

# **History of Water Level Gauges**

## **Lower Great Lakes and International Section of the St. Lawrence River**

by

**The Coordinating Committee**

on

**Great Lakes Basic Hydraulic and Hydrologic Data**

**March 1987**

**HISTORY OF WATER LEVEL GAUGES**

**LOWER GREAT LAKES**

**AND**

**INTERNATIONAL SECTION OF THE**

**ST. LAWRENCE RIVER**

HISTORY OF WATER LEVEL GAUGES

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ST. LAWRENCE RIVER

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HISTORY OF WATER LEVEL GAUGES  
LOWER GREAT LAKES  
AND  
INTERNATIONAL SECTION OF THE  
ST. LAWRENCE RIVER

INTRODUCTION

Requirement for internationally coordinated hydraulic and hydrologic data. The Great Lakes-St. Lawrence River system extends southerly and easterly from the headwaters of tributary streams in northern Minnesota and western Ontario some 2,000 miles to the Gulf of St. Lawrence in the Atlantic Ocean. The system drains a great interior basin of more than 295,000 square miles to the outlet of Lake Ontario, reaches almost halfway across the North American continent, and borders upon eight states of the United States and two provinces of Canada. This vast series of lakes and rivers is shared by the United States and Canada. The joint use of these waters poses numerous international problems in the solution of which the two countries need coordinated basic data.

Prior to 1953, data pertaining to the hydraulic and hydrologic factors of the Great Lakes and St. Lawrence River were collected and compiled independently by the responsible federal agencies in Canada and the United States, with only superficial and informal correlation of some of the data. As a consequence, the data in many instances were developed on different bases and datum planes and were divergent in many respects. This situation resulted in a large volume of study and evaluation by each country of the data used by the other in the solutions of international problems.

Establishment of international study. The quantity and scope of the international problems were greatly increased by the advent of extremely high lake levels in 1952 and by the imminent power and navigation development in the St. Lawrence River system. Recognizing that continued independent development of the basic data was illogical under the circumstances and that early agreement upon the hydraulic and hydrologic factors was of paramount importance, the Corps of Engineers, United States Army, and the Departments of Transport, Mines and Technical Surveys, and Resources and Development, Canada, opened negotiations early in 1953 for the purpose of establishing a basis for development and acceptance by both countries of identical data. The negotiations culminated in a meeting of representatives of the interested agencies at Ottawa on 7 May 1953.

At the meeting, the Coordinating Committee on Great Lakes Basic Hydraulic and Hydrologic Data was formed to study the problem and to establish a basis of procedure. This Committee was established advisory to the agencies of the United States and Canada who are charged with the responsibility for collecting and compiling the Great Lakes hydraulic and hydrologic data. The Committee was constituted as follows:

CANADA

T. M. Patterson  
Water Resources Division  
Department of Resources  
and Development  
Chairman

J. E. R. Ross  
Geodetic Survey of Canada  
Department of Mines and  
Technical Surveys

D. M. Ripley  
Special Projects Branch  
Department of Transport

UNITED STATE

G. A. Hathaway  
Corps of Engineers  
Department of the Army  
Chairman

E. W. Nelson  
Corps of Engineers  
Department of the Army

W. T. Laidly  
Corps of Engineers  
Department of the Army

The present membership of the Coordinating Committee is as follows:

CANADA

D. F. Witherspoon  
Inland Waters Directorate  
Environmental Conservation Service  
Ontario Region, Environment Canada  
Chairman

B. J. Tait  
Ocean and Aquatic Sciences  
Fisheries and Oceans, Canada

P. P. Yee  
Inland Waters Directorate  
Environmental Conservation Service  
Ontario Region, Environment Canada  
Secretary

UNITED STATES

D. J. Leonard  
Corps of Engineers  
Department of the Army  
Chairman

P. C. Morris  
National Oceanic and Atmospheric  
Administration  
Department of Commerce

R. E. Wilshaw  
Corps of Engineers  
Department of the Army  
Secretary

Messrs. C. M. Cross, A. T. Prince, R. H. Smith, and W. D. Forrester have also served as Canadian members of the Committee while Messrs. L. D. Kirshner, F. F. Snyder, H. F. Lawhead, F. A. Blust, B. G. DeCooke, and C. I. Thurlow have served as United States members of the Committee.

Four working groups, designated the River Flow Subcommittee, the Vertical Control Subcommittee, the Lake Levels Subcommittee, and the Physical Data Subcommittee, were formed to assist the Coordinating Committee in its work. These subcommittees were directed to conduct the required technical studies through collaboration of the appropriate agencies of Canada and the United States. In September 1969, the Vertical Control and the Lake Levels Subcommittees were combined into one body known as the Vertical Control-Water Levels

Subcommittee. The Subcommittee was normally composed of three members from Canada and three from the United States. The following persons served as members at various times during the progress of the work reported herein:

CANADA

G. C. Dohler  
L. P. Robertson  
B. E. Russell  
E. A. MacDonald  
J. M. Mirakami  
M. H. Quast  
B. J. Tait  
F. W. Young  
R. Gareau  
D. A. St. Jacques

UNITED STATES

B. G. De Cooke  
C. F. Feldscher  
C. F. Ellingwood  
R. M. Berry  
D. R. Rondy  
H. A. Lippincott  
R. E. Wilshaw  
C. T. Whalen

Authority. The Committee instructed its Vertical Control-Water Level Subcommittee to prepare a report in detail on all gauges used in obtaining water levels of Lakes Erie and Ontario, and their outflow channels.

Purpose and Scope. The purpose of this report is to document the history of the operation of water level gauges on the lower two Great Lakes and their outflow rivers. Detailed information about the water levels available is given for each gauging station. This report supercedes and updates information on water level gauges published earlier in two volumes by the Coordinating Committee.

Acknowledgements. The Coordinating Committee acknowledges and expresses its appreciation of the cooperation received from the Canadian Hydrographic Service, Department of Fisheries and Oceans; the Water Survey of Canada, Department of the Environment; the Detroit District, U. S. Army Corps of Engineers and the National Ocean Survey, (National Ocean Survey reorganized as National Ocean Service in November 1982) National Oceanic and Atmospheric Administration of the United States. The information used in compiling this report has been taken from the files of the two principal agencies concerned, the Canadian Hydrographic Service and the National Ocean Survey. The operation and records of Great Lakes water level gauging stations were transferred from the United States Lake Survey (U.S.L.S.), U.S. Army Corps of Engineers, to the National Ocean Survey in October 1970. The individual efforts of Robert A. Mace, Frank M. Sullivan, James S. Moore, Leonard T. Schutze, and Harry A. Lippincott are gratefully acknowledged by the Committee in researching and compiling the information in this report. In addition, the Committee is particularly grateful to Brenda S. Vostreys for typing revisions of the manuscript.

