				
217+93	569.73				
220+94	570.37				

225+55	571.74				
228+50	572.78				
229+21	573.71				
234+70	576.75				
243+44	575.19				
249+78	573.48				

252+49	583.21				
262+13	585.95				
268+22	583.32				
274+32	581.26				

SEDIMENT SURVEY SECTION
DEC 17 1941, PAGE 1
DITAMA, ONT.

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
551.50	2.0				
554.00	7.9				
554.50	15.1				
555.00	33.2				
555.50	82.4				
556.00	137.5				
556.50	195.6				
557.00	255.4				
557.50	317.4				
558.00	382.1				
558.50	449.7				
559.00	520.6				
559.50	591.2				
560.00	668.0				
560.50	744.3				
561.00	821.8				
561.50	903.6				
562.00	983.4				
562.50	1065.2				
563.00	1157.3				
563.50	1257.8				



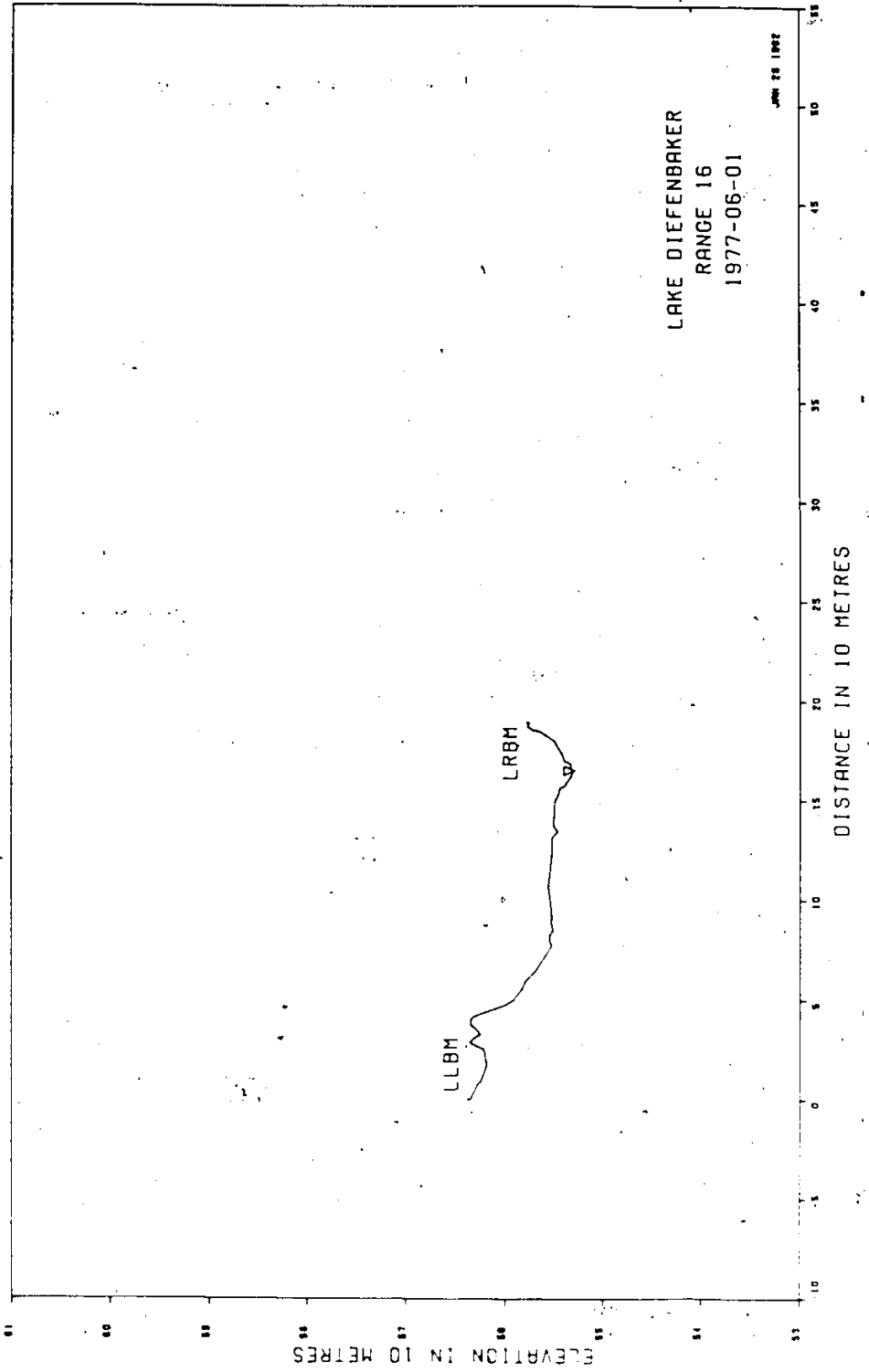
WATER SURVEY OF CANADA
DEC 17 1961
OTTAWA, ONT.

LAKE DIEFENBAKER

PROFILE DATA

RANGE NO 16 SURVEY DATE 1971-07-27

STA	LEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS
0+00	591.75	LLUM	274+12	591.22				
0+00	591.68		274+01	591.25				
7+62	592.78		283+31	596.22				
28+78	592.72		292+50	596.99				
29+57	591.45		295+04	592.04				
32+92	592.43		303+13	603.36				
49+84	591.16		304+19	604.72	L48M			
49+81	591.75							
49+77	599.63							
60+05	597.72							
71+00	592.59	HL						
73+16	592.54							
77+42	596.58							
85+14	596.52							
94+18	596.78							
102+41	596.83							
121+31	594.68							
122+22	594.23							
121+44	596.93							
129+32	596.83							
131+20	594.07							
140+21	596.93							
147+27	596.52							
155+35	593.22							
163+17	593.10							
168+25	591.30							
176+17	594.07							
178+11	594.27							
181+00	595.59	HL						
181+92	595.38							
186+71	597.33							
186+94	597.75							
195+07	599.34							
201+17	591.32							
207+26	593.55							
213+16	594.13							
219+46	597.91							
225+55	597.70							
231+65	595.10							
237+76	597.27							
243+86	597.06							
249+24	591.13							
256+03	594.27							
262+13	597.21							
268+22	599.95							



WATER SURVEY OF LAKES
JAN 26 1997 PAGE 1
OTTAWA, ONT.

LAKE DUFFERIN

PROFILE DATA

RANGE NO 16 SURVEY DATE 1977-06-01

STA ELEV RMKS STA ELEV RMKS

0+00	563.76	LLRM	166.12	553.24	
0+00	563.42		166.25	553.21	
7+62	562.69		169.87	553.10	
9+14	562.36		169.87	553.09	
16+76	561.81		173.13	554.10	
24+38	562.05		174.04	554.25	
25+30	562.17		178.00	554.71	
27+13	562.90		179.53	554.87	
28+35	563.45		182.58	555.77	
29+26	563.42		184.40	556.35	
31+09	562.90		185.01	556.63	
32+61	562.39		185.32	557.11	
35+05	562.87		186.23	557.37	
37+49	563.42		187.15	557.06	
40+23	563.42		189.13	557.84	
41+76	562.94		189.13	557.76	LRM
43+89	561.84				
47+55	559.41				
49+39	559.05				
54+86	558.24				
59+13	557.84				
60+35	557.63				
64+01	556.87				
71+63	555.96				
76+81	555.19				
79+86	555.41				
82+30	555.38				
84+23	555.01				
87+78	555.22				
91+44	555.15				
106+08	555.51				
121+92	555.16				
131+06	555.13				
134+11	554.55				
137+16	554.96				
149+35	554.93				
152+40	554.57				
156+06	554.31				
156+97	553.05				
158+50	551.67				
160+93	553.33				
162+15	553.14				
164+59	552.31				
164+90	552.85				
165+20	552.71				

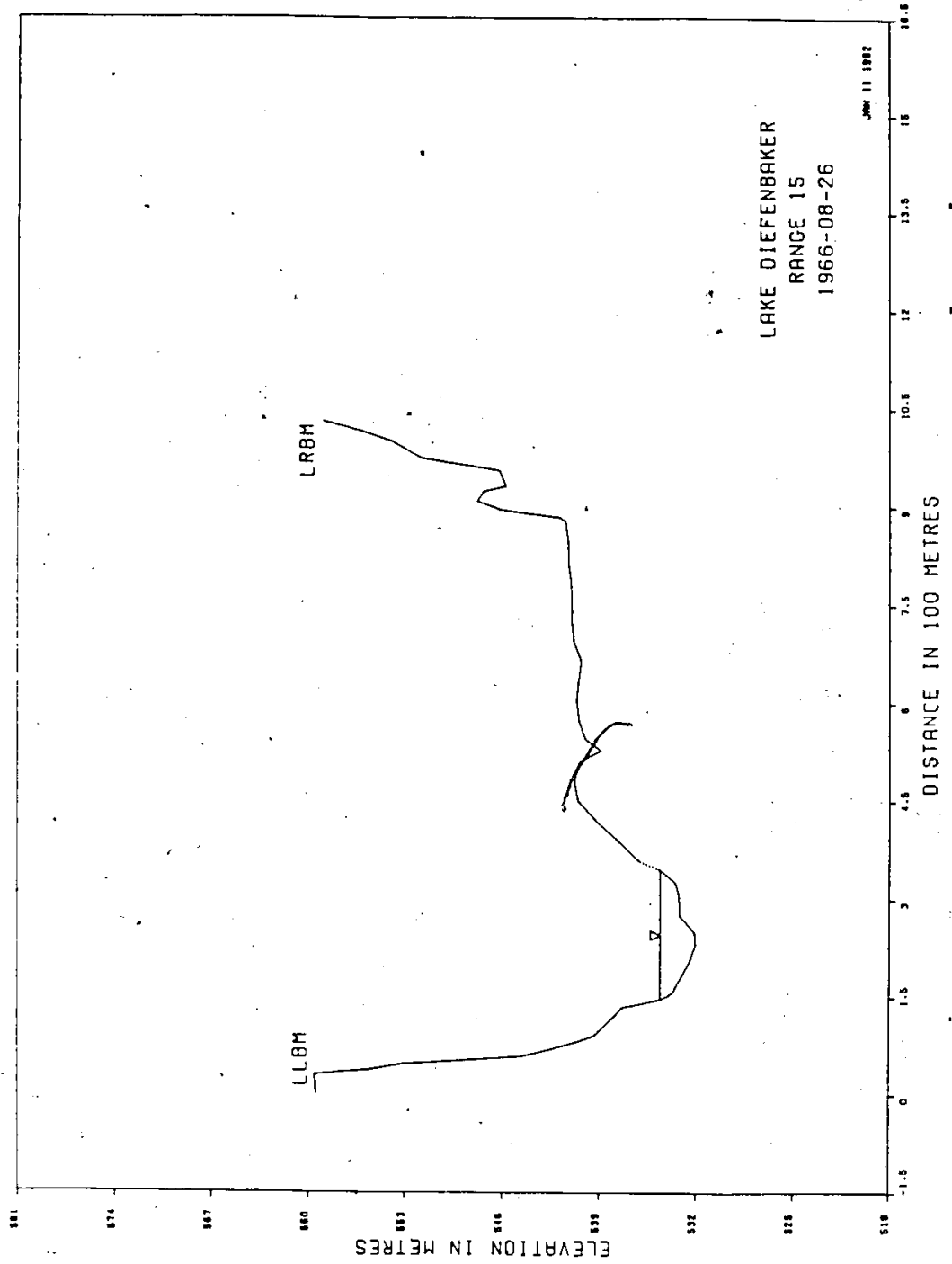
SECTION SURVEY SECTION
JAN 28 1982, PAGE 1
UTTAWA, ONT.

LAKE UTTAWA

RANGE NO. 16
SURVEYED 17 6/1977
MINIMUM ELEVATION = 552.85
ASSUMED MINIMUM DATUM = 553.50

ELEVATION - AREA TABLE

ELEVATION (P.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)	ELEVATION (M.)	ACC. AREA (50 M.)
553.50	3.0				
554.00	4.8				
554.50	14.1				
555.00	34.4				
555.50	71.5				
556.00	126.4				
556.50	194.1				
557.00	244.2				
557.50	306.0				



LAKE JIPEWAGACI

PROFILE DATA

RANGE NO 15 SURVEY DATE 1960-JB-26

STA ELEV RMKS STA ELEV RMKS STA ELEV RMKS

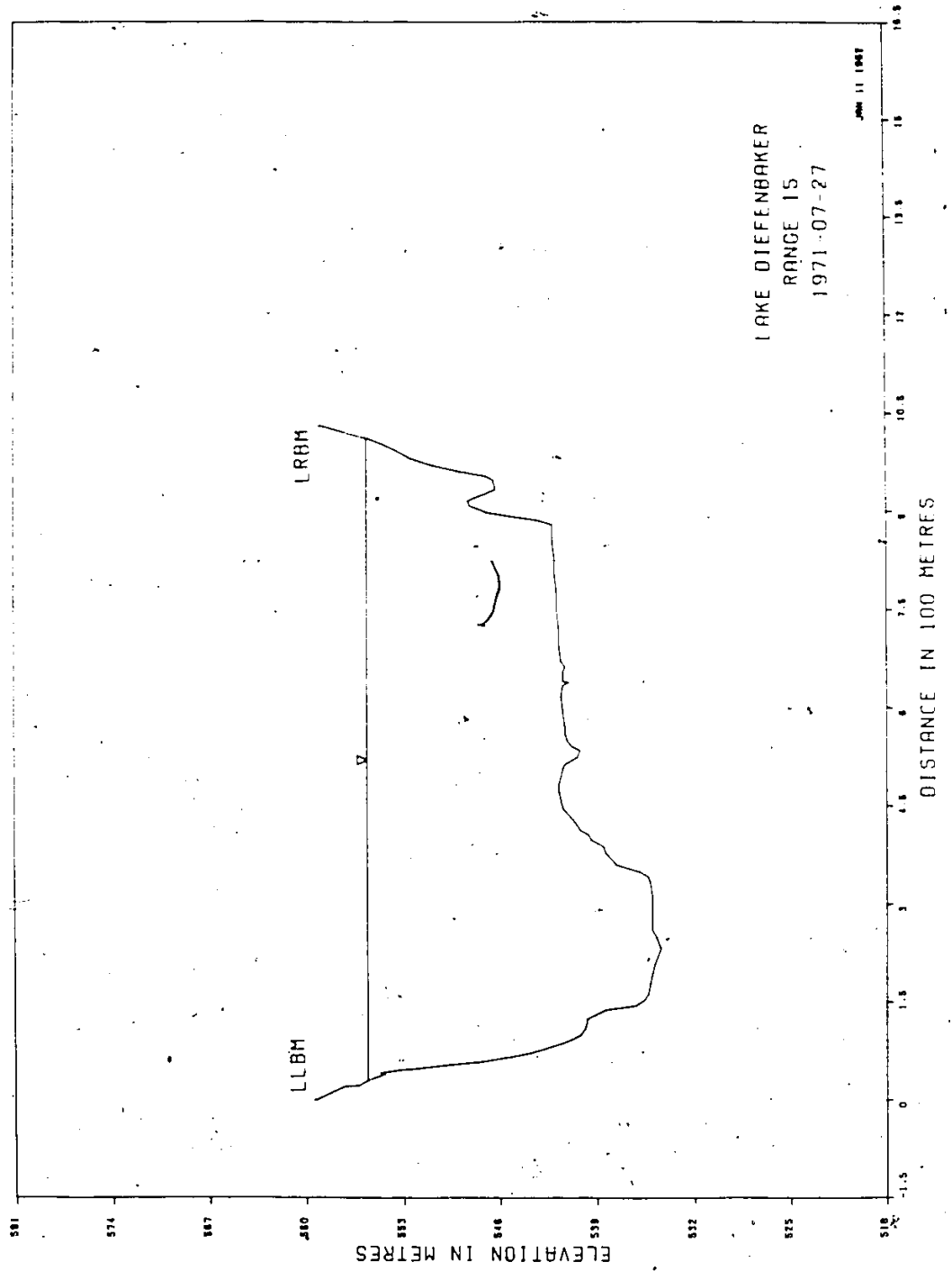
0.00	559.40	LLBM	869.41	545.16	
30.48	559.52		875.53	546.17	
38.10	555.71		907.59	547.82	
47.24	553.03		922.93	547.36	
50.44	544.56		930.55	545.74	
70.10	542.55		954.94	546.23	
83.52	540.32		961.03	548.06	
91.44	539.31		968.65	550.41	
121.92	537.82		973.23	551.87	
134.11	537.30		979.13	553.94	
146.00	534.53	WL	1014.37	556.17	
146.91	534.53		1029.61	558.74	LRM
152.70	533.92				
156.30	533.58				
171.30	532.31				
184.40	532.94				
206.35	532.39				
227.82	532.00				
249.02	532.06				
275.84	533.16				
288.95	533.16				
305.41	533.16				
325.22	533.16				
343.00	533.16	WL			
345.64	533.16				
359.05	535.08				
389.53	537.58				
420.01	539.19				
450.49	540.50				
480.97	540.78				
511.45	540.29				
526.69	538.83				
544.98	539.98				
572.41	540.44				
602.89	540.62				
633.37	540.47				
663.85	540.29				
694.33	540.84				
724.81	540.99				
755.29	540.99				
785.77	541.05				
816.25	541.23				
846.73	541.26				
877.21	541.45				
903.31	541.90				

SEDIMENT SUPPLY SECTION 2
 OFC 17 LOMT, PAGE 1
 OTTAWA-ONT.

LAKE DUFFINAKER

RANGE NO. 15

ELEVATION - AREA TABLE		MINIMUM ELEVATION = 532.00		SURVEYED 267 8/1966	
ELEVATION - AREA TABLE		ASSUMED MINIMUM DATUM = 532.50			
ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
532.50	15.3	545.00	5516.5	537.50	170605.6
533.00	55.7	545.50	5931.5	538.00	17555.1
533.50	125.5	546.00	6351.7	538.50	18051.5
534.00	291.1	546.50	6783.4		
534.50	393.6	547.00	7220.6		
535.00	404.4	547.50	7662.3		
535.50	505.6	548.00	8112.8		
536.00	516.0	548.50	8568.6		
536.50	727.8	549.00	9021.5		
537.00	945.8	549.50	9477.6		
537.50	973.5	550.00	9934.9		
538.00	1105.0	550.50	10393.4		
538.50	1249.6	551.00	10851.0		
539.00	1404.4	551.50	11313.7		
539.50	1574.1	552.00	11775.7		
540.00	1754.7	552.50	12240.5		
540.50	1959.7	553.00	12708.7		
541.00	2266.8	553.50	13180.7		
541.50	2543.1	554.00	13656.7		
542.00	3046.4	554.50	14135.8		
542.50	3452.8	555.00	14617.4		
543.00	3961.3	555.50	15101.6		
543.50	4771.7	556.00	15588.3		
544.00	4684.1	556.50	16077.2		
544.50	5079.5	557.00	16568.0		



WATER SURVEY OF CANADA
JAN 11 1982 PAGE 1
OTTAWA, ONT.

LAKE OPELONDA

PROFILE DATA

RANGE NO 15 SURVEY DATE 1971-07-27

STA ELEV ARKS

STA ELEV ARKS

STA ELEV ARKS

STA ELEV ARKS

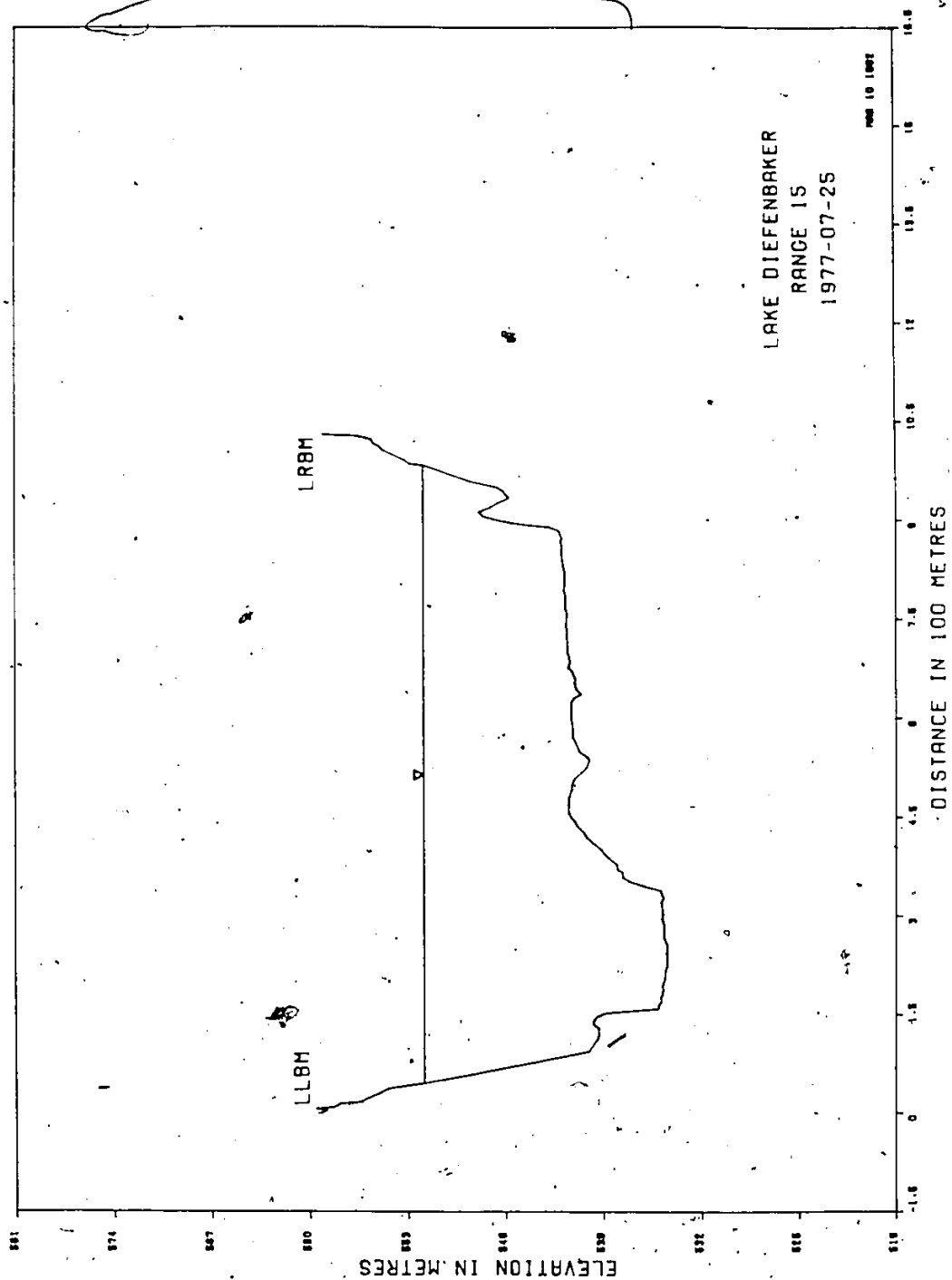
STA ELEV ARKS

STA ELEV ARKS

STA ELEV ARKS

1329.61 558.70
1029.61 558.94 4414

STA	ELEV	ARKS	STA	ELEV	ARKS
0.00	557.40	LLB4	455.92	541.35	
0.00	559.19		456.92	541.51	
9.75	558.27		471.81	541.65	
20.73	557.20		480.97	541.65	
22.25	556.20	HL	505.97	541.35	
29.00	555.53		512.95	541.20	
29.87	555.53		524.55	540.29	
39.93	554.31		534.01	540.14	
42.06	554.61		541.02	540.75	
45.11	553.39		544.94	541.05	
49.07	551.87		559.00	541.20	
53.04	550.04		566.01	541.20	
57.91	547.60		582.84	541.35	
65.84	545.17		616.00	541.51	
71.93	543.64		631.07	541.35	
78.03	542.73		638.55	540.70	
85.95	541.51		640.05	541.35	
93.88	540.59		654.13	541.35	
99.06	540.14		662.03	541.20	
107.90	539.83		669.35	541.51	
116.13	539.68		694.94	541.55	
123.14	539.68		719.02	541.65	
125.02	539.22		748.39	541.81	
137.16	538.31		775.02	541.91	
143.87	536.17		801.01	541.75	
152.10	535.26		826.01	541.95	
160.93	535.26		853.14	542.12	
174.00	535.11		879.34	542.12	
205.04	534.60		885.84	543.01	
231.04	534.34		897.94	543.84	
238.96	534.50		905.03	543.05	
248.11	534.65		915.01	543.21	
259.08	534.95		921.11	543.50	
278.89	534.95		925.94	543.94	
309.07	534.75		932.97	544.23	
332.84	535.11		947.01	546.38	
341.07	535.26		953.11	545.84	
349.00	535.87		961.03	548.14	
359.97	537.55		969.57	550.60	
377.95	538.11		981.15	552.83	
387.10	538.46		982.12	553.14	
398.07	539.37		1000.05	554.15	
405.08	537.53		1011.03	555.53	
413.00	540.14		1011.61	555.53	
423.06	542.44		1012.25	556.11	



WATER SURVEY OF CANADA
MAR 10 1982 PAGE 1
OTTAWA-ONT.

LAKE DUFFENBARGER

PROFILE DATA

RANGE NO 15 SURVEY DATE 1977-07-25

STA ELEV RMKS STA ELEV RMKS

989.00 546.49

959.00 546.54

981.00 551.84 ML

981.10 552.33

984.20 552.40

985.10 552.82

990.60 553.19

1005.90 554.70

1013.50 555.10

1015.60 555.37

1021.10 555.55

1022.60 555.61

1024.10 555.92

1026.30 556.38

1027.80 557.17

1028.40 558.42

1029.60 558.69

1029.60 558.96 L&M

STA ELEV RMKS STA ELEV RMKS

660.00 540.94

665.00 541.09

671.00 541.19

676.00 541.49

682.00 541.39

687.00 541.39

693.00 541.39

698.00 541.49

704.00 541.49

715.00 541.49

720.00 541.54

726.00 541.54

732.00 541.49

738.00 541.59

754.00 541.54

759.00 541.54

765.00 541.64

771.00 541.64

776.00 541.64

785.00 541.64

792.00 541.74

802.00 541.69

808.00 541.69

814.00 541.69

820.00 541.69

825.00 541.74

831.00 541.84

837.00 541.84

849.00 541.94

855.00 541.89

861.00 541.89

867.00 541.99

872.00 541.89

878.00 542.04

883.00 542.09

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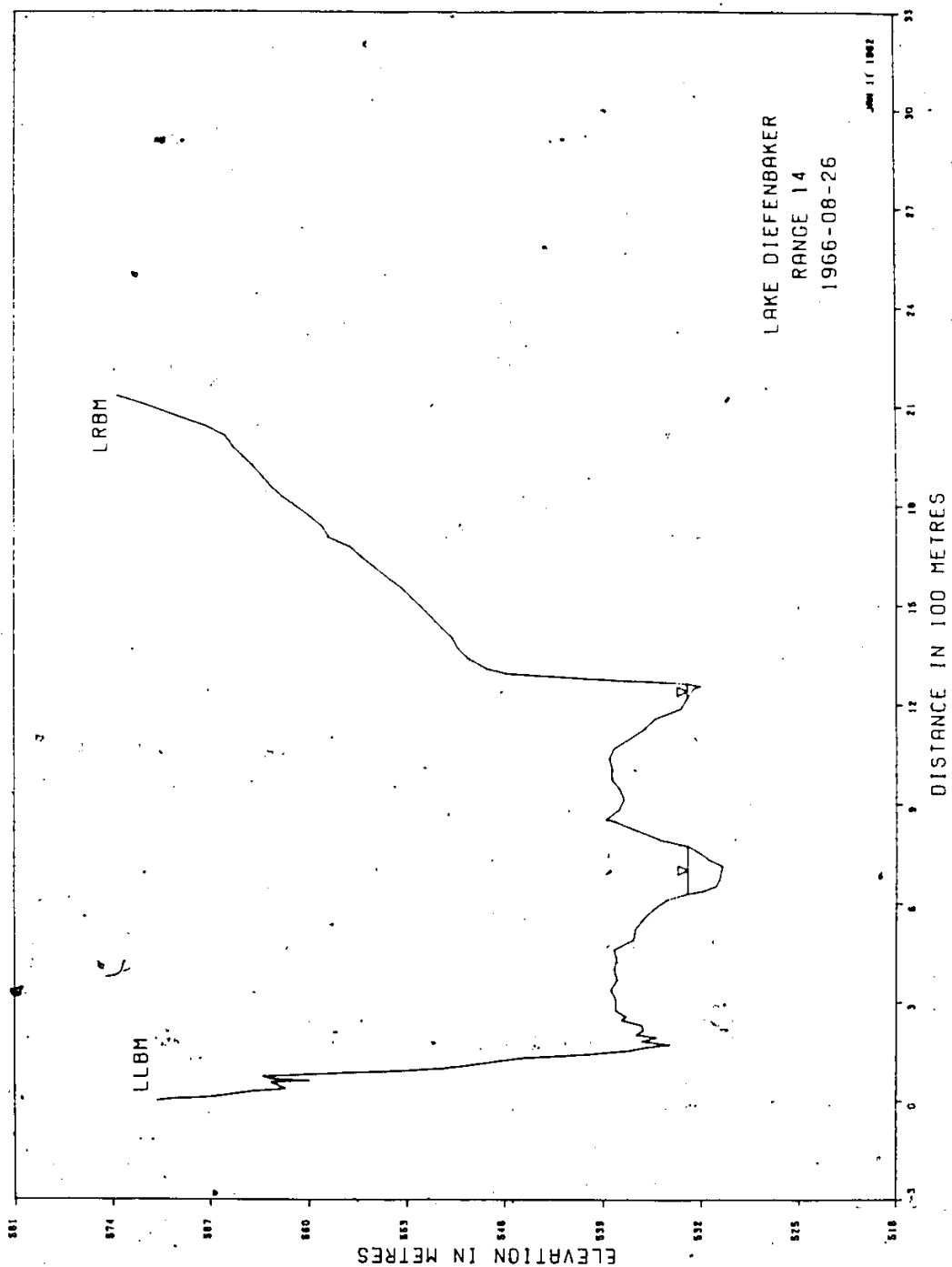
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SEDIMENT SURVEY SECTION
MAR 10 1982, PAGE 1
OTTAWA, ONT.

LAKE OTTEFENBAKEN

RANGE NO. - 15
SURVEYED 25/ 7/1977
MINIMUM ELEVATION - 534.44
ASSUMED MINIMUM DATUM - 535.00

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
535.00	54.7	547.50	8694.5		
535.50	145.3	548.00	7139.0		
536.00	238.0	548.50	7587.6		
536.50	332.7	549.00	8038.6		
537.00	429.6	549.50	8492.5		
537.50	529.2	550.00	8949.3		
538.00	635.2	550.50	9408.9		
538.50	749.1	551.00	9871.3		
539.00	866.3	551.50	10336.6		
539.50	997.4	552.00	10804.7		
540.00	1149.3	552.50	11274.0		
540.50	1323.5	553.00	11745.0		
541.00	1520.9	553.50	12219.7		
541.50	1784.6	554.00	12697.8		
542.00	2145.9	554.50	13179.4		
542.50	2545.2	555.00	13666.1		
543.00	2947.9	555.50	14159.2		
543.50	3352.4	556.00	14658.6		
544.00	3758.5	556.50	15162.2		
544.50	4166.3	557.00	15667.7		
545.00	4575.6	557.50	16174.0		
545.50	4986.6	558.00	16680.9		
546.00	5401.4	558.50	17190.2		
546.50	5823.5				
547.00	6256.8				



WATER SURVEY OF CANADA
JAN 11 1982 PAGE 1
OTTAWA, ONT.

