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# **GREAT LAKES WATER LEVELS**

## **History of Water Level Gauges**

### **Upper Great Lakes and the St. Clair - Detroit Rivers**

**The Coordinating Committee on  
Great Lakes Basic Hydraulic and Hydrologic Data**

**January 1978**

**History of Water Level Gauges**  
**Upper Great Lakes**  
**and**  
**the St. Clair - Detroit Rivers**

HISTORY OF WATER LEVEL GAUGES

UPPER GREAT LAKES

AND

THE ST. CLAIR-DETROIT RIVERS

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# HISTORY OF WATER LEVEL GAUGES

## UPPER GREAT LAKES

### AND

## THE ST. CLAIR-DETROIT RIVER

### INTRODUCTION

1. 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 half way 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.

2. 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.

3. 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 nego-

tiations culminated in a meeting of representatives of the interested agencies at Ottawa on 7 May 1953.

4. 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 STATES

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  
Environmental Management Service  
Ontario Region, Environment Canada  
Chairman

W. D. Forrester  
Ocean and Aquatic Sciences  
Environment Canada

P. P. Yee  
Environmental Management Service  
Ontario Region, Environment Canada  
Secretary

UNITED STATES

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

C. I. Thurlow  
National Oceanic and Atmospheric  
Administration  
Department of Commerce

B. G. DeCooke  
Corps of Engineers  
Department of the Army  
Secretary



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

5. 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. Murakami  
M. H. Quast  
B. J. Tait

UNITED STATES

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

6. Authority. The Committee instructed its Vertical Control-Water Levels Subcommittee to prepare a report in detail on all gauges used in obtaining water levels of Lakes Superior, Michigan and Huron and their outflow channels.

7. Purpose and Scope. The purpose of this report is to document the history of the operation of water level gauges on the upper three Great Lakes and their outflow rivers. Detailed information about the water levels available is given for each gauging station. Information on the histories of water levels gauges on the lower part of the system are available in two other volumes published earlier by the Coordinating Committee.

8. Acknowledgments. The Coordinating Committee acknowledges and expresses its appreciation of the cooperation received from the Canadian Hydrographic Service and the Water Survey of Canada, Department of the Environment; the Detroit District, U. S. Army Corps of Engineers and the National Ocean Survey, 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, James S. Moore and Leonard T. Schutze are gratefully acknowledged by the Committee in researching and compiling the information in this report.

#### PRESENTATION OF DATA

9. 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 upper Great Lakes, Lake St. Clair and the St. Clair and Detroit Rivers for various periods of time up through December 1976. For each station the following data are given:

a. A comprehensive statement as to how datums were established.

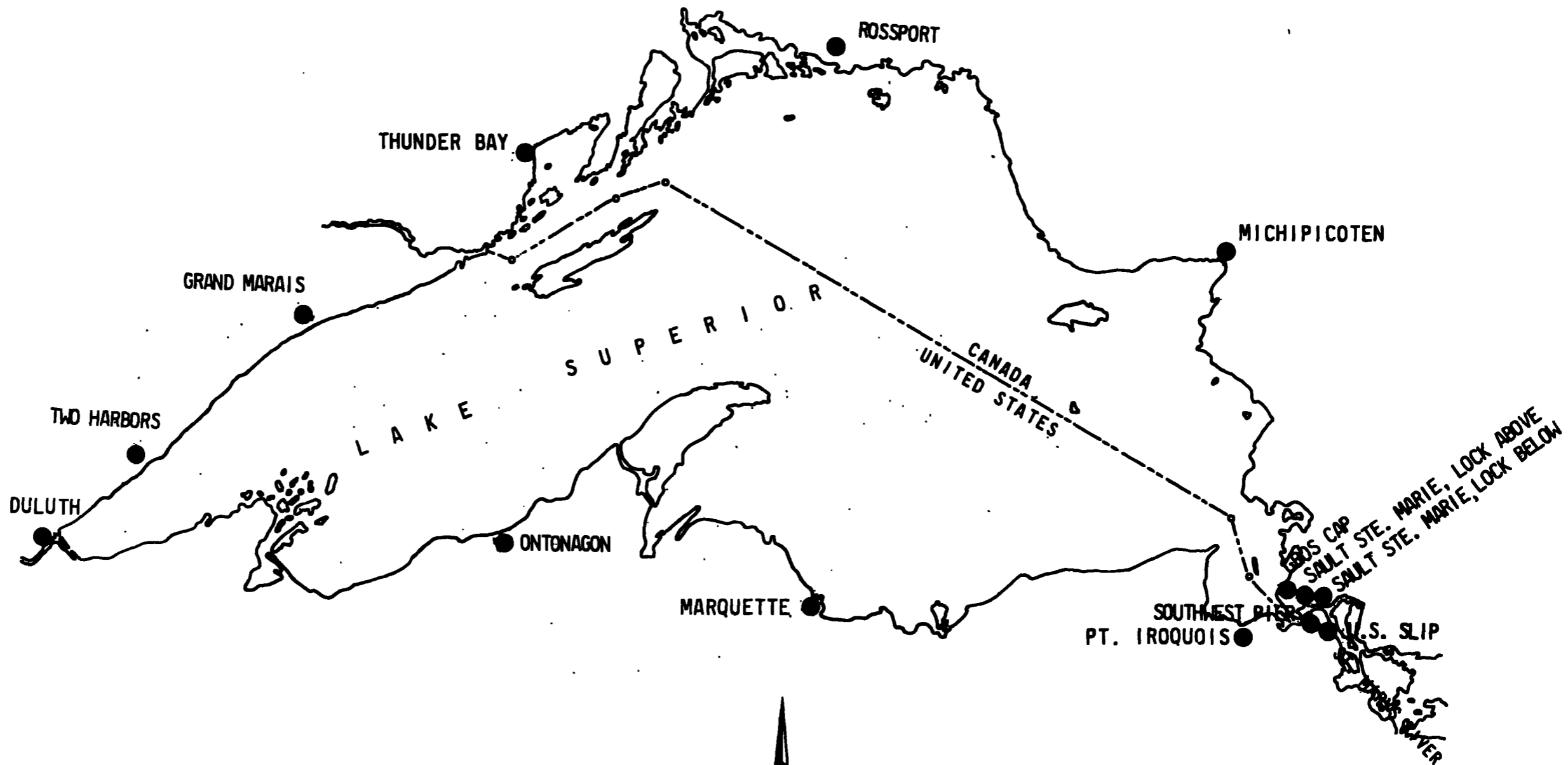
b. A chronological table listing the period when water level observations were made, the controlling bench mark and its elevation, the type of record, and the operating agency. See Plates 4-6 for the periods of operation of water level gauging stations. The following agency abbreviations have been used:

C. H. S.	- Canadian Hydrographic Service
D. of R. and C.	- Department of Railways and Canals
U. S. E. O.	- United States Engineering Office (Corps of Engineers)
U. S. L. S.	- United States Lake Survey (Since 1970 the National Ocean Survey)
N. O. S.	- National Ocean Survey

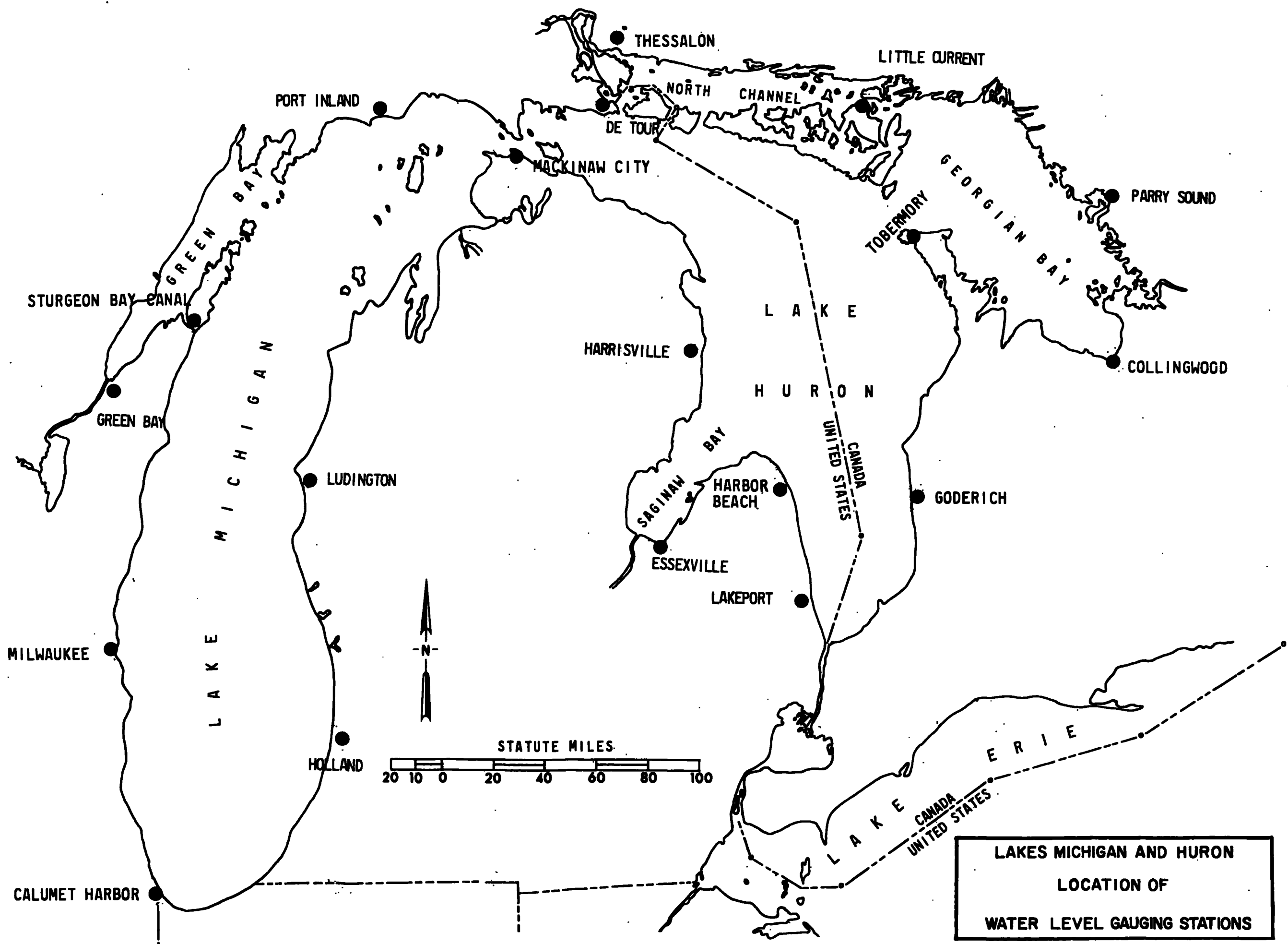
c. Elevation of the controlling bench mark, the International Great Lakes Datum, IGLD (1955).

d. Description and location of the gauging station sites for which adequate information is available. See Plates 1-3 for general location and Plates 7-45 for detailed location.

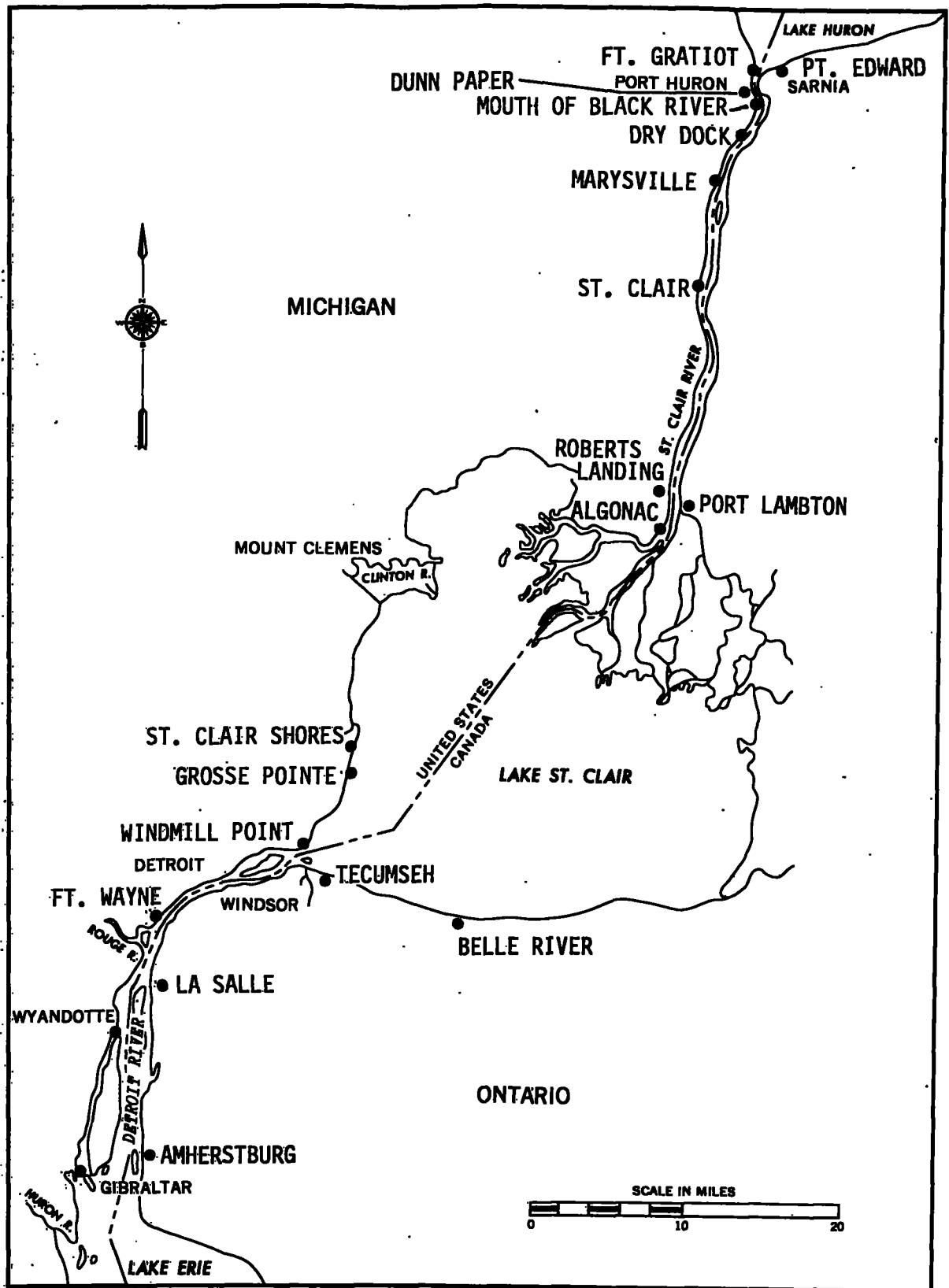
10. For more detailed information regarding these gauges and their records consult the Canadian Hydrographic Service in Ottawa, Ontario, for gauges in Canada, and the National Ocean Survey in Rockville, Maryland, for gauges in the United States.