## PRESENTATION OF DATA

Presented herein are the histories of all Canadian and United States gauging stations that the Committee considered have provided useful water level data on the lower Great Lakes, the International Section of the St. Lawrence River and the Niagara River for various periods of time through December 1982. For each station the following data are given:

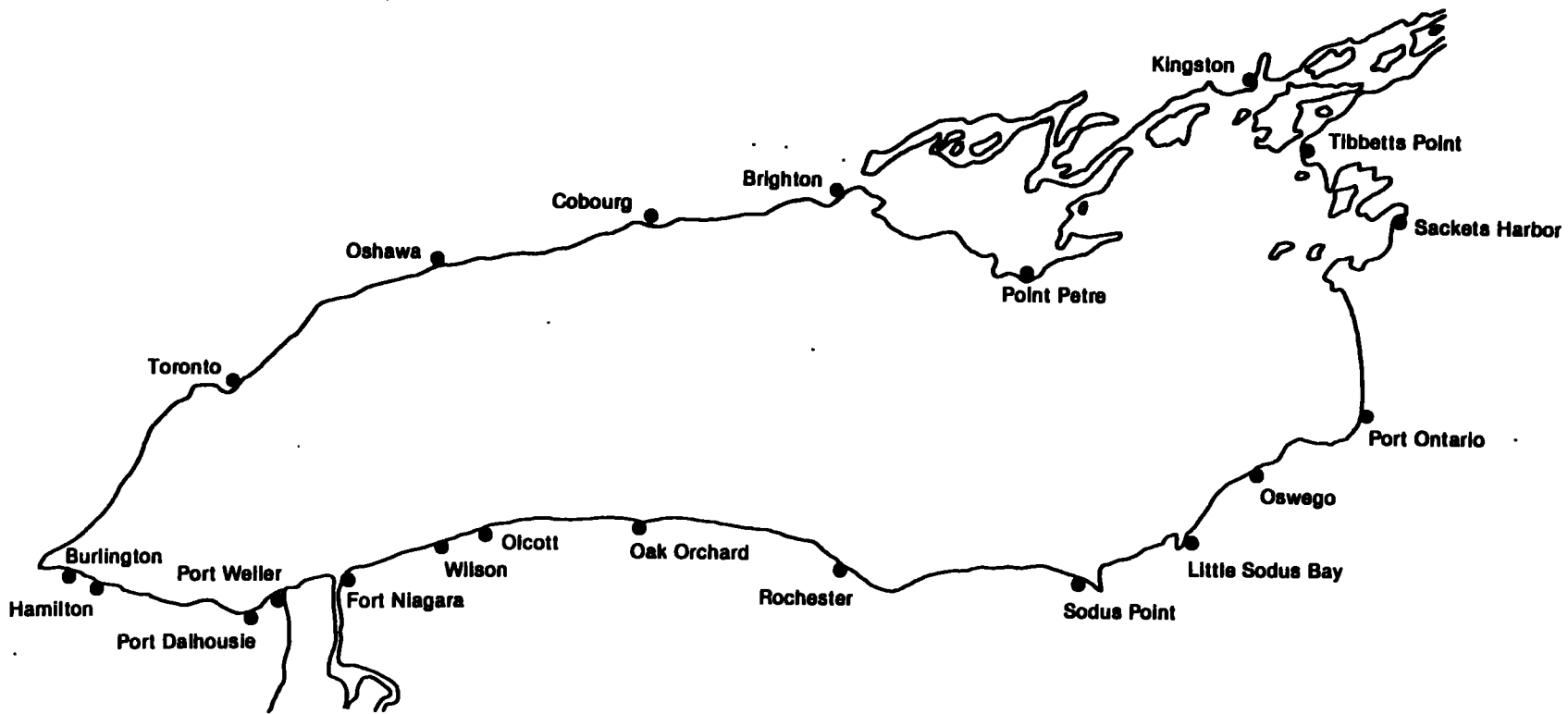
1. A comprehensive statement as to how datums were established.
2. A chronological table listing the period when water level observations were made, the controlling bench mark and its elevation, the type of record, and the abbreviation for the operating agency during each observation period. See Plates for the periods of operation of water level gauging stations. The following agency abbreviations have been used in the text.

C.H.S.	- Canadian Hydrographic Service
D.W.C.	- Deep Waterways Commission
D. of R. and C.	- Department of Railways and Canals
D.O.T.	- Department of Transport
D.P.W.	- Department of Public Works
D.W.P.B.	- Dominion Water and Power Bureau
W.R.B.	- Water Resources Branch
O.P. Co.	- Ontario Power Company
H.E.P.C.O.	- Hydro-Electric Power Commission of Ontario
O.H.E.	- Ontario Hydro-Electric
P.A.S.N.Y.	- Power Authority of the State of New York
Shipldg. Co.	- Kingston Shipbuilding Company
T.H.C.	- Toronto Harbour Commission
L.C.A.	- Lake Carriers Association
U.S.C. & G.S.	- United States Coast and Geodetic Survey
U.S.E.O.	- United States Engineering Office
U.S.L.S.	- United States Lake Survey
N.O.S.	- National Ocean Service

3. Elevation of the controlling bench mark on International Great Lakes Datum, IGLD (1955). Elevations in this publication are shown in the measurement unit accepted during each period of water level observations. The conversion to the equivalent customary or metric unit is shown in parenthesis. National and agency policies in the United States and Canada for conversion to the exclusive use of the metric unit are different. At present, United States policy is to plan increasing use and to coordinate the voluntary conversion to the metric system. Canada policy was to investigate, plan, schedule and implement a metric conversion program to be completed by 1980. This target date was achieved.

4. Description and location of the gauging station sites for which adequate information is available. See Plates 1-4 for general location and Plates 30-165 for detailed location.