LAKE OJIBWASEE

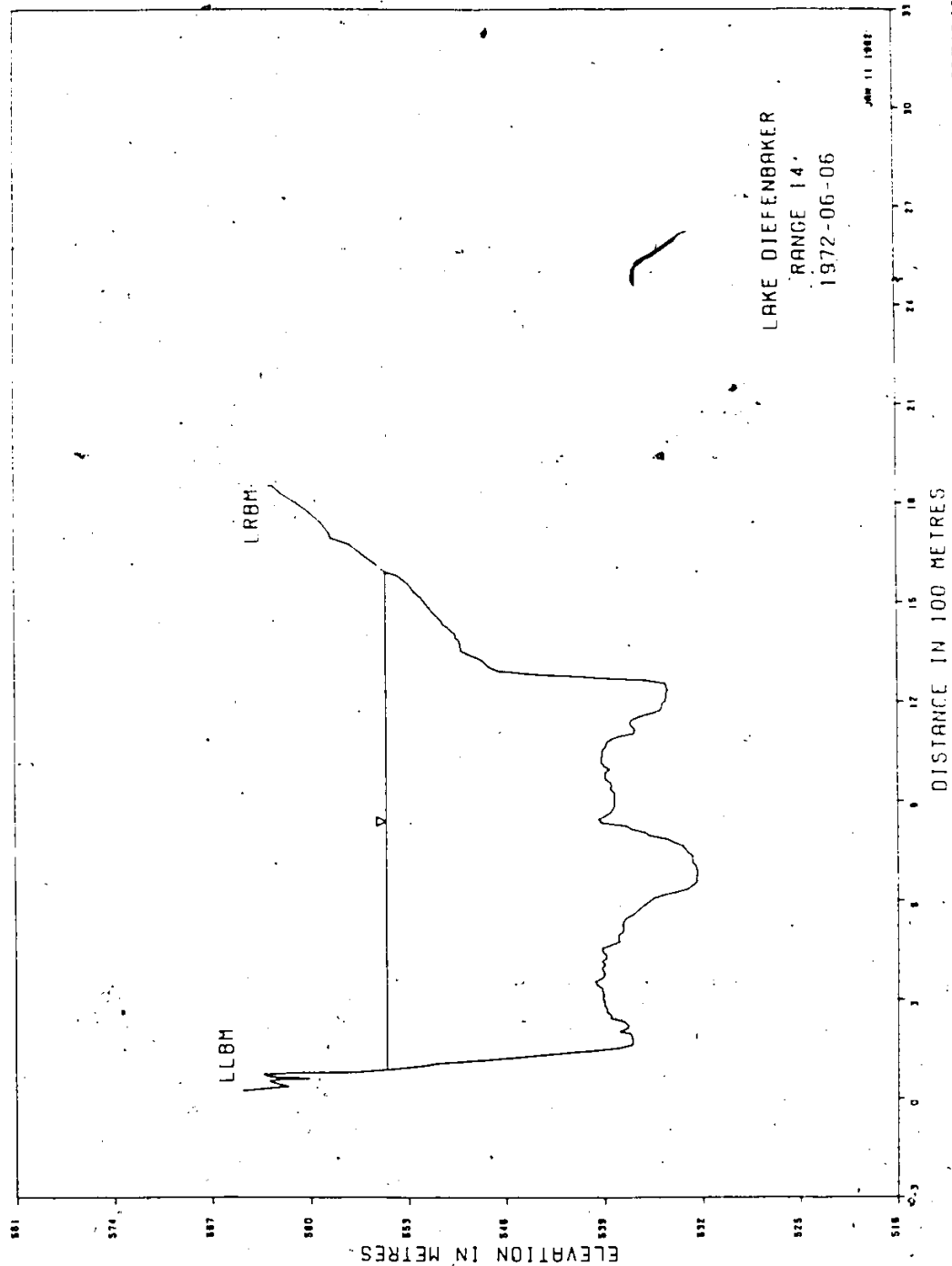
PROFILE DATA

RANGE NO 14 SURVEY DATE 1960-08-26

STA ELEV ANKS STA ELEV ANKS

STA	ELEV	RMS	STA	ELEV	RMS	STA	ELEV	ANKS
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6.10	569.98		635.20	531.82		1521.87	522.57	
9.14	567.48		649.83	530.87		1552.35	553.33	
12.19	566.02		670.56	530.60		1582.83	554.28	
27.43	564.03		697.63	530.47		1613.31	555.17	
35.05	561.62		710.79	530.35		1593.79	556.11	
54.86	562.03		731.52	531.39		1674.27	556.93	
60.96	559.92		753.47	532.12		1704.75	558.52	
65.53	562.83		772.03	532.88	ML	1745.23	558.94	
73.15	563.18		772.05	532.88		1765.71	559.80	
76.20	561.35		790.35	534.86		1796.19	560.77	
80.77	559.40		820.83	536.69		1826.67	561.81	
83.82	537.45		846.73	538.15		1857.15	562.63	
86.87	555.44		851.31	538.73		1887.63	563.21	
89.92	553.91		881.73	537.75		1918.11	563.85	
91.44	552.94		912.27	537.42		1948.59	564.64	
97.54	550.38		942.75	537.73		1979.07	565.37	
129.54	548.71		973.23	538.31		2009.55	565.85	
135.64	542.00		1003.71	538.29		2040.03	567.25	
140.21	540.23		1034.17	538.49		2070.51	569.37	
147.83	538.28		1064.67	538.17		2100.99	571.41	
150.88	537.12		1095.15	537.03		2131.47	573.63	LRM
161.54	535.90		1125.63	535.95				
170.69	534.19		1156.11	535.23				
178.93	536.17		1186.59	533.37				
192.02	535.14		1217.03	532.94	ML			
199.64	536.57		1247.07	532.94				
213.36	536.08		1277.55	532.49				
228.60	536.23		1295.17	531.97				
243.84	537.61		1262.03	532.94	ML			
251.98	537.30		1262.73	532.94				
274.32	538.06		1265.83	533.83				
304.80	534.03		1268.88	535.87				
335.28	536.40		1271.93	537.76				
365.76	537.94		1274.98	538.83				
396.24	536.15		1279.55	540.75				
426.72	537.97		1284.12	542.51				
457.20	538.15		1288.67	544.16				
487.68	536.75		1293.27	545.77				
518.16	536.63		1308.51	547.21				
548.64	536.04		1318.93	548.52				
579.12	535.35		1329.47	549.23				
609.60	534.34		1349.95	547.53				
627.08	532.86	ML	1430.43	550.41				
627.28	532.88		1460.91	551.14				

SEDIMENT SURVEY SECTION				LAKE DUFFENBURY				RANGE NO. - 19			
DEC 17 1981, PAGE 1								SURVEYED 267 871985			
UTAH-DNT.								MINIMUM ELEVATION - 510.35			
								ASSURED MINIMUM DATUM - 511.00			
ELEVATION (M.)	ALL. AREA (SQ M.)	ELEVATION (M.)	ALL. AREA (SQ M.)	ELEVATION (M.)	ALL. AREA (SQ M.)	ELEVATION (M.)	ALL. AREA (SQ M.)	ELEVATION (M.)	ALL. AREA (SQ M.)	ELEVATION (M.)	ALL. AREA (SQ M.)
531.00	30.2	543.50	8586.8	556.00	25042.9	568.50	47618.4				
531.50	72.6	544.00	9164.8	556.50	25824.7	569.00	48545.6				
532.00	125.6	544.50	9744.0	557.00	26616.0	569.50	49676.7				
532.50	191.0	545.00	10324.6	557.50	27414.1	570.00	50712.2				
533.00	275.8	545.50	10907.2	558.00	28217.5	570.50	51752.7				
533.50	387.0	546.00	11492.2	558.50	29026.0						
534.00	511.3	546.50	12080.9	559.00	29845.8						
534.50	645.1	547.00	12671.7	559.50	30678.4						
535.00	796.5	547.50	13271.2	560.00	31520.4						
535.50	967.4	548.00	13875.5	560.50	32371.6						
536.00	1163.4	548.50	14487.1	561.00	33232.7						
536.50	1407.6	549.00	15107.9	561.50	34101.7						
537.00	1694.7	549.50	15741.0	562.00	34981.8						
537.50	2003.4	550.00	16391.4	562.50	35878.0						
538.00	2379.7	550.50	17044.2	563.00	36791.2						
538.50	2879.7	551.00	17728.2	563.50	37720.8						
539.00	3443.0	551.50	18413.5	564.00	38663.2						
539.50	4009.0	552.00	19110.6	564.50	39616.9						
540.00	4576.5	552.50	19818.5	565.00	40561.8						
540.50	5155.6	553.00	20537.2	565.50	41558.8						
541.00	5715.0	553.50	21266.6	566.00	42551.1						
541.50	6247.6	554.00	22004.7	566.50	43552.9						
542.00	6800.5	554.50	22751.1	567.00	44561.4						
542.50	7414.1	555.00	23506.2	567.50	45576.1						
543.00	8011.2	555.50	24270.2	568.00	46595.3						



LAKE OPEWEGAN

PROFILE DATA

RANGE NO 14 SURVEY DATE: 1972-05-05

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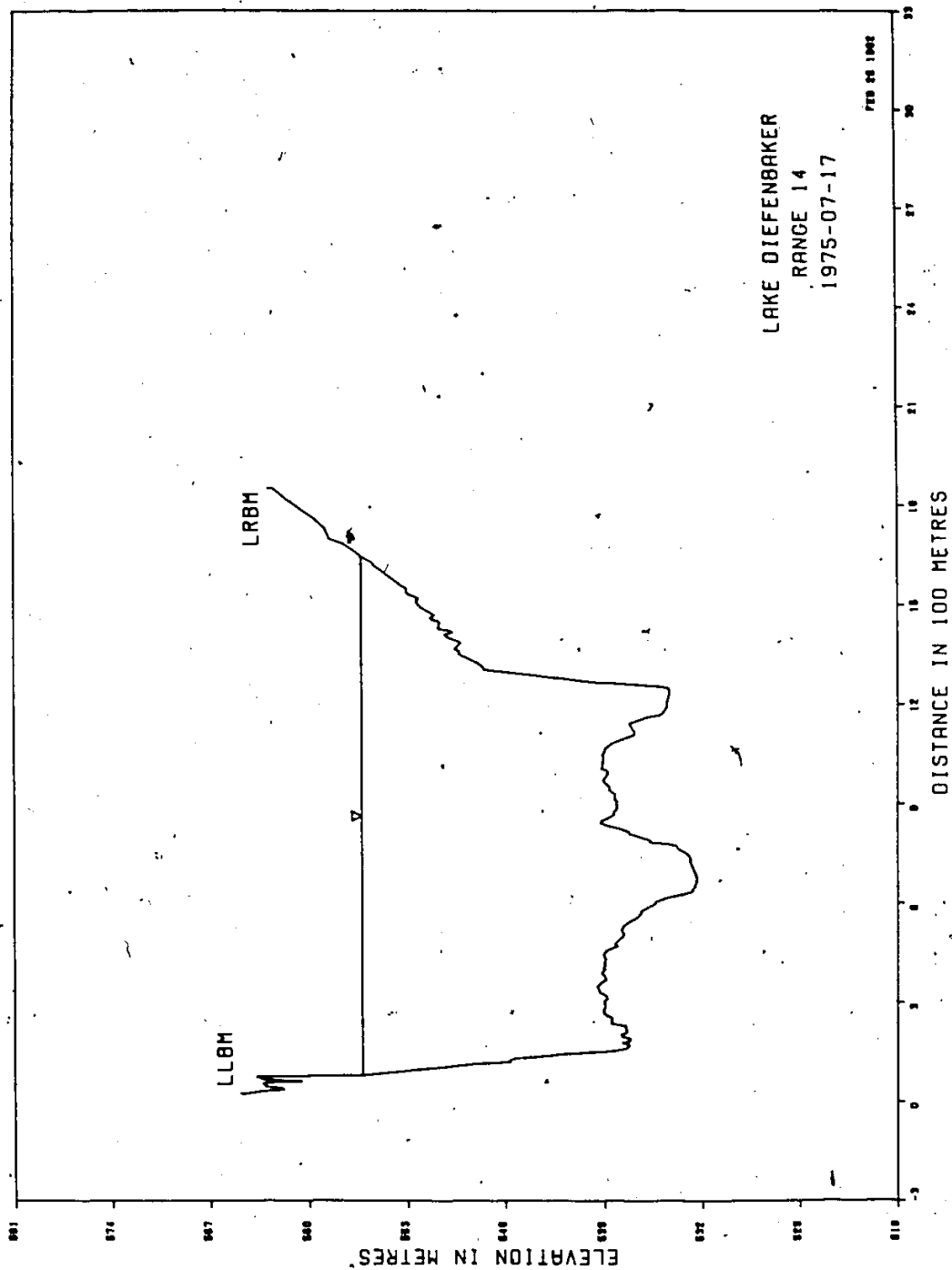
SEDIMENT SURVEY SECTION
JAN 4 1982, PAGE 1
DITAMA,ONT.

LAKE DUFENBACHER

RANGE NO. - 14
SURVEYED 6/ 6/1972
MINIMUM ELEVATION - 532.53
ASSUMED MINIMUM DATUM - 533.00

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
533.00	48.7	545.50	9704.0	558.00	27057.0		
533.50	111.6	546.00	10287.5	558.50	27865.0		
534.00	184.5	546.50	10873.0	559.00	28687.3		
534.50	265.8	547.00	11462.7	559.50	29520.9		
535.00	384.7	547.50	12059.7	560.00	30364.3		
535.50	522.3	548.00	12665.9	560.50	31216.6		
536.00	673.8	548.50	13277.5	561.00	32077.9		
536.50	842.0	549.00	13894.6	561.50	32947.7		
537.00	1030.0	549.50	14528.4	562.00	33827.8		
537.50	1269.4	550.00	15180.4	562.50	34722.1		
538.00	1554.5	550.50	15842.3				
538.50	1888.2	551.00	16516.7				
539.00	2300.2	551.50	17203.7				
539.50	2840.8	552.00	17905.0				
540.00	3403.9	552.50	18618.6				
540.50	3968.9	553.00	19345.0				
541.00	4535.4	553.50	20082.6				
541.50	5103.3	554.00	20828.4				
542.00	5672.8	554.50	21576.7				
542.50	6243.7	555.00	22335.8				
543.00	6816.2	555.50	23102.1				
543.50	7390.1	556.00	23877.1				
544.00	7965.7	556.50	24660.9				
544.50	8543.1	557.00	25453.8				
545.00	9122.5	557.50	26253.6				



LAKE DIEFFENBACHER

PKDFILE DATA

CHANGE NO 14 SURVEY DATE 1975-07-17

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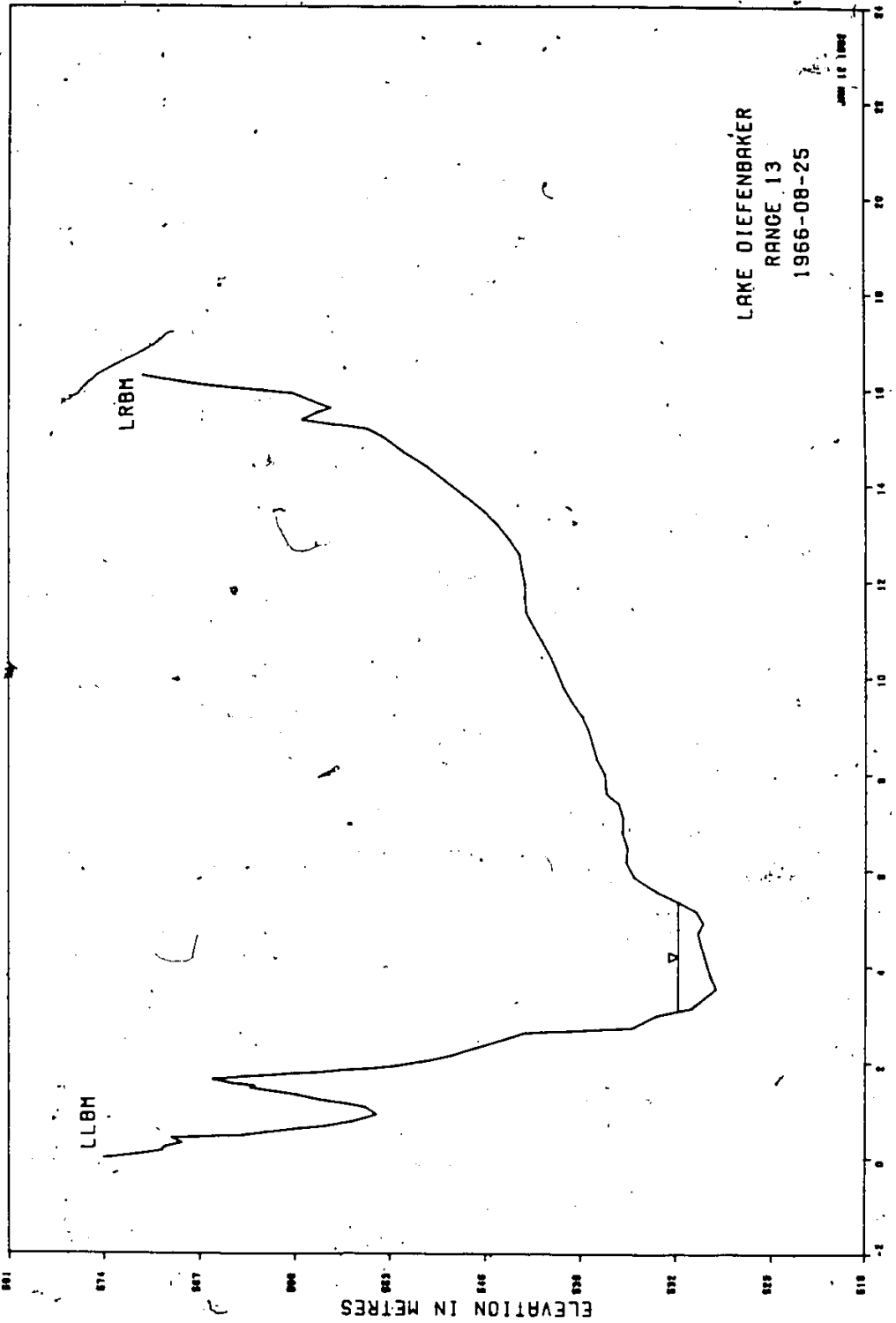
SEDIMENT SURVEY SECTION
MAR 3 1982, PAGE 1
OTTAWA, ONT.

LAKE DUFFENBAKER

RANGE NO. - 14
SURVEYED 17/ 7/1979
MINIMUM ELEVATION - 532.35
ASSUMED MINIMUM DATUM - 532.50

ELEVATION - AREA TABLE
.....
.....

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
532.50	3.3	545.00	9022.0	557.50	28102.4		
533.00	44.0	545.50	9603.8	558.00	26907.0		
533.50	106.5	546.00	10190.9	558.50	27715.5		
534.00	178.3	546.50	10780.7	559.00	28537.4		
534.50	262.3	547.00	11372.4	559.50	29372.6		
535.00	382.7	547.50	11966.1	560.00	30216.8		
535.50	516.8	548.00	12567.3	560.50	31068.4		
536.00	663.5	548.50	13175.6	561.00	31928.9		
536.50	825.3	549.00	13790.1	561.50	32797.6		
537.00	1008.7	549.50	14418.9	562.00	33676.0		
537.50	1229.5	550.00	15066.6	562.50	34567.7		
538.00	1505.3	550.50	15725.6				
538.50	1833.3	551.00	16397.0				
539.00	2230.8	551.50	17082.6				
539.50	2766.0	552.00	17776.9				
540.00	3324.6	552.50	18484.8				
540.50	3885.0	553.00	19203.0				
541.00	4447.1	553.50	19934.8				
541.50	5011.3	554.00	20675.0				
542.00	5577.4	554.50	21424.5				
542.50	6145.6	555.00	22183.0				
543.00	6716.2	555.50	22950.3				
543.50	7289.4	556.00	23727.0				
544.00	7864.9	556.50	24510.9				
544.50	8442.5	557.00	25303.1				



WATER SURVEY OF CANADA
JAN. 12 1962 PAGE 1
OTTAWA, ONT.

LAKE DIEPHENWATER

PROFILE DATA

RANGE NO 13 SURVEY DATE 1966-03-25

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STA ELEV 49KS

STA ELEV 49KS

STA ELEV 49KS

STA ELEV 49KS

STA ELEV 49KS

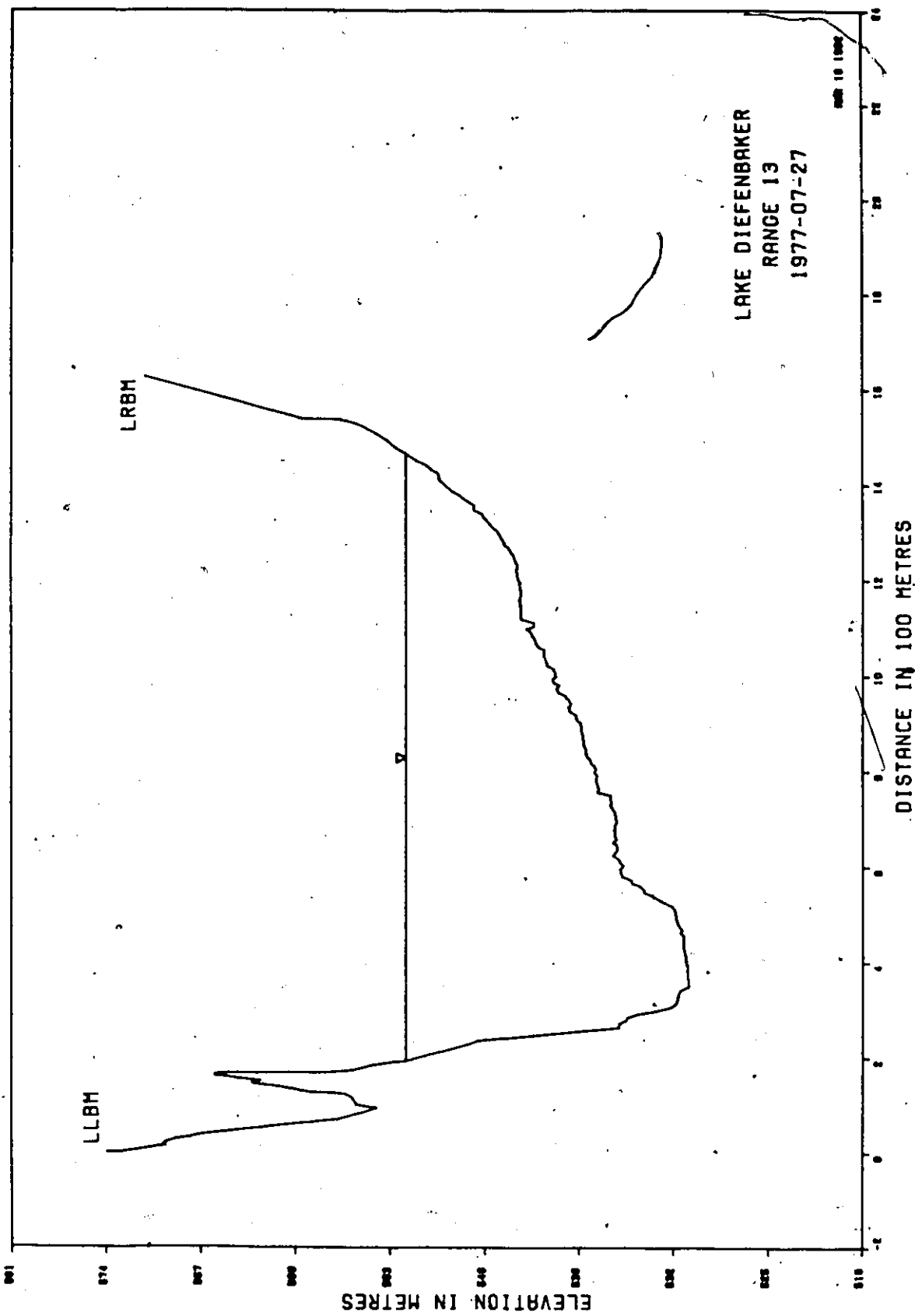
STA ELEV 49KS

STA ELEV 49KS

STA ELEV 49KS

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WATER SURVEY OF CANADA
MAR 30 1962
OTTAWA, ONT.

PAGE 1

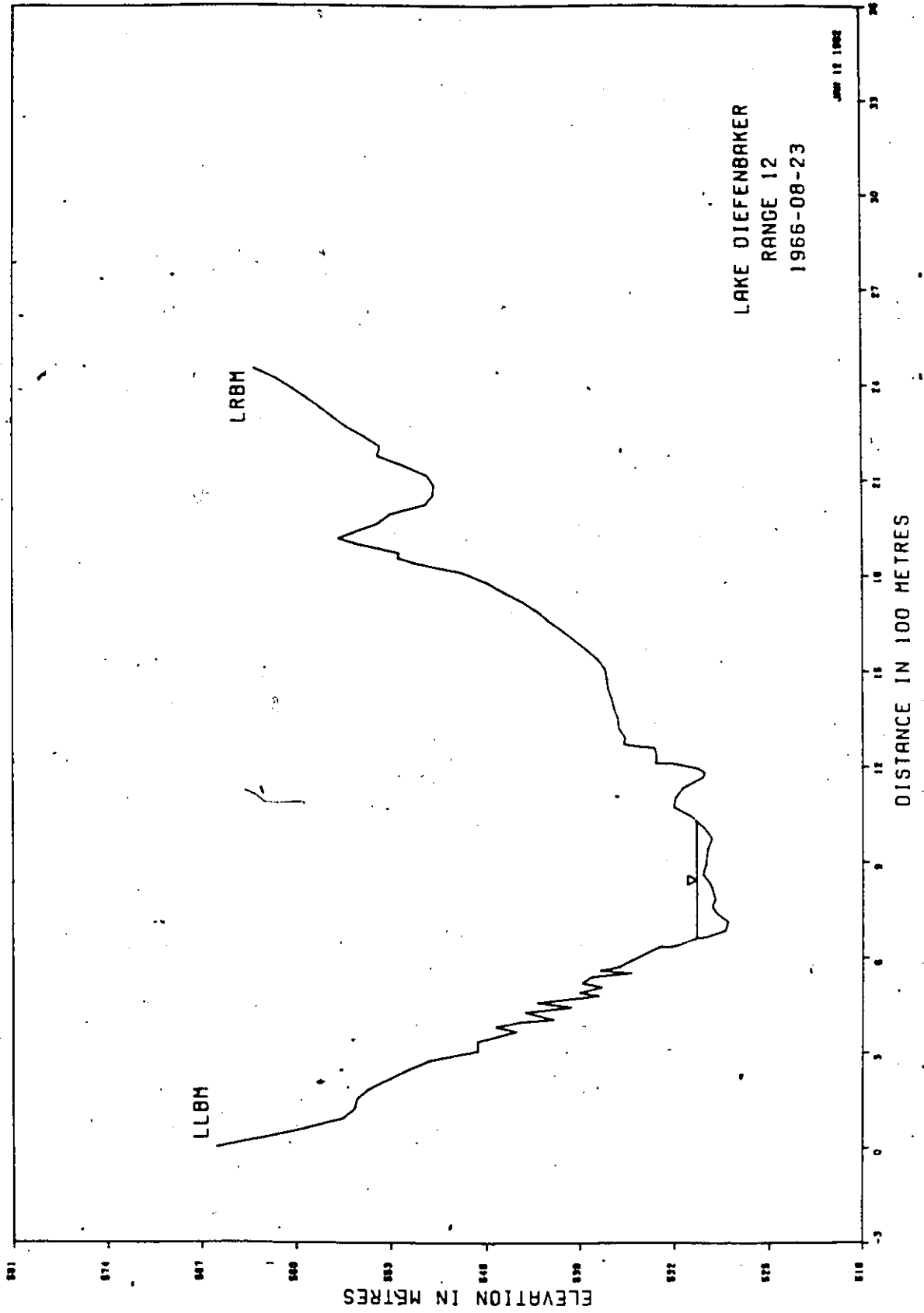
LAKE DUFFENHARER

PROFILE DATA

RANGE NO 13 SURVEY DATE 1977-07-27

STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS
0+00	573.93	LL34	142+00	524.43		572+00	535.16		901+00	538.91	
0+00	573.56		142+00	522.25		580+00	535.81		1205+00	543.81	
1+20	572.60		142+30	521.86		588+00	535.91		1253+00	543.91	
6+10	571.55		142+60	521.82	HL	595+00	535.96		1260+00	544.11	
9+10	573.74		143+00	548.31		602+00	535.71		1268+00	544.26	
12+50	570.29		143+00	547.01		607+00	535.76		1273+00	544.51	
13+70	569.51		143+00	546.46		615+00	536.00		1278+00	544.56	
14+60	569.00		143+00	536.01		624+00	536.40		1287+00	544.76	
15+30	567.81		143+00	536.01		632+00	536.21		1295+00	544.91	
21+30	569.57		143+00	535.51		637+00	536.16		1302+00	545.06	
22+40	569.45		143+00	535.35		645+00	536.21		1310+00	545.81	
25+00	569.17		143+00	535.06		651+00	536.46		1316+00	545.81	
29+00	568.75		143+00	534.30		657+00	536.21		1326+00	545.91	
30+50	568.29		143+00	532.16		665+00	536.36		1333+00	546.16	
32+40	567.63		143+00	531.81		672+00	536.36		1338+00	546.21	
36+60	567.26		143+00	531.71		679+00	536.35		1347+00	546.81	
41+10	565.99		143+00	531.66		686+00	536.36		1356+00	546.81	
43+30	565.25		143+00	531.61		693+00	536.21		1362+00	547.11	
47+20	565.12		143+00	531.67		699+00	536.26		1370+00	547.56	
53+30	562.23		143+00	530.87		707+00	536.31		1378+00	547.86	
61+00	559.76		143+00	530.76		714+00	536.36		1384+00	548.26	
70+10	558.52		143+00	530.91		721+00	536.51		1392+00	548.61	
86+40	558.54		143+00	531.07		728+00	536.66		1399+00	548.91	
96+50	553.76		143+00	531.07		733+00	536.61		1406+00	549.16	
97+50	554.81		143+00	531.06		742+00	536.66		1411+00	549.36	
101+20	553.48		143+00	531.15		750+00	536.66		1416+00	549.36	
115+50	555.82		143+00	531.21		758+00	537.61		1424+00	549.46	
123+40	555.28		143+00	531.25		764+00	537.56		1432+00	549.96	
125+00	555.35		143+00	531.23		770+00	537.61		1437+00	550.16	
127+10	558.84		143+00	531.26		777+00	537.71		1442+00	550.41	
129+50	559.54		143+00	531.21		783+00	537.71		1450+00	551.06	
132+30	560.20		143+00	531.25		791+00	537.66		1465+00	551.82	HL
135+30	560.64		143+00	531.35		797+00	537.66		1478+00	552.59	
138+40	561.28		143+00	531.62		805+00	537.76		1493+00	553.26	
141+30	562.59		143+00	531.76		812+00	537.91		1505+00	553.94	
145+40	563.14		143+00	531.81		817+00	538.11		1521+00	554.94	
148+40	563.17		143+00	531.97		825+00	538.21		1528+00	555.55	
151+20	563.53		143+00	531.91		830+00	538.41		1533+00	556.22	
155+40	563.10		143+00	532.11		834+00	538.51		1536+00	556.80	
158+30	563.35		143+00	532.71		840+00	538.51		1537+00	559.52	
161+50	563.96		143+00	533.96		849+00	538.66		1539+00	559.61	
163+70	563.85		143+00	534.15		857+00	538.71		1625+00	571.13	LRBM
166+10	563.16		143+00	534.21		865+00	538.76				
168+30	563.42		143+00	534.51		873+00	538.80				
173+40	565.57		143+00	535.05		881+00	538.86				