LAKE SUPERIOR & ST. MARYS RIVER  
 LOCATION  
 OF  
 WATER LEVEL GAUGING STATIONS



**LAKES MICHIGAN AND HURON  
 LOCATION OF  
 WATER LEVEL GAUGING STATIONS**



**ST. CLAIR - DETROIT RIVERS  
LOCATION OF  
WATER LEVEL GAUGING STATIONS**

# WATER LEVEL RECORDS PRIOR TO 1860

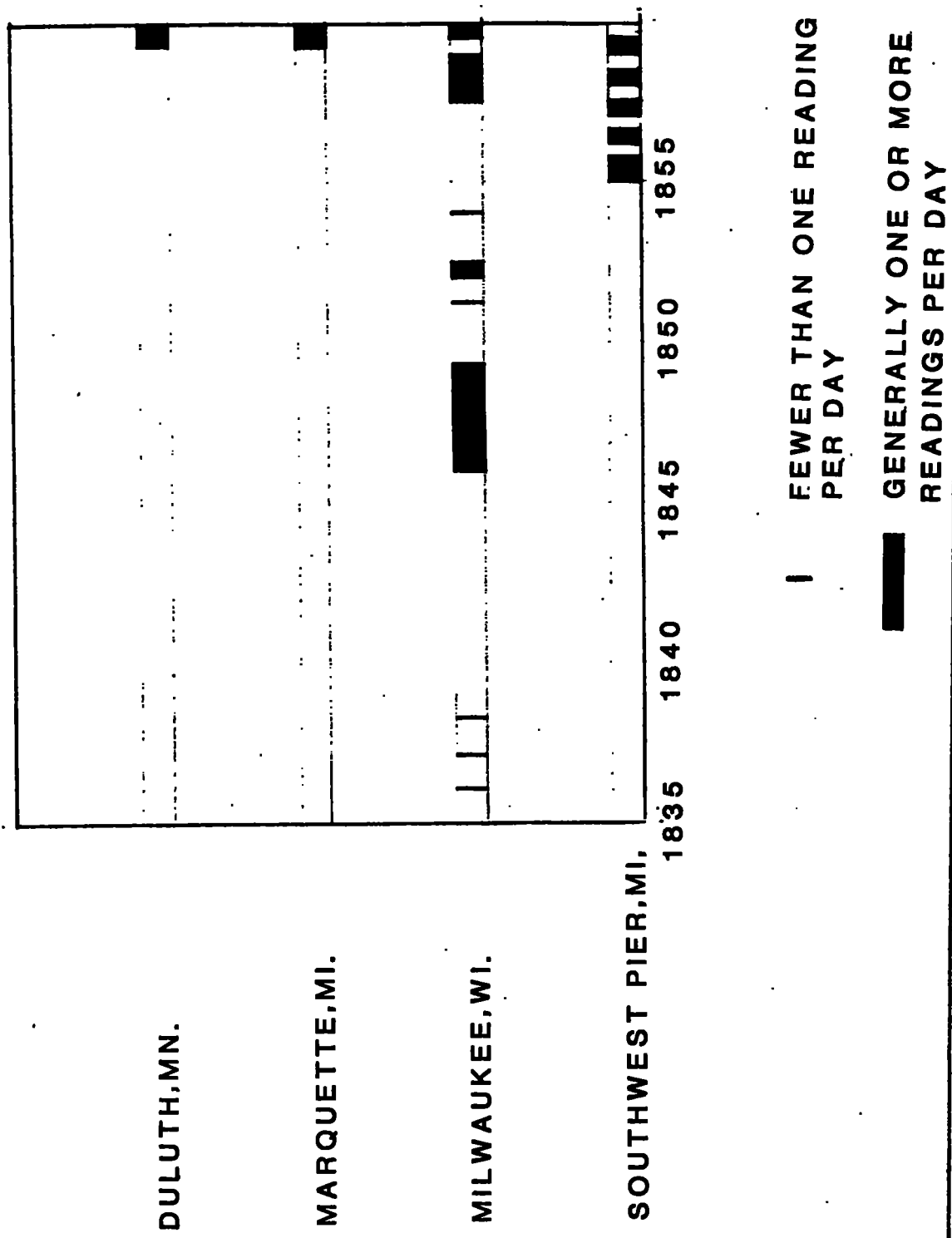
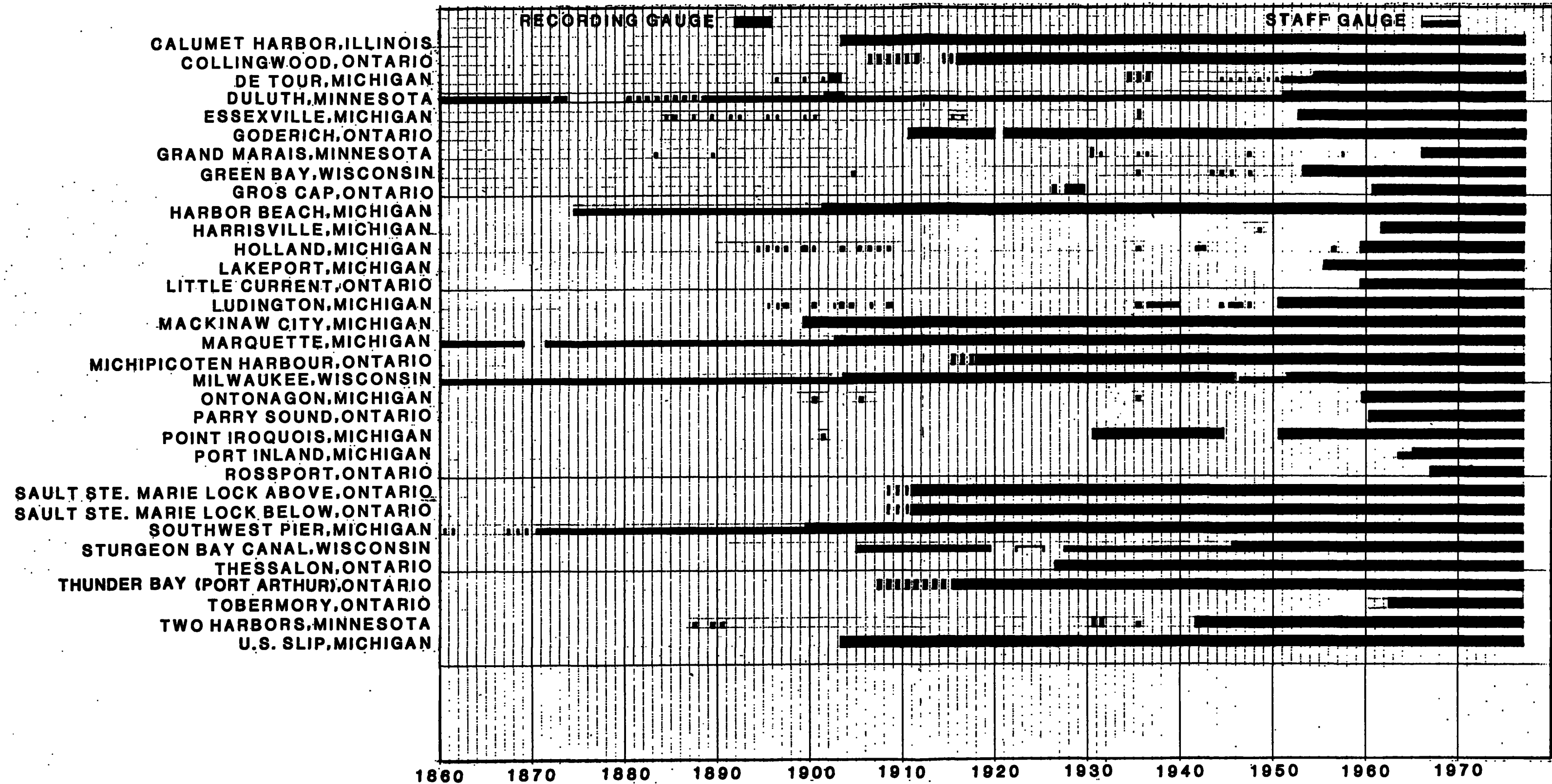
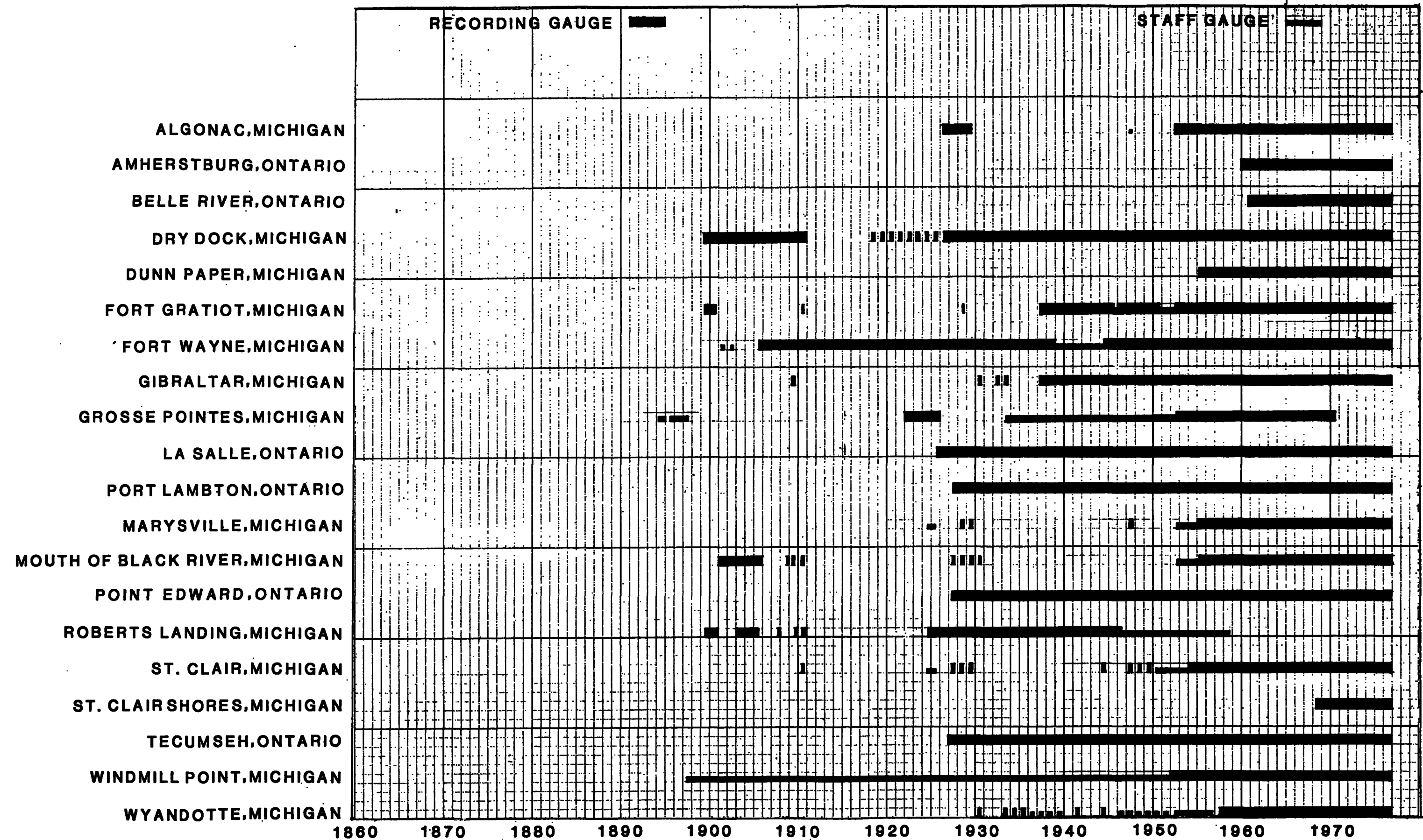


PLATE 41

# UPPER GREAT LAKES WATER LEVEL RECORDS 1860 - DATE



# ST. CLAIR-DETROIT RIVERS WATER LEVEL RECORDS 1860 - DATE





## GAUGE HISTORY

### Gros Cap, Ontario

11. Elevations on 1903 Datum at Gros Cap were obtained by comparison of float gauge readings with water surface elevations at Marquette, Michigan 1926 - 1927, Port Arthur, Ontario, 1926 - 1928, and at Michipicoten Harbour, Ontario 1926 - 1928. The 1903 Datum elevation for B.M. "1632" at Gros Cap is 619.780 feet and depends on B.M. "NO. 6" at Marquette as being 628.414 feet and B.M. "STEEL RIVET" at Port Arthur as being 616.154 feet and B.M. "CONCRETE" at Michipicoten as being 626.352 feet on 1903 Datum. IGLD (1955) elevations at Gros Cap depend on B.M. "1632" at elevation 618.012 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955), prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jul 1926 - Oct 1926	1632	618.012	Recording Gauge, Hourly Scalings	C.H.S.
Jun 1927 - Oct 1929	1632	618.012	Recording Gauge, Hourly Scalings	C.H.S.
Dec 1960 - Date	1632	618.012	Recording Gauge, Hourly Scalings	C.H.S.

NOTE: Prior to 1975 recording gauges with analog records were used; after 1975 a recording gauge with digital output every 15 minutes has been added.

### 12. Gauging Station Sites (see Plate 7 , page 13 ):

(a) July 1926 - October 1929: Recording gauges located on east side of second last outer pier of old wharf at end of the lower road leading to fishermen's homes at Gros Cap, Ontario.

(b) December 1960 - February 1963: Recording gauges located in gauge house at shore end of new wharf at Gros Cap. Stilling pipe located on the wharf approximately 50 feet from outside end.

(c) April 1963 - Date: Recording gauges located in gauge house at the end of Highway 550, quarter mile west of new wharf at Gros Cap.