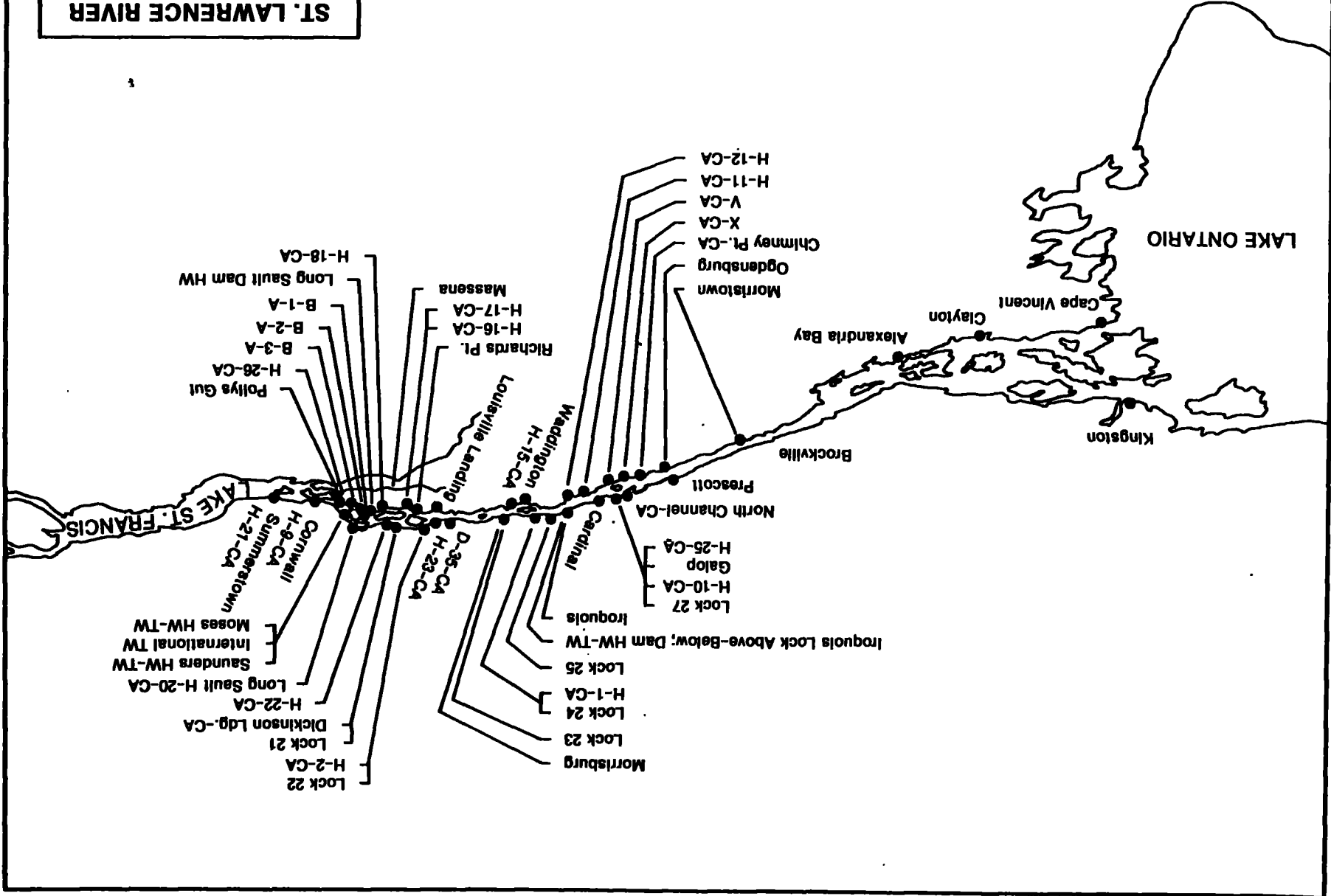
For more detailed information regarding these gauges and their records consult the Canadian Hydrographic Service in Ottawa, Ontario, for gauges in Canada, and the National Ocean Service in Rockville, Maryland, for gauges in the United States.