SEDIMENT SURVEY SECTION				LAKE DIEFENBAKER				RANGE NO. - 13			
MAR 10 1982, PAGE 1				SURVEYED 27/ 7/1977				MINIMUM ELEVATION = 530.84			
OTTAWA, ONT.				ELEVATION - AREA TABLE				ASSURED MINIMUM DATUM = 531.00			
ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
531.00	1.9	541.50	6196.8	556.00	21257.8	568.50	38819.9				
531.50	51.5	542.00	6693.6	556.50		569.00	40629.4				
532.00	137.1	544.50	7206.1	557.00	22672.1	569.50	41422.9				
532.50	245.2	545.00	7729.8	557.50	23384.2	570.00	42222.4				
533.00	357.0	545.50	8263.9	558.00	24098.0	570.50	43026.0				
533.50	475.4	546.00	8805.8	558.50	24812.9	571.00	43832.6				
534.00	598.8	546.50	9358.4	559.00	25529.1						
534.50	728.9	547.00	9915.3	559.50	26247.0						
535.00	865.5	547.50	10484.0	560.00	26968.0						
535.50	1009.7	548.00	11059.8	560.50	27693.1						
536.00	1166.2	548.50	11642.2	561.00	28422.2						
536.50	1363.4	549.00	12232.0	561.50	29155.1						
537.00	1605.0	549.50	12831.3	562.00	29891.8						
537.50	1852.5	550.00	13441.4	562.50	30632.1						
538.00	2118.4	550.50	14058.9	563.00	31376.8						
538.50	2402.6	551.00	14681.1	563.50	32127.5						
539.00	2711.7	551.50	15309.5	564.00	32882.1						
539.50	3041.7	552.00	15944.7	564.50	33640.2						
540.00	3386.0	552.50	16584.9	565.00	34402.0						
540.50	3741.5	553.00	17230.4	565.50	35167.7						
541.00	4112.8	553.50	17882.6	566.00	35938.0						
541.50	4499.7	554.00	18540.7	566.50	36712.5						
542.00	4902.8	554.50	19206.0	567.00	37489.7						
542.50	5317.2	555.00	19880.1	567.50	38269.7						
543.00	5749.1	555.50	20562.8	568.00	39053.3						



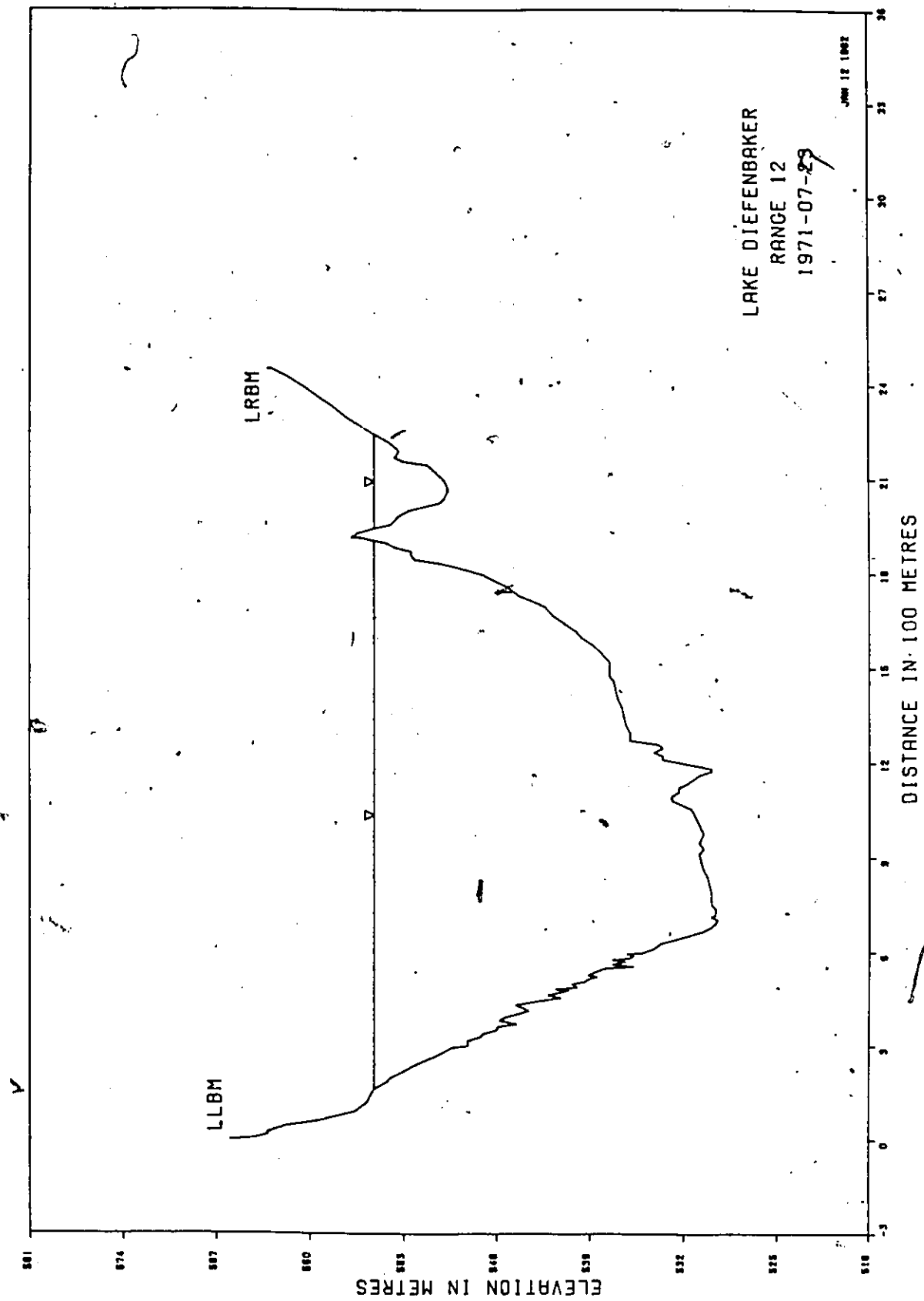
LAKE DUFFENBARGER
PROFILE DATA

RANGE NO 12 SURVEY DATE 1966-08-23

STA ELEV RMKS STA ELEV RMKS STA ELEV RMKS

0.00	565.92	LLN	938.75	524.87	2321.63	550.41	
30.48	562.45		974.31	524.16	2351.31	549.83	
60.96	559.31		1007.35	529.77	2382.39	549.80	
91.44	556.56		1025.03	530.29	2412.87	550.26	ML
121.92	555.68		1025.35	530.29	2443.35	551.96	
152.40	555.50		1039.98	530.64	2473.93	553.91	
182.88	555.64		1076.65	532.00	2504.31	553.76	
213.36	553.18		1100.94	531.85	2534.79	554.86	
243.84	551.75		1131.42	531.27	2565.27	556.20	
274.32	550.13		1164.95	529.80	2595.75	557.20	
304.80	546.60		1178.65	529.84	2626.23	558.15	
335.28	545.63		1192.38	530.14	2656.71	559.16	
365.76	543.73		1206.03	531.75	2687.19	563.22	
396.24	543.23		1208.23	532.24	2717.67	561.36	
426.72	543.03		1228.75	533.25	2748.15	563.05	LRM
457.20	542.15		1270.10	535.66			
487.68	538.95		1289.91	535.59			
518.16	539.76		1320.39	536.08			
548.64	537.36		1350.87	536.14			
579.12	535.12		1381.35	536.42			
609.60	533.11		1411.83	536.60			
640.08	537.45		1442.31	536.87			
670.56	536.11		1472.79	536.97			
701.04	535.17		1503.27	537.09			
731.52	533.03		1533.75	537.54			
762.00	532.26		1564.23	538.37			
792.48	531.66		1594.71	539.28			
822.96	530.29	ML	1625.19	540.23			
853.44	529.29		1655.67	541.26			
883.92	529.65		1686.15	542.07			
914.40	528.22		1716.63	543.21			
944.88	528.01		1747.11	544.34			
975.36	528.77		1777.59	545.84			
1005.84	528.95		1808.07	547.86			
1036.32	529.16		1838.55	551.25			
1066.80	529.05		1869.03	552.42			
1097.28	529.16		1899.51	552.34			
1127.76	529.35		1930.00	552.62			
1158.24	529.83		1960.48	555.87			
1188.72	529.68		1990.96	553.31			
1219.20	527.62		2021.44	552.74			

ELEVATION (M.)	AREA (M.)	ELEVATION (M.)	AREA (M.)	ELEVATION (M.)	AREA (M.)
528.50	15.2	541.00	9012.6	553.50	27802.4
529.00	45.6	541.50	9620.4	554.00	28751.3
529.50	127.5	542.00	10244.5	554.50	29730.4
530.00	234.6	542.50	10883.7	555.00	30720.8
530.50	400.9	543.00	11534.4	555.50	31740.1
531.00	720.7	543.50	12194.8	556.00	32798.3
531.50	981.2	544.00	12863.4	556.50	33872.7
532.00	1227.2	544.50	13544.2	557.00	34967.7
532.50	1515.5	545.00	14237.8	557.50	36074.5
533.00	1804.5	545.50	14944.1	558.00	37192.0
533.50	2105.3	546.00	15659.5	558.50	38330.3
534.00	2425.5	546.50	16382.1	559.00	39498.9
534.50	2754.3	547.00	17123.3	559.50	40697.7
535.00	3080.5	547.50	17874.3	560.00	41746.3
535.50	3423.7	548.00	18631.1	560.50	42934.3
536.00	3792.3	548.50	19392.4	561.00	44111.3
536.50	4122.5	549.00	20157.9	561.50	45207.3
537.00	4633.2	549.50	20927.7	562.00	46490.9
537.50	5119.2	550.00	21709.5	562.50	47691.4
538.00	5624.4	550.50	22520.5	563.00	48896.8
538.50	6151.1	551.00	23366.3		
539.00	6700.5	551.50	24218.7		
539.50	7262.4	552.00	25086.5		
540.00	7834.4	552.50	25972.0		
540.50	8417.9	553.00	26878.5		



LAKE DIEFENBAKER
RANGE 12
1971-07-29

JUN 12 1982

ELEVATION IN METRES

DISTANCE IN 100 METRES

WATER SURVEY OF CANADIAN
JAN 12 1952 PAGE 1
OTTAWA, ONT.

LAKE DUFENBACHER

PROFILE DATA

RANGE MU 12 SURVEY DATE 1971-07-23

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STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

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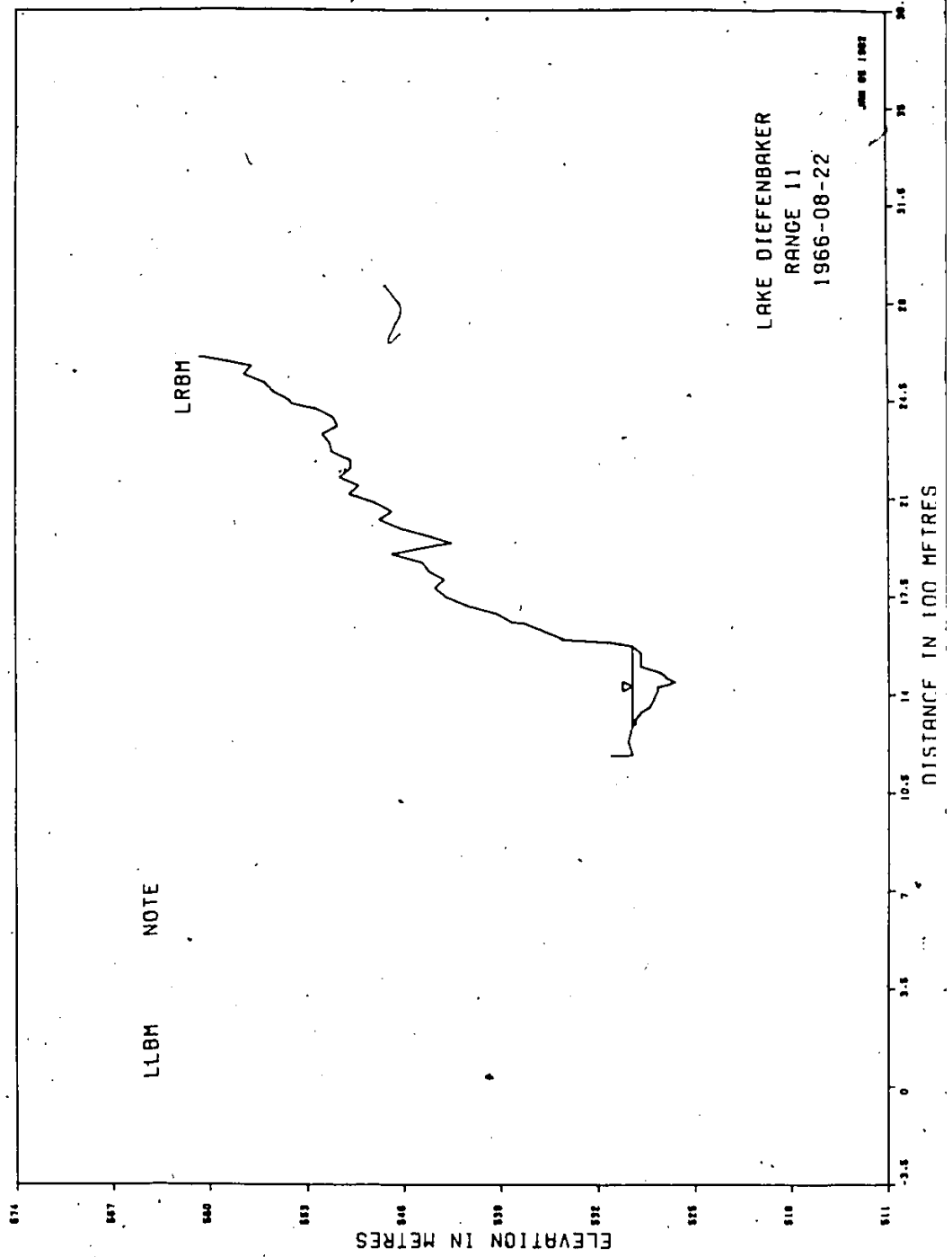
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4736.71 618.22

473

REDEMPT SURVEY SECTION				LAKE DIEFFENBARGER				RANGE NO. 12			
DEC 17 1981, PAGE 1				*****				SURVEYED 23/ 7/1971			
UTTARA-DUMT.				*****				MINIMUM ELEVATION = 529.41			
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LAKE DICKENBARGER

PAUFILE DATA

RANGE NO 11 SURVEY DATE 1966-08-22

STA ELEV MARKS

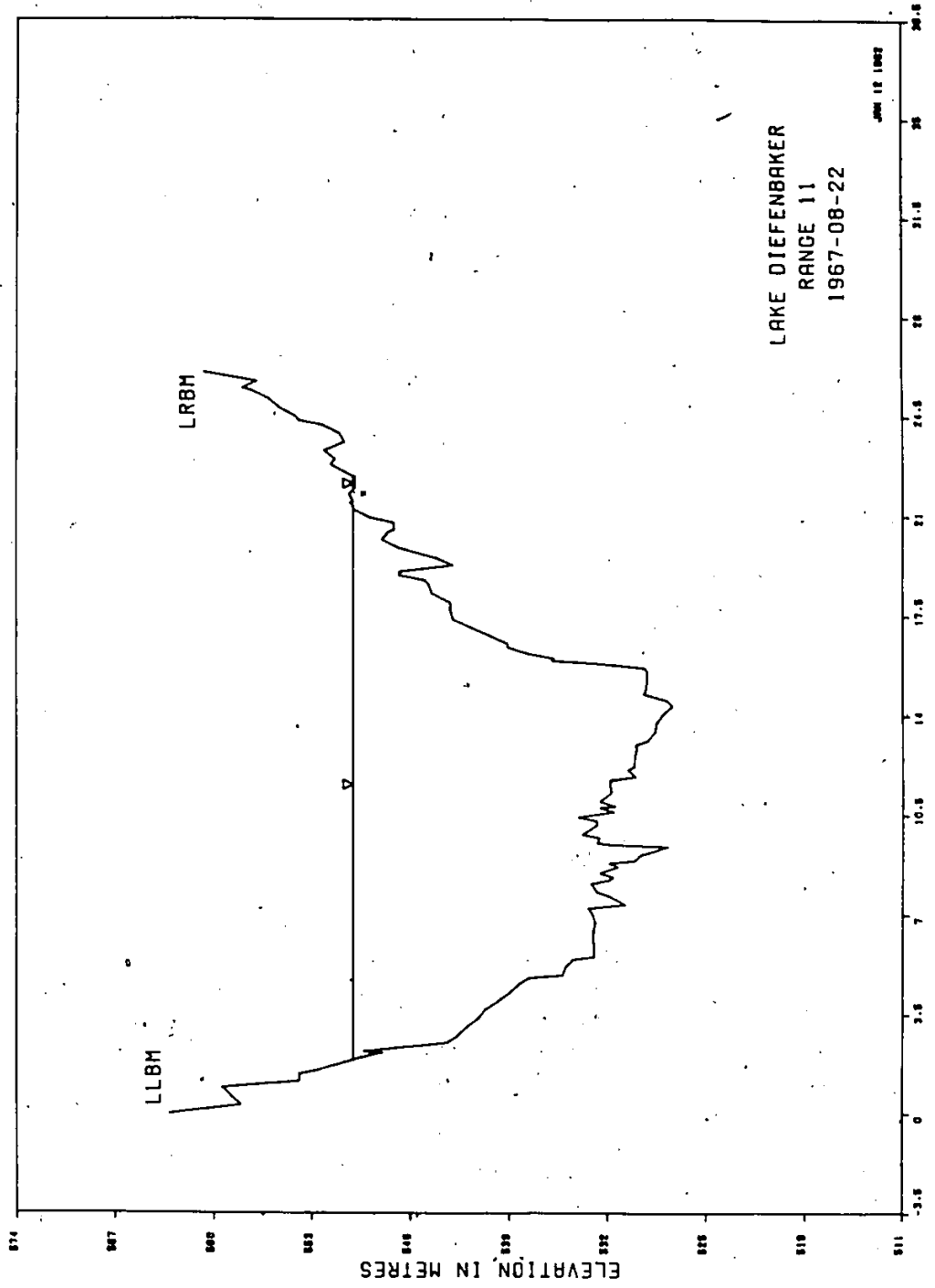
STA ELEV MARKS

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STA ELEV MARKS

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1266.00	529.50	HL	1973.32	546.17	
1265.26	529.50		2023.87	547.73	
1292.35	529.35		2054.35	546.84	
1298.45	529.25		2084.83	548.06	
1304.54	529.35		2115.31	549.87	
1310.64	529.25		2145.72	549.25	
1316.74	529.19		2176.27	550.54	
1322.83	529.07		2206.75	549.83	
1328.93	528.95		2237.23	549.83	
1335.02	528.99		2267.71	551.20	
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1353.31	528.28		2328.67	551.87	
1379.22	527.97		2359.15	550.77	
1399.03	527.82		2389.63	551.04	
1414.27	527.67		2420.11	552.30	
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1424.94	527.67		2450.59	554.22	
1438.66	526.76		2481.07	555.38	
1444.75	526.45		2511.55	555.96	
1458.47	527.06		2542.03	557.39	
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1478.28	527.52		2602.99	560.65	LRUM
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1520.95	528.89				
1545.25	528.89				
1572.00	529.50	HL			
1572.16	529.50				
1584.96	530.99				
1586.24	534.56				
1597.15	536.41				
1627.53	535.90				
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1558.11	538.15				
1688.59	539.19				
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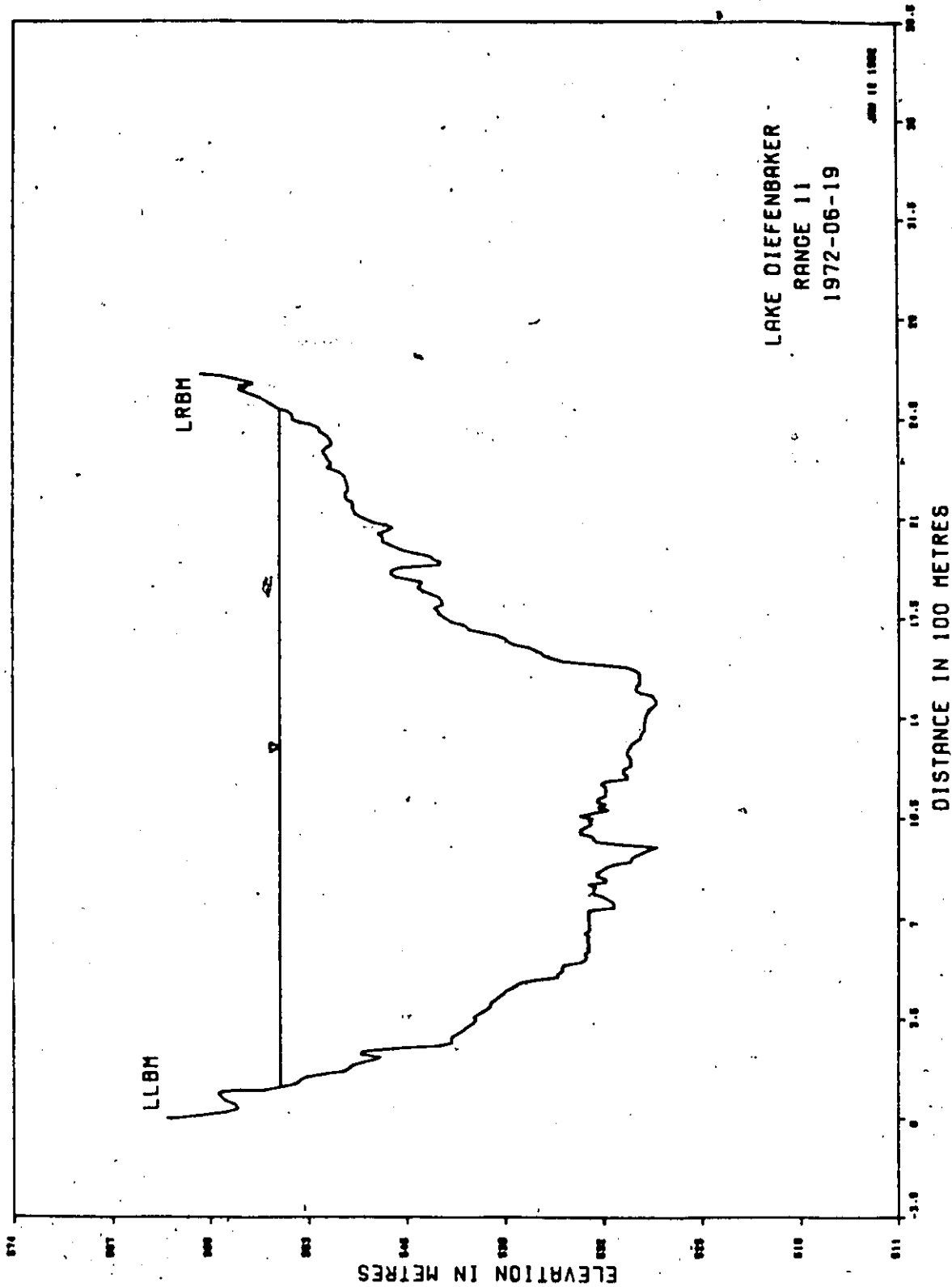


LAKE DIEFFENBACHER

PROFILE DATA

STA	ELEV	RMKS	STA	ELEV	RMKS	STA	ELEV	RMKS	STA	ELEV	RMKS
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30.48	558.06		944.83	531.69		1891.20	546.75				
60.96	558.76		950.94	532.67		1903.48	546.72				
91.44	559.37		969.25	532.55		1926.34	542.97				
114.30	553.97		981.46	533.74		1950.72	544.10				
121.92	553.65		1013.45	532.73		1981.20	546.35				
140.21	553.88		1028.70	532.76		1937.30	546.41				
152.40	552.66		1042.42	534.01		2016.25	547.97				
190.00	550.04	ML	1059.18	531.54		2026.92	547.76				
190.20	550.04		1074.42	532.46		2042.16	547.57				
196.60	549.62		1078.93	531.45		2051.30	547.12				
202.69	549.13		1097.29	532.49		2073.69	547.15				
208.79	549.76		1127.75	531.67		2095.50	548.91				
214.88	547.97		1158.24	531.82		2123.00	550.04	ML			
220.98	549.25		1171.65	531.72		2123.54	550.04				
249.94	543.37		1182.62	529.96		2133.60	550.04				
274.32	542.64		1207.01	530.50		2145.79	550.26				
304.80	542.00		1219.23	530.05		2148.84	550.04				
335.28	541.20		1247.53	530.02		2176.27	550.32				
365.76	540.72		1280.15	529.89		2198.00	550.04	ML			
396.24	539.77		1294.40	529.93		2188.46	550.04				
426.72	538.95		1310.54	529.10		2206.75	549.89				
457.20	538.28		1341.12	528.55		2237.23	549.89				
477.01	537.61		1371.63	528.45		2239.00	550.04	ML			
487.68	535.20		1402.05	528.01		2239.67	550.04				
518.16	534.95		1432.55	527.33		2267.71	551.20				
542.54	534.44		1452.37	527.76		2279.90	551.63				
551.69	532.94		1475.23	529.33		2298.19	551.35				
579.12	532.97		1473.52	529.22		2328.67	552.08				
609.60	533.00		1424.00	529.16		2359.15	550.68				
640.08	533.00		1454.43	529.15		2389.63	551.02				
670.56	532.95		1466.67	529.35		2420.11	552.24				
701.04	533.06		1486.95	531.85		2435.35	553.88				
722.38	533.34		1492.56	535.95		2450.59	554.16				
734.57	530.72		1600.23	535.44		2481.07	555.32				
765.05	531.86		1615.44	537.61		2511.55	556.05				
780.29	532.76		1639.82	539.10		2532.03	557.36				
807.72	533.13		1652.02	539.13		2548.13	557.91				
819.91	531.91		1676.40	540.26		2572.51	556.90				
830.58	531.57		1706.08	541.66		2502.79	560.68	LRM			
845.82	532.49		1737.36	542.97							
867.16	531.24		1767.94	543.15							
879.23	531.72		1775.27	543.15							
889.49	530.05		1828.82	544.47							
908.30	523.54		1854.28	544.71							

SEDIMENT SURVEY SECTION				LAKE DIEFENBAKER				RANGE NO. - 11			
DEC 17 1981, PAGE 1				SURVEYED 22/ 8/1967				MINIMUM ELEVATION = 527.33			
OTTAWA, ONT.				ELEVATION - AREA TABLE				ASSUMED MINIMUM DATUM = 528.00			
ELEVATION	ACC. AREA	ELEVATION	ACC. AREA	ELEVATION	ACC. AREA	ELEVATION	ACC. AREA	ELEVATION	ACC. AREA	ELEVATION	ACC. AREA
(M.)	(SQ. M.)	(M.)	(SQ. M.)	(M.)	(SQ. M.)	(M.)	(SQ. M.)	(M.)	(SQ. M.)	(M.)	(SQ. M.)
528.00	20.5	540.50	10618.4	523.00	32830.9	528.00	32830.9	528.00	32830.9	528.00	32830.9
528.50	62.6	541.00	11280.8	523.50	33992.4	528.50	33992.4	528.50	33992.4	528.50	33992.4
529.00	139.5	541.50	11962.6	524.00	35142.0	529.00	35142.0	529.00	35142.0	529.00	35142.0
529.50	201.8	542.00	12659.9	524.50	36311.6	529.50	36311.6	529.50	36311.6	529.50	36311.6
530.00	417.5	542.50	13373.9	525.00	37489.2	530.00	37489.2	530.00	37489.2	530.00	37489.2
530.50	631.7	543.00	14104.7	525.50	38674.7	530.50	38674.7	530.50	38674.7	530.50	38674.7
531.00	854.6	543.50	14874.4	526.00	39870.9	531.00	39870.9	531.00	39870.9	531.00	39870.9
531.50	1100.3	544.00	15666.2	526.50	41076.7	531.50	41076.7	531.50	41076.7	531.50	41076.7
532.00	1383.6	544.50	16471.9	527.00	42289.5	532.00	42289.5	532.00	42289.5	532.00	42289.5
532.50	1721.4	545.00	17301.2	527.50	43514.6	532.50	43514.6	532.50	43514.6	532.50	43514.6
533.00	2104.4	545.50	18146.3	528.00	44752.2	533.00	44752.2	533.00	44752.2	533.00	44752.2
533.50	2598.8	546.00	19000.0	528.50	46000.7	533.50	46000.7	533.50	46000.7	533.50	46000.7
534.00	3114.9	546.50	19862.1	529.00	47264.7	534.00	47264.7	534.00	47264.7	534.00	47264.7
534.50	3637.0	547.00	20734.4	529.50	48545.1	534.50	48545.1	534.50	48545.1	534.50	48545.1
535.00	4167.7	547.50	21630.5	530.00	49832.7	535.00	49832.7	535.00	49832.7	535.00	49832.7
535.50	4715.9	548.00	22548.3	530.50	51123.9	535.50	51123.9	535.50	51123.9	535.50	51123.9
536.00	5271.1	548.50	23481.2			536.00		536.00		536.00	
536.50	5831.5	549.00	24421.4			536.50		536.50		536.50	
537.00	6395.1	549.50	25372.4			537.00		537.00		537.00	
537.50	6962.0	550.00	26337.5			537.50		537.50		537.50	
538.00	7534.7	550.50	27356.3			538.00		538.00		538.00	
538.50	8112.1	551.00	28400.4			538.50		538.50		538.50	
539.00	8714.3	551.50	29474.2			539.00		539.00		539.00	
539.50	9316.5	552.00	30584.0			539.50		539.50		539.50	
540.00	9774.6	552.50	31734.3			540.00		540.00		540.00	



LAKE DIEPENBAKER

PROFILE DATA

RANGE NO 11 SURVEY DATE 1972-JS-19

STA	ELEV	RMKS	STA	ELEV	RMKS	STA	ELEV	RMKS	STA	ELEV	RMKS
0.00	501.06	LLBN	437.54	519.13		866.56	531.27		1797.71	543.93	
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9.14	500.77		456.53	538.58		906.78	529.97		1824.84	543.87	
21.34	558.94		465.65	538.22		915.84	529.68		1836.72	544.28	
33.53	558.00		477.62	537.91		926.59	529.22		1846.78	544.03	
48.77	558.18		486.77	536.84		936.65	528.77		1856.84	543.17	
64.01	558.97		496.82	535.23		946.71	528.13		1867.81	544.95	
86.87	559.40		506.58	535.23		956.77	530.60		1876.65	544.89	
92.96	559.16		516.64	534.89		966.83	532.43		1883.64	545.50	
99.06	557.94		526.69	534.92		976.58	532.77		1896.77	546.75	
99.36	556.26		536.75	534.80		986.72	532.79		1906.83	547.09	
110.00	554.98	HL	546.81	533.64		996.78	533.64		1917.80	547.02	
110.34	554.98		556.55	533.28		1006.75	533.64		1927.86	546.41	
119.79	554.07		566.62	533.19		1016.81	533.31		1936.73	543.84	
126.80	553.73		576.68	533.31		1026.87	532.85		1946.75	543.55	
136.55	553.58		586.74	533.03		1036.62	533.03		1957.73	544.07	
146.61	553.12		596.80	533.06		1046.68	532.74		1967.79	544.31	
156.67	551.93		606.85	533.03		1056.74	533.84		1976.83	543.17	
166.73	550.47		617.81	533.10		1066.80	532.70		1986.63	546.14	
176.78	550.10		626.67	533.13		1076.86	531.88		1996.74	546.63	
185.62	549.92		637.64	533.03		1086.61	532.36		2006.80	547.06	
197.82	549.16		646.74	533.31		1096.67	531.82		2016.69	547.86	
206.65	548.30		656.84	533.00		1106.73	532.46		2037.83	547.70	
216.71	547.85		666.69	533.03		1116.79	532.36		2045.82	547.97	
226.77	549.25		677.57	533.03		1126.85	531.82		2056.73	547.39	
236.83	549.10		686.71	533.00		1136.60	531.85		2065.85	546.93	
246.58	547.06		696.77	533.06		1146.66	531.82		2076.91	547.16	
256.64	543.67		706.83	533.06		1156.72	531.85		2085.75	548.30	
266.70	542.79		716.59	533.03		1167.69	532.15		2096.72	548.88	
276.76	542.79		727.85	533.06		1176.73	531.82		2107.63	549.34	
286.82	542.79		737.62	531.21		1186.67	530.23		2116.84	549.65	
296.57	542.48		746.75	531.24		1196.64	530.24		2137.87	549.86	
306.63	542.12		756.92	531.36		1206.70	530.24		2146.71	549.77	
316.69	541.87		766.57	531.69		1216.76	530.27		2157.63	549.86	
326.75	541.57		777.85	532.12		1226.70	530.02		2165.91	550.24	
336.80	541.26		785.77	532.73		1236.71	529.93		2176.83	550.35	
346.56	541.11		797.65	532.70		1245.72	530.11		2186.81	550.38	
356.62	541.26		809.63	532.58		1255.78	530.02		2197.91	550.16	
366.67	540.96		817.78	533.03		1266.75	530.29		2206.75	550.16	
375.62	540.59		826.62	531.82		1276.61	530.29		2217.93	550.41	
386.79	540.23		836.63	531.65		1286.87	530.23		2226.71	550.74	
396.54	540.04		846.73	532.47		1296.87	530.02		2237.77	551.05	
406.50	537.21		856.73	532.47		1306.58	529.96		2247.77	551.63	
416.66	534.71		866.83	532.12		1317.55	529.65		2256.74	551.35	
427.63	539.44		875.80	531.82		1327.68	529.35		2267.89	551.41	

WATER SURVEY OF CANADA
JAN 12 1982 PAGE 2
OTTAWA, ONT.