## GAUGE HISTORY

### Point Iroquois, Michigan

13. Elevations at Point Iroquois on 1903 Datum depend on B.M. "IROQUOIS LIGHTHOUSE" at elevation 622.033 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at Point Iroquois on 1935 Datum were established by precise levels from De Tour, Michigan. The 1935 Datum elevation of B.M. "IROQUOIS LIGHTHOUSE" at Point Iroquois is 622.249 feet and depends on the elevation of B.M. "TERRETT" at De Tour as being 599.758 feet on 1935 Datum. IGLD (1955) elevations at Point Iroquois depend on B.M. "IROQUOIS LIGHTHOUSE" at elevation 620.623 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

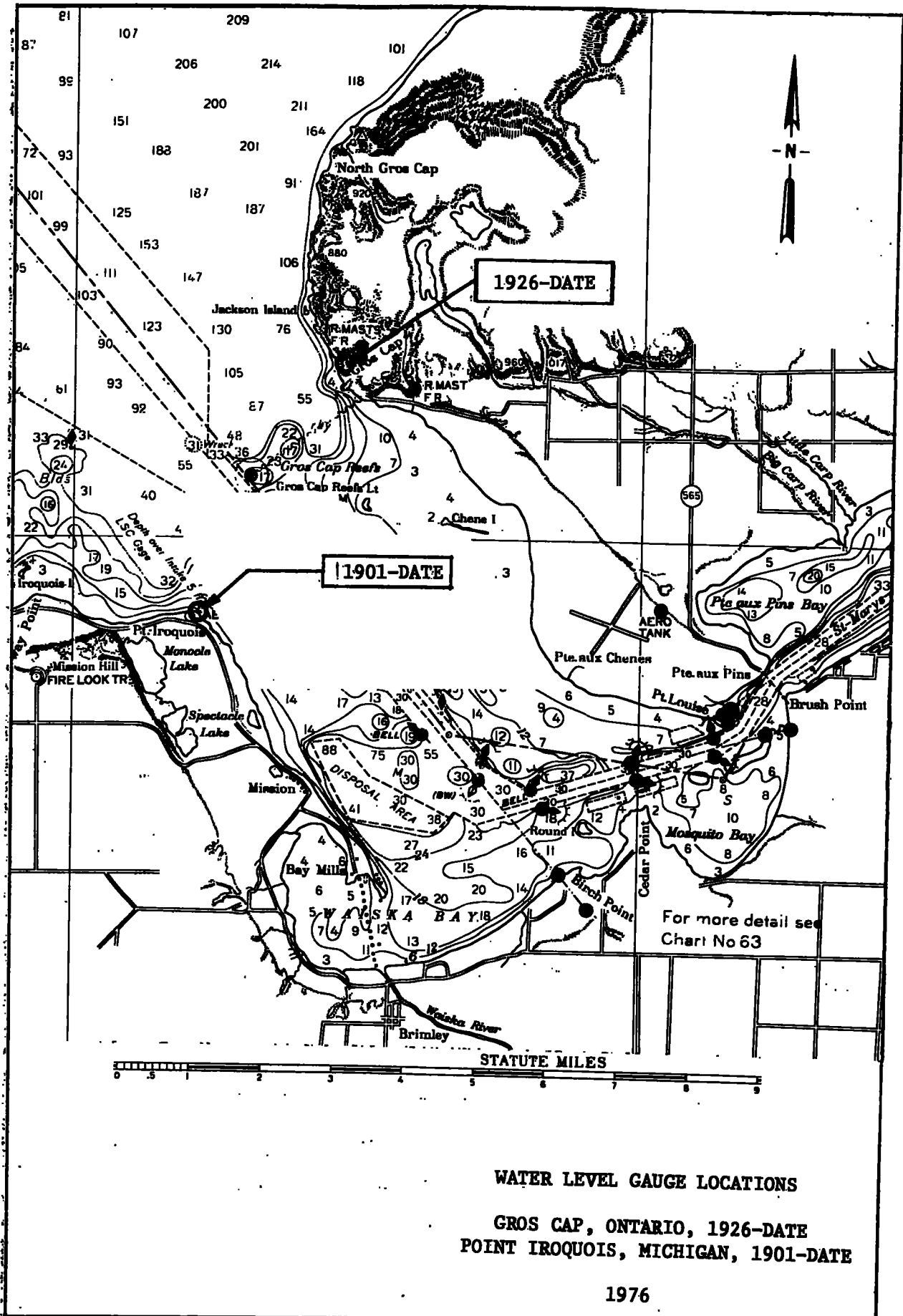
PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jul 1901 - Oct 1901	Iroquois LH	620.623	Staff Gauge, 6 Times per Hour	U.S.E.O.
Oct 1930 - Sep 1944	Iroquois LH	620.623	Recording Gauge, Hourly Readings	U.S.L.S.
Nov 1950 - Oct 1970	Iroquois LH	620.623	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Date	Iroquois LH	620.623	Recording Gauge, Hourly Readings	N.O.S.

NOTE: Gauge read at ten-minute intervals during work hours between 15 July and 12 October 1901. Recording gauges had analog records before June 1968 and punched tape records since that time. Telemetering service at Point Iroquois was started 31 October 1973.

#### 14. Gauging Station Sites (See Plate 7, page 13):

(a) July 1901 - October 1901: Staff gauge located on a small dock northeast of the lighthouse at Point Iroquois.

(b) October 1930 - Date: Recording gauges located about 100 feet east of the 1901 site at Point Iroquois.



WATER LEVEL GAUGE LOCATIONS  
 GROS CAP, ONTARIO, 1926-DATE  
 POINT IROQUOIS, MICHIGAN, 1901-DATE

1976

## GAUGE HISTORY

### Michipicoten Harbour, Ontario

15. Elevations at Michipicoten Harbour on 1903 Datum were obtained by comparison of float gauge readings with water surface elevations at Port Arthur 1915 - 1917. The 1903 Datum elevation for B.M. "CONCRETE" at Michipicoten Harbour is 626.352 feet and depends on B.M. "STEEL RIVET" at Port Arthur as being 616.154 feet on 1903 Datum. The IGLD (1955) elevations at Michipicoten Harbour depend on B.M. "698" at elevation 626.329 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

CHRONOLOGICAL TABLE

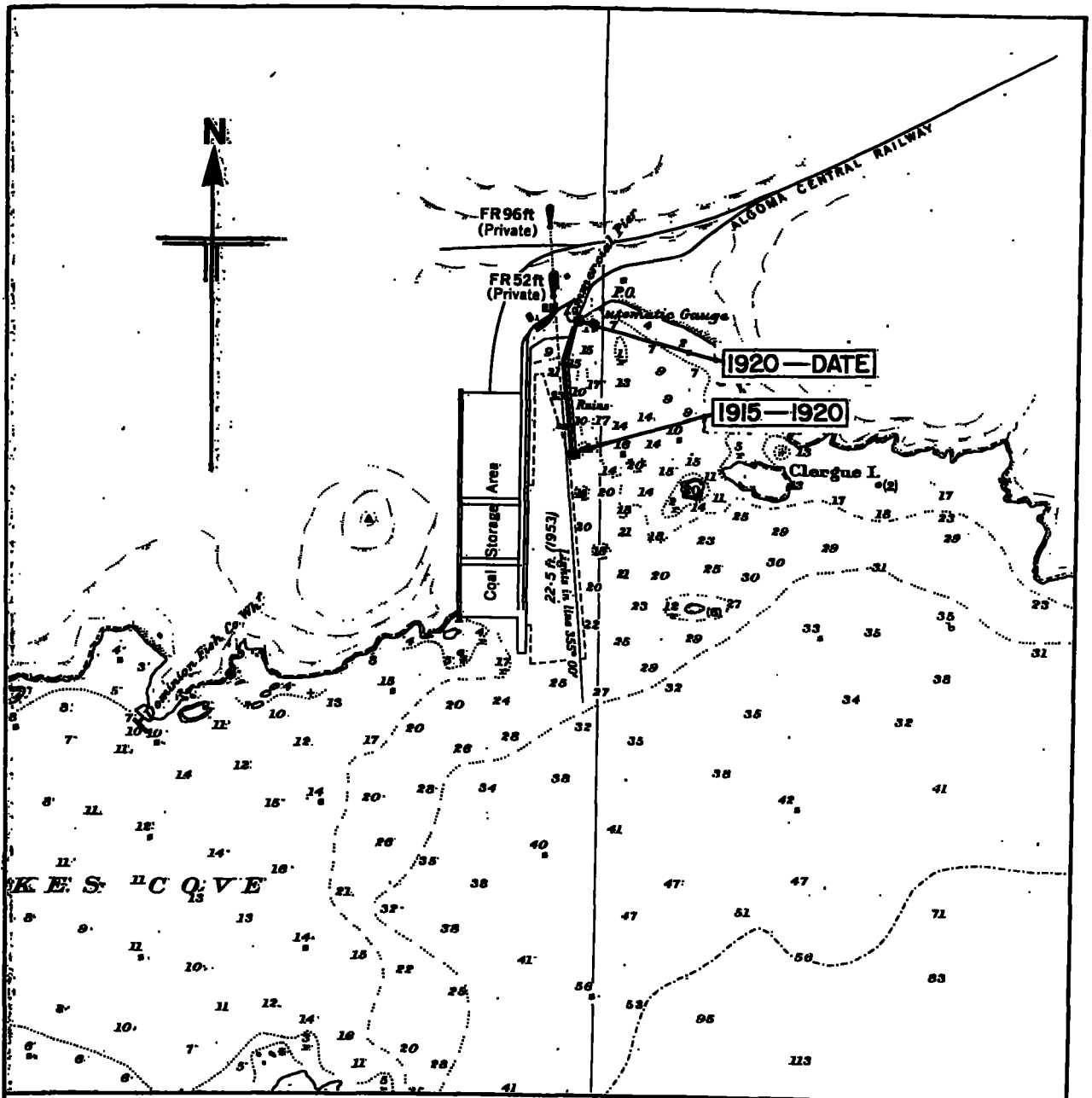
PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jun 1915 - Nov 1917	Concrete	624.788	Recording Gauge, Hourly Scalings	C.H.S.
Jan 1918 - Dec 1946	Concrete	624.788	Recording Gauge, Hourly Scalings	C.H.S.
Jan 1947 - Date	698	626.329	Recording Gauge, Hourly Scalings	C.H.S.

NOTE: Gauge before 1918 operated in summer months only. Prior to 1975 recording gauges with analog records were used; after 1975 a tel-announcing instrument and a telemetering recorder gauge with digital output every hour have been added.

### 16. Gauging Station Sites (see Plate 8, page 15 ):

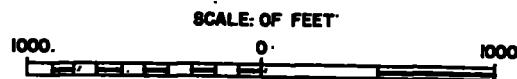
(a) June 1915 - September 1920: Recording gauges located at the outer end of Algoma Central Railway commercial wharf at Michipicoten Harbour, Ontario.

(b) October 1920 - Date: Recording gauges located over a well in the embankment on the east side of the approach to the Algoma Central Railway commercial wharf.



WATER LEVEL GAUGE LOCATION  
 MICHIPICOTEN HARBOUR, ONTARIO  
 1915—DATE

1976



## GAUGE HISTORY

### Rosspport, Ontario

17. IGLD (1955) elevations\* at Rosspport depend on B.M. "768" at elevation 660.380 feet as published in Appendix A, Establishment of Internation Great Lake Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

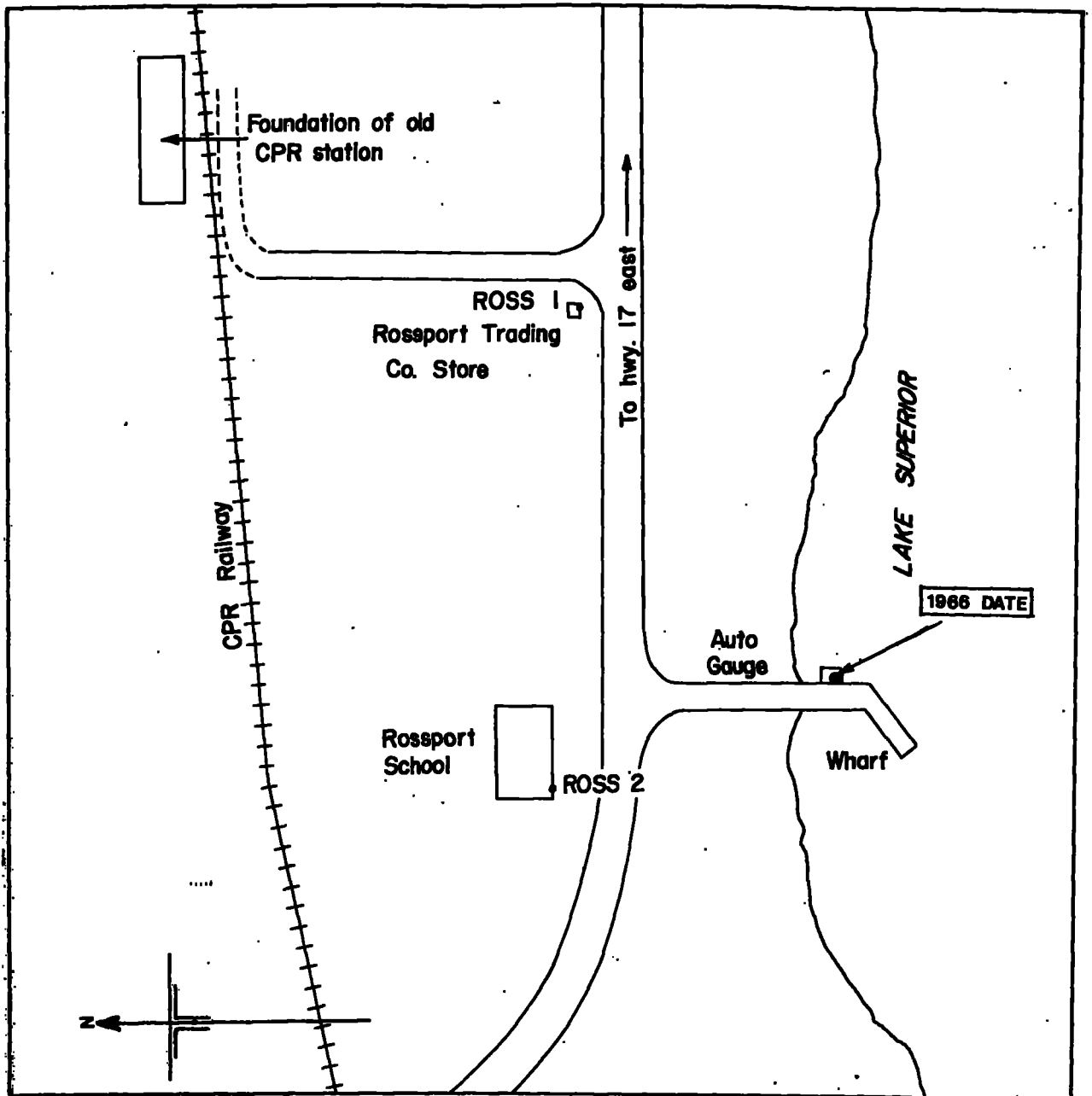
PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Dec 1966 - Date	768	660.380	Recording Gauge, Hourly Scalings	C.H.S.