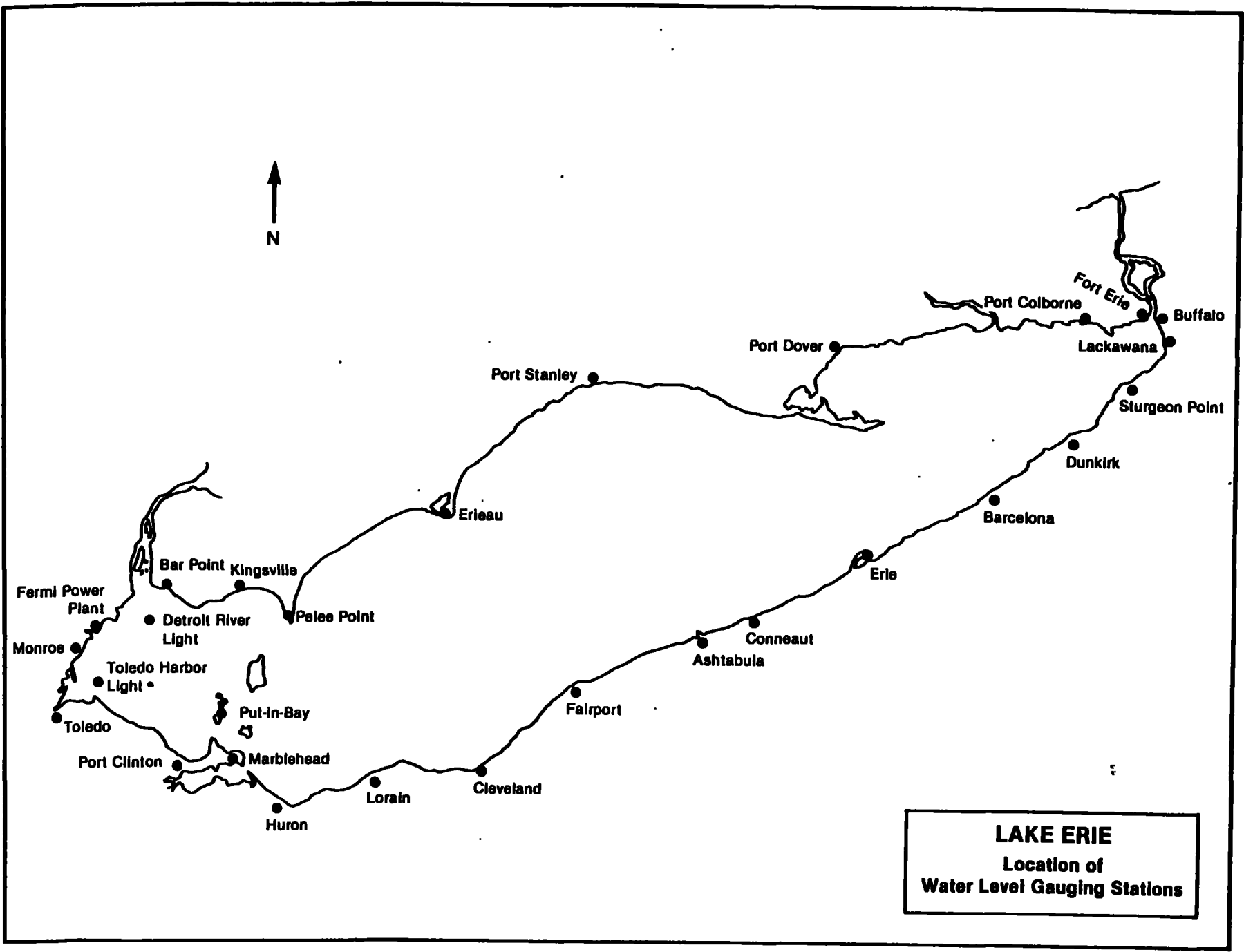


**LAKE ONTARIO**  
Location of  
Water Level Gauging Stations



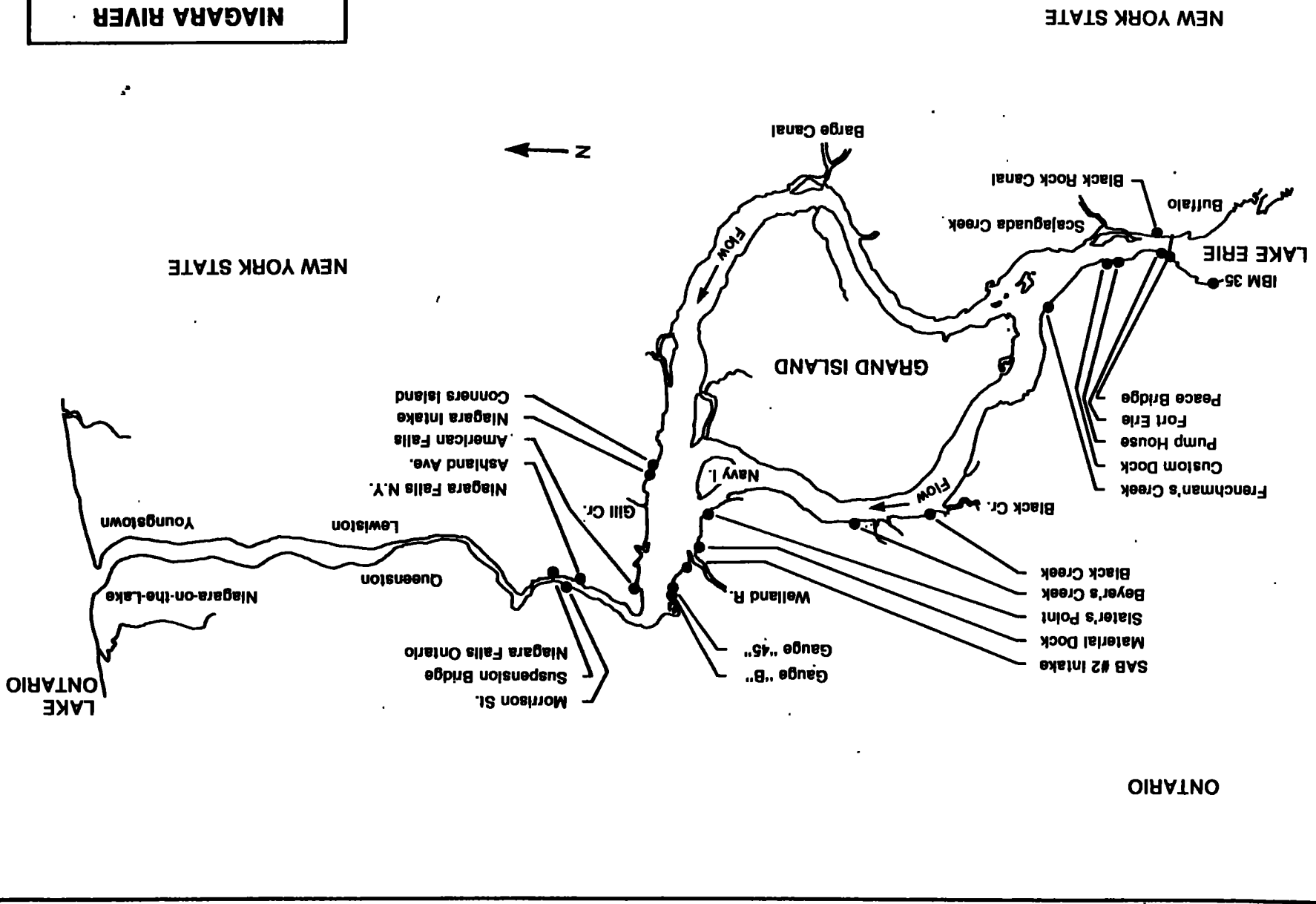
**ST. LAWRENCE RIVER**  
**Location of**  
**Water Level Gauging Stations**