LAKE DUFFENBARGER

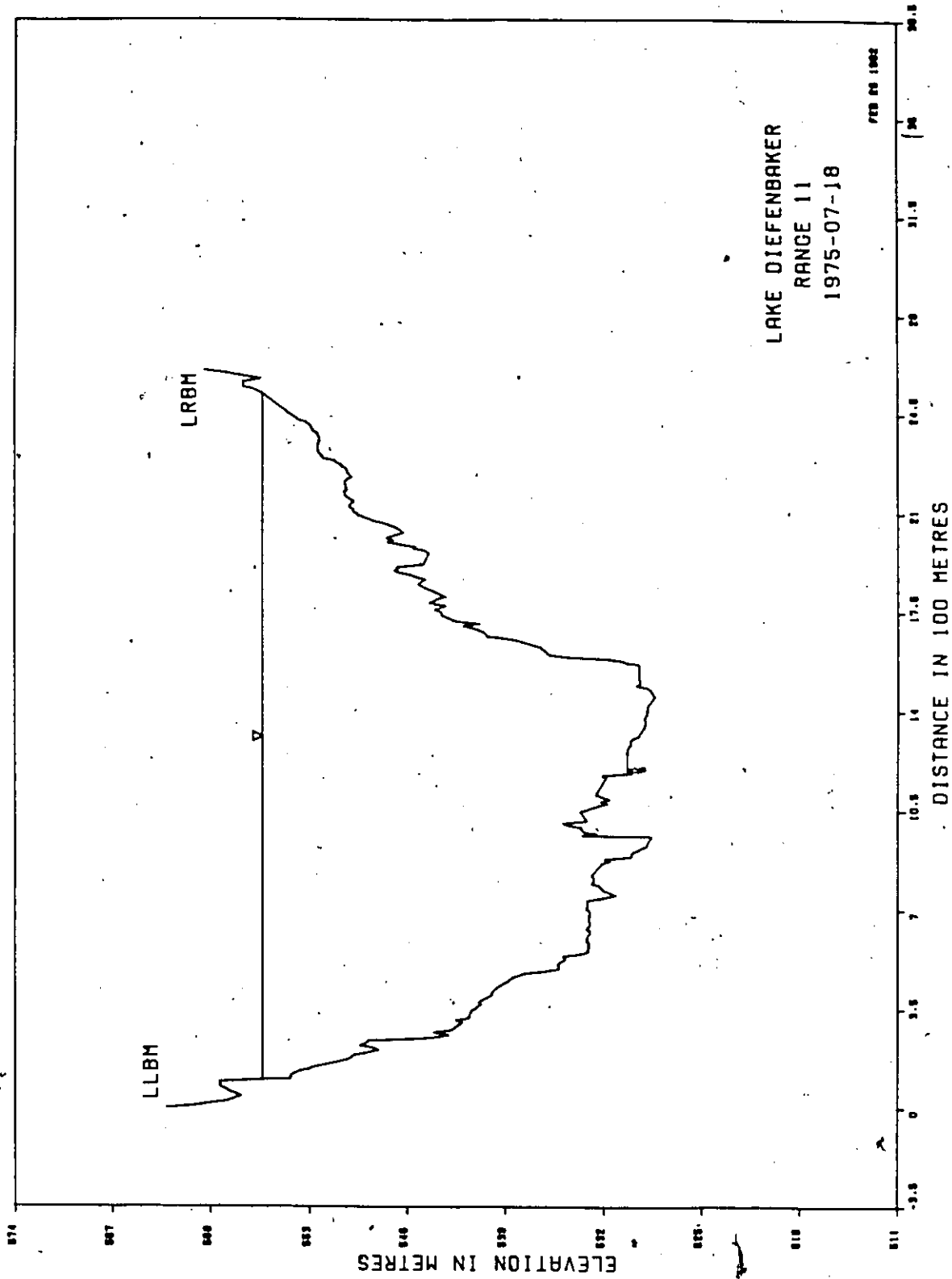
PROFILE DATA

RANGE NO 11 SURVEY DATE 1972-36-19

STA	ELEV	MARKS	STA	ELEV	MARKS	STA	ELEV	MARKS
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2307.84	551.63							
2315.87	551.69							
2330.81	551.93							
2335.90	551.90							
2346.66	551.72							
2356.71	551.35							
2365.76	551.32							
2376.83	551.47							
2385.67	551.57							
2397.86	551.93							
2405.79	552.18							
2417.67	552.24							
2430.78	552.82							
2433.03	553.12							
2436.88	553.52							
2439.92	553.76							
2446.93	554.07							
2454.86	554.07							
2463.70	554.16							
2474.57	554.37							
2482.00	554.98	HL						
2482.60	554.98							
2523.74	556.44							
2549.65	557.91							
2557.27	557.76							
2563.37	557.44							
2567.94	556.94							
2574.04	556.90							
2595.37	558.08							
2602.99	560.34							
2602.99	560.55	LRM						

SEDIMENT SURVEY SECTION				LAKE DILFENBAKER				RANGE NO. 11			
DEC 17 1981, PAGE 1				SURVEYED 19/ 6/1972				MINIMUM ELEVATION - 528.13			
OTTAWA, ONT.				ELEVATION - AREA TABLE				ASSUMED MINIMUM DATUM - 528.50			
ELEVATION	ACC. AREA	ELEVATION	ACC. AREA	ELEVATION	ACC. AREA	ELEVATION	ACC. AREA	ELEVATION	ACC. AREA	ELEVATION	ACC. AREA
(M.)	(SQ. M.)	(M.)	(SQ. M.)	(M.)	(SQ. M.)	(M.)	(SQ. M.)	(M.)	(SQ. M.)	(M.)	(SQ. M.)
528.50	9.0	531.00	11188.9	553.50	33289.5						
529.00	44.9	541.50	11869.7	554.00	34945.5						
529.50	131.7	542.00	12568.5	554.50	36119.5						
530.00	273.5	542.50	13282.1	555.00	37303.0						
530.50	472.9	543.00	14010.7	555.50	38494.0						
531.00	703.1	543.50	14756.9	556.00	39694.3						
531.50	945.6	544.00	15519.1	556.50	40903.5						
532.00	1218.2	544.50	16344.4	557.00	42110.8						
532.50	1550.5	545.00	17160.9	557.50	43344.1						
533.00	1912.1	545.50	17997.2	558.00	44582.5						
533.50	2413.6	546.00	18841.4	558.50	45836.9						
534.00	2934.2	546.50	19693.1	559.00	47104.3						
534.50	3484.5	547.00	20557.2	559.50	48387.1						
535.00	3992.5	547.50	21446.0	560.00	49679.3						
535.50	4542.5	548.00	22356.5	560.50	50974.2						
536.00	5100.6	548.50	23284.5								
536.50	5657.7	549.00	24223.0								
537.00	6239.1	549.50	25175.7								
537.50	6819.9	550.00	26148.9								
538.00	7406.1	550.50	27162.9								
538.50	8001.0	551.00	28210.8								
539.00	8604.6	551.50	29270.7								
539.50	9216.4	552.00	30374.6								
540.00	9870.4	552.50	31504.3								
540.50	10524.4	553.00	32681.9								



WATER SUPPLY OF CANADA
FEB 26 1982
OTTAWA, ONT.

LAKEL DIEFFENBACHER
PROFILE DATA

RANGE NO 11 SURVEY DATE 1975-07-18

STA ELEV RMKS

STA ELEV RMKS

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STA ELEV RMKS

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STA ELEV RMKS

LAKE OLFENBAKER

PROFILE DATA

RANGE NO 11 SURVEY DATE 1975-07-10

STA	ELEV	RKKS	STA	ELEV	RKKS	STA	ELEV	RKKS
2134.00	549.98		2553.00	557.70				
2141.00	549.83		2562.80	557.73				
2148.00	550.08		2567.10	557.09				
2162.00	550.48		2573.50	556.44				
2169.00	550.48		2583.20	557.67				
2176.00	550.53		2593.90	558.86				
2181.00	550.33		2603.00	560.38				
2189.00	550.38		2603.00	560.37	LRUM			
2196.00	550.43							
2204.00	550.46							
2210.00	550.46							
2218.00	550.33							
2226.00	549.98							
2241.00	550.28							
2248.00	550.23							
2257.00	550.38							
2266.00	550.73							
2271.00	550.73							
2279.00	551.08							
2286.00	551.23							
2294.00	552.03							
2301.00	552.08							
2308.00	552.23							
2315.00	552.33							
2321.00	552.38							
2334.00	552.38							
2341.00	552.38							
2347.00	552.33							
2354.00	552.73							
2360.00	552.28							
2366.00	552.28							
2373.00	552.38							
2379.00	552.38							
2385.00	552.53							
2391.00	552.73							
2398.00	552.83							
2405.00	552.88							
2410.00	552.98							
2415.00	553.08							
2423.00	553.33							
2428.00	553.78							
2456.00	554.58							
2522.00	555.77							
2537.80	557.07							
2545.40	557.73							

SEDIMENT SURVEY SECTION
MAR 3 1982, PAGE 1
OTTAWA, ONT.

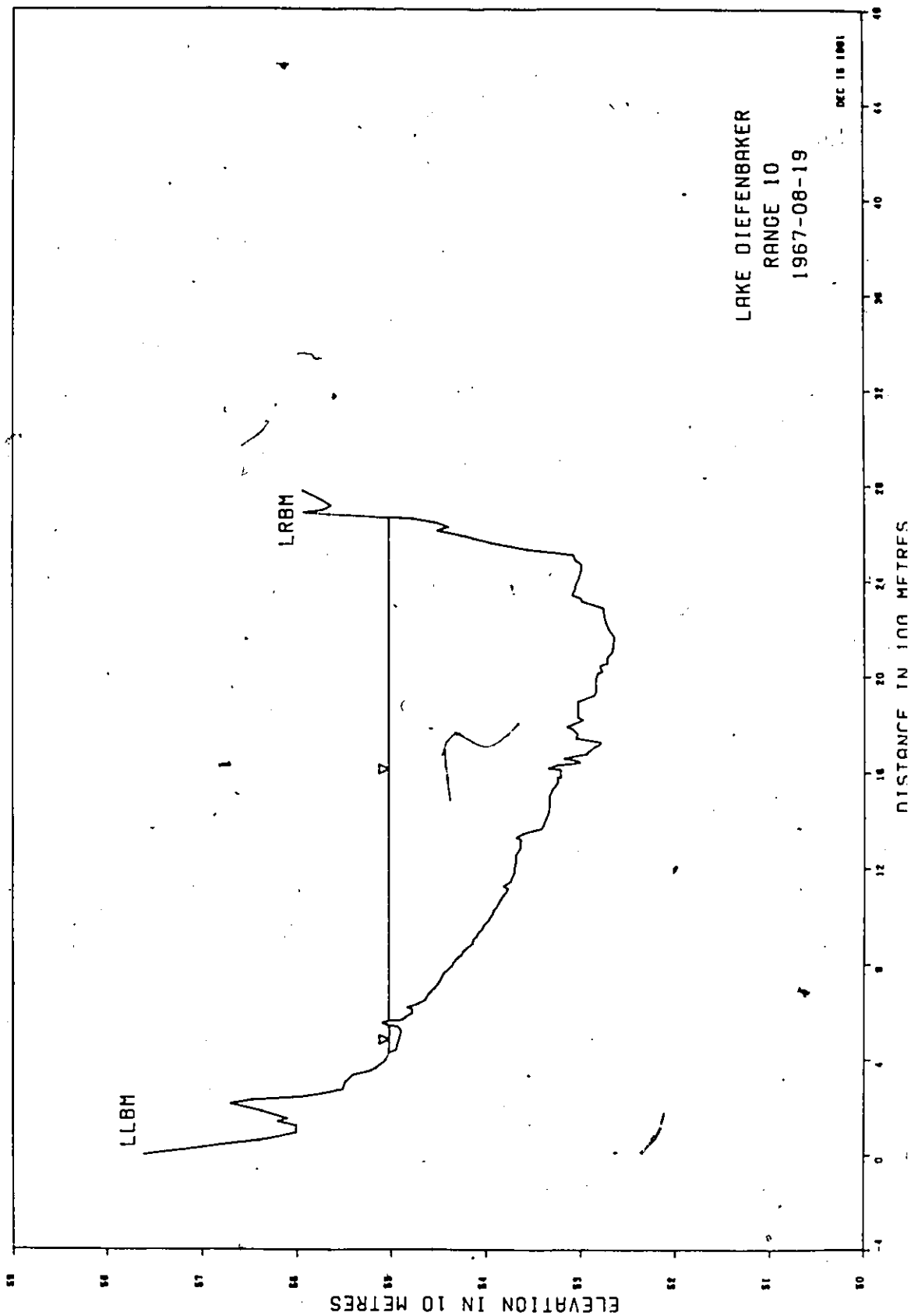
LAKE DIEFENBAKER

P.

RANGE MD.- 11
SURVEYED 18/ 7/1975
MINIMUM ELEVATION = 528.33
ASSUMED MINIMUM DATUM = 528.50

* ELEVATION - AREA TABLE *

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
528.50	1.9	541.00	11080.4	553.50	33336.3
529.00	39.9	541.50	11755.5	554.00	34685.8
529.50	139.9	542.00	12451.5	554.50	35850.8
530.00	297.2	542.50	13159.1	555.00	37031.4
530.50	499.8	543.00	13881.5	555.50	38221.9
531.00	737.9	543.50	14616.3	556.00	39422.4
531.50	982.0	544.00	15381.3	556.50	40632.7
532.00	1245.6	544.50	16168.1	557.00	41852.3
532.50	1560.3	545.00	16984.8	557.50	43080.9
533.00	1924.9	545.50	17826.5	558.00	44321.2
533.50	2385.8	546.00	18680.0	558.50	45575.8
534.00	2896.6	546.50	19541.6	559.00	46843.5
534.50	3415.8	547.00	20424.4	559.50	48125.4
535.00	3944.7	547.50	21327.8	560.00	49416.9
535.50	4492.1	548.00	22240.2		
536.00	5048.5	548.50	23159.0		
536.50	5615.3	549.00	24089.7		
537.00	6190.5	549.50	25035.8		
537.50	6770.6	550.00	25995.1		
538.00	7356.5	550.50	26998.6		
538.50	7950.1	551.00	28049.6		
539.00	8552.8	551.50	29111.2		
539.50	9165.0	552.00	30178.8		
540.00	9787.6	552.50	31268.4		
540.50	10425.2	553.00	32394.3		



LAKE DIEFENBAKER

PROFILE DATA

RANGE NO 10 SURVEY DATE 1967-08-19									
STA	ELEV	RMKS	STA	ELEV	RMKS	STA	ELEV	RMKS	STA
0.00	576.10	LLBM	792.48	543.52		1578.86	532.08		2436.40
30.48	570.13		807.22	543.31		1591.06	532.15		2468.88
60.96	563.91		822.96	543.00		1609.34	532.09		2487.17
91.44	560.13		838.20	542.51		1615.48	533.37		2509.50
121.92	560.04		853.44	542.30		1627.63	532.52		2529.84
140.21	561.99		868.68	541.87		1638.30	530.05		2555.75
152.40	561.05		883.92	541.36		1645.92	530.29		2575.56
182.80	563.67		899.16	541.32		1656.59	531.72		2590.80
213.36	566.93		914.40	540.93		1674.98	529.32		2609.70
228.60	564.89		929.64	540.75		1682.50	529.22		2618.21
243.84	559.06		944.88	540.35		1706.88	528.40		2624.33
274.32	555.13		960.12	540.17		1714.20	527.91		2644.14
304.80	554.86		975.36	539.77		1723.64	527.88		2660.00
335.28	553.92		990.60	539.53		1730.41	530.47		2664.87
350.52	552.27		1005.84	539.28		1757.17	530.29	WL	2664.87
365.76	551.97		1021.08	539.16		1778.51	530.81		2682.85
381.00	550.62		1036.32	538.81		1787.65	531.42		2695.04
421.00	550.22	WL	1051.56	538.61		1796.80	530.90		2713.33
427.63	550.22		1066.80	538.40		1816.81	529.74		2743.81
441.96	549.43		1082.04	538.15		1828.80	530.25		2774.29
457.20	549.37		1097.28	537.82		1853.18	530.23		2774.29
487.66	549.13		1112.52	537.64		1874.52	530.26		
518.16	548.91		1121.66	538.12		1892.81	530.26		
539.50	549.31		1143.00	537.33		1920.24	528.52		
542.00	550.22	WL	1158.24	537.21		1935.48	528.34		
542.54	550.22		1173.48	537.00		1950.22	528.37		
548.64	550.53		1188.72	536.97		1981.20	528.40		
554.74	550.90		1203.96	536.91		2011.68	528.16		
562.00	550.22	WL	1219.20	536.81		2017.78	527.70		
562.36	550.22		1249.68	536.84		2042.16	527.94		
565.40	548.79		1280.16	536.36		2054.35	527.12		
579.12	548.40		1310.64	536.30		2072.44	527.21		
594.36	547.76		1316.74	536.30		2100.07	526.66		
609.60	547.70		1325.88	536.72		2112.26	526.57		
618.74	545.24		1341.12	536.08		2164.08	526.42		
630.94	547.24		1356.36	534.83		2194.56	527.00		
649.22	546.35		1359.41	534.25		2225.04	527.33		
670.56	546.05		1371.60	533.98		2255.52	527.52		
685.80	545.71		1402.08	533.67		2286.00	527.58		
701.04	545.32		1432.56	533.34		2313.43	529.83		
716.28	545.01		1463.04	533.28		2327.15	529.94		
731.52	544.77		1493.52	533.34		2339.16	530.67		
745.76	544.59		1524.00	533.00		2362.20	530.60		
762.00	544.37		1554.48	532.42		2372.93	530.51		
777.24	543.92		1575.82	532.42		2407.92	530.20		

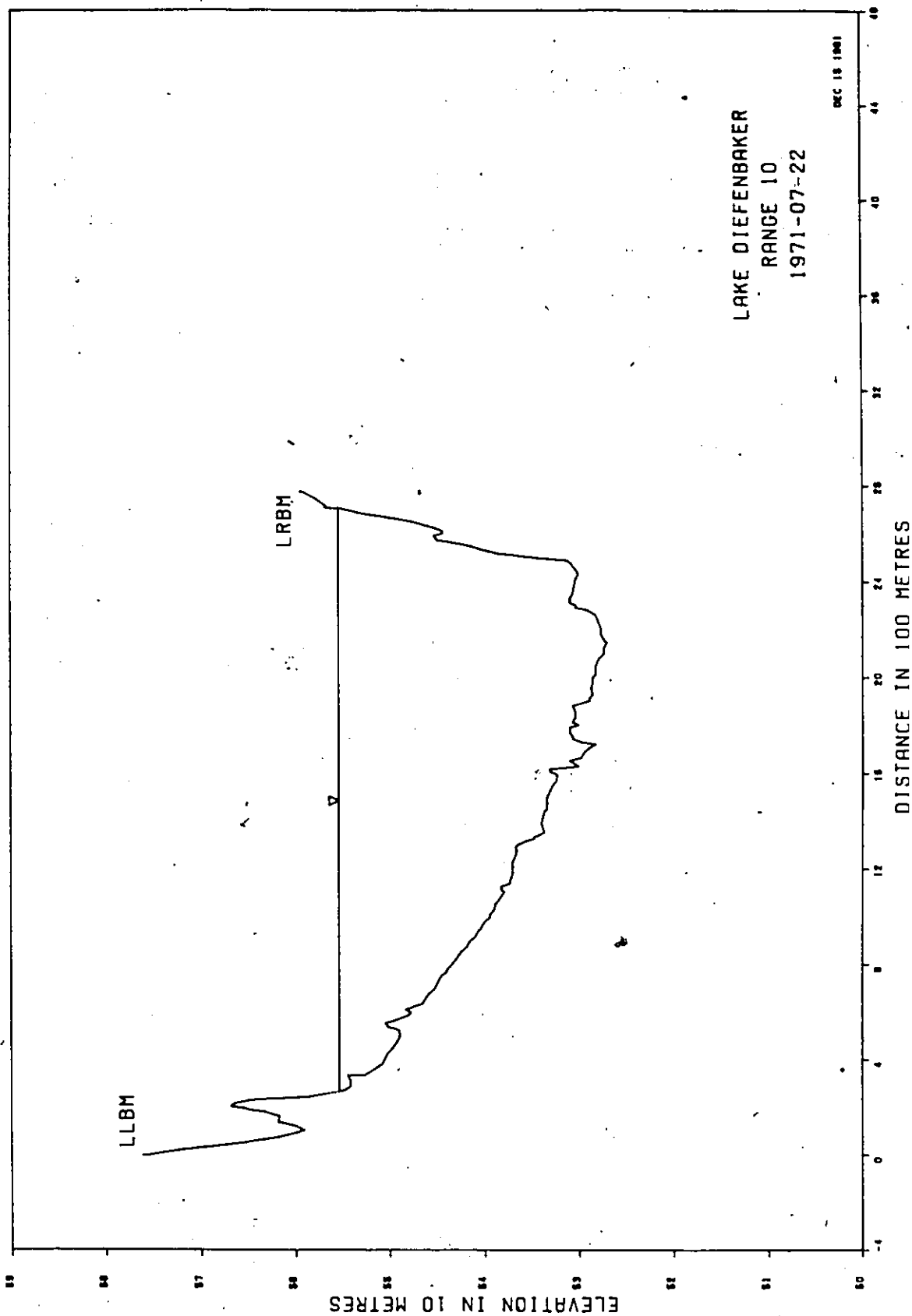
SEDIMENT SURVEY SECTION
 DEC 15 1981, PAGE 1
 OTTAWA, ONT.

LAKE DICFENHAKER

RANGE NO. - 10
 SURVEYED 197-8/1987
 MINIMUM ELEVATION - 526.42
 ASSURED MINIMUM DATUM - 527.00

ELEVATION - ANLA TABLE
 ELEVATION - ANLA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
527.00	42.4	539.50	11987.0	552.00	36330.3
527.50	121.9	540.00	12778.7	552.50	37489.0
528.00	247.9	540.50	13585.6	553.00	38650.8
528.50	411.0	541.00	14408.2	553.50	39815.4
529.00	619.1	541.50	15234.0	554.00	40982.7
529.50	844.0	542.00	16102.9	554.50	42156.3
530.00	1086.2	542.50	16969.5	555.00	43339.7
530.50	1408.6	543.00	17850.0	555.50	44539.4
531.00	1814.8	543.50	18742.9	556.00	45742.8
531.50	2247.1	544.00	19651.0	556.50	46968.9
532.00	2687.7	544.50	20574.3	557.00	48164.1
532.50	3145.6	545.00	21521.9	557.50	49396.4
533.00	3629.8	545.50	22491.6	558.00	50636.3
533.50	4149.2	546.00	23473.6	558.50	51884.6
534.00	4713.0	546.50	24470.6	559.00	53141.0
534.50	5294.1	547.00	25477.5		
535.00	5879.0	547.50	26491.0		
535.50	6467.7	548.00	27514.8		
536.00	7060.9	548.50	28553.6		
536.50	7667.6	549.00	29601.5		
537.00	8315.8	549.50	30682.3		
537.50	9010.0	550.00	31785.1		
538.00	9723.0	550.50	32897.4		
538.50	10459.3	551.00	34031.8		
539.00	11214.3	551.50	35177.3		



PROFILE DATA

SURVEY DATE 1971-07-22										
RANGE NO 10										
STA	ELEV	RMKS	STA	ELEV	RMKS	STA	ELEV	RMKS	STA	ELEV
0.00	576.10		586.44	546.00		1410.31	533.83		2056.87	528.19
0.00	575.52		586.32	547.70		1430.22	533.67		2261.43	529.10
10.67	573.88		610.21	548.30		1451.15	533.37		2291.18	530.32
21.34	572.05		623.32	547.39		1472.18	533.37		2301.24	530.93
32.00	569.70		636.42	546.48		1498.40	533.37		2311.30	530.93
42.87	567.42		651.36	546.32		1523.39	533.06		2322.28	530.93
53.34	565.25		675.44	545.87		1548.38	532.76		2349.40	530.63
64.01	563.39		699.21	545.26		1571.24	532.30		2379.88	530.47
74.68	561.84		723.29	544.95		1595.32	532.30		2410.16	530.32
85.35	559.92		747.37	544.65		1608.43	533.06		2441.39	530.02
96.02	558.06		769.32	544.34		1617.27	533.06		2450.29	530.32
106.69	556.07		780.29	543.83		1628.24	530.07		2479.24	530.93
117.36	554.07		802.23	543.43		1641.35	530.47		2489.30	531.24
128.03	552.08		826.31	542.94		1654.32	530.93		2497.23	534.26
138.70	550.09		851.31	542.51		1665.43	529.71		2506.37	536.11
149.37	548.10		873.25	541.90		1686.15	529.41		2517.34	538.55
160.04	546.11		894.28	541.60		1707.18	528.80		2526.18	539.47
170.71	544.12		917.14	540.99		1728.29	528.19		2535.33	540.38
181.38	542.13		940.31	540.68		1731.26	529.71		2546.30	541.29
192.05	540.14		962.20	540.38		1744.37	529.63		2555.44	542.21
202.72	538.15		976.27	540.08		1754.43	530.63		2564.28	543.43
213.39	536.16		998.22	539.47		1769.36	530.93		2573.43	544.95
224.06	534.17		1008.28	539.47		1791.31	530.93		2591.41	545.26
234.73	532.18		1031.44	539.01		1801.32	530.02		2601.16	544.34
245.40	530.19		1052.17	538.46		1813.26	530.61		2610.31	544.34
256.07	528.20		1077.15	538.40		1834.29	530.32		2621.28	544.95
266.74	526.21		1103.99	537.94		1856.23	530.32		2630.24	547.54
277.41	524.22		1114.35	538.25		1881.23	530.63		2667.30	550.13
288.08	522.23		1126.24	538.25		1903.17	528.80		2686.20	553.18
298.75	520.24		1139.34	537.33		1915.36	528.80		2696.26	554.10
309.42	518.25		1151.23	537.33		1927.25	528.49		2705.00	555.32
320.09	516.26		1162.20	537.18		1933.16	528.69		2705.71	555.32
330.76	514.27		1184.15	537.03		1978.37	528.49		2707.84	556.78
341.43	512.28		1207.31	537.03		1998.27	528.49		2713.33	556.63
352.10	510.29		1229.26	537.03		2009.24	528.19		2743.81	557.66
362.77	508.30		1255.17	536.72		2021.43	528.19		2774.29	559.13
373.44	506.31		1276.20	536.57		2044.29	528.19		2774.29	559.40
384.11	504.32		1289.30	536.72		2074.16	527.88			
394.78	502.33		1301.19	536.42		2094.46	527.27			
405.45	500.34		1315.21	535.66		2121.41	527.27			
416.12	498.35		1326.18	534.74		2143.35	526.97			
426.79	496.36		1332.59	534.74		2155.24	527.27			
437.46	494.37		1339.29	534.28		2175.36	527.58			
448.13	492.38		1353.31	533.67		2198.22	527.88			
458.80	490.39		1386.54	533.78		2228.39	527.88			

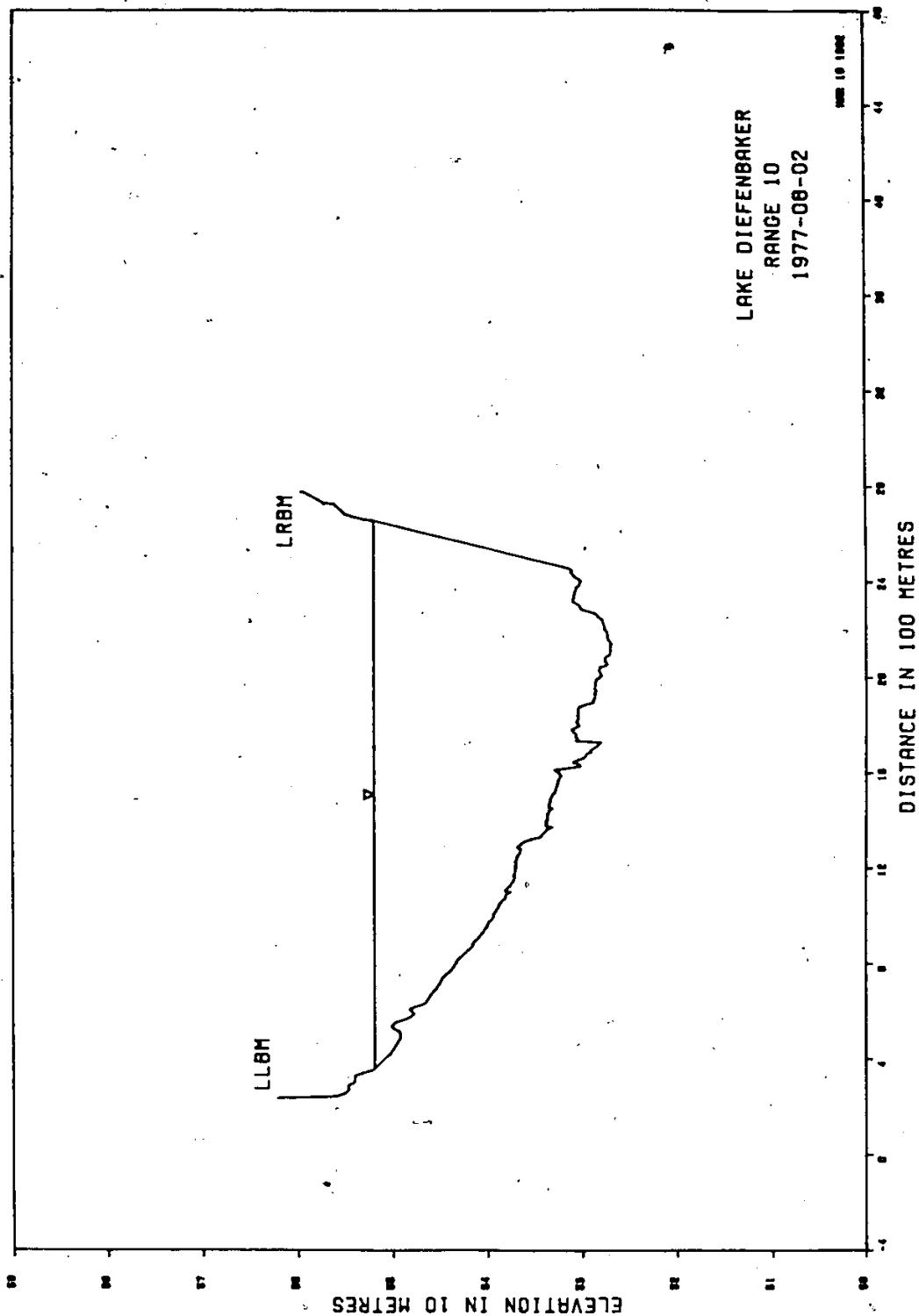
SEDIMENT SURVEY SECTION
DEC 15 1981, PAGE 1
OTTAWA, ONT.