NOTE: Prior to 1975 recording gauge with analog records were used; after 1975 a recording gauge with digital output every 15 minutes has been added.

### 18. Gauging Station Site (see Plate 9 , page 17 ):

(a) December 1966 - Date: Recording gauges located on public wharf at Rosspport, Ontario.

\*1903 and 1935 Datums were never established at Rosspport.



**WATER LEVEL GAUGE LOCATION**

**ROSSPORT, ONTARIO**

1966—DATE

1978

NOT TO SCALE

## GAUGE HISTORY

### Thunder Bay (formerly Port Arthur), Ontario

19. Elevations at Thunder Bay on 1903 Datum were obtained by comparison of float gauge readings with water surface elevation at Marquette, Michigan from 1907 - 1914. The 1903 Datum elevation for B.M. "STEEL RIVET" at Thunder Bay is 616.154 feet and depends on B.M. "NO. 6" at Marquette, Michigan as being 628.414 feet. IGLD (1955) elevations at Thunder Bay depend on B.M. "STEEL RIVET" at elevation 614.492 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### C H R O N O L O G I C A L   T A B L E

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jun 1907 - Oct 1921	Steel Rivet	614.492	Recording Gauge, Hourly Scalings	C.H.S.
Nov 1921 - Jun 1922	Steel Rivet	614.492	Recording Gauge, Hourly Scalings	C.H.S.
Jul 1922 - Apr 1967	Steel Rivet	614.492	Recording Gauge, Hourly Scalings	C.H.S.
May 1967 - Date	347E	607.098	Recording Gauge, Hourly Scalings	C.H.S.

NOTE: Gauge before 1915 operated only in summer months. Prior to 1975 recording gauges with analog records were used; after 1975 a tel-announcer instrument and a telemetering recorder gauge with digital output every hour have been added.

### 20. Gauging Station Sites (see Plate 10 , page 20 ):

(a) June 1907 - June 1913: Recording gauges located at shore end of the Canadian Pacific Railway freight pier south of Canadian Pacific Railway Station at Thunder Bay, Ontario.

(b) June 1913 - November 1914: Recording gauges located behind Department of Public Works boathouse, at the shore end of the Canadian National Railway steel dock.

(c) November 1914 - September 1929: Recording gauges located in front of the Canadian National Railway grain elevator.

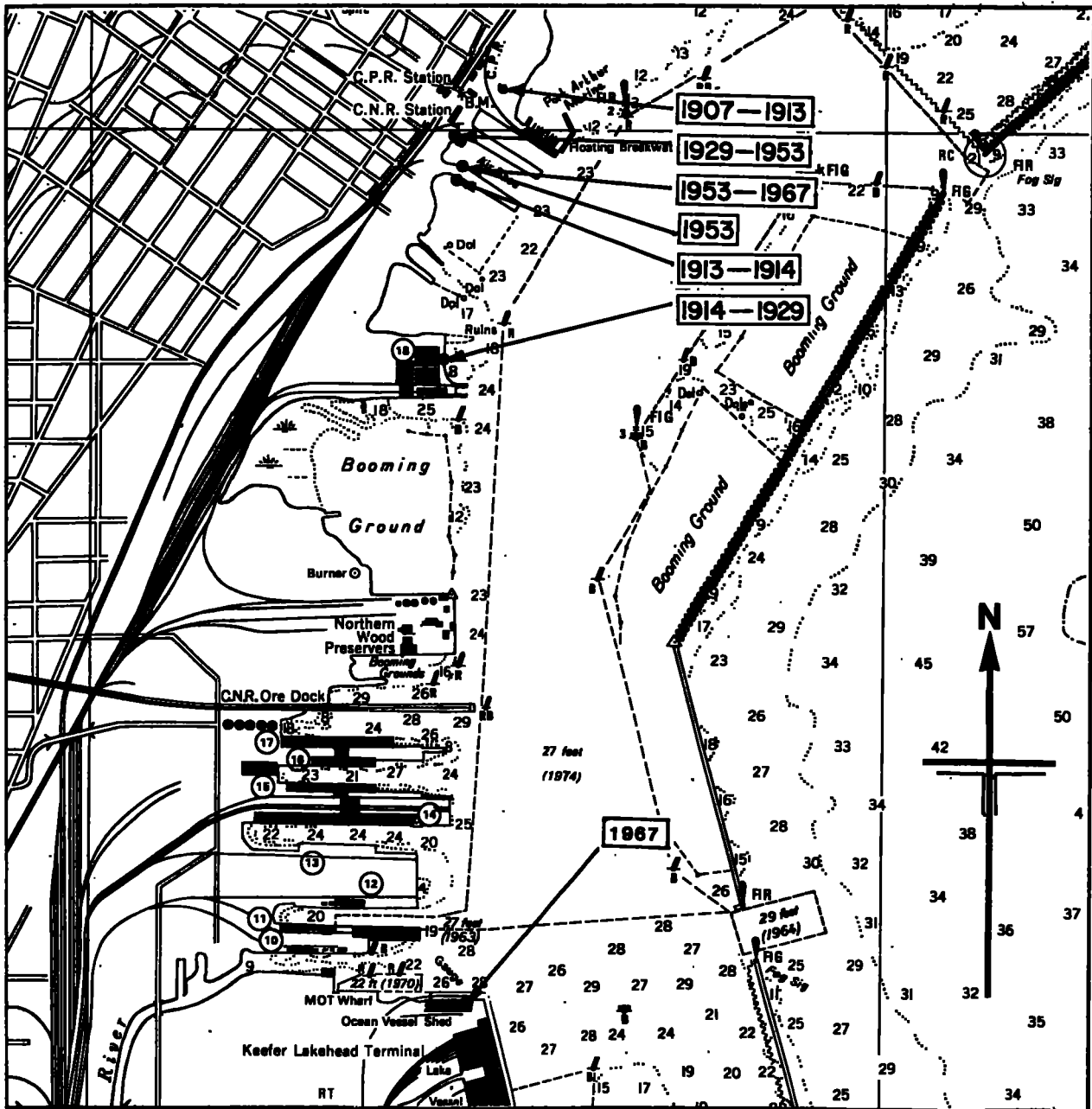
(d) September 1929 - May 1953: Recording gauges located in Department of Public Works boathouse, at the shore end of steamer slip between the Canadian National Railway station and Sailors' Institute.

(e) May 1953 - October 1953: Recording gauges located in the shed on the west end of the Canadian National Railway Dock No. 3.



(f) October 1953 - May 1967: Recording gauges located in the Department of Public Works boathouse at the shore end of the steamer slip between the Canadian National Railway Station and the Sailors' Institute.

(g) May 1967 - Date: Recording gauges located in the Keefe Lakehead Terminal Building in the northeast corner of the North Warehouse.



WATER LEVEL GAUGE LOCATION  
 THUNDER BAY (PORT ARTHUR), ONTARIO  
 1967—DATE

1976



## GAUGE HISTORY

### Grand Marais, Minnesota

21. 1903 Datum was never established at Grand Marais. Elevations at Grand Marais on 1935 Datum were established by water level transfer from Marquette, Michigan, and Duluth, Minnesota, using recording gauge records at Marquette and Duluth and the staff gauge records at Grand Marais for the period June - September 1935. The 1935 Datum elevation of B.M. "WL 308" at Grand Marais is 611.272 feet and depends on the elevation of B.M. "NO. 6" at Marquette as being 628.253 feet and the elevation of B.M. "26-B" at Duluth as being 616.807 feet on 1935 Datum. IGLD (1955) elevations at Grand Marais depend on B.M. "WL 308" at elevation 609.571 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Aug 1883 - Sep 1883	No. 2	601.477	Staff Gauge, Tri-Daily	U.S.E.O.
Jun 1889 - Aug 1889	No. 2	601.477	Staff Gauge, Once Daily	U.S.E.O.
Sep 1930 - Nov 1930	No. 2	601.477	Recording Gauge, Hourly Readings	U.S.E.O.
Apr 1931 - May 1931	No. 2	601.477	Staff Gauge, Tri-Daily	U.S.E.O.
Jun 1935 - Sep 1935	WL 308	609.571	Staff Gauge, Tri-Daily	U.S.L.S.
Jul 1936 - Nov 1936	WL 308	609.571	Staff Gauge, Tri-Daily	U.S.E.O.
Jun 1947 - Sep 1947	WL 308	609.571	Staff Gauge, Tri-Daily	U.S.L.S.
Jun 1957 - Sep 1957	WL 308	609.571	Staff Gauge, Tri-Daily	U.S.L.S.
Jan 1966 - Oct 1970	WL 308	609.571	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Date	WL 308	609.571	Recording Gauge, Hourly Readings	N.O.S.

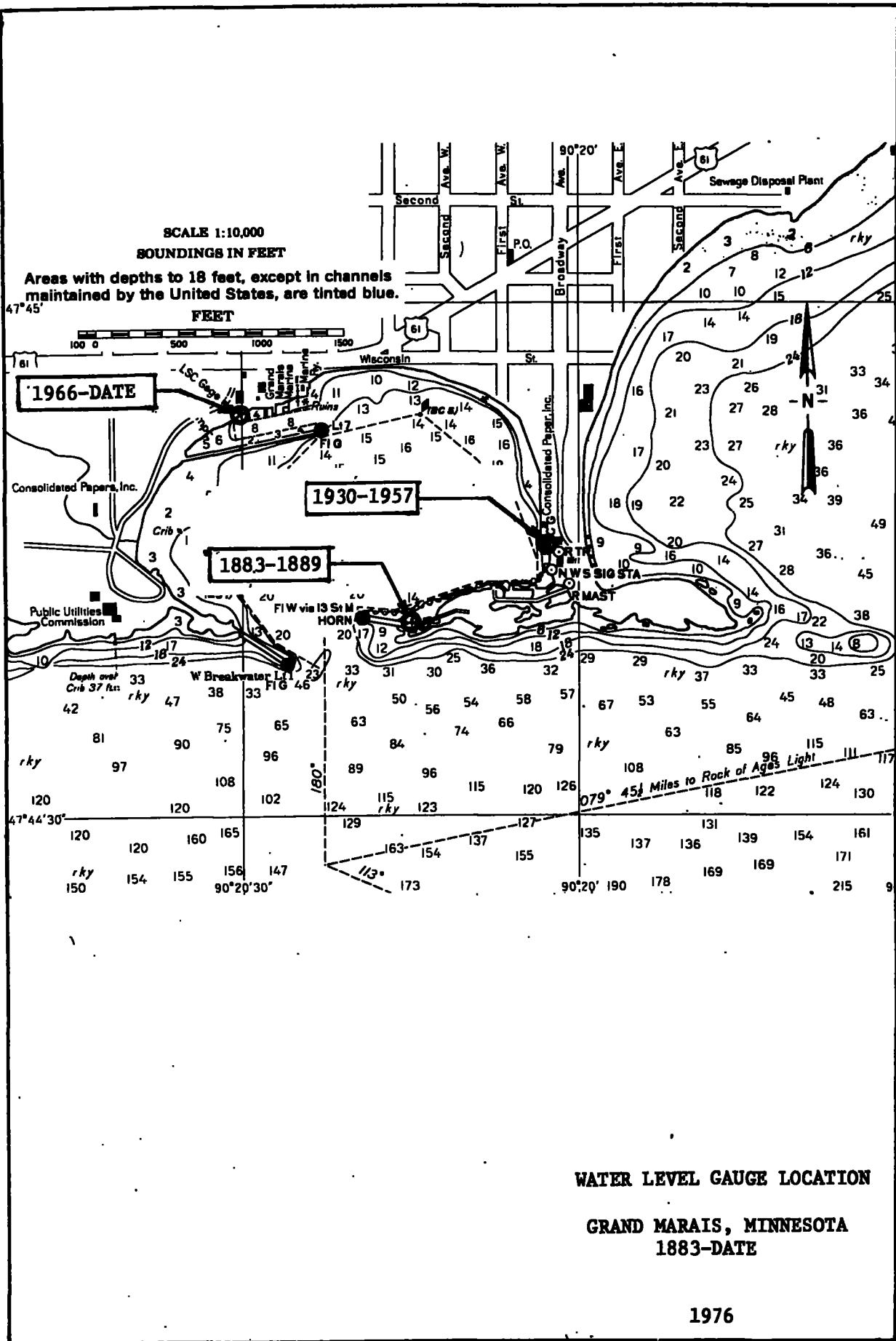
NOTE: Recording gauges with analog record were used until June 1967; after that date digital gauges were used at Grand Marais.

#### 22. Gauging Station Sites (See Plate 11, page 22):

(a) August 1883 - August 1889: Staff gauges located near the inner end of the east breakwater at Grand Marais, Minnesota.

(b) September 1930 - September 1957: Staff and recording gauges located on the U.S. Coast Guard dock on the east side of the harbor.

(c) January 1966 - Date: Recording gauges located at the foot of Sixth Avenue extended in Grand Marais.



## GAUGE HISTORY

### Two Harbors, Minnesota

23. 1903 Datum was never established at Two Harbors. Elevations at Two Harbors on 1935 Datum were established by water level transfer from Marquette, Michigan, and Duluth, Minnesota, using recording gauge records at Marquette and Duluth and staff gauge records at Two Harbors for the period June - September 1935. The 1935 Datum elevation of B.M. "U.S.E." at Two Harbors is 613.672 feet and depends on the elevation of "B.M. NO. 6" at Marquette as being 628.253 feet and the elevation of B.M. "26-B" at Duluth as being 616.807 feet on 1935 Datum. IGLD (1955) elevations at Two Harbors depend on B.M. "U.S.E." at elevation 611.923 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by Coordinating Committee.