**LAKE ERIE**  
**Location of**  
**Water Level Gauging Stations**

**NIAGARA RIVER**  
**Location of**  
**Water Level Gauging Stations**



NEW YORK STATE

NEW YORK STATE

ONTARIO

LAKE  
 ONTARIO

WATER LEVEL RECORDS PRIOR TO 1860

1815 1820 1825 1830 1835 1840 1845 1850 1855 1860

PORT COLBORNE, ONTARIO

MONROE, MICHIGAN

CLEVELAND, OHIO

ERIE, PENNSYLVANIA

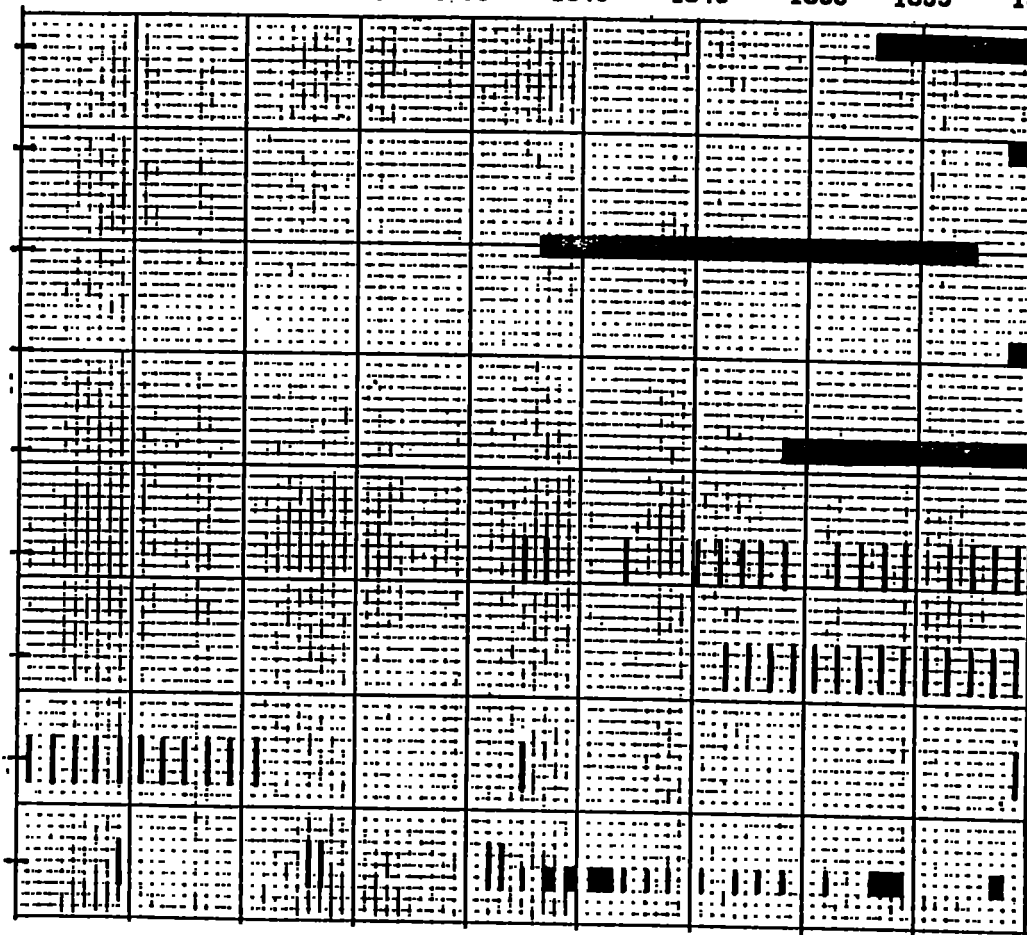
II  
PORT DALHOUSIE, ONTARIO