LAKE DUFFERINAKER

RANGE NO. - 10
SURVEYED 22/ 7/1971
MINIMUM ELEVATION = 526.97
ASSURED MINIMUM DATUM = 527.50

.....
ELEVATION - AREA TABLE
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ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)	ELEVATION (M.)	ACC. AREA (SQ. M.)
527.50	20.5	540.00	12215.9	552.50	36714.3		
528.00	87.0	540.50	13001.5	553.00	37887.4		
528.50	206.3	541.00	13800.4	553.50	39062.9		
529.00	390.9	541.50	14623.5	554.00	40241.4		
529.50	601.6	542.00	15457.0	554.50	41439.4		
530.00	831.3	542.50	16300.4	555.00	42633.2		
530.50	1106.1	543.00	17165.4	555.50	43871.3		
531.00	1491.4	543.50	18041.4	556.00	45091.9		
531.50	1923.3	544.00	18931.2	556.50	46314.7		
532.00	2357.6	544.50	19836.8	557.00	47543.2		
532.50	2799.5	545.00	20763.2	557.50	48781.8		
533.00	3264.9	545.50	21723.2	558.00	50029.1		
533.50	3763.4	546.00	22698.4	558.50	51283.4		
534.00	4308.2	546.50	23683.4	559.00	52533.9		
534.50	4886.6	547.00	24693.8				
535.00	5471.7	547.50	25704.6				
535.50	6062.7	548.00	26724.1				
536.00	6658.3	548.50	27758.6				
536.50	7259.7	549.00	28802.5				
537.00	7884.1	549.50	29877.2				
537.50	8560.1	550.00	30973.7				
538.00	9250.5	550.50	32092.3				
538.50	9961.1	551.00	33234.5				
539.00	10692.6	551.50	34386.6				
539.50	11445.4	552.00	35546.7				



LAKE DIEFENBAKER

PROFILE DATA

PROFILE DATA								
RANGE NO 10			SURVEY DATE 1977-08-02					
STA	ELEV	RKMS	STA	ELEV	RKMS	STA	ELEV	RKMS
237.80	562.07	LL84	1031.00	538.90		1411.00	533.60	1779.00 531.00
237.80	561.69		1040.00	538.80		1420.00	533.60	1796.00 530.20
241.10	561.69		1046.00	538.70		1426.00	533.55	1805.00 530.40
241.10	560.41		1056.00	538.55		1435.00	533.45	1813.00 530.50
246.30	555.90		1065.00	538.40		1440.00	533.40	1822.00 530.35
258.70	553.03		1072.00	538.10		1448.00	533.10	1832.00 530.35
274.30	554.54		1080.00	538.10		1453.00	533.45	1839.00 530.40
289.60	554.66		1092.00	537.95		1461.00	533.45	1847.00 530.35
304.80	553.97		1100.00	537.95		1469.00	533.45	1863.00 530.35
332.20	553.87		1106.00	538.10		1477.00	533.25	1874.00 530.25
342.90	553.08		1114.00	537.95		1485.00	533.35	1880.00 529.85
353.60	552.23		1122.00	537.65		1490.00	533.25	1892.00 528.75
362.70	551.85	WL	1131.00	537.50		1499.00	533.15	1897.00 528.80
415.00	550.30		1139.00	537.35		1507.00	533.05	1905.00 528.70
421.00	550.30		1146.00	537.25		1515.00	532.80	1914.00 528.60
426.00	550.20		1153.00	537.10		1525.00	532.75	1923.00 528.55
434.00	550.10		1163.00	537.15		1533.00	532.70	1931.00 528.65
441.00	549.95		1168.00	537.20		1541.00	532.60	1940.00 528.55
448.00	549.80		1176.00	537.10		1551.00	532.55	1948.00 528.60
455.00	549.70		1194.00	537.00		1559.00	532.45	1956.00 528.60
462.00	549.60		1202.00	537.00		1567.00	532.45	1964.00 528.55
471.00	549.45		1211.00	537.00		1584.00	532.15	1973.00 528.55
478.00	549.35		1219.00	536.95		1593.00	532.30	1981.00 528.50
486.00	549.20		1227.00	537.00		1601.00	532.45	1989.00 528.55
495.00	549.15		1236.00	536.90		1609.00	532.80	1999.00 528.00
502.00	549.15		1244.00	536.85		1617.00	531.50	2007.00 527.90
511.00	549.20		1253.00	536.70		1625.00	530.10	2014.00 528.00
519.00	549.35		1261.00	536.55		1633.00	530.20	2024.00 528.15
526.00	549.70		1269.00	536.50		1642.00	530.85	2031.00 528.10
533.00	550.00		1278.00	536.40		1649.00	530.45	2040.00 528.10
540.00	550.15		1287.00	536.60		1659.00	529.80	2047.00 527.35
547.00	549.90		1296.00	536.50		1666.00	529.55	2055.00 527.25
555.00	549.65		1303.00	536.30		1678.00	529.40	2063.00 527.50
562.00	549.10		1312.00	535.90		1683.00	529.00	2074.00 527.55
570.00	548.50		1320.00	535.30		1691.00	529.05	2081.00 527.50
579.00	548.05		1329.00	534.30		1703.00	528.60	2091.00 527.05
587.00	547.75		1337.00	534.20		1708.00	528.45	2103.00 526.95
595.00	547.75		1345.00	534.00		1717.00	528.15	2117.00 526.95
603.00	548.05		1354.00	533.75		1725.00	527.85	2126.00 527.00
611.00	548.15		1361.00	533.65		1733.00	530.55	2135.00 528.85
621.00	547.95		1370.00	533.10		1742.00	530.40	2142.00 528.95
629.00	546.85		1377.00	533.75		1749.00	530.60	2159.00 527.20
637.00	546.55		1386.00	533.70		1754.00	530.55	2167.00 527.30
645.00	546.15		1397.00	533.75		1762.00	530.60	2176.00 527.25
654.00	546.25		1402.00	533.55		1770.00	530.85	2191.00 527.40

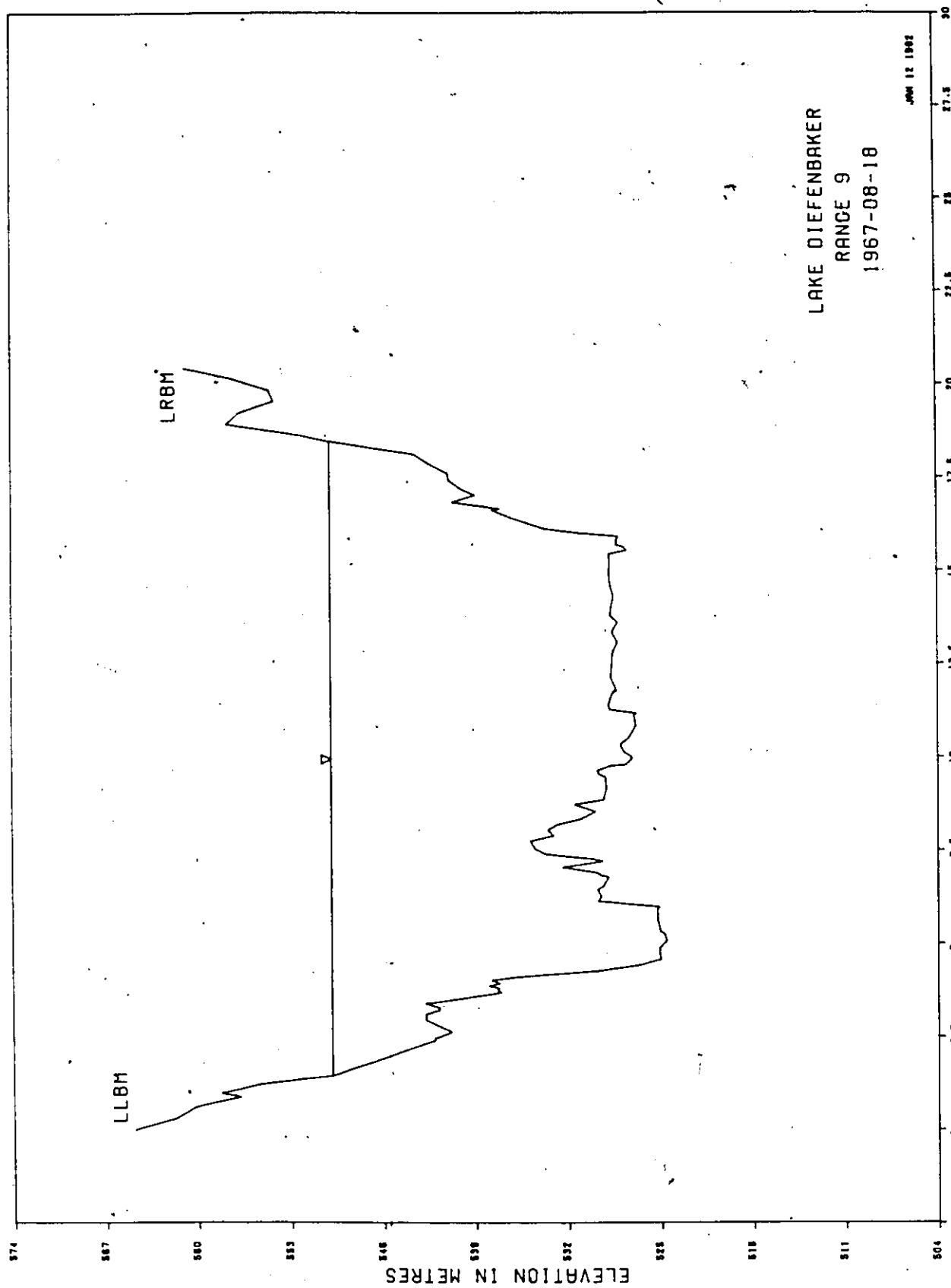
LAKE DIEFENBAKER

PROFILE DATA

RANGE NO 10 SURVEY DATE 1977-08-02

STA	ELEV	RKKS	STA	ELEV	RKKS	STA	ELEV	RKKS
2201.00	527.60							
2210.00	527.60							
2235.00	527.80							
2243.00	527.90							
2253.00	528.25							
2260.00	528.40							
2267.00	528.60							
2285.00	530.05							
2301.00	530.25							
2318.00	530.90							
2327.00	530.85							
2334.00	530.80							
2344.00	530.75							
2352.00	530.70							
2361.00	530.60							
2375.00	530.50							
2383.00	530.25							
2400.00	530.05							
2409.00	530.20							
2424.00	530.80							
2441.00	531.10							
2450.00	531.00							
2457.00	531.45							
2455.50	531.85	ML						
2455.80	552.10							
2460.90	552.89							
2473.10	554.20							
2482.30	554.91							
2725.90	556.10							
2726.80	557.10							
2743.20	557.78							
2774.30	559.27							
2774.30	559.55	LKBM						

SEDIMENT SURVEY SECTION				LAKE DIEFENBAKER				RANGE NO. - 10			
MAR 10 1982, PAGE 1								SURVEYED - 8/1977			
OTTAWA, ONT.								MINIMUM ELEVATION - 526.85			
								ASSUMED MINIMUM DATUM - 527.00			
				ELEVATION - AREA TABLE							
				ELEVATION - AREA TABLE							



LAKE DIEFFENBACHER

PROFILE DATA

RANGE NO 9 SURVEY DATE 1967-08-10

STA ELEV RMKS

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STA ELEV RMKS

0+00 554.79 LRM 687.75 527.56 1426.46 528.46

30+48 561.72 686.55 529.71 1456.94 528.71

60+96 560.19 704.03 532.30 1487.42 528.83

88+39 556.78 719.33 529.35 1517.90 528.74

91+44 557.17 725.42 529.94 1542.76 528.60

96+62 558.06 733.14 533.70 1551.43 527.46

99+45 558.15 759.35 534.97 1563.58 527.73

121+92 555.25 788.10 534.71 1566.97 528.25

137+16 551.87 774.19 534.77 1578.86 528.22

144+00 549.86 787.31 533.03 1589.01 528.10

146+17 547.86 802.54 533.43 1597.15 530.93

240+79 542.09 817.78 534.75 1609.34 533.67

246+89 542.06 833.02 530.96 1624.58 534.95

262+13 540.87 852.53 529.89 1639.82 536.20

265+18 540.84 871.73 531.42 1659.64 537.58

277+37 541.60 883.92 529.25 1662.68 537.00

295+66 542.73 914.43 529.04 1680.77 540.53

310+90 542.73 944.85 529.13 1699.26 538.83

323+09 541.72 954.32 527.55 1719.07 540.01

329+18 541.75 963.17 529.71 1740.41 540.84

339+85 542.76 975.35 528.65 1758.70 543.93

352+04 540.98 978.41 527.58 1786.13 542.45

368+81 537.03 993.55 527.12 1808.99 543.43

374+90 537.30 997.74 527.15 1842.00 549.96 4L

381+00 537.18 1011.74 527.70 1842.52 549.86

387+10 537.94 1028.70 527.97 1857.76 551.90

393+19 537.15 1034.50 527.89 1888.44 557.60

402+34 537.73 1051.55 527.30 1918.72 556.66

411+48 535.59 1082.04 528.82 1949.20 554.03

426+72 529.71 1112.52 526.97 1979.68 554.37

441+96 526.60 1115.57 526.77 2013.16 557.11

457+20 524.96 1124.71 528.74 2040.64 560.83 LRM

472+44 525.08 1136.70 528.59

487+68 525.05 1146.02 528.77

505+97 524.53 1167.35 528.58

524+26 524.69 1176.33 529.25

533+20 525.02 1210.05 528.63

563+88 525.23 1243.54 528.61

594+36 525.20 1271.02 528.55

597+41 525.08 1280.15 529.49

612+65 529.69 1304.54 528.15

624+84 529.47 1331.94 528.54

643+13 529.74 1357.61 528.16

652+27 529.29 1376.17 529.71

676+66 528.69 1395.94 528.62

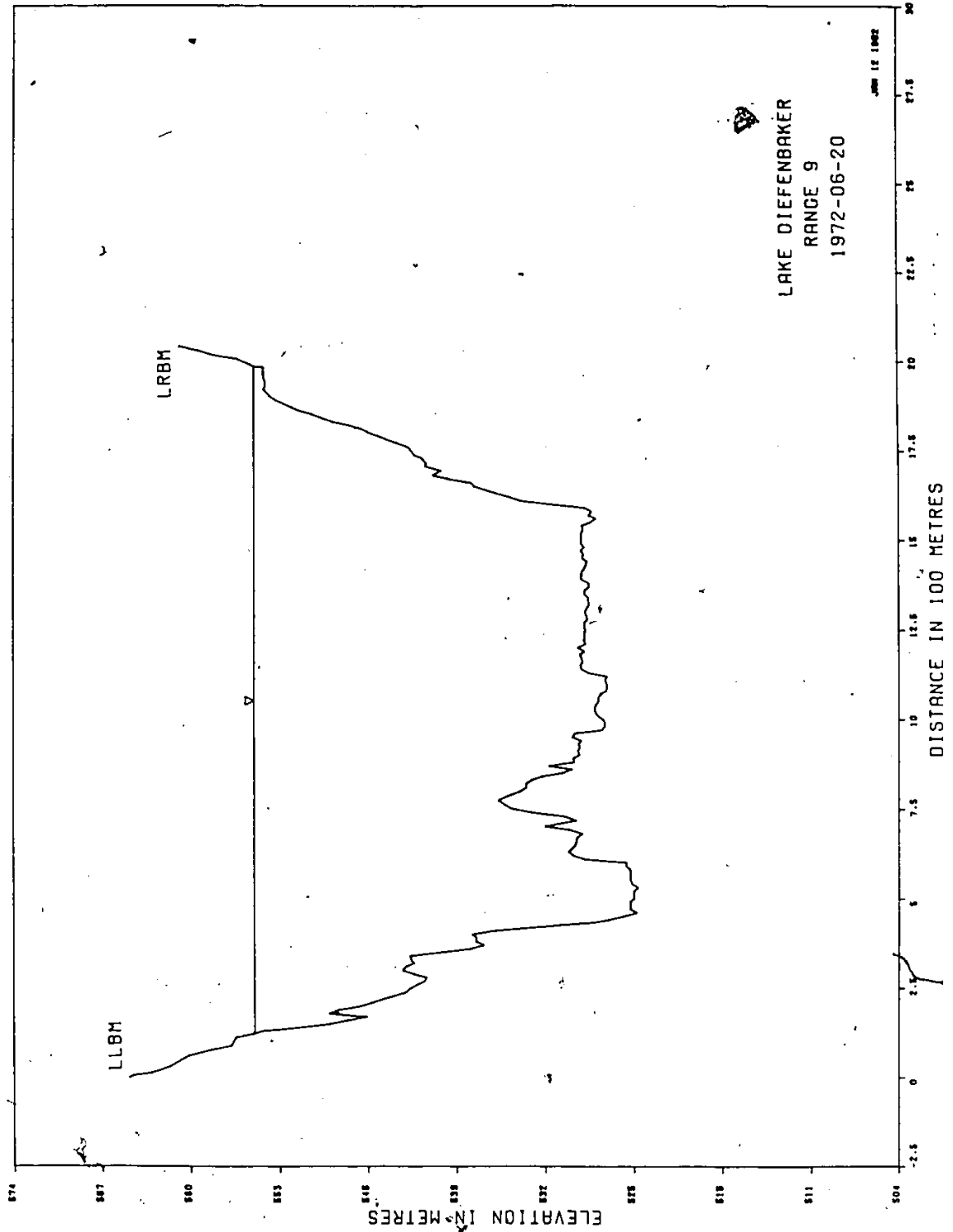
SEDIMENT SURVEY SECTION
DEC 15 1981, PAGE 1
DITAMA, ONT.

LAKE DIERFENBAKER

RANGE NO. - 9
SURVEYED MO/ 8/1967
MINIMUM ELEVATION = 524.53
ASSUMED MINIMUM DATUM = 525.00

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
525.00	12.6	537.50	10652.7	550.00	29780.7
525.50	72.1	538.00	11301.5	550.50	30632.0
526.00	147.0	538.50	11955.0	551.00	31486.0
526.50	225.0	539.00	12611.6	551.50	32342.8
527.00	310.7	539.50	13276.3	552.00	33202.3
527.50	430.3	540.00	13950.5	552.50	34064.4
528.00	580.7	540.50	14635.2	553.00	34928.9
528.50	774.9	541.00	15332.4	553.50	35796.0
529.00	1121.9	541.50	16048.6	554.00	36665.4
529.50	1561.4	542.00	16780.0	554.50	37547.8
530.00	2045.4	542.50	17533.3	555.00	38443.7
530.50	2548.4	543.00	18308.9	555.50	39347.9
531.00	3065.7	543.50	19098.1	556.00	40260.9
531.50	3596.0	544.00	19893.3	556.50	41183.1
532.00	4135.4	544.50	20693.0	557.00	42115.9
532.50	4682.2	545.00	21497.1	557.50	43065.6
533.00	5234.6	545.50	22305.6	558.00	44029.4
533.50	5799.7	546.00	23118.6	558.50	45000.6
534.00	6376.1	546.50	23935.9	559.00	45976.1
534.50	6962.6	547.00	24757.6	559.50	46955.7
535.00	7563.8	547.50	25583.8	560.00	47939.3
535.50	8171.7	548.00	26414.3	560.50	48927.5
536.00	8783.5	548.50	27249.3		
536.50	9399.4	549.00	28088.7		
537.00	10020.0	549.50	28932.5		



WATER SURVEY OF CANADA
JAN 12 1952 PAGE 1
OTTAWA, ONT.

LAKE DIEFLINGER

PROFILE DATA

RANGE NO 9 SURVEY DATE 1972-05-20

STA	ELEV	RKMS	STA	ELEV	RKMS	STA	ELEV	RKMS	STA	ELEV	RKMS
0+00	584.79	LLRM	400.00	529.13		1391.11	529.13		1830.08	549.58	
5+71	584.40		450.00	529.03		1399.95	529.13		1850.14	550.29	
13+41	583.09		460.12	529.02		1410.00	529.10		1860.19	551.35	
30+48	581.62		469.87	528.93		1417.45	528.92		1869.79	551.99	
60+96	580.10		510.44	528.93		1428.93	528.77		1880.31	552.63	
76+20	578.49		523.20	528.73		1440.18	528.68		1890.26	553.24	
88+70	576.75		530.25	528.62		1449.93	528.07		1900.12	553.67	
111+56	576.41		1000.05	527.43		1459.93	528.95		1910.19	553.94	
122+00	574.92	WL	1011.02	527.05		1469.94	528.16		1919.32	554.16	
122+53	574.92		1020.17	528.01		1469.14	528.16		1929.99	554.03	
129+44	574.19		1028.92	528.07		1480.11	528.92		1940.05	554.03	
138+99	571.54		1039.98	527.97		1480.93	528.13		1950.11	554.16	
149+96	569.04		1050.04	527.75		1499.92	529.13		1950.11	554.16	
160+02	567.70		1060.07	527.75		1509.98	529.16		1969.31	554.19	
170+99	566.02		1071.07	527.58		1520.04	529.10		1981.20	554.19	
179+83	569.01		1079.91	527.12		1530.10	528.98		1982.72	554.80	
189+89	568.24		1089.96	527.05		1540.15	528.37		1983.02	554.92	ML
197+95	566.57		1100.02	527.12		1549.30	528.43		1983.34	554.92	
210+01	565.68		1110.08	527.24		1559.97	527.97		1990.19	555.32	
220+98	564.62		1120.14	527.06		1569.11	528.35		2006.19	555.32	
230+12	563.82		1129.99	526.55		1580.08	528.31		2016.39	558.39	
239+88	562.91		1139.75	529.13		1590.14	528.83		2029.05	559.25	
249+94	562.40		1150.01	529.19		1600.20	531.54		2034.54	560.01	
259+99	562.03		1160.07	529.04		1609.93	533.92		2040.64	560.63	LLRM
270+05	561.45		1170.11	529.10		1620.01	534.74				
280+11	561.29		1179.98	529.25		1630.94	535.84				
289+86	562.30		1189.94	528.84		1640.13	535.66				
299+92	561.21		1200.00	529.38		1650.19	537.55				
309+98	562.97		1210.06	528.83		1659.94	537.76				
320+04	562.30		1220.11	528.72		1670.00	537.53				
326+88	562.54		1230.17	528.89		1680.05	542.75				
336+85	562.60		1239.73	528.85		1690.15	543.14				
349+91	560.01		1249.78	528.83		1705.47	541.39				
359+97	537.79		1260.04	528.83		1712.95	541.29				
370+03	536.78		1270.10	528.87		1719.94	541.45				
381+00	537.42		1278.94	528.85		1729.13	541.69				
391+06	537.39		1289.91	528.74		1737.97	541.27				
399+90	537.70		1299.97	528.85		1750.14	542.54				
409+96	535.40		1310.94	528.69		1759.92	542.79				
420+93	532.33		1320.09	528.52		1761.13	543.70				
433+12	526.19		1330.15	528.58		1780.03	544.40				
438+97	525.41		1339.40	528.54		1790.04	545.10				
448+97	525.41		1349.06	528.89		1800.15	545.87				
459+94	524.71		1360.02	528.86		1811.12	545.51				
470+00	525.23		1370.08	528.52		1817.95	547.36				
			1380.13	528.55		1830.02	548.73				

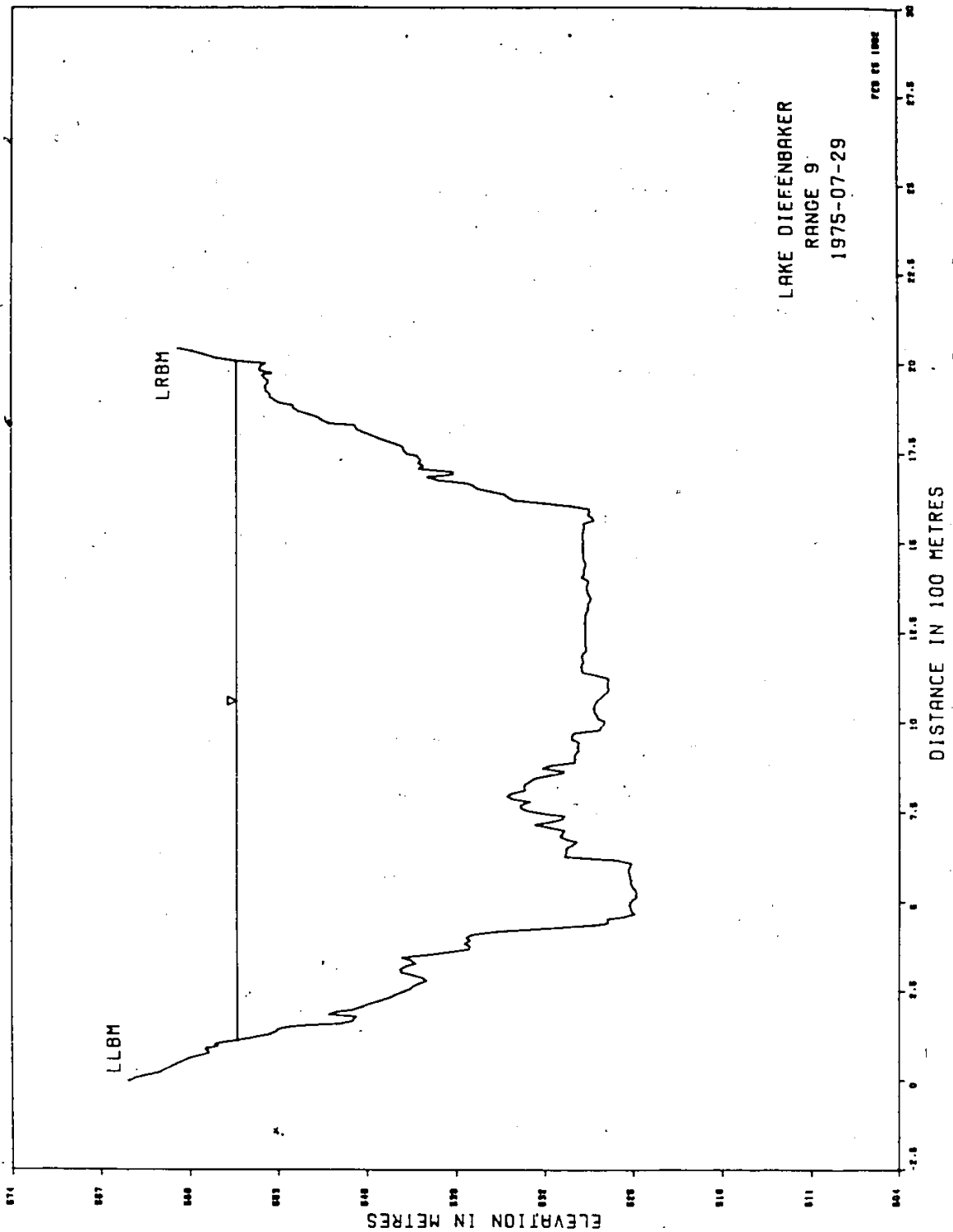
SEDIMENT SURVEY SECTION
DEC 15 1981, PAGE 1
OTTAWA, ONT.