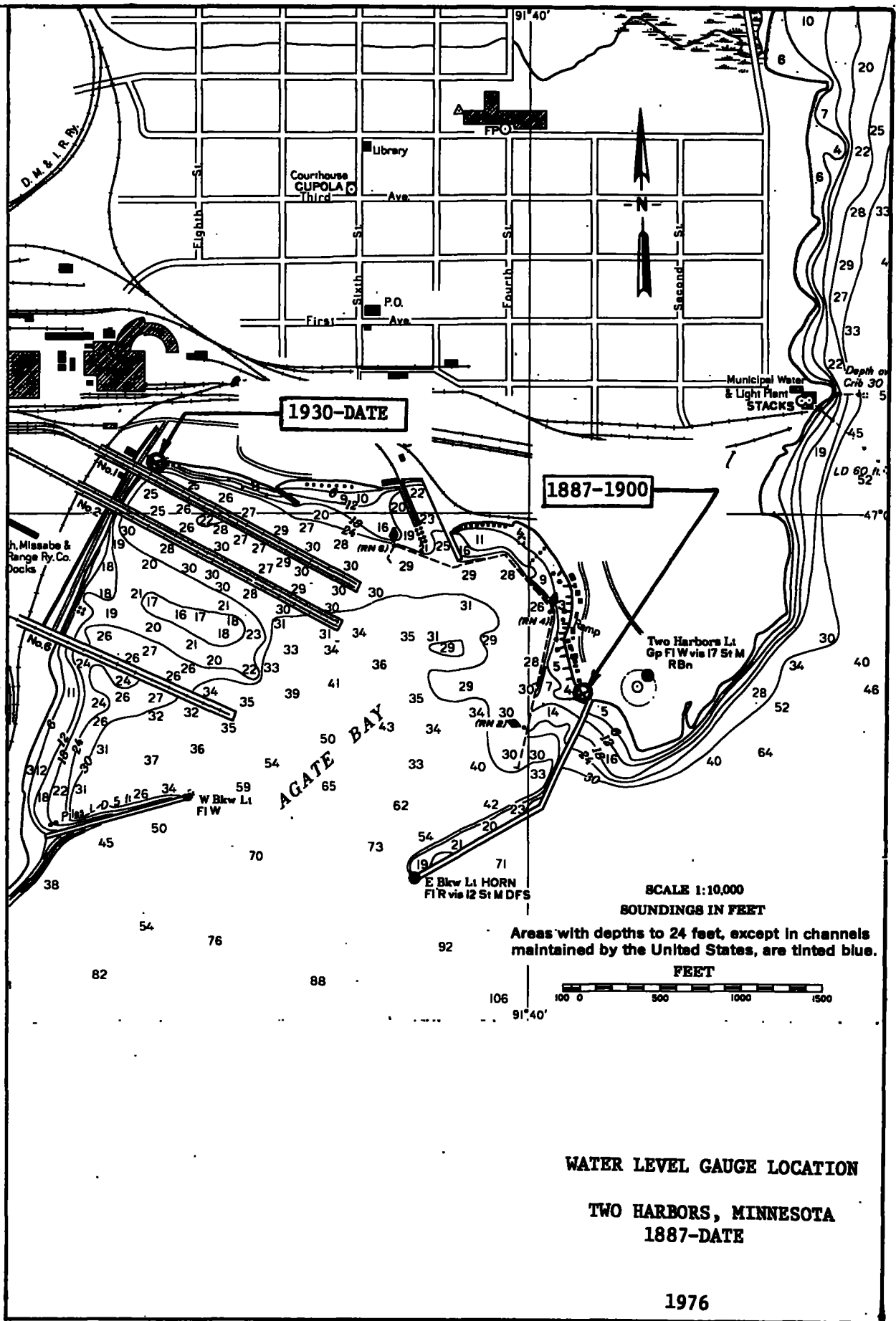
C H R O N O L O G I C A L   T A B L E

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jun 1887 - Nov 1887	No. 4	611.28	Staff Gauge, Tri-Daily	U.S.E.O.
Jul 1889 - Oct 1889	No. 5	615.73	Staff Gauge, Tri-Daily	U.S.E.O.
Sep 1900 - Oct 1900	No. 5	615.73	Staff Gauge, Tri-Daily	U.S.E.O.
Sep 1930 - Oct 1930	U.S.E.	611.923	Recording Gauge, Hourly Readings	U.S.L.S.
May 1931 - Nov 1931	U.S.E.	611.923	Recording Gauge, Hourly Readings	U.S.L.S.
Jun 1935 - Sep 1935	U.S.E.	611.923	Staff Gauge, Tri-Daily	U.S.L.S.
Aug 1941 - Jun 1967	U.S.E.	611.923	Recording Gauge, Hourly Readings	U.S.L.S.
Jun 1967 - Oct 1970	ORE DOCK	611.951	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Date	ORE DOCK	611.951	Recording Gauge, Hourly Readings	N.O.S.

NOTE: Recording gauges with analog record were used until June 1967; after that date digital gauges were used at Two Harbors.

#### 24. Gauging Station Sites (See Plate 12, page 24):

- (a) June 1887 - October 1900: Staff gauges located near the inner end of the east breakwater at Two Harbors.
- (b) September 1930 - Date: Staff and recording gauges located at the inner end of the No. 1 ore dock at Two Harbors.



**WATER LEVEL GAUGE LOCATION**

**TWO HARBORS, MINNESOTA  
1887-DATE**

1976

## GAUGE HISTORY

### Duluth, Minnesota

25. Elevations at Duluth on 1903 Datum depend on B.M. "NO. 1" at elevation 627.168 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at Duluth on 1935 Datum were established by water level transfer from Marquette and Point Iroquois, Michigan, using recording gauge records for 14 months during the 1939-1941 period. The 1935 Datum elevation of B.M. "BAR" is 605.652 feet and depends on the elevation of B.M. "RIVER" at Marquette as being 625.127 feet and the elevation of B.M. "IROQUOIS LIGHTHOUSE" at Point Iroquois as being 622.249 feet on 1935 Datum. IGLD (1955) elevations at Duluth depend on B.M. "BAR" at elevation 603.897 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### C H R O N O L O G I C A L   T A B L E

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jul 1859 - Dec 1871	8111	602.66	Staff Gauge, Monthly Means	U.S.L.S.
Jun 1872 - Sep 1873	No. 2	607.21	Staff Gauge, Monthly Means	U.S.L.S.
May 1880 - Jan 1889	26	609.097	Staff Gauge, Monthly Means	U.S.E.O.
Feb 1889 - Sep 1901	26	609.097	Staff Gauge, Tri-Daily	U.S.E.O.
Oct 1901 - May 1903	26	609.097	Recording Gauge, Hourly Scalings	U.S.E.O.
Jun 1903 - Dec 1906	26	609.097	Staff Gauge, Tri-Daily	U.S.E.O.
Jan 1907 - Dec 1925	26 A	609.136	Staff Gauge, Tri-Daily	U.S.E.O.
Jan 1926 - Dec 1946	26 B	615.052	Staff Gauge, Tri-Daily	U.S.E.O.
Jan 1947 - Dec 1950	Bar	603.897	Staff Gauge, Tri-Daily	U.S.E.O.
Jan 1951 - Oct 1970	Bar	603.897	Recording Gauge, Hourly Scalings	U.S.L.S.
Oct. 1970 - Data	Bar	603.897	Recording Gauge, Hourly Scalings	N.O.S.

**NOTE:** In 1880 - 1887 period gauge operated only during summer months. In period October 1930 - December 1950, unreduced analog records from gauges in the U.S.E.O. vessel yard are available for some months. In June 1967 a digital recording gauge replaced the gauge with analog record. Telemetering service was installed in November 1973 at Duluth.

**26. Gauging Station Sites (see Plate 13, page 27):**

(a) July 1859 - December 1871: Staff gauge located just north of the mouth of the Nemadji River at the south end of Duluth-Superior Harbor in Superior, Wisconsin.

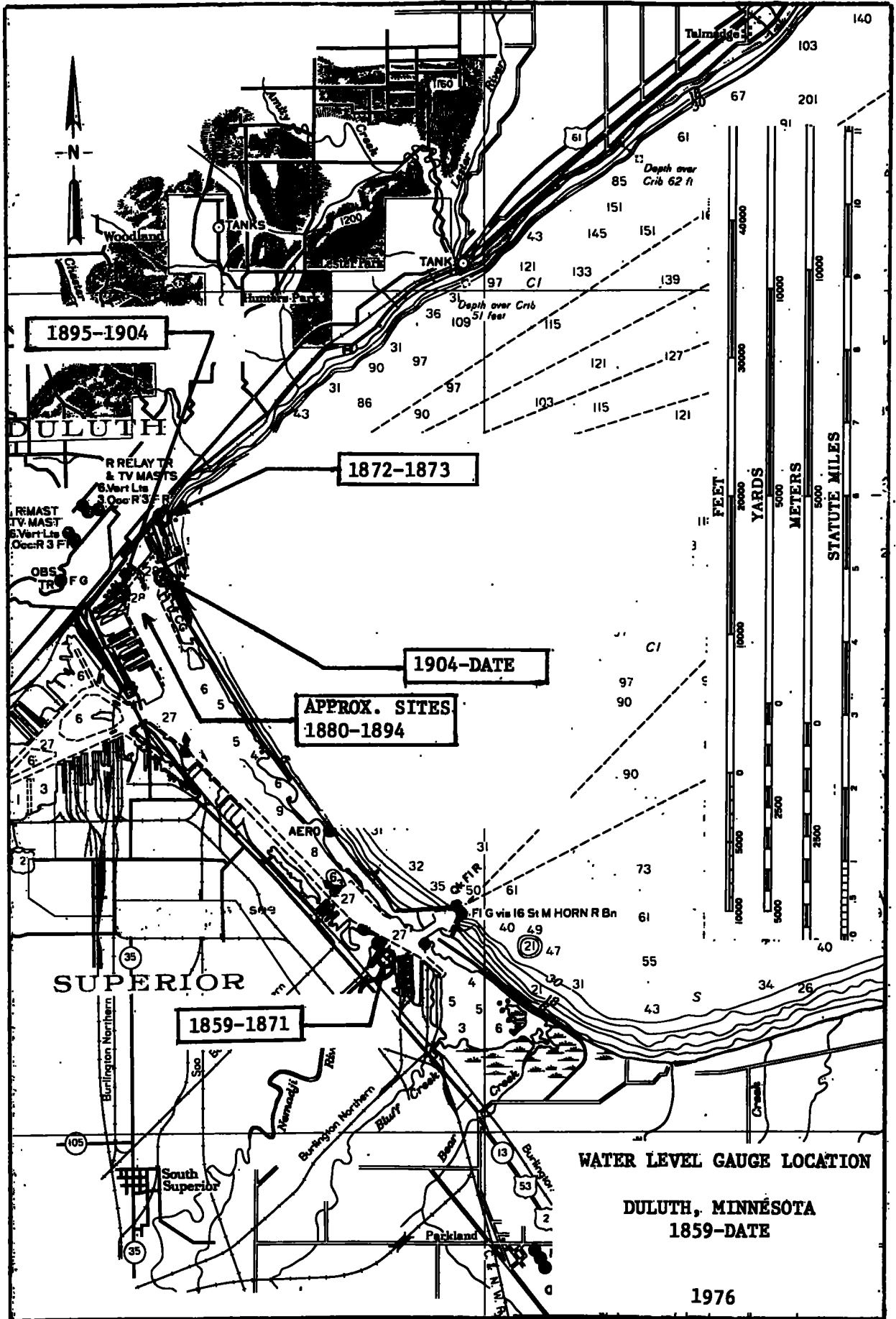
(b) June 1872 - September 1873: Staff gauge located on an old elevator dock at Duluth on the lake side of Minnesota Point.

(c) May 1880 - December 1894: Staff gauges located at various sites at the north end of Duluth-Superior Harbor in Duluth.

(d) January 1895 - November 1904: Staff gauge located in the Northern Pacific Railroad slip at the north end of the Harbor in Duluth.

(e) December 1904 - Date: Staff and recording gauges located at the Corps of Engineers vessel yard in the harbor about 750 feet south of the west end of the Duluth Ship Canal.





## GAUGE HISTORY

### Ontonagon, Michigan

27. 1903 Datum was never established at Ontonagon. Elevations at Ontonagon on 1935 Datum were established by water level transfers from Marquette, Michigan, and Duluth, Minnesota, using recording gauge records at Marquette and Duluth and staff gauge records at Ontonagon for the period June - September 1935. The 1935 Datum elevation of B.M. "NO. 2" at Ontonagon is 608.936 feet and depends on the elevation of B.M. "NO. 6" at Marquette as being 628.253 feet and the elevation of B.M. "26-B" at Duluth as being 616.807 feet on 1935 Datum. IGLD (1955) elevations at Ontonagon depend on B.M. "NO. 2" at elevation 607.188 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### C H R O N O L O G I C A L   T A B L E

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jun 1900 - Aug 1900	No. 2	607.188	Staff Gauge, Tri-Daily	U.S.E.O.
May 1905 - Jun 1905	No. 2	607.188	Staff Gauge, Tri-Daily	U.S.E.O.
Jun 1935 - Sep 1935	No. 2	607.188	Staff Gauge, Tri-Daily	U.S.L.S.
Jul 1959 - Jul 1963	No. 2	607.188	Recording Gauge, Hourly Readings	U.S.L.S.
Jul 1963 - Oct 1970	Potato	607.181	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - May 1977	Potato	607.181	Recording Gauge, Hourly Readings	N.O.S.
May 1977 - Date	011	605.291	Recording Gauge, Hourly Readings	N.O.S.