OSWEGO, NEW YORK

ROCHESTER, NEW YORK

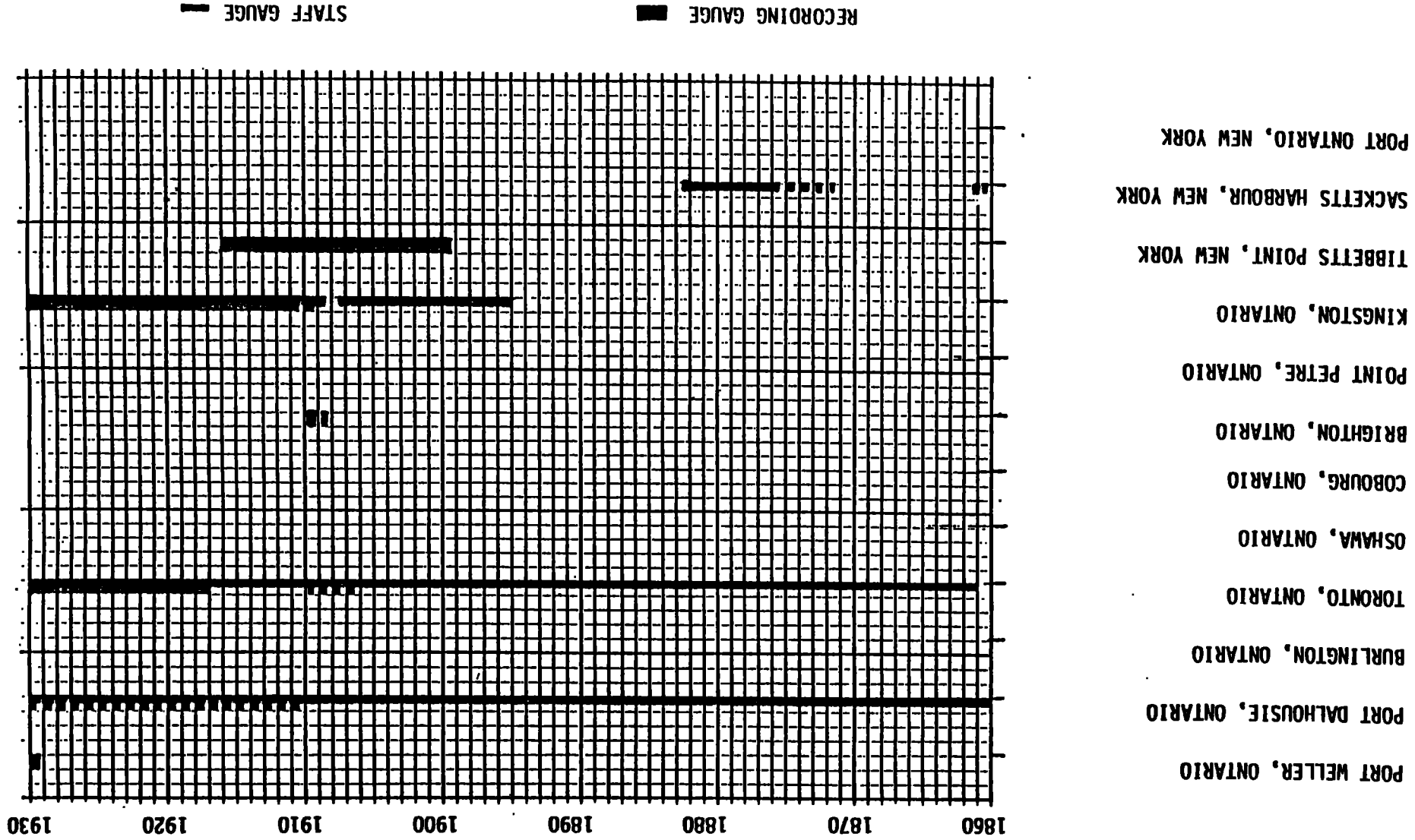
FORT NIAGARA, NEW YORK

BUFFALO, NEW YORK



FEWER THAN ONE READING PER DAY 

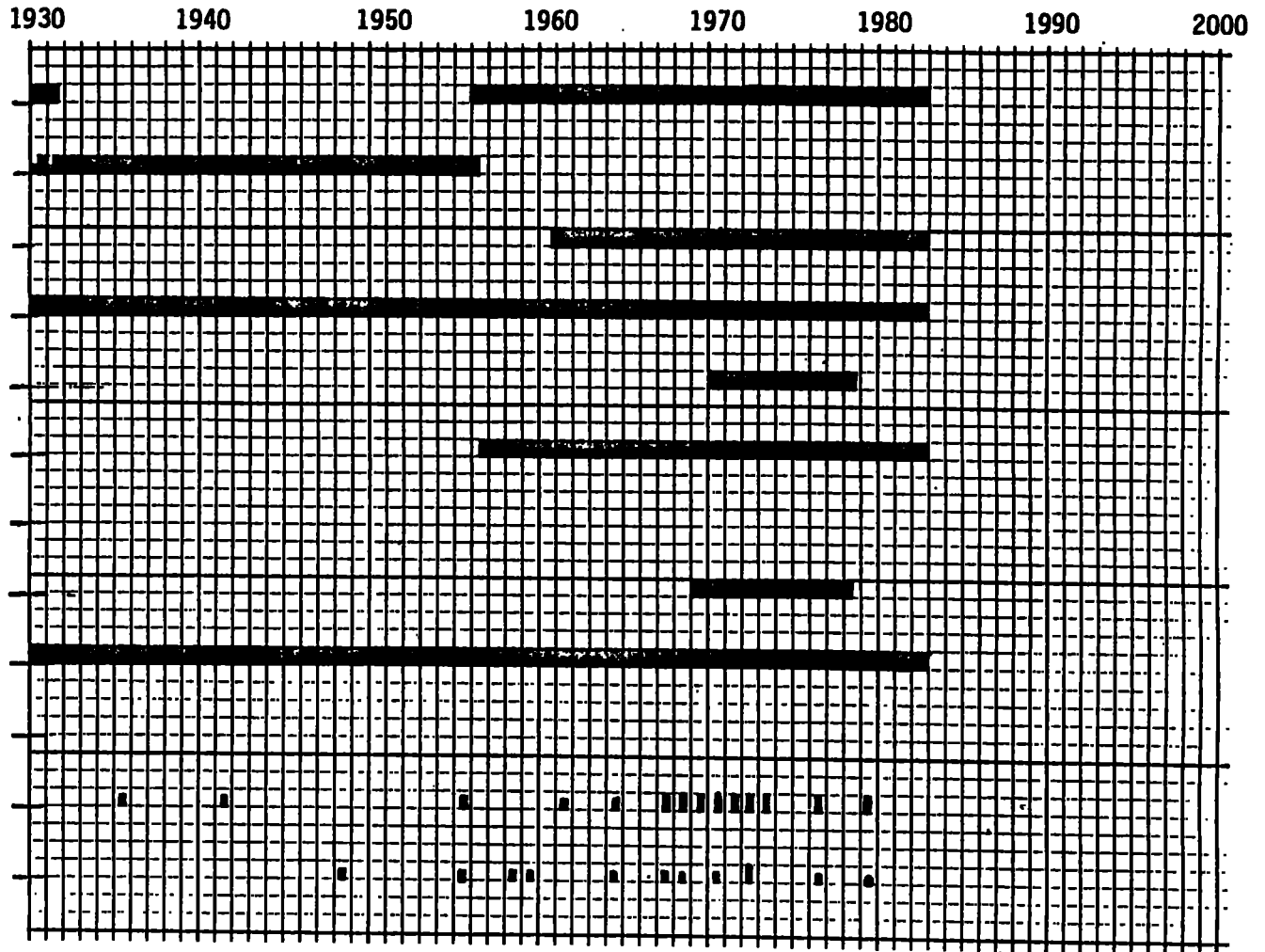
GENERALLY ONE OR MORE READINGS PER DAY 



LAKE ONTARIO  
 WATER LEVEL RECORDS 1860-1930

RECORDING GAUGE ■  
 STAFF GAUGE —

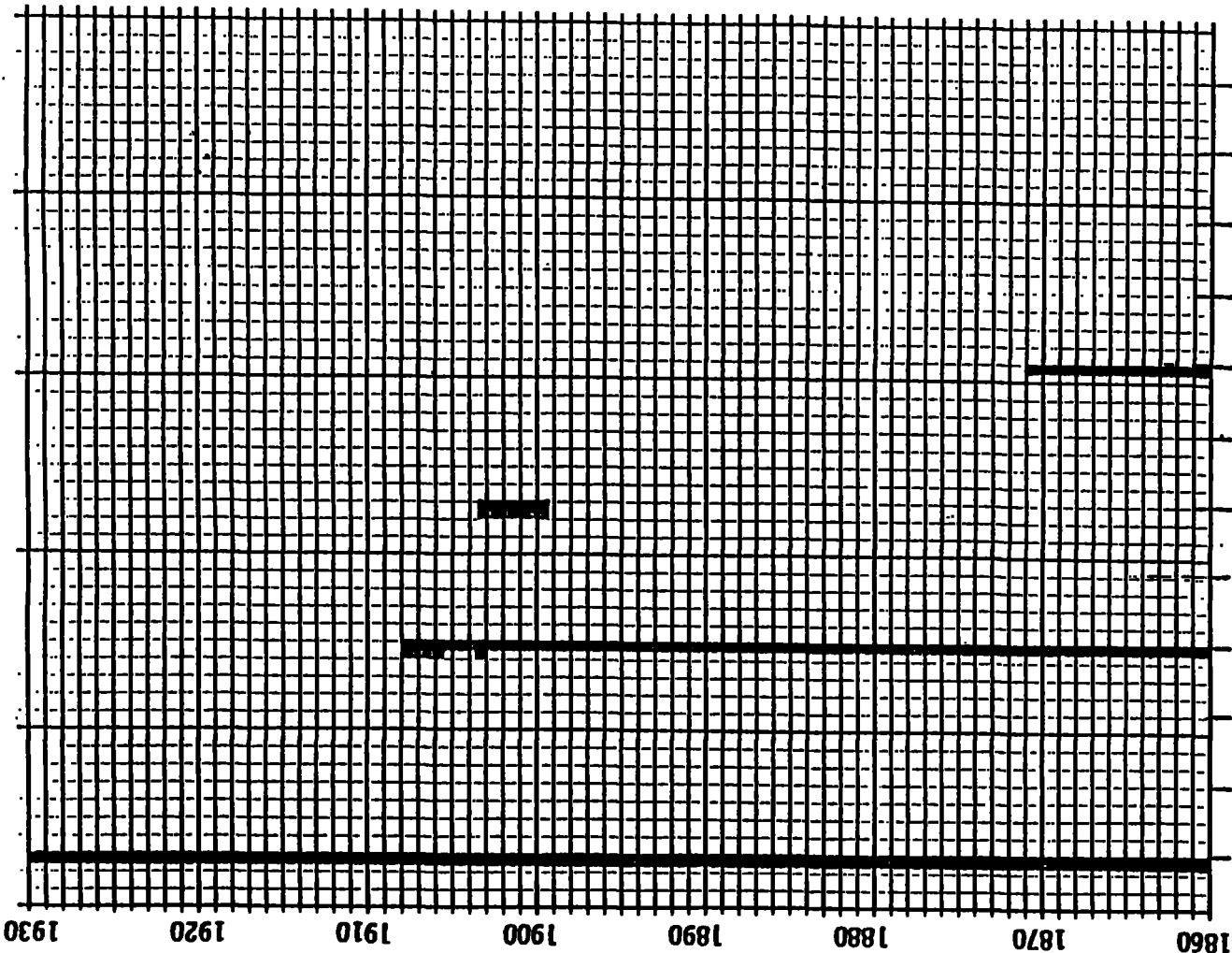
LAKE ONTARIO  
WATER LEVEL RECORDS 1930- TO DATE