LAKE DUFFENBARGER

RANGE NO. - 9
SURVEYED 20/ 6/1972
MINIMUM ELEVATION = 524.62
ASSUMED MINIMUM DATUM = 525.00

ELEVATION - AREA TABLE
ELEVATION (M.)

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
525.00	6.5	537.50	10350.8	550.00	29102.0
525.50	36.3	538.00	10998.5	550.50	29954.4
526.00	131.5	538.50	11650.9	551.00	30810.5
526.50	209.9	539.00	12305.9	551.50	31670.0
527.00	291.0	539.50	12961.4	552.00	32534.0
527.50	397.9	540.00	13623.8	552.50	33402.7
528.00	539.0	540.50	14289.4	553.00	34276.3
528.50	712.3	541.00	14964.7	553.50	35155.1
529.00	958.4	541.50	15648.0	554.00	36041.2
529.50	1361.2	542.00	16350.9	554.50	36958.8
530.00	1833.9	542.50	17067.5	555.00	37888.2
530.50	2337.0	543.00	17813.4	555.50	38823.0
531.00	2852.1	543.50	18576.9	556.00	39763.6
531.50	3377.0	544.00	19347.4	556.50	40709.8
532.00	3911.0	544.50	20123.8	557.00	41668.0
532.50	4450.7	545.00	20906.5	557.50	42631.3
533.00	4996.1	545.50	21695.1	558.00	43597.8
533.50	5547.4	546.00	22490.0	558.50	44567.7
534.00	6116.9	546.50	23292.7	559.00	45542.3
534.50	6693.6	547.00	24101.6	559.50	46522.1
535.00	7280.2	547.50	24920.9	560.00	47506.3
535.50	7877.3	548.00	25744.1	560.50	48495.8
536.00	8485.8	548.50	26571.5		
536.50	9102.6	549.00	27410.7		
537.00	9721.2	549.50	28254.2		



WATER SURVEY OF CANADA
FEB 25 1982 P.A. 1
OTTAWA-ONT.

LAKE DUFFENAKEN

PROFILE DATA

BANGLU MU 9 SURVEY DATE 1975-07-29

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WATER SURVEY OF CANADA
FEB 25 1982
OTTAWA, ONT.

PAGE 2

LAKE DIEFENBAKER

PROFILE DATA

RANGE YU 9

SURVEY DATE 1975-07-29

STA ELEV RMKS

STA ELEV RMKS

STA ELEV RMKS

STA

ELEV

RMKS

1817.00 586.75

1826.00 546.90

1833.00 548.90

1842.00 549.50

1850.00 549.80

1858.00 550.50

1866.00 551.35

1875.00 551.75

1882.00 551.75

1890.00 552.90

1898.00 553.25

1906.00 553.60

1914.00 553.80

1922.00 553.90

1928.00 553.95

1936.00 553.95

1944.00 553.75

1950.00 553.75

1958.00 554.05

1966.00 554.20

1972.00 553.45

1979.00 554.40

1985.00 554.40

1991.00 554.30

1999.00 553.95

2005.00 556.26 ML

2010.80 557.27

2014.80 557.97

2023.90 558.80

2033.00 559.71

2040.70 560.89

2040.70 560.85 LREM

SEDIMENT SURVEY SECTION
MAR 3 1982, PAGE 1
OTTAWA/ONT.

LAKE OIEFENBACHER

RANGE MD.- 9
SURVEYED 29/ 7/1975
MINIMUM ELEVATION = 524.70
ASSUMED MINIMUM DATUM = 525.00

ELEVATION - AREA TABLE

ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)	ELEVATION (M.)	ACC. AREA (SQ M.)
525.00	7.9	537.50	10436.5	550.00	29121.7
525.50	63.5	538.00	11065.6	550.50	29971.5
526.00	140.9	538.50	11714.1	551.00	30824.7
526.50	221.4	539.00	12367.0	551.50	31681.3
527.00	305.7	539.50	13024.4	552.00	32544.9
527.50	423.6	540.00	13687.0	552.50	33413.6
528.00	568.6	540.50	14353.6	553.00	34285.8
528.50	750.7	541.00	15025.6	553.50	35167.0
529.00	1049.0	541.50	15703.1	554.00	36067.9
529.50	1465.0	542.00	16398.5	554.50	36998.4
530.00	1918.4	542.50	17113.8	555.00	37938.6
530.50	2393.8	543.00	17846.8	555.50	38881.0
531.00	2899.5	543.50	18603.0	556.00	39825.8
531.50	3417.8	544.00	19371.5	556.50	40773.0
532.00	3947.5	544.50	20146.7	557.00	41722.6
532.50	4487.9	545.00	20928.1	557.50	42674.8
533.00	5036.5	545.50	21715.6	558.00	43631.1
533.50	5594.5	546.00	22509.4	558.50	44594.2
534.00	6172.9	546.50	23309.7	559.00	45567.3
534.50	6762.3	547.00	24118.8	559.50	46546.9
535.00	7361.7	547.50	24941.4	560.00	47531.1
535.50	7970.7	548.00	25768.9	560.50	48520.3
536.00	8582.6	548.50	26600.1		
536.50	9197.4	549.00	27435.6		
537.00	9815.2	549.50	28275.9		

LOIER75 L027M1

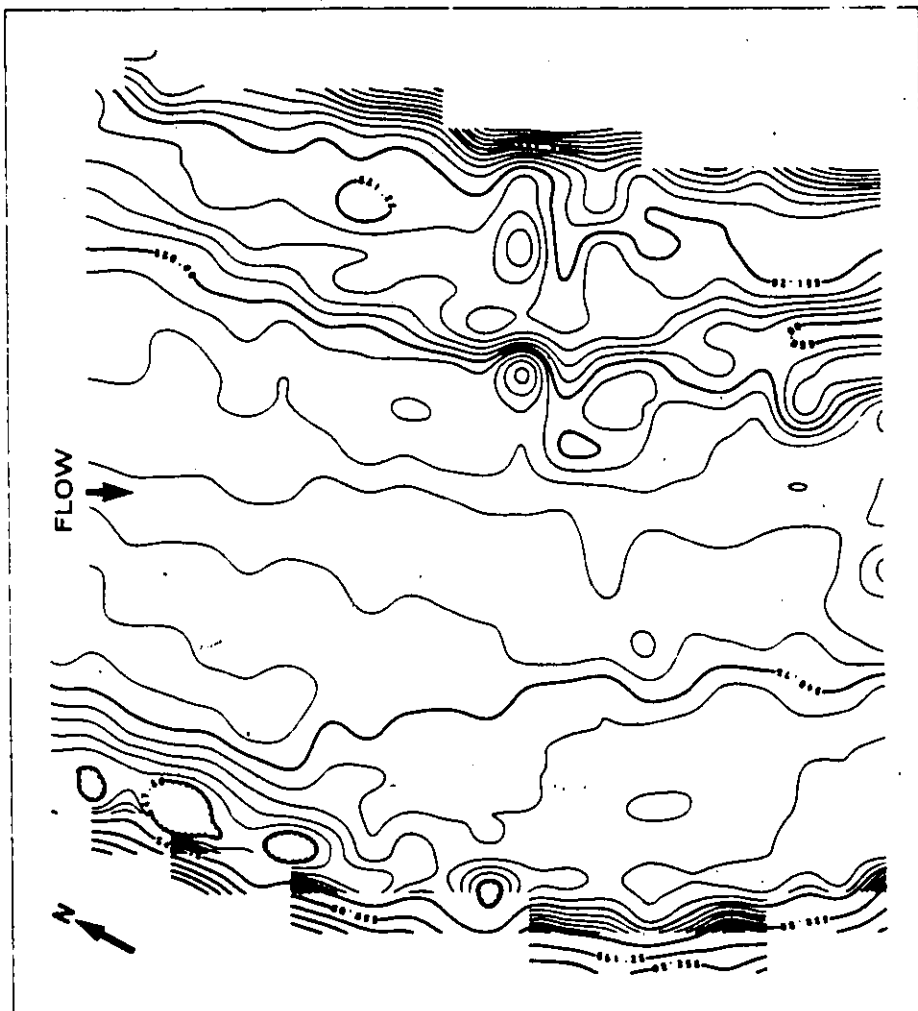
SEDIMENT SURVEY 5 TION

OTTAWA, QNT.

MAY 1981

ELEVATION - CAPACITY TABLE

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
547.50	.9						
548.00	4.2						
548.50	21.9						
549.00	67.0						
549.50	151.4						
550.00	269.2						
550.50	483.8						
551.00	548.5						
551.50	718.7						
552.00	884.1						
552.50	1061.4						
553.00	1240.7						
553.50	1421.4						
554.00	1603.6						
554.50	1786.9						
555.00	1969.4						
555.50	2152.4						
556.00	2335.4						



SECTOR 27
1975 CONTOURS
CONTOUR INTERVAL = 0.25 METRE

0 150 300
METRES

LOIEF7A LD27M1

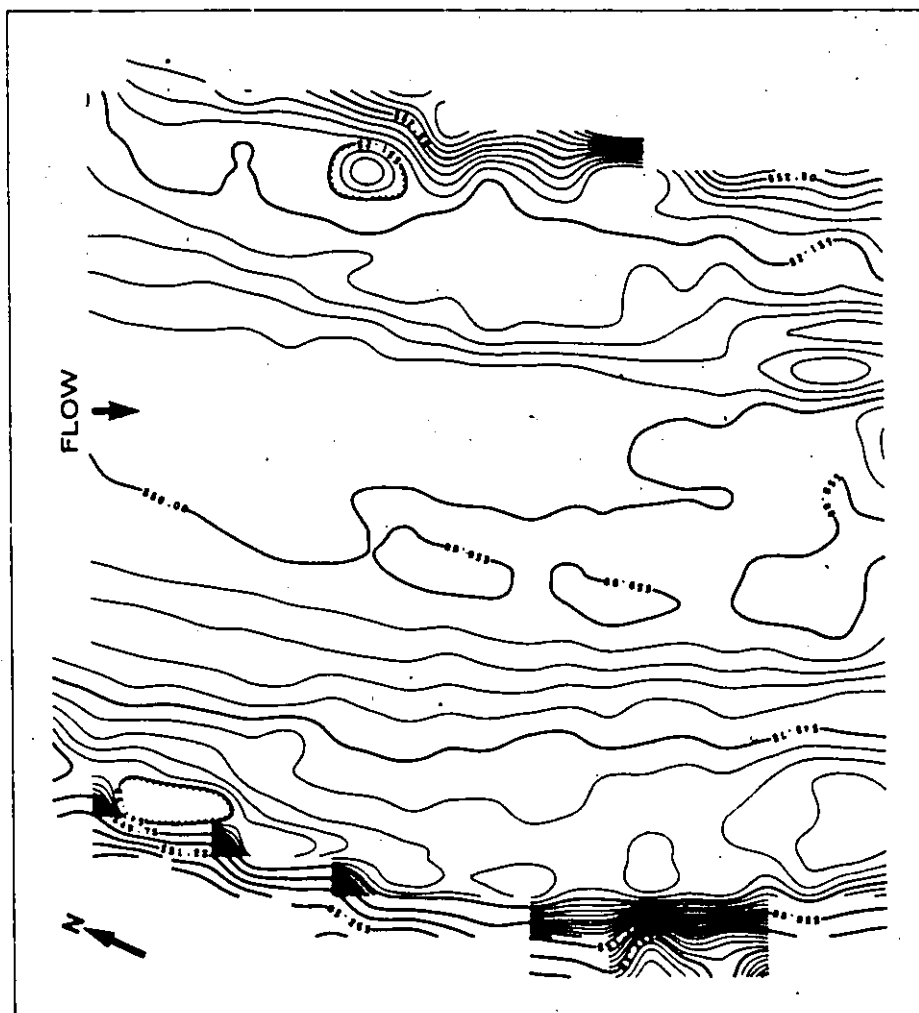
SFOIMENT SURVAY SECTION

OTTAWA, ONT.

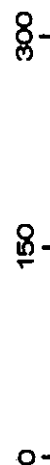
MAY 1991

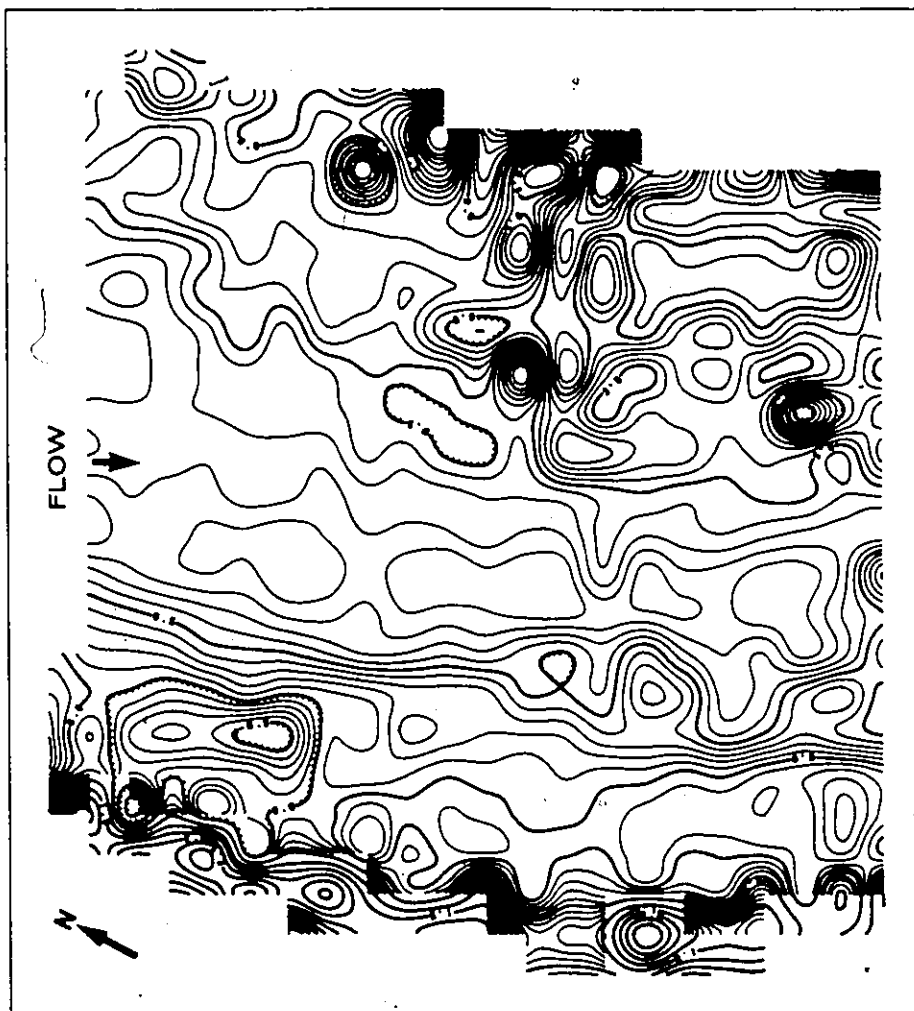
.....
 * ELEVATION - CAPACITY TABLE *

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
547.50	0.6						
548.00	4.4						
548.50	20.5						
549.00	54.0						
549.50	102.0						
550.00	171.8						
550.50	279.2						
551.00	412.7						
551.50	566.6						
552.00	736.8						
552.50	912.3						
553.00	1098.7						
553.50	1271.0						
554.00	1452.9						
554.50	1635.5						
555.00	1818.3						
555.50	2001.2						
556.00	2184.2						



SECTOR 27
1978 CONTOURS
CONTOUR INTERVAL = 0.25 METRE





SECTOR 27
1975-1978 CONTOUR DIFFERENCES
CONTOUR INTERVAL = 0.1 METRE

0 150 300
METRES

LDIEFFS LD26M1

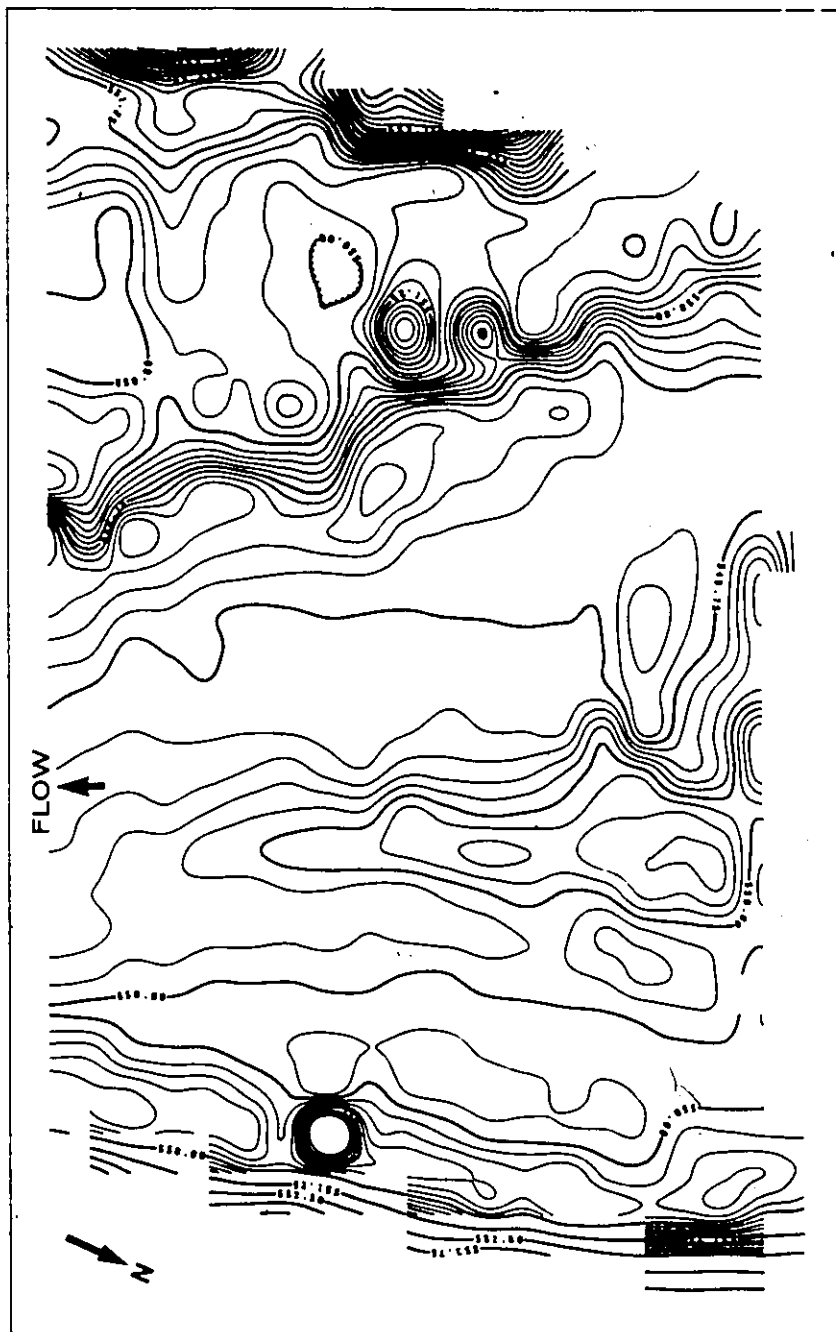
SEEDIMENT SURVEY STATION

OTTAWA, ONT.

MAY 1981

ELEVATION - CAPACITY TABLE

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
548.00	2.5						
548.50	16.2						
549.00	59.6						
549.50	136.1						
550.00	247.6						
550.50	406.2						
551.00	599.7						
551.50	808.9						
552.00	1024.7						
552.50	1242.7						
553.00	1463.1						
553.50	1685.0						
554.00	1907.0						
554.50	2132.0						
555.00	2357.5						
555.50	2584.2						
556.00	2811.4						



SECTOR 26
1975 CONTOURS
CONTOUR INTERVAL = 0.25 METRE



LOIEF78 LD26M1

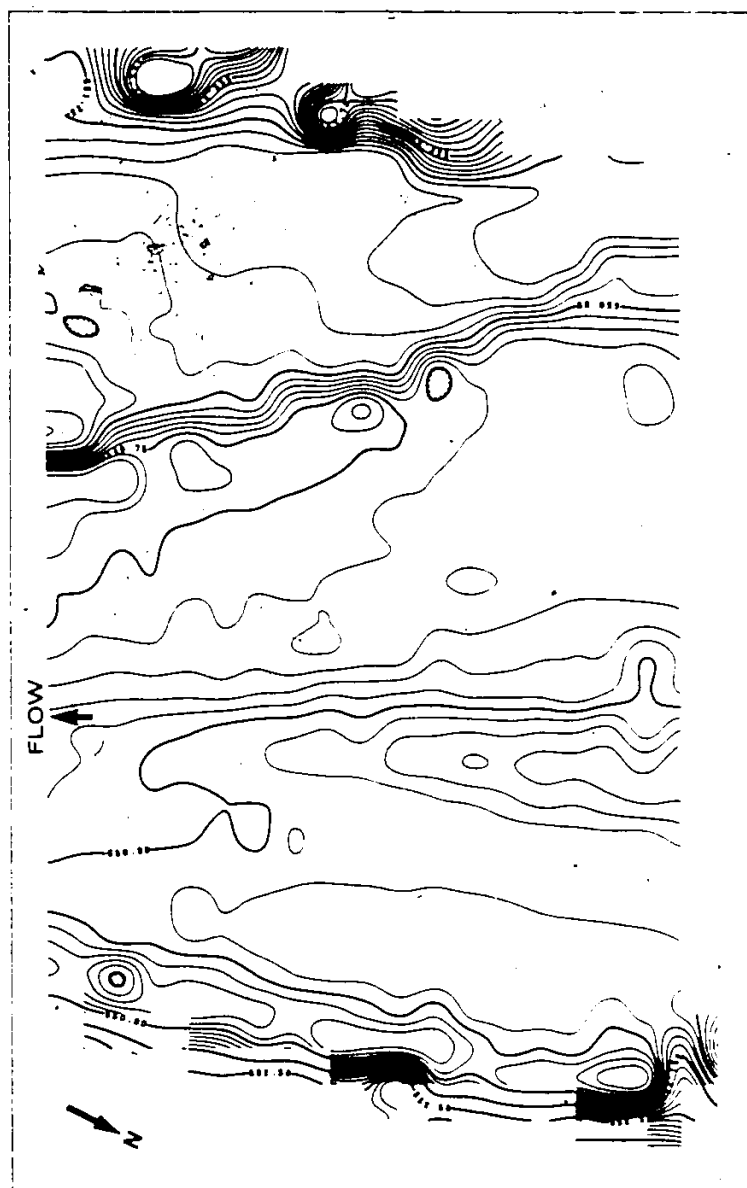
SEDIMENT SURVEY SECTION

OTTAWA, ONT.

MAY 1941

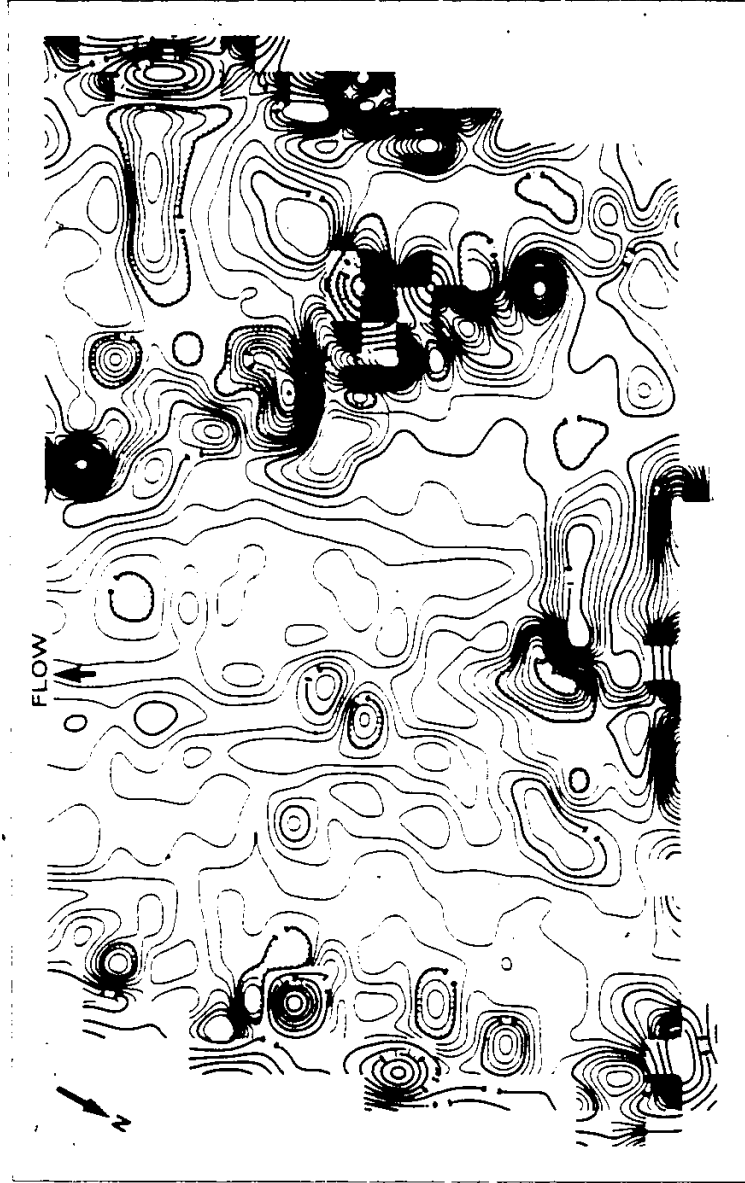
ELEVATION - CAPACITY TABLE

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
548.50	1.7						
549.00	17.3						
549.50	68.4						
550.00	154.4						
550.50	289.5						
551.00	477.0						
551.50	684.6						
552.00	898.7						
552.50	1115.8						
553.00	1336.1						
553.50	1558.9						
554.00	1783.3						
554.50	2009.0						
555.00	2236.1						
555.50	2463.8						
556.00	2691.5						

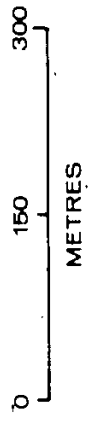


SECTOR 26
1978 CONTOURS
CONTOUR INTERVAL = 0.25 METRE





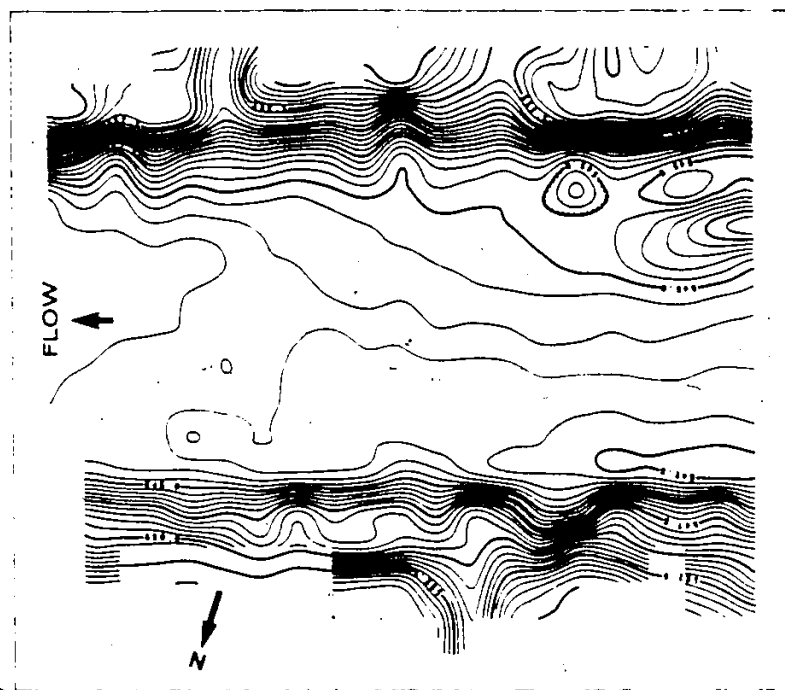
SECTOR 26
1975-1978 CONTOUR DIFFERENCES
CONTOUR INTERVAL = 0.1 METRE



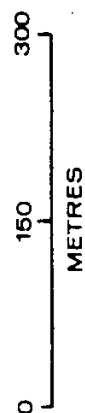
SEDIMENT SURVEY SECTION LOILFFS LOZAMI
 OITANA, ONT.
 MAY 1981

ELEVATION - CAPACITY TABLE

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
542.50	.6	555.00	2251.0				
543.00	3.6	555.50	2386.4				
543.50	19.7	556.00	2519.0				
544.00	57.0						
544.50	113.5						
545.00	180.2						
545.50	255.6						
546.00	339.7						
546.50	417.0						
547.00	503.3						
547.50	592.6						
548.00	685.1						
548.50	780.0						
549.00	877.4						
549.50	977.8						
550.00	1081.1						
550.50	1186.5						
551.00	1294.0						
551.50	1406.4						
552.00	1519.8						
552.50	1634.6						
553.00	1751.6						
553.50	1871.3						
554.00	1994.3						
554.50	2120.9						