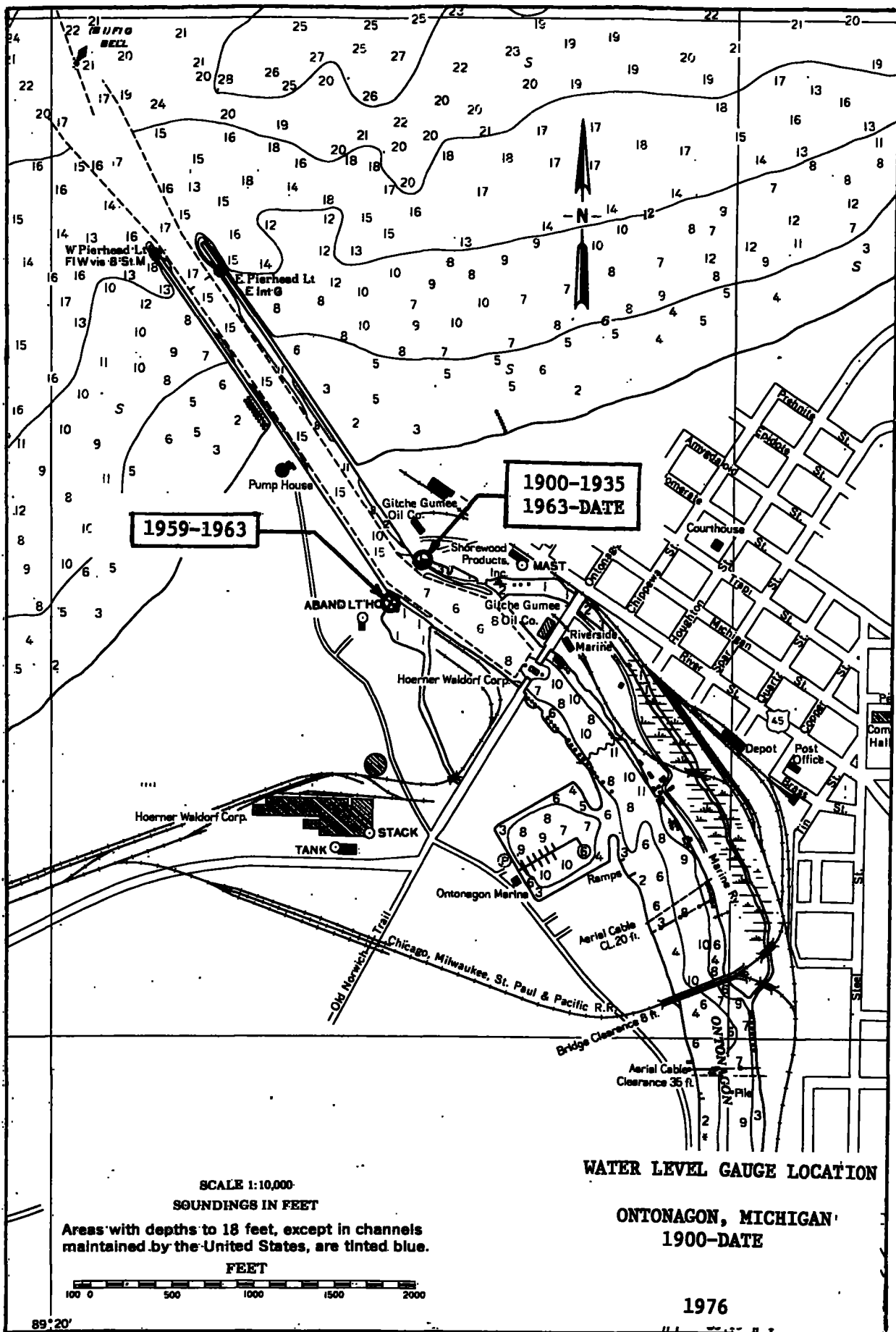
NOTE: Recording gauges with analog records are used at Ontonagon.

### 28. Gauging Station Sites (See Plate 14, page 29):

(a) June 1900 - September 1935: Staff gauges located near inner end of the east entrance pier at Ontonagon, Michigan.

(b) July 1959 - July 1963: Recording gauge located at the inner end of the west entrance pier at Ontonagon.

(c) July 1963 - Date: Recording gauge located at the inner end of the east entrance pier.



## GAUGE HISTORY

### Marquette, Michigan

29. Elevations at Marquette on 1903 Datum depend on B.M. "NO. 6" at elevation 628.414 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at Marquette on 1935 Datum were established by water level transfer from Point Iroquois, Michigan, using recording gauge records for the seven months May through November for the period 1933-1935. The 1935 Datum elevation of B.M. "NO. 6" at Marquette is 628.253 feet and depends on the elevation of B.M. "IROQUOIS LIGHTHOUSE" at Point Iroquois as being 622.249 feet on 1935 Datum. IGLD (1955) elevations at Marquette depend on B.M. "NO. 6" at elevation 626.554 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### C H R O N O L O G I C A L   T A B L E

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jul 1859 - Jul 1882	No. 6	626.554	Staff Gauge, Monthly Means	U.S.L.S.
Jul 1882 - Oct 1902	No. 6	626.554	Staff Gauge, Monthly Means	U.S.E.O.
Oct 1902 - Aug 1936	No. 6	626.554	Recording Gauge, Hourly Readings	U.S.L.S.
Aug 1936 - Oct 1970	Rivet	623.421	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Date	Rivet	623.421	Recording Gauge, Hourly Readings	N.O.S.

NOTE: Gauge not operated from January 1869 through September 1871. Recording gauges with analog records were used before June 1968; since that time digital gauges have been used. Telemetry service at Marquette was started 25 October 1973.

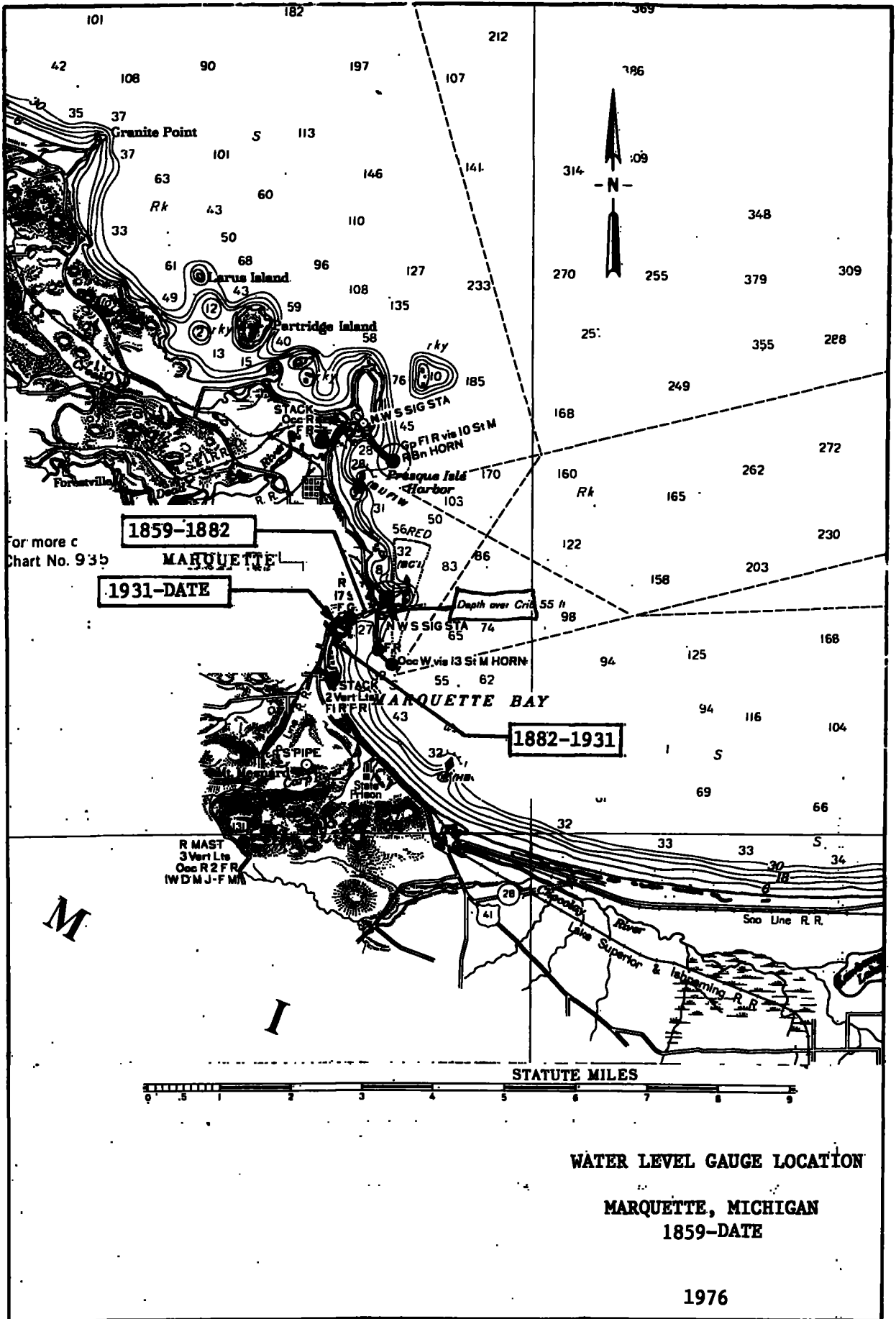
### 30. Gauging Station Sites (See Plate 15, page 31):

(a) July 1859 - July 1882: Staff gauge located on docks along the north shore of Marquette Harbor.

(b) July 1882 - December 1931: Staff and recording gauges located on docks along the west shore of Marquette Harbor.

(c) December 1931 - Date: Recording gauges located on the inner end of the D.S.S.&A. Ore Dock on the west shore of the harbor at the foot of Spring Street in Marquette.

(d)



## GAUGE HISTORY

### Sault Ste. Marie Lock Above, Ontario

31. Elevations on 1903 Datum at Sault Ste. Marie Lock (above) were based on levelling in 1908 and 1909 from B.M. "A" on Weitzel Lock, Sault Ste. Marie, Michigan. The 1903 Datum from B.M. "WEST SOO" at upper lock is 606.518 feet and depends on B.M. "A" at Weitzel Lock as being 606.069 feet on 1903 Datum. IGLD (1955) elevations at Sault Ste. Marie depend on B.M. "MIDDLE SOO" at elevation 611.513 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Sep 1908 - May 1925	West Soo	605.155	Recording Gauge, Hourly Scalings	D of R and C
Jun 1925 - Date	Middle Soo	611.513	Recording Gauge, Hourly Scalings	C.H.S.

NOTE: Gauge before 1911 operated in summer months only. Prior to 1975 recording gauges with analog records were used; after 1975 a recording gauge with digital output every 15 minutes has been added.

### 32. Gauging Station Site (see Plate 16 , page 36 ):

(a) September 1908 - Date: Recording gauges located over the river side of the outside approach pier, about 1000 feet from west end, to the upper entrance of the Canadian Soo Lock at Sault Ste. Marie, Ontario.

## GAUGE HISTORY

### Sault Ste. Marie Lock Below, Ontario

33. Elevations on 1903 Datum at Sault Ste. Marie Lock (below) were based on levelling in 1908 and 1909 from B.M. "A" on Weitzel Lock, Sault Ste. Marie, Michigan. The 1903 Datum for B.M. "EAST SOO" at lower lock is 588.023 feet and depends on B.M. "A" at Weitzel Lock as being 606.069 feet on 1903 Datum. IGLD (1955) elevations at Sault Ste. Marie depend on B.M. "MIDDLE SOO" at elevation 611.513 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Sep 1908 - May 1925	East Soo	586.660	Recording Gauge, Hourly Scalings	D of R and C
Jun 1925 - Date	Middle Soo	611.513	Recording Gauge, Hourly Scalings	C.H.S.

NOTE: Gauge before 1911 operated in summer months only. Prior to 1975 recording gauges with analog records were used; after 1975 a recording gauge with digital output every 15 minutes has been added.

### 34. Gauging Station Site (see Plate 16 , page 36 ):

(a) September 1908 - Date: Recording gauges located on the river side of the outside pier at the lower entrance of the Canadian Soo Lock at Sault Ste. Marie, Ontario.

## GAUGE HISTORY

### Southwest Pier, Michigan

35. Elevations at the Southwest Pier (S.W.P.) gauge site on 1903 Datum depend on B.M. "MERIDIAN" at elevation 607.834 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at the S.W.P. site on 1935 Datum were established by precise levels from De Tour, Michigan. The 1935 Datum elevation of B.M. "MERIDIAN" is 608.010 feet and depends on the elevation of B.M. "TERRETT" at De Tour as being 599.758 feet on 1935 Datum. IGLD (1955) elevations at the S.W. Pier depend on B.M. "MERIDIAN" at elevation 606.431 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### C H R O N O L O G I C A L   T A B L E

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jan 1855 - Nov 1855	Meridian	606.431	Staff Gauge, Monthly Means	U.S.E.O.
May 1856 - Nov 1869	Meridian	606.431	Staff Gauge, Monthly Means	U.S.E.O.
Nov 1870 - Sep 1899	Meridian	606.431	Staff Gauge, Once Daily	U.S.E.O.
Oct 1899 - Dec 1912	Meridian	606.431	Recording Gauge, Hourly Scalings	U.S.L.S.
Jan 1913 - Sep 1964	Meridian	606.431	Recording Gauge, Hourly Scalings	U.S.E.O.
Oct 1964 - Aug 1966	Q	605.629	Recording Gauge, Hourly Scalings	U.S.E.O.
Sep 1966 - May 1977	S.W. Pier	603.944	Recording Gauge, Hourly Scalings	U.S.E.O.
May 1977 - Date	Q	603.629	Recording Gauge, Hourly Scalings	U.S.E.O.

NOTE: Gauges operated only during navigation season in 1856 - 1869 period. No records available for 1857 - 1858 and 1862 - 1866 periods. Recording gauges with analog records used at this site.

### 36. Gauging Station Sites (See Plate 16, page 36):

(a) January 1855 - October 1856: Staff gauge located at the west end of the old state lock at Sault Ste. Marie, Michigan.

(b) July 1859 - August 1942: Staff and recording gauges located near the west end of the Southwest Pier at Sault Ste. Marie.

(c) September 1942 - December 1943: Recording gauge located on the Center Pier about 1,500 feet east of International Railroad Bridge.

(d) January 1944 - Date: Recording gauge located near the west end of the Southwest Pier.