RECORDING GAUGE

STAFF GAUGE

13



WATER LEVEL RECORDS 1860-1930

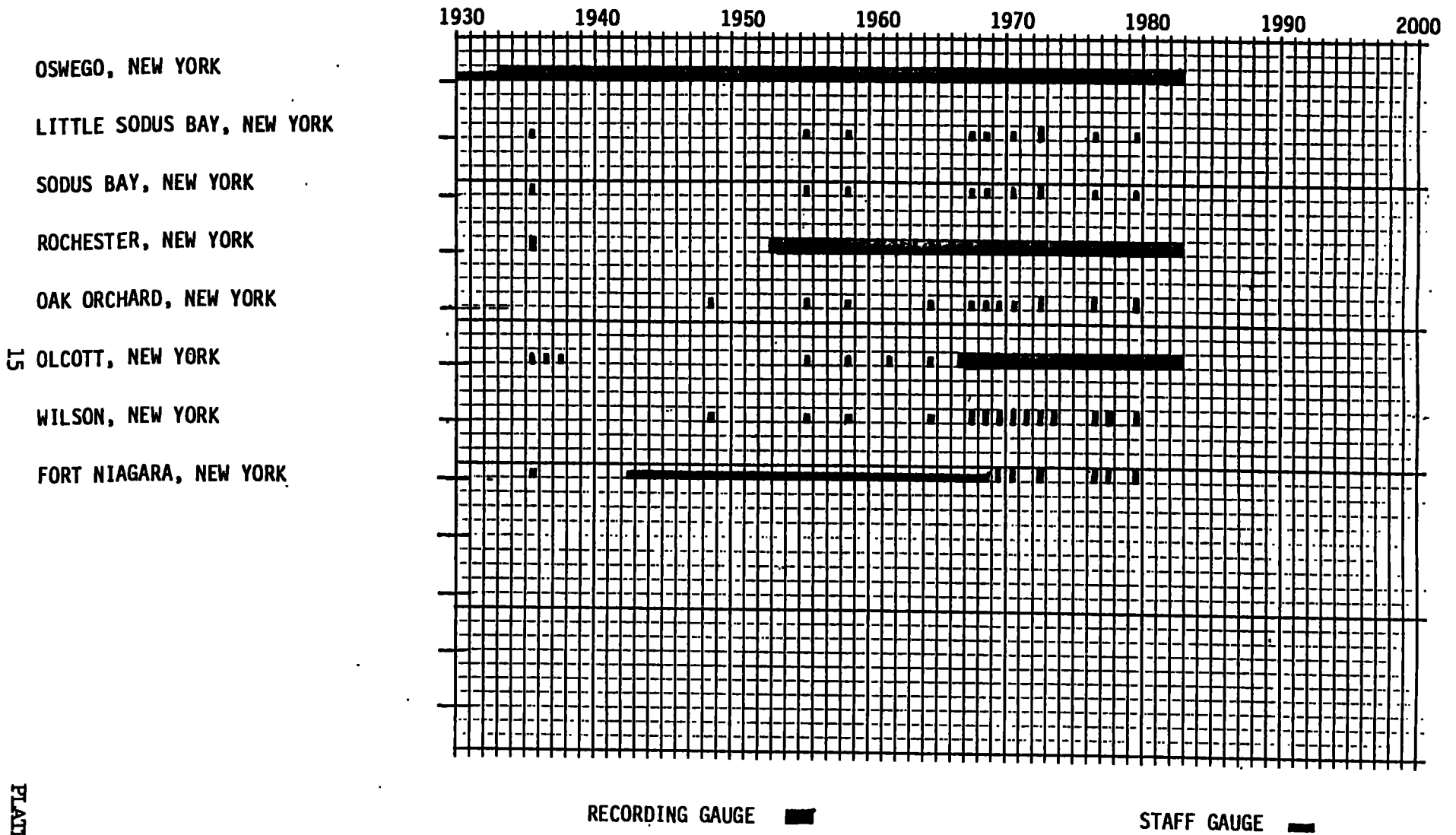
LAKE ONTARIO

STAFF GAUGE

RECORDING GAUGE

OSWEGO, NEW YORK  
 LITTLE SODUS BAY, NEW YORK  
 SODUS BAY, NEW YORK  
 ROCHESTER, NEW YORK  
 OAK ORCHARD, NEW YORK  
 OLCOTT, NEW YORK  
 WILSON, NEW YORK  
 FORT NIAGARA, NEW YORK