SECTOR 24
1975 CONTOURS
CONTOUR INTERVAL = 0.5 METRE



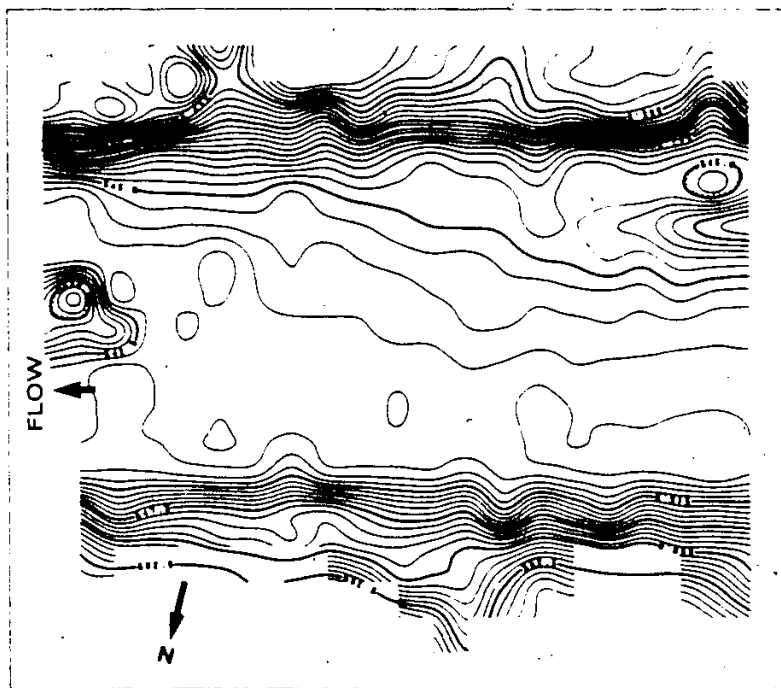
SEDIMENT SURVEY SECTION LOIFFER L024M1

OTTAWA, ONT.
MAY 1961

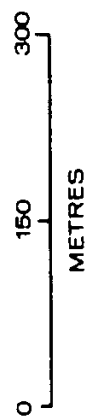
PAGE 1

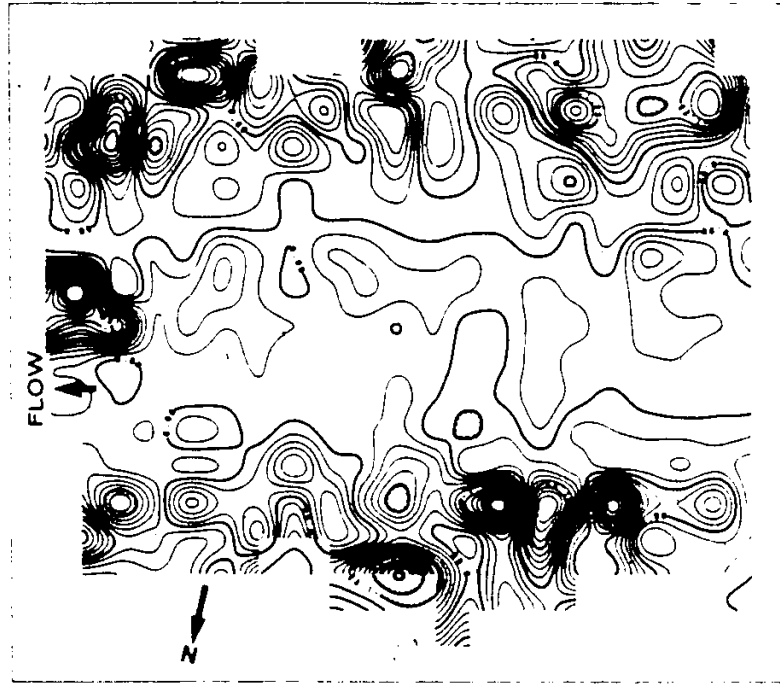
ELEVATION - CAPACITY TABLE

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
539.00	0.2	551.59	1429.7				
539.50	.7	552.00	1543.1				
540.00	1.1	552.50	1659.3				
540.50	1.7	553.00	1778.4				
541.00	2.7	553.50	1900.9				
541.50	4.3	554.00	2027.5				
542.00	6.1	554.50	2157.2				
542.50	7.9	555.00	2289.3				
543.00	12.0	555.50	2422.7				
543.50	34.6	556.00	2556.7				
544.00	79.0						
544.50	136.7						
545.00	281.5						
545.50	272.8						
546.00	351.7						
546.50	434.6						
547.00	520.8						
547.50	610.5						
548.00	704.0						
548.50	800.4						
549.00	898.4						
549.50	998.4						
550.00	1101.0						
550.50	1207.4						
551.00	1317.5						

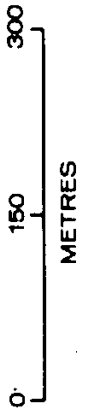


SECTOR 24
1978 CONTOURS
CONTOUR INTERVAL = 0.5 METRE





SECTOR 24
1975-1978 CONTOUR DIFFERENCES
CONTOUR INTERVAL = 0.25 METRE

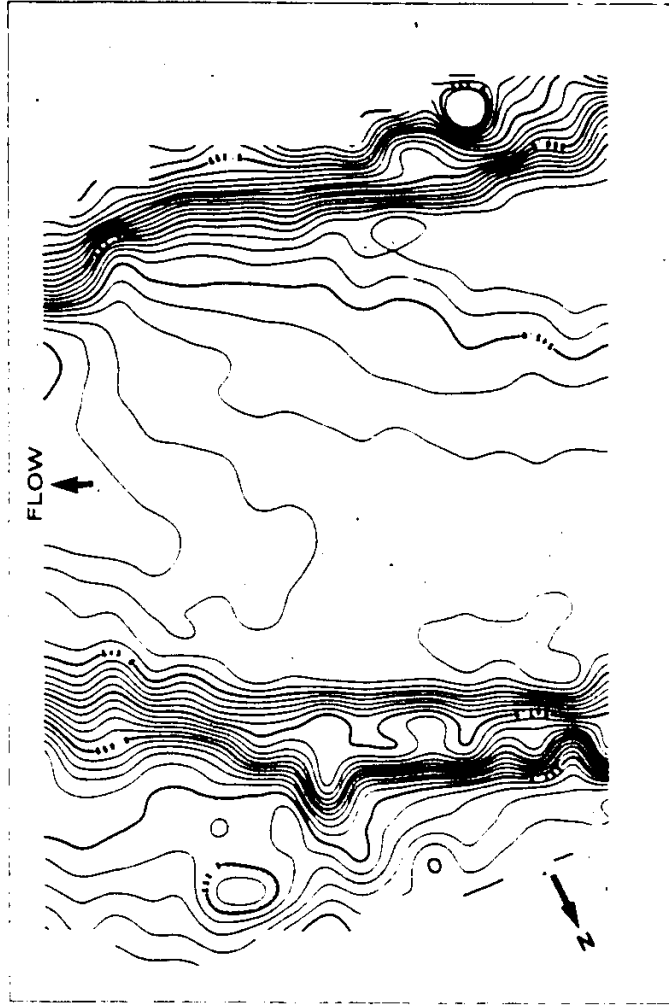


DIAMENT SURVEY S IUM LDIET/5 L02JMI

UTAMA, ONT.
MAY 1991

ELEVATION - CAPACITY TABLE

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
542.50	2	555.00	2533.0				
543.00	3.2	555.50	2691.6				
543.50	15.4	556.00	2850.0				
544.00	52.0						
544.50	113.5						
545.00	187.3						
545.50	267.5						
546.00	352.2						
546.50	443.7						
547.00	540.9						
547.50	640.0						
548.00	745.1						
548.50	853.9						
549.00	964.3						
549.50	1076.5						
550.00	1190.5						
550.50	1306.2						
551.00	1424.4						
551.50	1545.6						
552.00	1670.3						
552.50	1808.2						
553.00	1946.4						
553.50	2078.3						
554.00	2225.9						
554.50	2378.1						



SECTOR 23
1975 CONTOURS
CONTOUR INTERVAL = 0.5 METRE

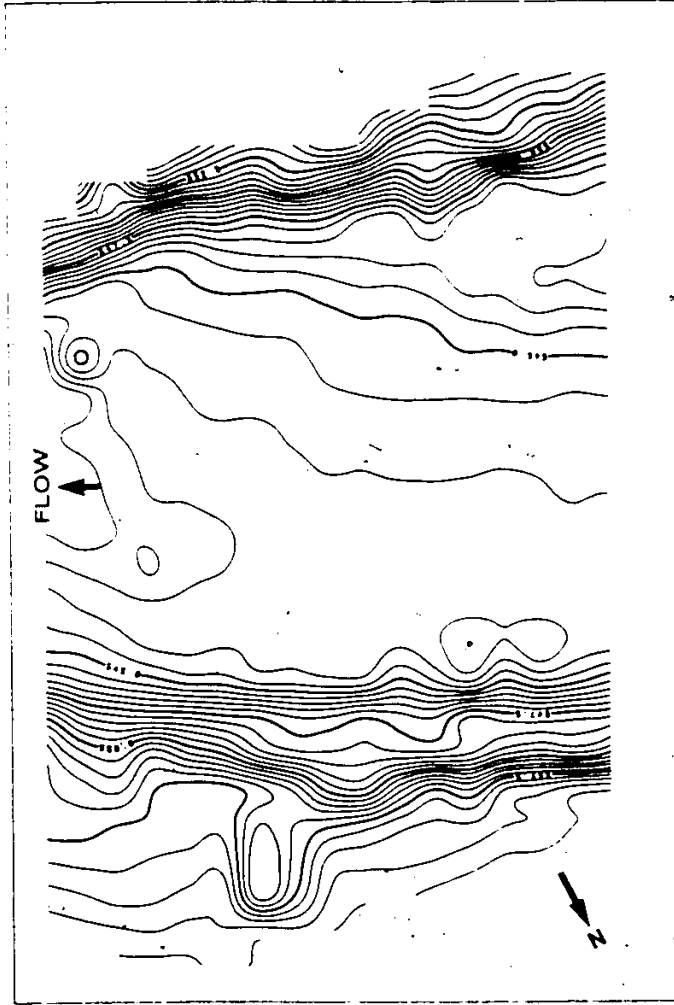


SEDIMENT SURVEY SECTION
 OTTAWA, ONT.
 MAY 1981

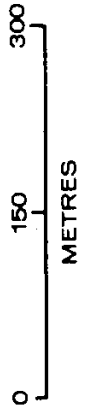
LOIFF76 LD23M1

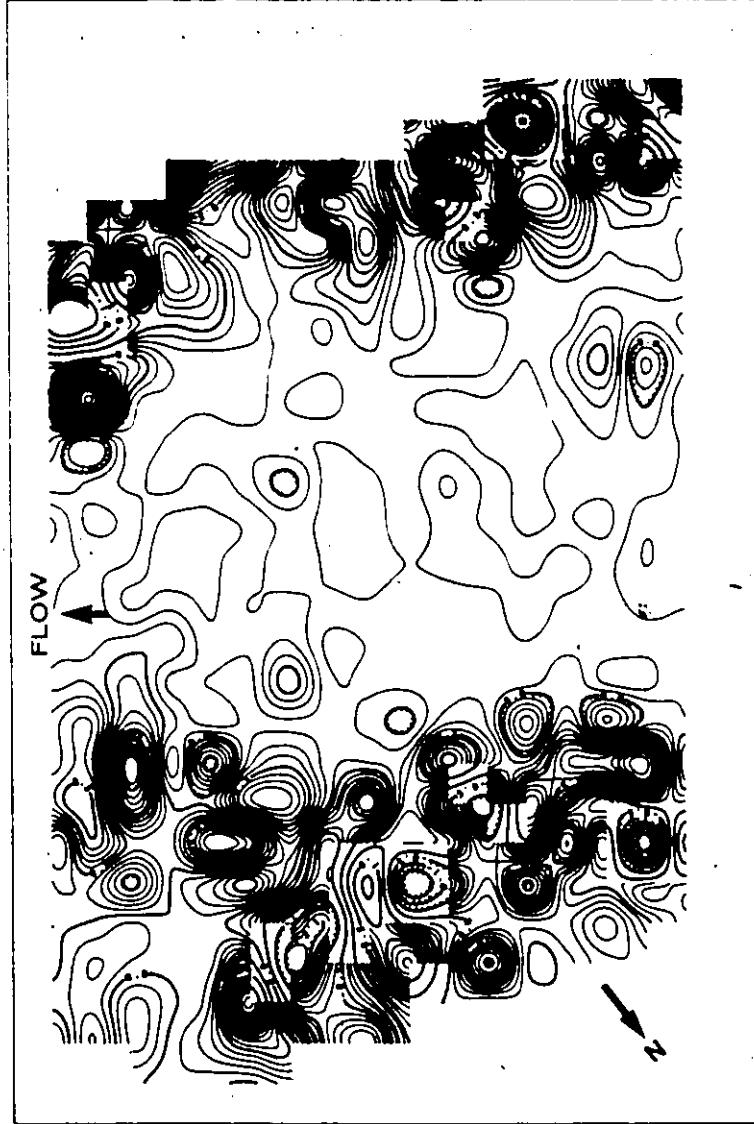
ELEVATION - CAPACITY TABLE

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
543.00	1.9	555.50	2668.1				
543.50	8.6	556.00	2818.9				
544.00	16.8						
544.50	27.7						
545.00	156.9						
545.50	235.4						
546.00	318.6						
546.50	488.3						
547.00	584.8						
547.50	684.7						
548.00	707.8						
548.50	815.5						
549.00	926.7						
549.50	1039.8						
550.00	1154.9						
550.50	1271.9						
551.00	1390.8						
551.50	1512.7						
552.00	1638.9						
552.50	1769.9						
553.00	1905.4						
553.50	2045.8						
554.00	2192.1						
554.50	2344.8						
555.00	2501.7						

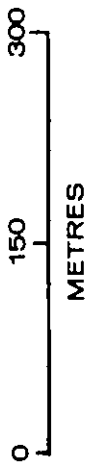


SECTOR 23
1978 CONTOURS
CONTOUR INTERVAL = 0.5 METRE





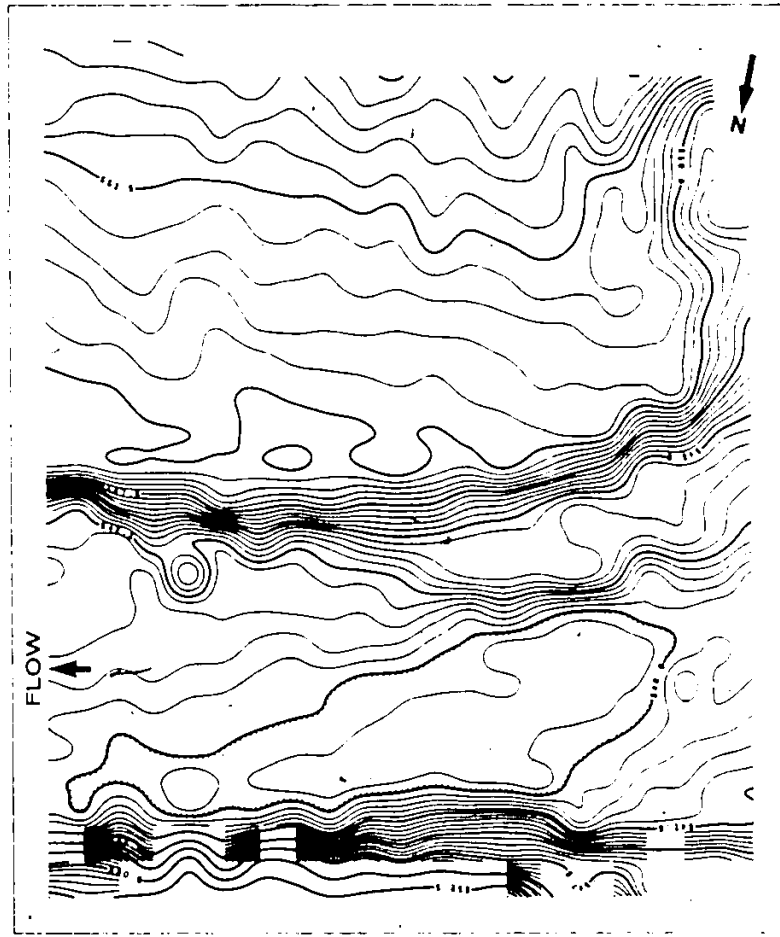
SECTOR 23
1975-1978 CONTOUR DIFFERENCES
CONTOUR INTERVAL = 0.1 METRE



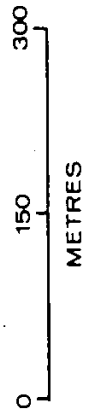
SEDIMENT SUPPLY SECTION
 UTTA, ONT.
 MAY 1981

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 * ELEVATION - CAPACITY TABLE *

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
539.50	4.7	552.00	2153.8				
540.00	20.3	552.50	2321.9				
540.50	47.9	553.00	2499.3				
541.00	85.7	553.50	2685.1				
541.50	132.3	554.00	2870.6				
542.00	180.4	554.50	3070.2				
542.50	251.6	555.00	3281.5				
543.00	318.5	555.50	3406.5				
543.50	389.0	556.00	3691.7				
544.00	463.8						
544.50	544.7						
545.00	629.8						
545.50	715.7						
546.00	802.7						
546.50	891.9						
547.00	983.3						
547.50	1076.8						
548.00	1173.7						
548.50	1273.8						
549.00	1375.7						
549.50	1480.0						
550.00	1591.8						
550.50	1715.0						
551.00	1849.8						
551.50	1996.1						



SECTOR 21
1975 CONTOURS
CONTOUR INTERVAL = 0.5 METRE



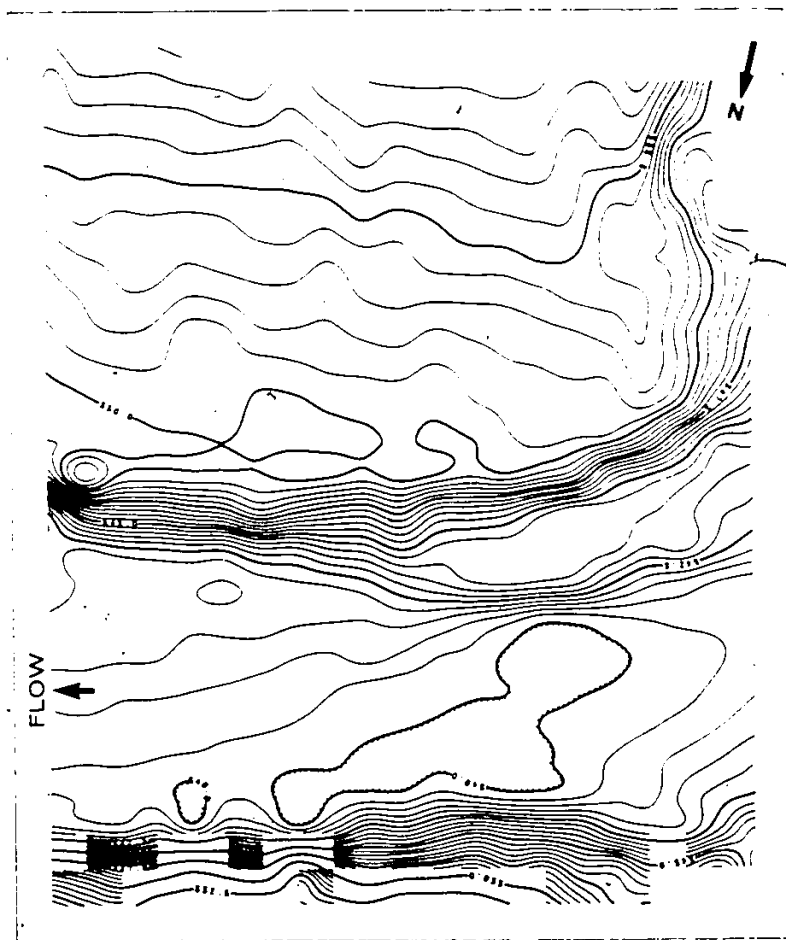
L01E7R L021M1

SPOILMENT SURVEY SECTION

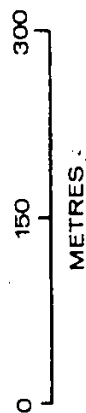
OTTAWA, ONT.
MAY 1941

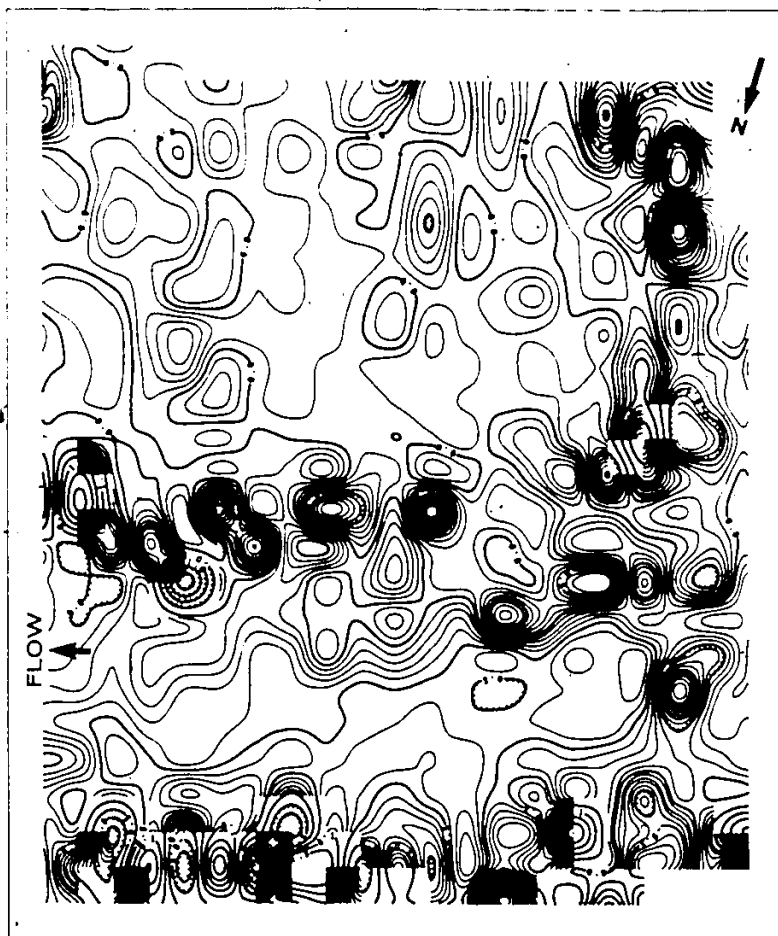
ELEVATION - CAPACITY TABLE

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
548.00	1.6	552.50	2292.3				
548.50	20.0	553.00	2471.3				
549.00	53.4	553.50	2650.0				
549.50	98.2	554.00	2831.9				
550.00	153.6	554.50	3052.4				
550.50	217.7	555.00	3256.4				
551.00	295.0	555.50	3462.0				
551.50	355.1	556.00	3667.2				
552.00	420.9						
552.50	500.9						
553.00	593.5						
553.50	679.3						
554.00	766.6						
554.50	855.9						
555.00	947.5						
555.50	1041.1						
556.00	1137.0						
556.50	1236.3						
557.00	1338.6						
557.50	1443.3						
558.00	1555.7						
558.50	1640.8						
559.00	1817.6						
559.50	1966.4						
560.00	2122.5						

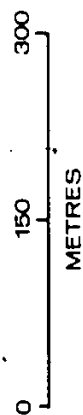


SECTOR 21
1978 CONTOURS
CONTOUR INTERVAL = 0.5 METRE





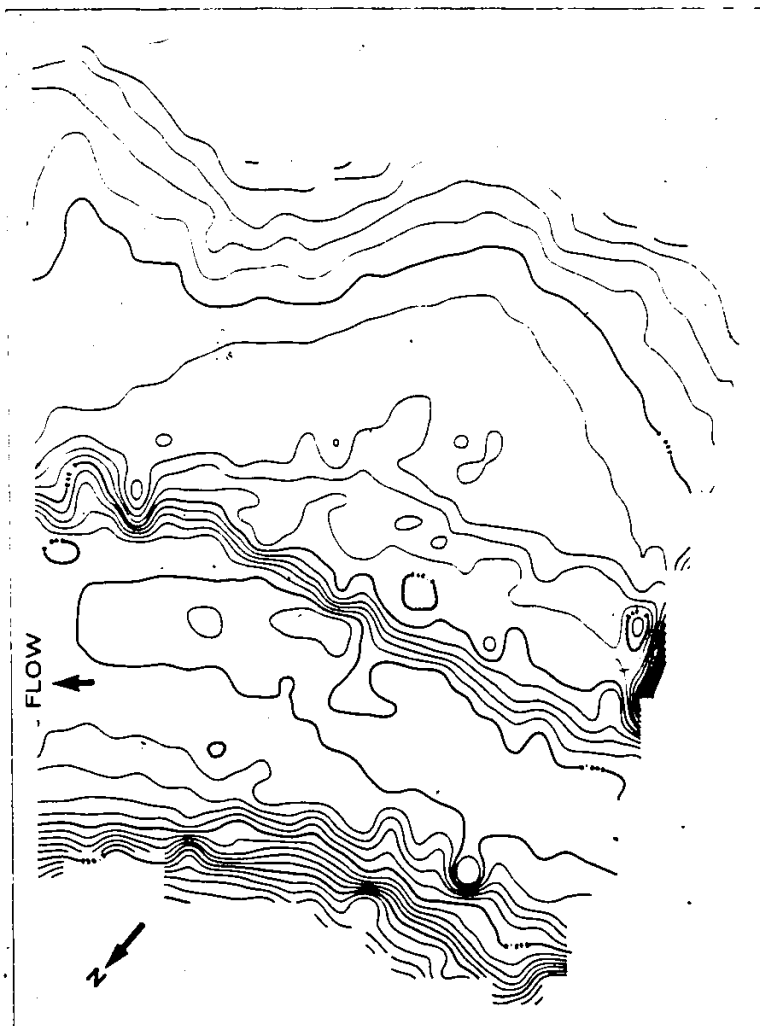
SECTOR 21
1975-1978 CONTOUR DIFFERENCES
CONTOUR INTERVAL = 0.1 METRE



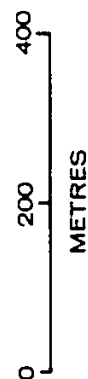
SEDIMENT SURVEY SECTION L01EF75 L02BM1
OTTAWA, ONT.
MAY 1981

ELEVATION - CAPACITY TABLE

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
539.00	0.9	551.50	3574.2				
539.50	6.6	552.00	3801.2				
540.00	31.4	552.50	4197.7				
540.50	84.6	553.00	4523.6				
541.00	156.9	553.50	4850.2				
541.50	238.5	554.00	5198.0				
542.00	326.6	554.50	5561.2				
542.50	428.3	555.00	5807.2				
543.00	518.1	555.50	6234.8				
543.50	628.8	556.00	6582.7				
544.00	726.9						
544.50	838.4						
545.00	955.4						
545.50	1079.6						
546.00	1215.0						
546.50	1361.5						
547.00	1515.0						
547.50	1675.6						
548.00	1842.5						
548.50	2026.9						
549.00	2236.4						
549.50	2468.0						
550.00	2721.8						
550.50	2994.4						
551.00	3278.5						



SECTOR 20
1975 CONTOURS
CONTOUR INTERVAL = 1.0 METRE

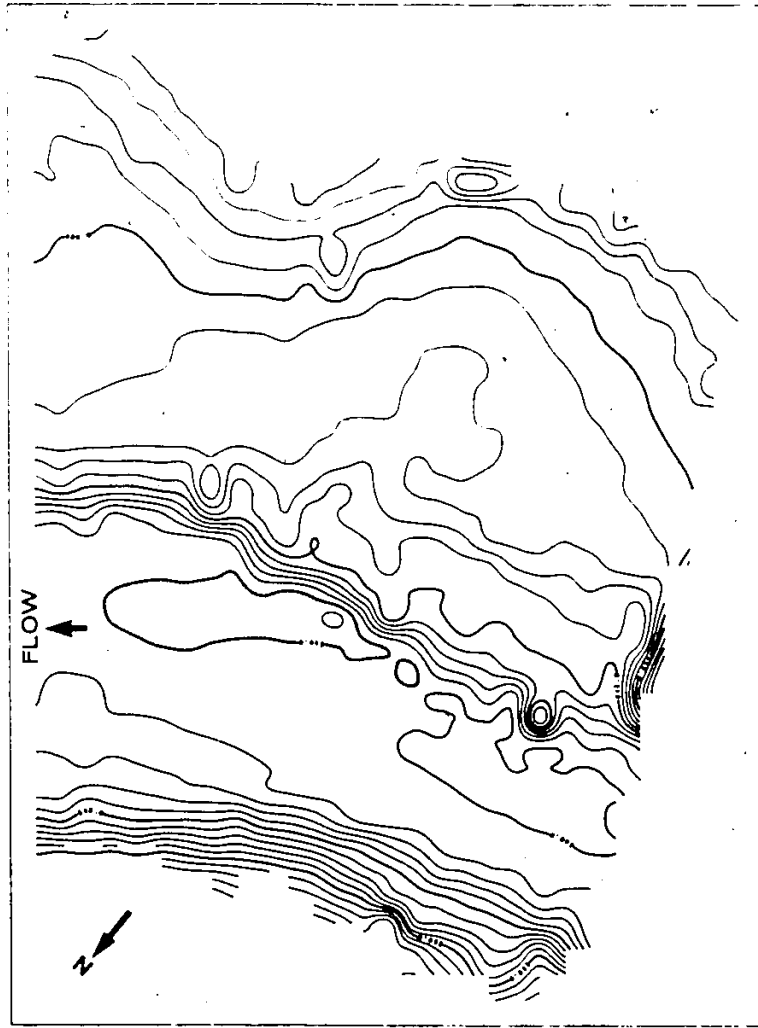


SEDIMENT SURVEY SECTION L0IEF7A L020M1
OTTAWA, ONT.
MAY 1961

PAGE 1

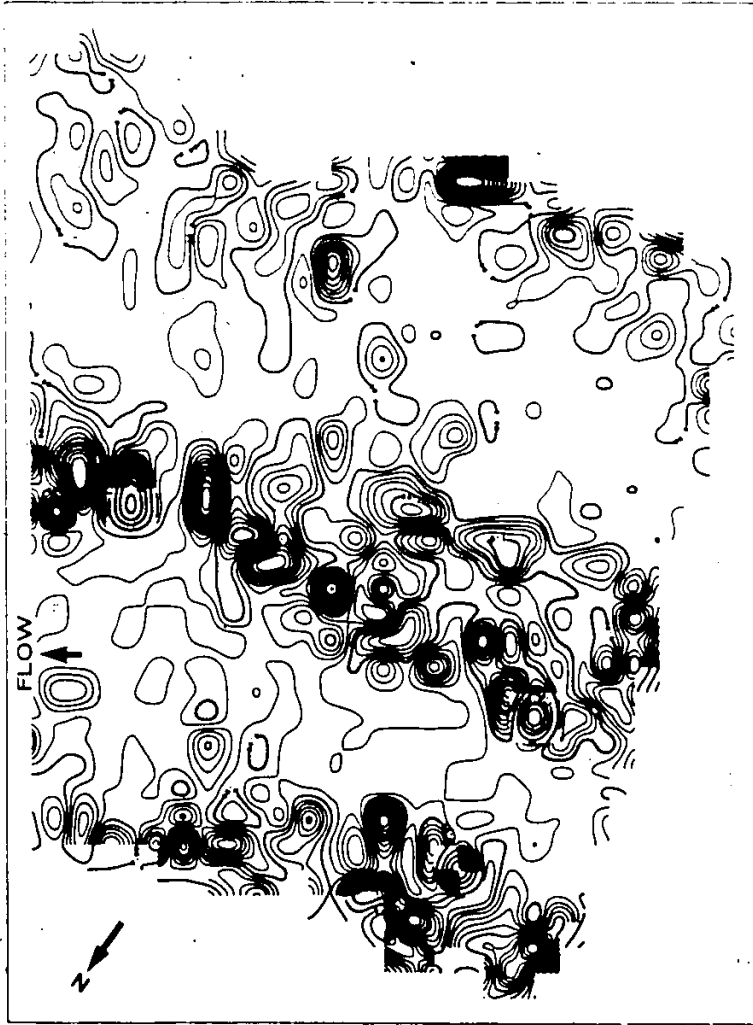
.....
* ELEVATION - CAPACITY TABLE *
.....