## GAUGE HISTORY

### U.S. Slip, Michigan

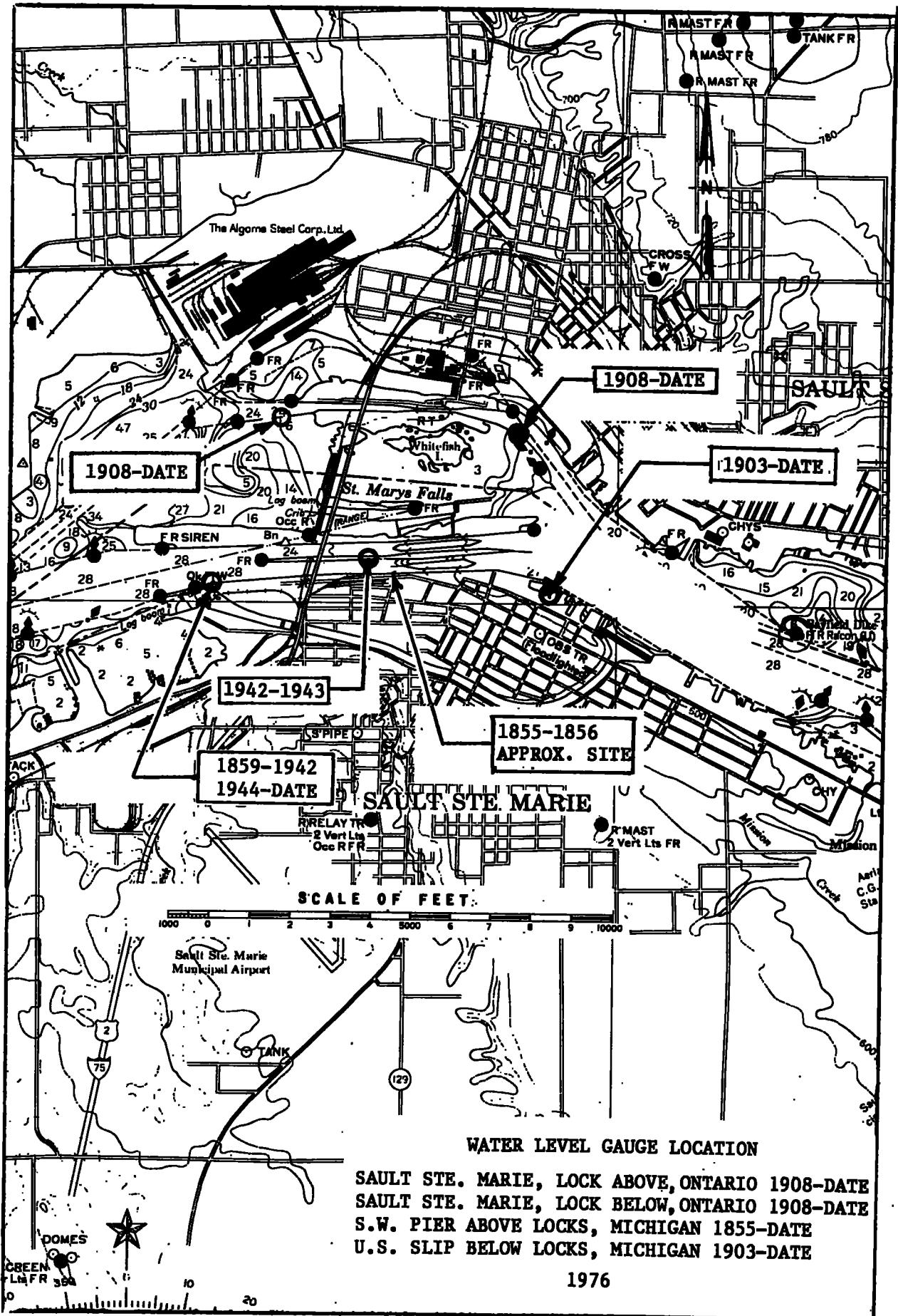
37. Elevations at the U.S. Slip gauge site on 1903 Datum depend on B.M. "B" at elevation 588.629 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at the U.S. Slip site on 1935 Datum were established by precise levels from De Tour, Michigan. The 1935 Datum elevation of B.M. "B" is 588.854 feet and depends on the elevation of B.M. "TERRETT" at DeTour as being 599.758 feet on 1935 Datum. IGLD (1955) elevations at U.S. Slip depend on B.M. "BRADY" at elevation 585.156 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Apr 1903 - Jun 1912	B	587.272	Recording Gauge, Hourly Readings	U.S.L.S.
Jul 1912 - Jul 1947	B	587.272	Recording Gauge, Hourly Readings	U.S.E.O.
Aug 1947 - Date	Brady	585.156	Recording Gauge, Hourly Readings	U.S.E.O.

#### 38. Gauging Station Site (See Plate 16, page 36):

(a) April 1903 - Date: Analog recording gauges located at the lower end of the Corps of Engineers slip at the foot of the locks in Sault Ste. Marie, Michigan.



**WATER LEVEL GAUGE LOCATION**

- SAULT STE. MARIE, LOCK ABOVE, ONTARIO 1908-DATE
- SAULT STE. MARIE, LOCK BELOW, ONTARIO 1908-DATE
- S.W. PIER ABOVE LOCKS, MICHIGAN 1855-DATE
- U.S. SLIP BELOW LOCKS, MICHIGAN 1903-DATE

1976

## GAUGE HISTORY

### Port Inland, Michigan

39. IGLD (1955) elevations\* at Port Inland were established by water level transfers from Mackinaw City and Sturgeon Bay Canal for the period 17 August - 30 November 1963 and 1 April - 30 November 1964. The IGLD (1955) elevation of B.M. "BUZZO" at Port Inland is 585.767 feet and depends on the elevation of B.M. "STATE DOCK" at Mackinaw City as being 583.526 feet and on the elevation of B.M. "FLAG A" at Sturgeon Bay Canal as being 584.330 feet on IGLD (1955).

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Aug 1963 - Nov 1964	Buzzo	585.767	Staff Gauge, Once Daily	U.S.L.S.
Nov 1964 - May 1969	Buzzo	585.767	Recording Gauge, Hourly Readings	U.S.L.S.
May 1969 - Oct 1970	Tank	589.227	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Date	Tank	589.227	Recording Gauge, Hourly Readings	N.O.S.

NOTE: Analog recording gauges used at Port Inland.

#### 40. Gauging Station Site (see Plate 17, page 38):

August 1963 - Date: Staff and recording gauges located on dock in northwest corner of the Inland Lime and Stone Company slip about 18 miles east of Manistique, Michigan.

\*1903 and 1935 Datums were never established at Port Inland.

85°53'

85°52'

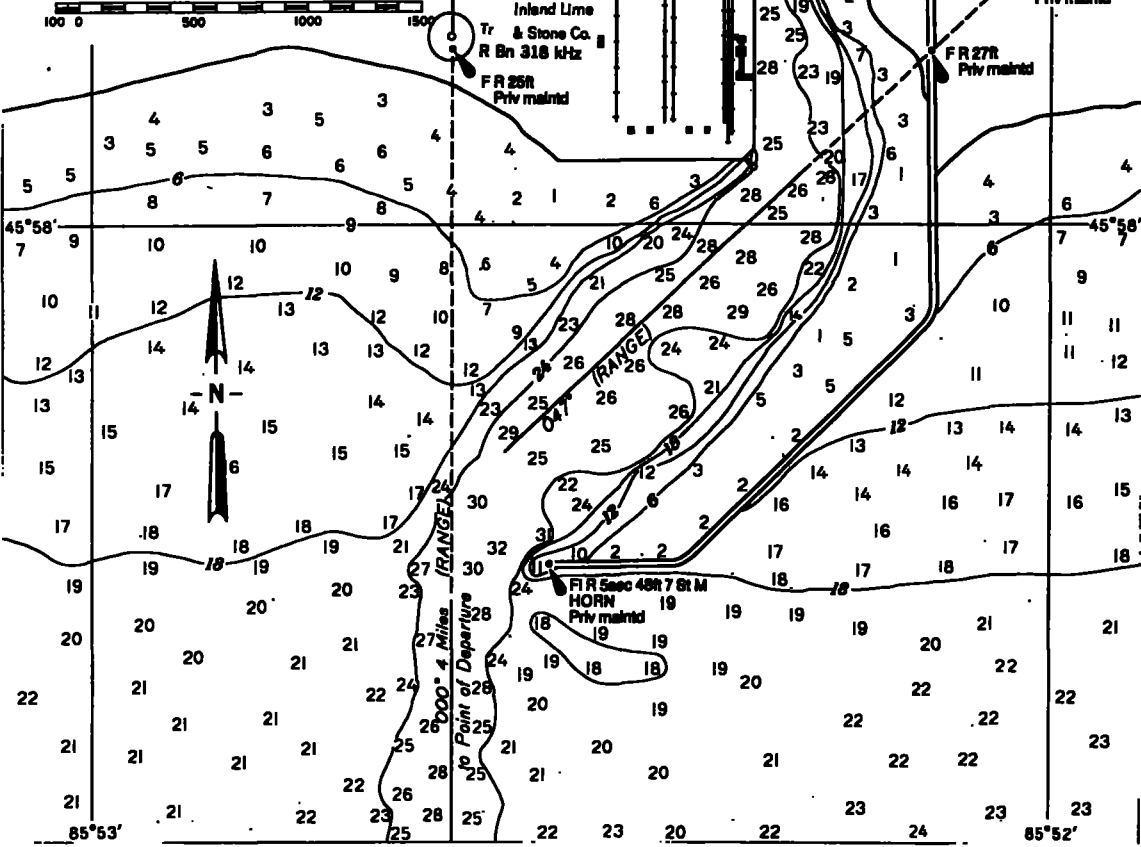
1963-DATE

Scale 1:10,000

SOUNDINGS IN FEET

Areas with depths to 24 feet are tinted blue.

FEET



WATER LEVEL GAUGE LOCATION

PORT INLAND, MICHIGAN  
1963-DATE

1976

## GAUGE HISTORY

### Green Bay, Wisconsin

41. 1903 Datum was never established at Green Bay. Elevations at Green Bay on 1935 Datum were established by water level transfer from Milwaukee, Sturgeon Bay Canal and Mackinaw City using the gauge records for the summer months in the years 1935, 1943, and 1944. The 1935 Datum elevation of B.M. "WL 257" at Green Bay is 589.596 feet and depends on the elevation of B.M. "BREAKWATER NO. 1" at Milwaukee as being 585.934 feet, the elevation of B.M. "NO. 1" at Sturgeon Bay Canal as being 599.751 feet and the elevation of B.M. "STATE DOCK" at Mackinaw City as being 585.196 feet on 1935 Datum. IGLD (1955) elevations at Green Bay depend on B.M. "LEG" at elevation 585.654 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Oct 1904 - Nov 1904	No. 2	588.779	Staff Gauge, Six Times per Day	U.S.L.S.
May 1935 - Sep 1935	WL 257	587.788	Staff Gauge, Tri-Daily	U.S.L.S.
Jun 1943 - Sep 1943	WL 257	587.788	Staff Gauge, Tri-Daily	U.S.L.S.
Apr 1944 - Sep 1944	WL 257	587.788	Staff Gauge, Tri-Daily	U.S.L.S.
Aug 1945 - Oct 1945	WL 257	587.788	Staff Gauge, Daily Means	U.S.E.O.
Oct 1947 - Nov 1947	WL 257	587.788	Staff Gauge, Daily Means	U.S.E.O.
Jun 1953 - Oct 1970	Leg	585.654	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Data	Leg	585.654	Recording Gauge, Hourly Readings	N.O.S.

NOTE: Before June 1967, recording gauges used analog records. Since that time, digital recording gauges have been used at Green Bay.

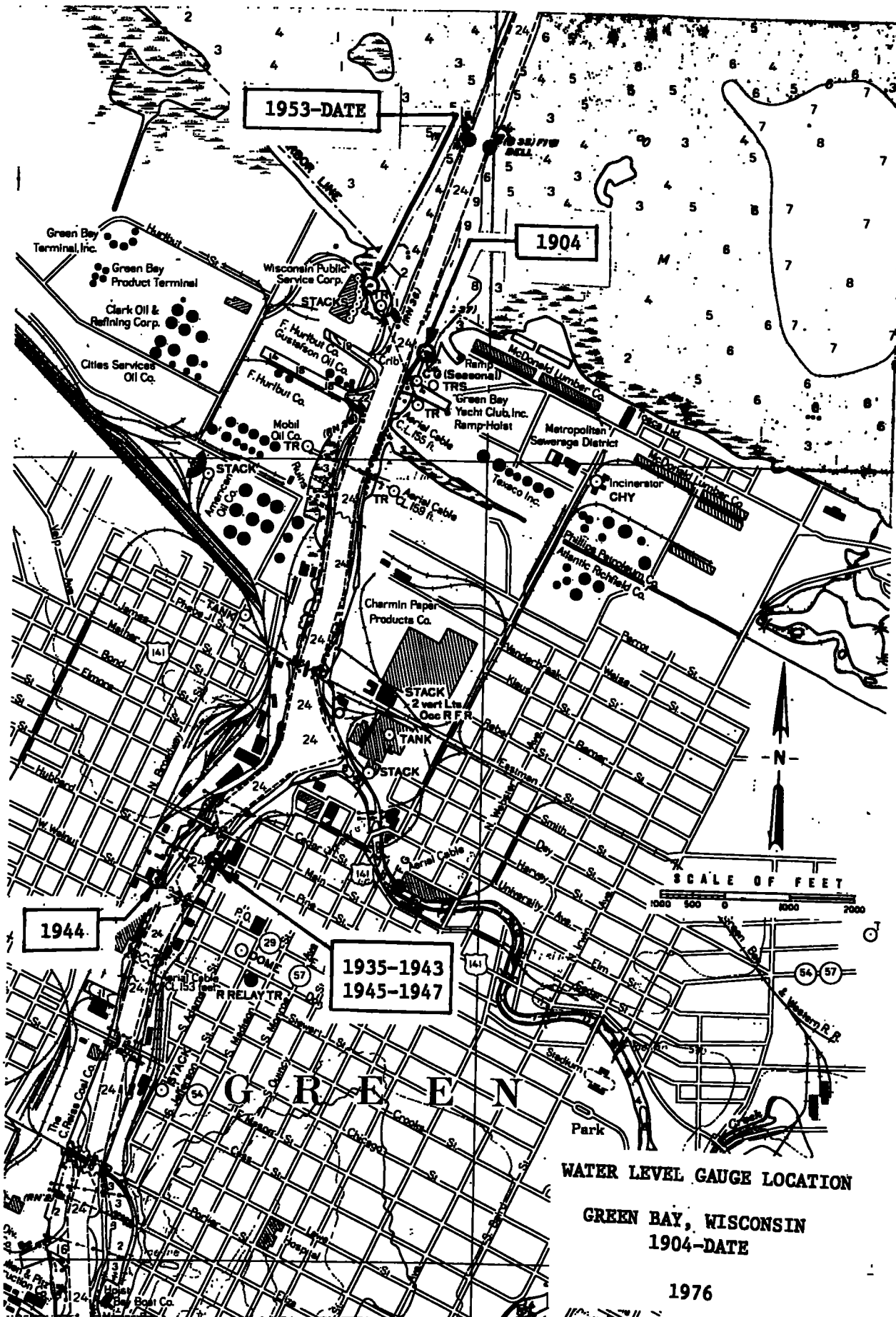
#### 42. Gauging Station Sites (see Plate 18, page 41):

(a) October 1904 - November 1904: Staff gauge located on Murphy Dock along the east bank at the mouth of the Fox River in Green Bay, Wisconsin.