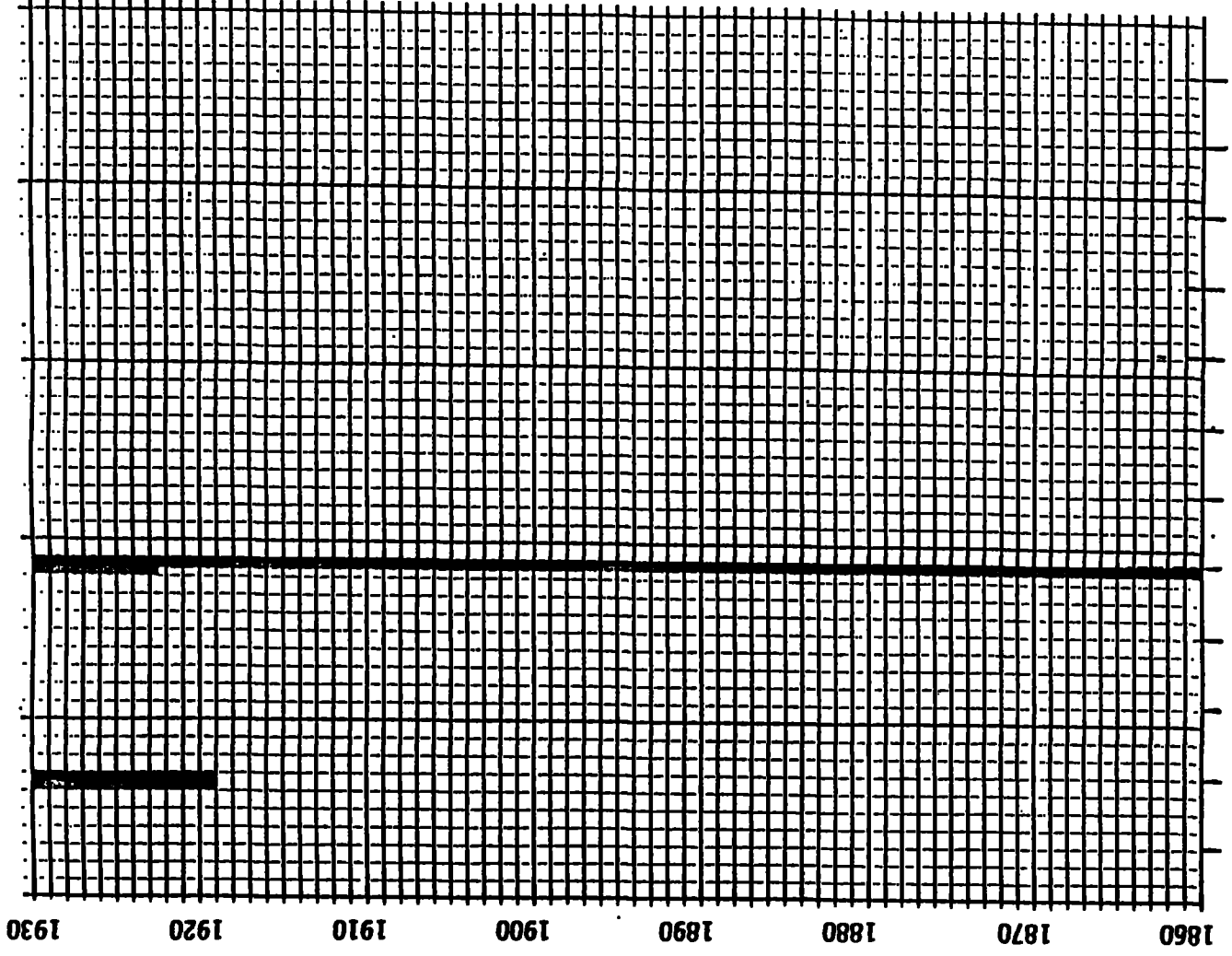
**LAKE ONTARIO**  
**WATER LEVEL RECORDS 1930- TO DATE**





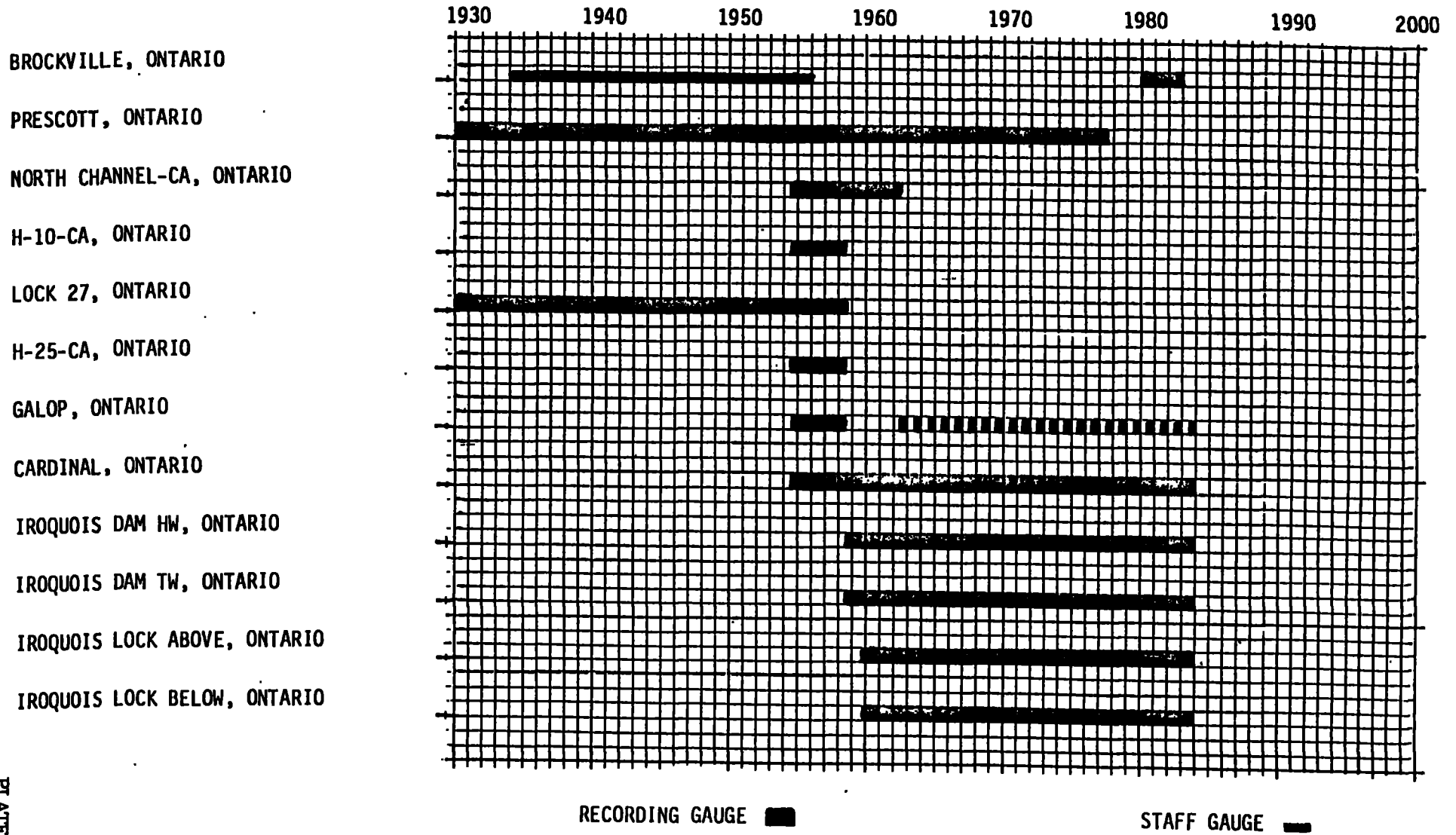
ST. LAWRENCE RIVER

WATER LEVEL RECORDS 1860-1930



- BROCKVILLE, ONTARIO
- PRESCOTT, ONTARIO
- NORTH CHANNEL-CA, ONTARIO
- H-10-CA, ONTARIO
- LOCK 27, ONTARIO
- H-25-CA, ONTARIO
- GALOP, ONTARIO
- CARDINAL, ONTARIO
- IROQUOIS DAM HM, ONTARIO
- IROQUOIS DAM TM, ONTARIO
- IROQUOIS LOCK ABOVE, ONTARIO
- IROQUOIS LOCK BELOW, ONTARIO

**ST. LAWRENCE RIVER**  
**WATER LEVEL RECORDS 1930 - TO DATE**



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