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
539.00	.2	551.50	3548.1				
539.50	2.0	552.00	3657.8				
540.00	14.0	552.50	4175.4				
540.50	51.1	553.00	4591.0				
541.00	114.8	553.50	4834.2				
541.50	193.6	554.00	5174.2				
542.00	241.3	554.50	5518.9				
542.50	375.8	555.00	5866.2				
543.00	475.0	555.50	6214.8				
543.50	577.3	556.00	6563.7				
544.00	682.5						
544.50	791.0						
545.00	906.1						
545.50	1031.1						
546.00	1166.6						
546.50	1310.0						
547.00	1459.7						
547.50	1617.4						
548.00	1785.0						
548.50	1973.7						
549.00	2189.9						
549.50	2428.2						
550.00	2686.7						
550.50	2961.2						
551.00	3248.3						



SECTOR 20
1978 CONTOURS
CONTOUR INTERVAL = 1.0 METRE





SECTOR 20
1975-1978 CONTOUR DIFFERENCES
CONTOUR INTERVAL = 0.25 METRE

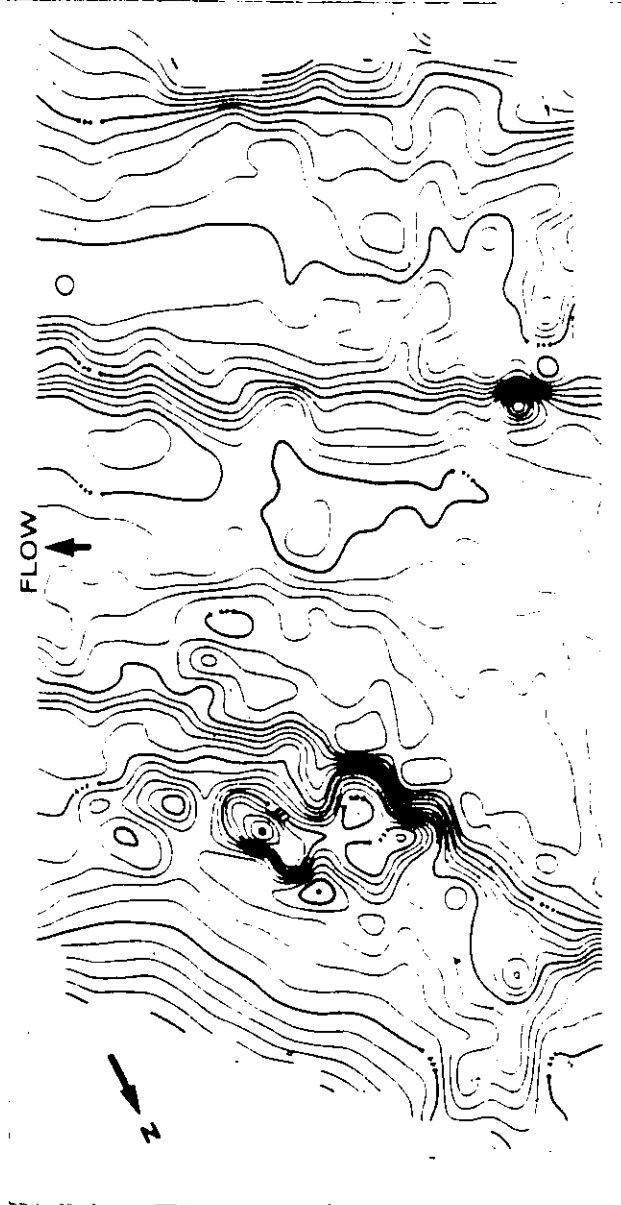
0 200 400
METRES

SEDIMENT SURVEY STATION
OTTAWA, ONT.
MAY 1961

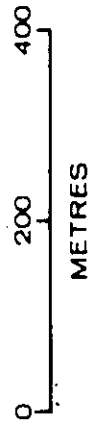
LD1675 L017M1

ELEVATION - CAPACITY TABLE

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
533.50	12	546.00	2402.2				
534.00	2.0	546.50	2608.5				
534.50	6.5	547.00	2905.0				
535.00	17.6	547.50	3133.6				
535.50	30.3	548.00	3373.0				
536.00	70.2	548.50	3622.5				
536.50	113.1	549.00	3879.1				
537.00	165.6	549.50	4143.1				
537.50	226.0	550.00	4415.3				
538.00	299.1	550.50	4694.2				
538.50	385.2	551.00	4977.0				
539.00	482.6	551.50	5267.6				
539.50	590.7	552.00	5562.9				
540.00	707.1	552.50	5861.1				
540.50	820.7	553.00	6163.3				
541.00	954.0	553.50	6468.1				
541.50	1081.4	554.00	6774.0				
542.00	1210.7	554.50	7083.6				
542.50	1342.0	555.00	7393.8				
543.00	1479.4	555.50	7705.5				
543.50	1620.0	556.00	8017.8				
544.00	1767.8						
544.50	1920.4						
545.00	2102.0						
545.50	2206.9						



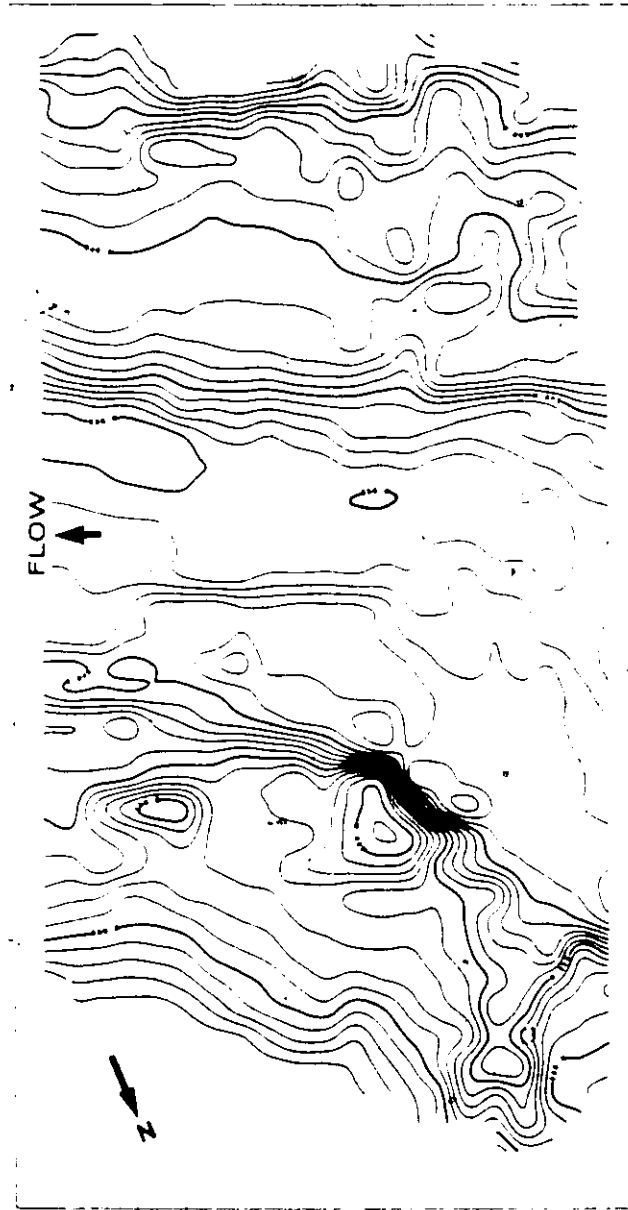
SECTOR 17
1975 CONTOURS
CONTOUR INTERVAL = 1.0 METRE



SPOTMENT SURVEY SECTION LOIEF78 L017M1
OTTAWA, ONT.
MAY 1991

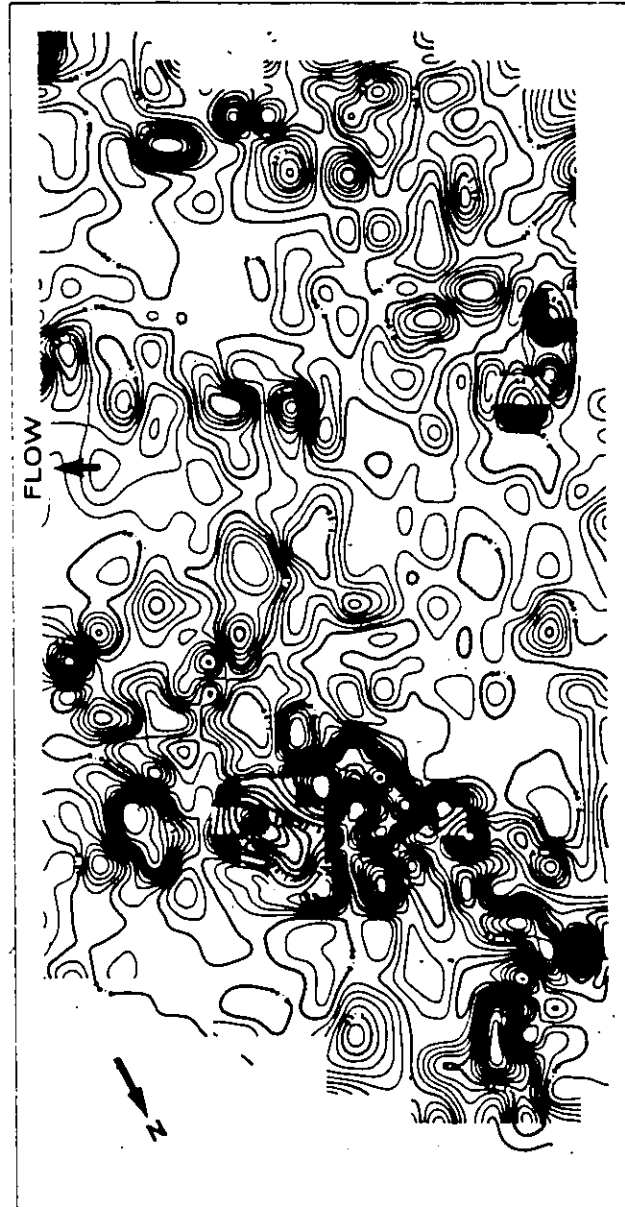
ELEVATION - CAPACITY TABLE

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
534.50	.7	547.00	2855.5				
535.00	3.5	547.50	3008.6				
535.50	15.0	548.00	3332.0				
536.00	39.0	548.50	3504.0				
536.50	78.1	549.00	3666.5				
537.00	127.5	549.50	4113.5				
537.50	185.1	550.00	4309.1				
538.00	251.3	550.50	4678.7				
538.50	329.5	551.00	4997.1				
539.00	422.1	551.50	5268.3				
539.50	527.6	552.00	5543.7				
540.00	641.7	552.50	5841.8				
540.50	761.7	553.00	6143.5				
541.00	886.4	553.50	6447.7				
541.50	1013.4	554.00	6753.9				
542.00	1143.7	554.50	7062.4				
542.50	1277.1	555.00	7374.0				
543.00	1413.2	555.50	7686.2				
543.50	1554.5	556.00	7998.4				
544.00	1705.1						
544.50	1868.9						
545.00	2045.3						
545.50	2231.2						
546.00	2426.1						
546.50	2631.6						



SECTOR 17
1978 CONTOURS
CONTOUR INTERVAL = 1.0 METRE

0 200 400
METRES



SECTOR 17
1975-1978 CONTOUR DIFFERENCES
CONTOUR INTERVAL = 0.25 METRE

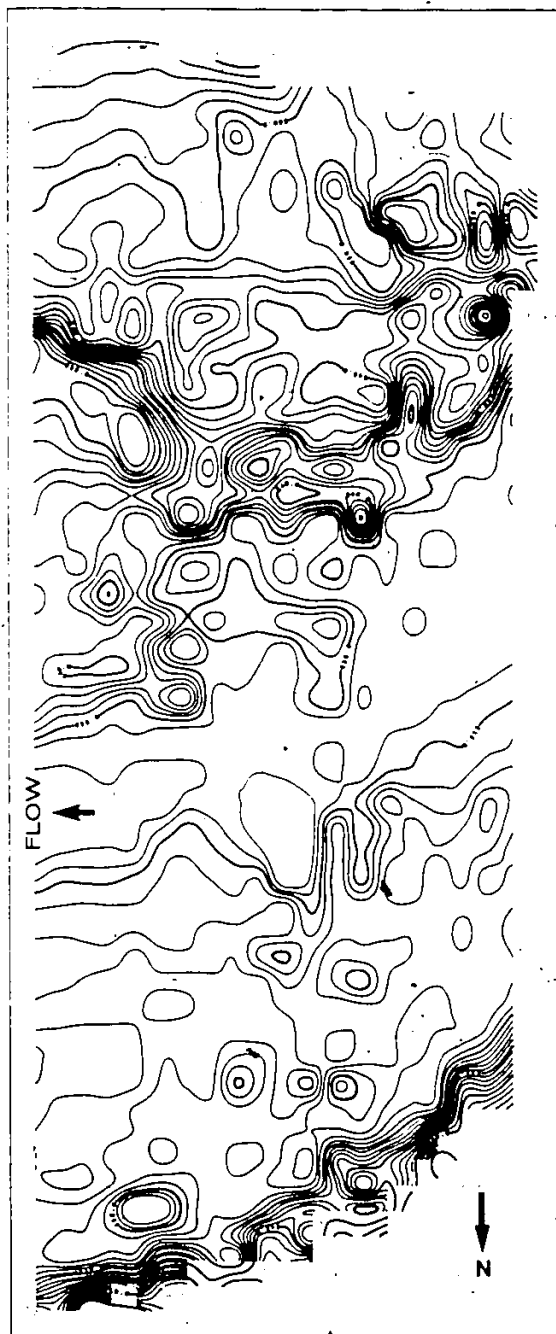


SEDIMENT SURVEY SECTION
OTTAWA, ONT.
MAY 1961

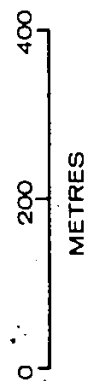
LOIEF75 LO1641

ELEVATION - CAPACITY TABLE

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
532.50	1.1	545.00	4626.8				
533.00	8.0	545.50	4922.5				
533.50	34.9	546.00	5223.7				
534.00	83.8	546.50	5530.4				
534.50	151.2	547.00	5842.0				
535.00	232.9	547.50	6159.4				
535.50	325.8	548.00	6484.7				
536.00	431.2	548.50	6816.5				
536.50	548.1	549.00	7155.8				
537.00	678.9	549.50	7504.6				
537.50	838.7	550.00	7861.1				
538.00	1009.2	550.50	8223.7				
538.50	1216.8	551.00	8591.5				
539.00	1443.2	551.50	8963.0				
539.50	1681.5	552.00	9338.3				
540.00	1930.4	552.50	9716.9				
540.50	2184.4	553.00	10098.5				
541.00	2441.6	553.50	10483.5				
541.50	2701.7	554.00	10870.4				
542.00	2964.3	554.50	11258.1				
542.50	3229.8	555.00	11646.8				
543.00	3499.6	555.50	12036.0				
543.50	3774.0	556.00	12425.5				
544.00	4052.6						
544.50	4336.6						



SECTOR 14
1975 CONTOURS
CONTOUR INTERVAL = 1.0 METRE

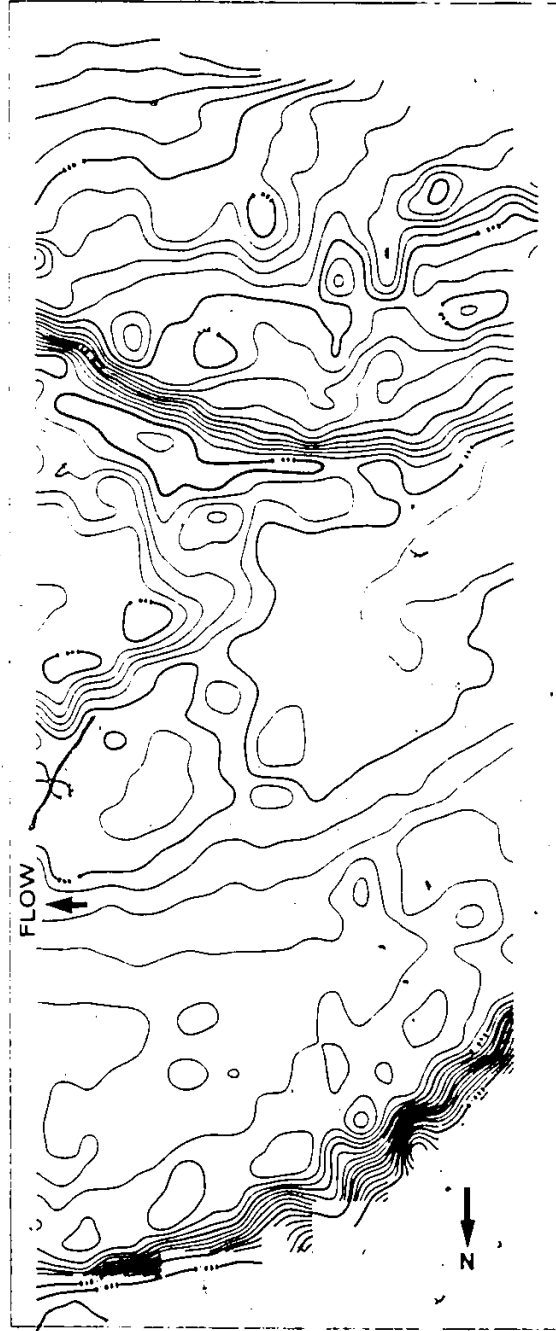


LOIEF7A L014M1

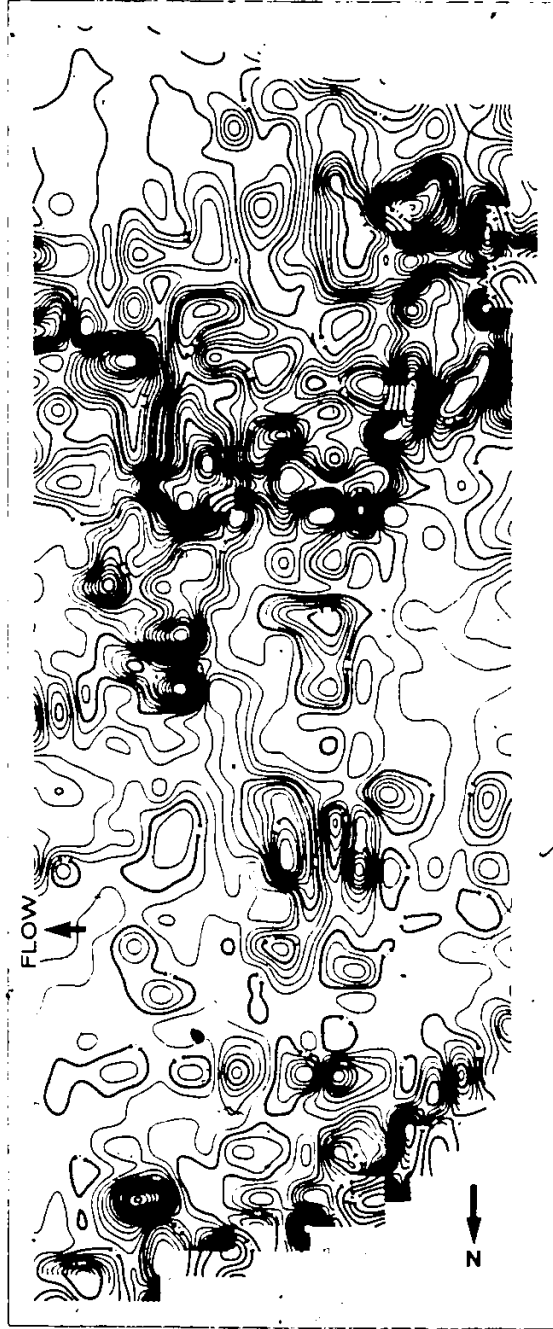
SEDIMENT SURVEY SECTION
OTTAWA, ONT.
MAY 1991

.....
F ELEVATION - CAPACITY TABLE
.....

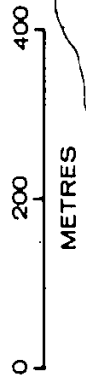
ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
533.50	0.7	546.00	5058.1				
534.00	0.4	546.50	5373.1				
534.50	37.6	547.00	5695.5				
535.00	94.2	547.50	6021.6				
535.50	172.2	548.00	6365.6				
536.00	264.7	548.50	6710.7				
536.50	370.1	549.00	7062.0				
537.00	490.4	549.50	7421.2				
537.50	627.2	550.00	7784.5				
538.00	780.8	550.50	8152.7				
538.50	901.3	551.00	8524.5				
539.00	1200.6	551.50	8900.0				
539.50	1440.3	552.00	9278.3				
540.00	1692.7	552.50	9659.9				
540.50	1949.9	553.00	10042.5				
541.00	2210.2	553.50	10429.1				
541.50	2474.6	554.00	10817.3				
542.00	2743.0	554.50	11207.1				
542.50	3014.6	555.00	11598.0				
543.00	3289.8	555.50	11989.4				
543.50	3569.4	556.00	12381.2				
544.00	3853.1						
544.50	4143.9						
545.00	4443.0						
545.50	4740.3						



SECTOR 14
1978 CONTOURS
CONTOUR INTERVAL = 1.0 METRE



SECTOR 14
1975-1978 CONTOUR DIFFERENCES
CONTOUR INTERVAL = 0.5 METRE



APPENDIX K

Measured Bed Material Density and Particle Size
for Data Collected from Lake Diefenbaker

No.	Year	Sample Identifier	% Sand	% Silt	% Clay	Measured Density (Kg/m ³)	Calculated Density (Kg/m ³)
1	1972	R26	11	56	33	905	737
2	1972	R17	4	29	67	684	705
3	1972	R14	7	54	39	854	721
4	1972	SCC 1	15	48	37	1 110	902
5	1972	SCC 3	48	34	18	988	1 155
6	1972	SCC 4	46	34	20	1 148	1 136
7	1972	SCC 5	39	36	25	980	1 076
8	1972	SCC 6	30	37	33	950	992
9	1972	SCC 7	54	28	18	1 209	1 182
10	1972	SCC 10	49	31	20	1 275	1 150
11	1972	SCC 11	10	26	64	412	727
12	1972	SCC 12	49	37	14	1 073	1 184
13	1972	SCC 13	5	29	66	416	695
14	1972	SCC 14	5	28	67	405	689
15	1972	SCC 15	16	40	44	527	867
16	1972	SCC 16	3	23	74	290	641
17	1972	SCC 17	3	31	66	444	686
18	1972	SCC 18	12	50	38	649	883
19	1972	SCC 19	67	19	14	1 017	1 264
20	1972	SCC 20	9	56	35	697	1 278
21	1972	SCC 21	8	55	37	559	870
22	1972	SCC 22	2	45	53	548	756
23	1972	SCC 28	1	26	73	372	636
24	1972	SCC 29	1	33	66	450	676
25	1972	SCC 30	8	49	43	524	836
26	1972	SCC 31	5	28	67	453	689
27	1972	SCC 32	20	59	21	580	1 014
28	1972	SCC 33	22	36	42	545	905
29	1972	SCC 34	20	54	26	549	985
30	1972	SCC 35	17	35	48	638	849
31	1972	SCC 36	7	33	60	447	737
32	1972	SCC 37	8	59	33	756	892
33	1972	SCC 38	52	24	22	1 280	1 131
34	1972	SCC 39	36	40	24	1 042	1 068
35	1972	SCC 40	28	35	37	801	959
36	1972	SCC 41	69	17	14	1 646	1 273
37	1972	SCC 42	38	37	25	1 252	1 072
38	1974	60-2	9	43	48	1 408	812
39	1974	60-3	24	60	16	905	1 059
40	1974	60-4	15	68	17	1 046	1 062
41	1974	60-5	13	70	17	1 267	1 004
42	1974	60-6	34	31	35	633	998
43	1974	60-8	15	65	20	905	996
44	1974	60-9	31	47	22	529	1 057
45	1974	61-4	39	41	20	487	1 104
46	1974	61-8	18	59	23	452	993
47	1974	61-10	19	33	48	1 056	857
48	1974	62-2	7	24	69	745	686
49	1974	62-3	64	24	12	1 267	1 261

No.	Year	Sample Identifier	% Sand	% Silt	% Clay	Measured Density (Kg/m ³)	Calculated Density (Kg/m ³)
50	1974	62-5	27	58	15	844	1 078
51	1974	62-6	35	50	15	1 267	1 175
52	1974	62-8	41	39	20	1 267	1 381
53	1974	62-10	40	40	20	1 267	1 108
54	1974	63-2	13	56	31	793	926
55	1974	63-3	28	53	19	1 456	1 060
56	1975	D1	17	58	25	860	977
57	1975	D2	22	42	36	1 057	939
58	1975	D3	1	39	60	593	710
59	1975	D4	2	43	55	593	743
60	1975	D5	8	47	45	625	825
61	1975	D6	2	61	37	673	844
62	1975	D7	30	42	28	766	1 020
63	1975	D8	10	52	38	626	873
64	1975	D9	4	58	38	636	846
65	1975	D10	23	52	25	665	1 004
66	1975	D11	37	34	29	939	1 044
67	1975	D12	29	51	20	1 115	1 060
68	1975	D13	21	30	44	548	860
69	1975	D14	39	25	36	687	1 016
70	1975	D15	0	35	65	562	678
71	1975	D16	28	32	40	745	942
72	1975	D17	46	22	32	835	1 068
73	1975	D18	3	39	58	572	730
74	1975	D19	4	46	50	562	778
75	1975	D20	3	42	55	529	778
76	1975	D21	6	44	50	581	746
77	1975	D22	12	47	41	633	788
78	1975	D23	24	51	25	844	867
79	1975	D24	24	31	45	671	897
80	1975	D25	53	28	19	950	1 173
81	1975	D26	1	36	63	628	692
82	1975	D27	46	34	20	1 190	1 136
83	1977	10R	4	32	64	375	700
84	1977	10C	24	56	20	785	1 036
85	1977	12R	14	46	40	678	881
86	1977	12C	12	30	68	388	670
87	1977	12L	10	44	46	497	828
88	1977	13R	48	32	20	1 067	1 144
89	1977	13C	13	36	51	408	814
90	1977	13L	9	28	63	421	729
91	1977	19R	4	31	65	444	695
92	1977	19C	7	38	55	540	764
93	1977	19L	25	26	49	461	879
94	1977	22R	4	28	68	730	678
95	1977	22C	2	40	58	524	726
96	1977	22L	15	41	44	658	863

No.	Year	Sample Identifier	% Sand	% Silt	% Clay	Measured Density (Kg/m ³)	Calculated Density (Kg/m ³)
97	1977	25R	5	35	60	554	729
98	1977	25C	5	51	44	589	819
99	1978	25L	11	45	44	729	844
100	1978	SCC 1	4	44	52	381	767
101	1978	SCC 2	19	52	29	687	964
102	1978	SCC 3	1	35	64	360	687
103	1978	SCC 4	2	55	43	798	809
104	1978	SCC 6	1	43	56	453	732
105	1978	SCC 7	10	45	45	820	835
106	1978	SCC 8	13	47	40	621	875
107	1978	SCC 9	7	42	51	452	786
108	1978	SCC 10	40	38	22	1 081	1 097
109	1978	SCC 11	2	30	68	399	670
110	1978	SCC 12	3	48	49	559	780
111	1978	SCC 13	1	77	22	312	613
112	1978	27L	3	51	46	641	798
113	1978	27C	2	45	53	921	754
114	1978	26L	34	51	15	761	1 110
115	1978	26C	2	41	57	432	698
116	1978	26R	2	42	56	543	737
117	1978	24L	12	45	43	599	855
118	1978	24C	4	59	37	557	852
119	1978	23L	32	26	42	961	950
120	1978	23C	14	45	41	471	875
121	1978	23R	2	38	60	407	714
122	1978	21L	9	35	56	543	769
123	1978	21C	24	45	31	1 124	975
124	1978	21R	38	44	18	1 161	1 110
125	1978	20L	3	33	64	463	697
126	1978	20C	11	34	55	734	782
127	1978	20R	49	29	22	1 134	1 139
128	1978	17L	16	52	32	605	934
129	1978	17C	1	26	73	346	636
130	1978	17R	26	52	22	971	1 035
131	1978	14L	2	28	70	364	658
132	1978	14C	5	45	50	466	785
133	1978	14R	22	52	26	1 198	995
134	1978	9C	2	14	84	184	580
135	1978	9R	3	36	61	429	713
136	1978	7L	15	59	26	849	964
137	1978	7C	11	42	47	463	820
138	1978	7R	14	41	45	1 118	689
139	1978	6L	31	33	36	681	979
140	1978	6C	6	43	51	655	783
141	1978	6R	6	51	43	770	828
142	1978	5L	10	59	31	671	913
143	1978	5C	34	43	23	831	1 065
144	1978	5R	64	23	13	1 076	1 256

APPENDIX L

1972 and 1978 Swift Current Creek
Area Elevation-Capacity Tables

SEDIMENT SURVEY SECTION L0SC72 SC57M1
 OTTAWA, ONT.
 JUL 1961

ELEVATION - CAPACITY TABLE

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
533.50	3.2	546.00	11511.0				
534.00	16.4	546.50	12502.6				
534.50	55.0	547.00	13520.5				
535.00	145.4	547.50	14561.4				
535.50	288.4	548.00	15622.9				
536.00	464.6	548.50	16705.5				
536.50	673.3	549.00	17804.9				
537.00	913.7	549.50	18919.1				
537.50	1179.7	550.00	20047.1				
538.00	1471.3	550.50	21184.3				
538.50	1786.8	551.00	22330.2				
539.00	2121.5	551.50	23484.7				
539.50	2473.7	552.00	24646.6				
540.00	2847.3	552.50	25815.5				
540.50	3246.7	553.00	26990.3				
541.00	3677.7	553.50	28169.8				
541.50	4166.3	554.00	29353.4				
542.00	4749.5	554.50	30539.5				
542.50	5427.5	555.00	31727.1				
543.00	6170.6	555.50	32916.1				
543.50	6966.9						
544.00	7812.8						
544.50	8695.6						
545.00	9606.5						
545.50	10545.1						

L0SC78 SC57M1

SEDIMENT SURVEY SECTION

OTTAWA, ONT.

JUL 1981

.....
 * ELEVATION - CAPACITY TABLE *

ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)	ELEVATION (M.)	ACC. VOLUME (1000 CU. M.)
535.00	4.0	547.50	13507.7				
535.50	34.3	548.00	14554.0				
536.00	123.1	548.50	15617.0				
536.50	278.2	549.00	16697.2				
537.00	457.6	549.50	17795.0				
537.50	681.2	550.00	18907.5				
538.00	948.7	550.50	20032.1				
538.50	1231.8	551.00	21167.3				
539.00	1550.4	551.50	22313.6				
539.50	1895.1	552.00	23470.8				
540.00	2268.6	552.50	24634.7				
540.50	2644.3	553.00	25806.5				
541.00	3049.5	553.50	26983.3				
541.50	3490.2	554.00	28164.5				
542.00	3990.4	554.50	29349.5				
542.50	4565.2	555.00	30536.9				
543.00	5276.3	555.50	31725.9				
543.50	6034.0						
544.00	6845.9						
544.50	7785.6						
545.00	8602.8						
545.50	9530.4						
546.00	10487.6						
546.50	11471.2						
547.00	12479.0						