(b) May 1935 - November 1947: Staff gauges located at the foot of Pine Street on the east bank of the Fox River about 1-1/2 miles above the mouth of the river.

(c) April 1944 - September 1944: Staff gauge located on the west bank of the river at the north side of the Walnut Street Bridge two blocks south of Pine Street.

(d) June 1953 - Date: Recording gauges in the Wisconsin Public Service Corporation Canal on the west bank of the Fox River at the mouth of the river.



## GAUGE HISTORY

### Sturgeon Bay Canal, Wisconsin

43. 1903 Datum was never established along the Sturgeon Bay Canal. Elevations at Sturgeon Bay Canal on 1935 Datum were established by water level transfer from Milwaukee and Mackinaw City for period June - September 1935. The 1935 Datum elevation of B.M. "NO. 1" at Sturgeon Bay Canal is 599.751 feet and depends on the elevation of B.M. "BREAKWATER NO. 1" at Milwaukee as being 585.934 feet and of B.M. "STATE DOCK" at Mackinaw City as being 585.196 feet on 1935 Datum. IGLD (1955) elevations at Sturgeon Bay Canal depend on B.M. "DWELLING A" at elevation 584.930 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jan 1905 - Dec 1908	Base Plate	596.916	Staff Gauge, Monthly Means	U.S.E.O.
Jan 1909 - Dec 1939	No. 1	598.023	Staff Gauge, Monthly Means	U.S.E.O.
Jan 1940 - Jul 1945	No. 1	598.023	Staff Gauge, Daily Means	U.S.E.O.
Jul 1945 - Dec 1956	No. 5	583.923	Recording Gauge, Hourly Readings	U.S.L.S.
Jan 1957 - Dec 1966	Flag A	584.330	Recording Gauge, Hourly Readings	U.S.L.S.
Jan 1967 - Oct 1970	Dwelling A	584.930	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Data	Dwelling A	584.930	Recording Gauge, Hourly Readings	N.O.S.

NOTE: In period July 1919 - June 1927, only two monthly means are available—May 1922 and May 1925. Analog recording gauges used before October 1966 when a digital recording gauge was installed.

#### 44. Gauging Station Sites (see Plate 19, page 44):

(a) January 1905 - March 1919: Staff gauges located on the north side of Sturgeon Bay Canal at the dwelling of the Canal Superintendent about 3400 feet from the east entrance of the canal.

(b) May 1922 - July 1945: Staff gauges located in the lighthouse slip near the east end of the Sturgeon Bay Canal.

(c) June 1927 - November 1927: Staff gauge located on the north side of the canal at the Goodrich Transportation Company dock in Sturgeon Bay.

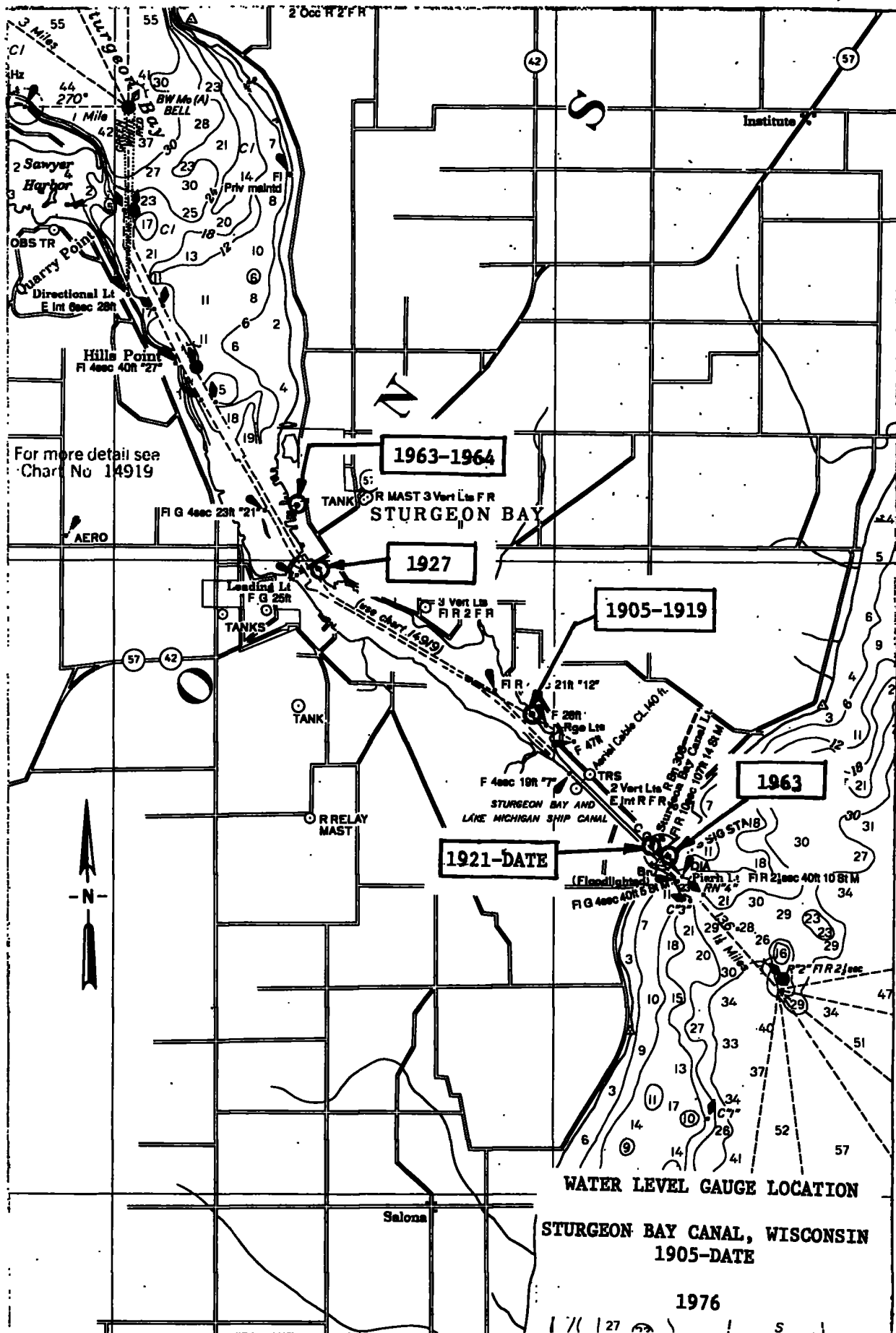


(d) June 1945 - June 1963: Recording gauge located in a slip on the north side of the canal about 125 feet west of the Coast Guard boat ramp.

(e) June 1963 - December 1963: Recording gauge located in a boat slip outside the east entrance to canal.

(f) December 1963 - November 1964: Recording gauge located on the north side of the canal at the Sturgeon Bay Shipbuilding Company in Sturgeon Bay.

(g) November 1964 - Date: Recording gauges located in the Coast Guard Slip about 500 feet west of the east canal entrance.



## GAUGE HISTORY

### Milwaukee, Wisconsin

45. Elevations at Milwaukee on 1903 Datum depend on B.M. "NO. 1" at elevation 593.025 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at Milwaukee on 1935 Datum were established by water level transfer from Harbor Beach, Michigan, for the months May through November for the years 1933 - 1936. The 1935 Datum elevation of B.M. "BREAKWATER NO. 1" at Milwaukee is 585.934 feet and depends on the elevation of B.M. "BOULDER" at Harbor Beach as being 582.296 feet on 1935 Datum. IGLD (1955) elevations at Milwaukee depend on B.M. "NORTH BREAKWATER LIGHT" at elevation 584.024 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### C H R O N O L O G I C A L   T A B L E

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Mar 1836 - Mar 1859	No. 1	591.07	Staff Gauge, Monthly Means	
Aug 1859 - Aug 1876	No. 1	591.07	Staff Gauge, Monthly Means	U.S.E.O.
Aug 1876 - Aug 1901	Old Check Point	584.59	Staff Gauge, Monthly Means	U.S.E.O.
Aug 1901 - Sep 1903	Lapham	594.42	Staff Gauge, Tri-Daily	U.S.E.O.
Sep 1903 - Nov 1910	No. 2	585.942	Recording Gauge, Hourly Scalings	U.S.L.S.
Nov 1910 - Oct 1916	South Pier	583.733	Recording Gauge, Hourly Scalings	U.S.L.S.
May 1916 - Sep 1945	Brkwtr. No. 1	584.081	Recording Gauge, Hourly Scalings	U.S.L.S.
Mar 1946 - Jul 1951	Nant	585.439	Staff Gauge, Tri-Daily	U.S.L.S.
Jul 1951 - Jan 1970	N. Brkwtr. Lt.	584.024	Recording Gauge, Hourly Scalings	U.S.L.S.
May 1969 - Oct 1970	Tower	595.755	Recording Gauge, Hourly Scalings	U.S.L.S.
Oct 1970 - Data	Tower	595.755	Recording Gauge, Hourly Scalings	N.O.S.

NOTE: Before August 1859, 58 monthly levels at Milwaukee were published in the December 1896 Report of the U.S. Deep Waterways Commission, House Document No. 192, 54th Congress, 2nd Session. Recording gauges before September 1967 used analog records and after September 1967 used digital records.

#### 46. Gauging Station Sites (see Plate 20, page 47):

(a) March 1836 - July 1907: Staff gauges located about two miles upstream from the mouth of the Milwaukee River in the vicinity of the foot of W. McKinley Avenue (formerly Poplar Street).

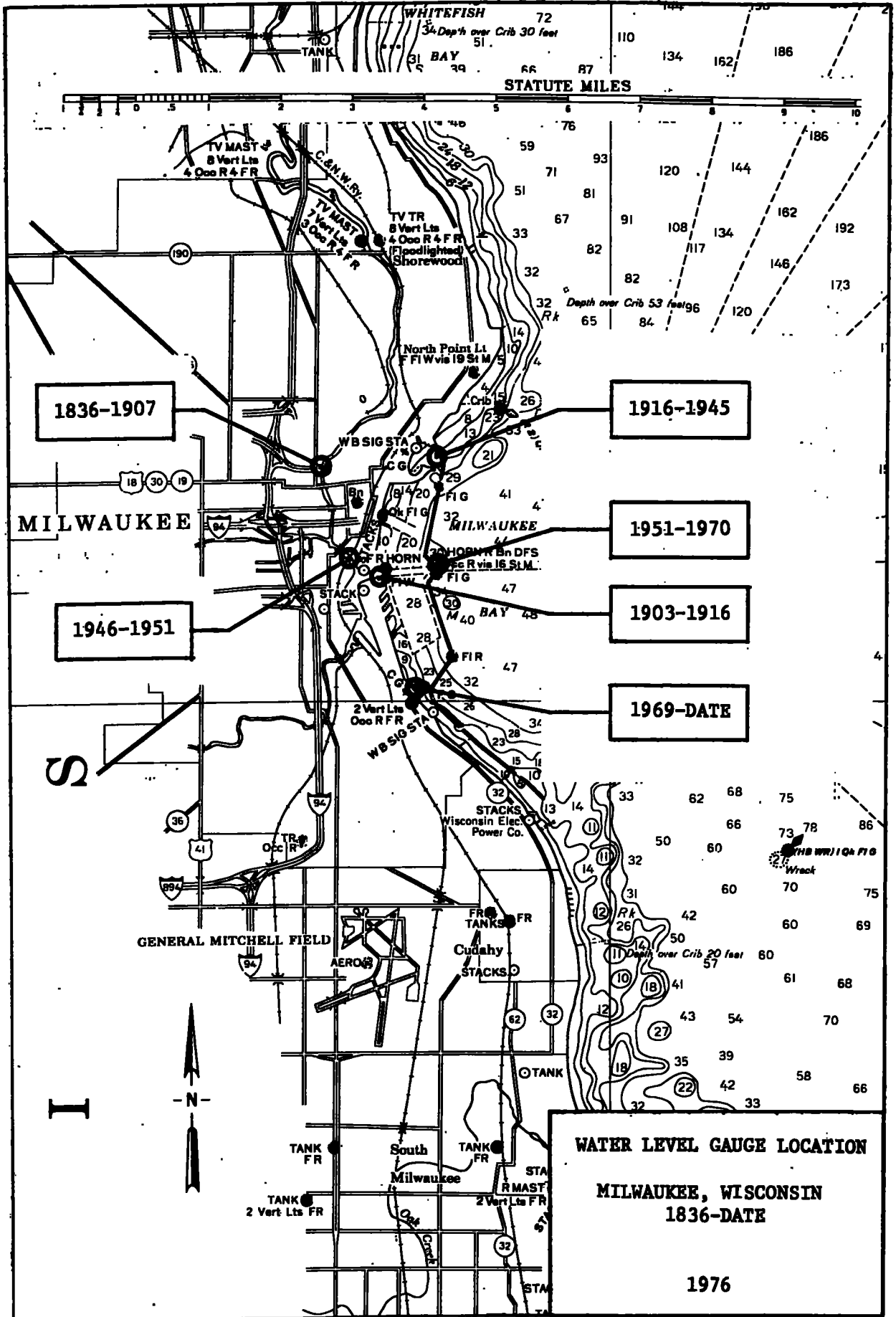
(b) September 1903 - November 1916: Recording gauge located on the south side and near the mouth of the Milwaukee River.

(c) May 1916 - September 1945: Recording gauge located at the U.S.E.O. Caisson Plant inside the north breakwater.

(d) March 1946 - July 1951: Staff gauge located on the Chicago Northwestern Railroad Bridge about one-half mile upstream from the mouth of the Milwaukee River.

(e) July 1951 - January 1970: Recording gauge located in the North Breakwater Light Building.

(f) May 1969 - Date: Recording gauge located in the south end of the harbor at the U.S. Coast Guard Station.



## GAUGE HISTORY

### Calumet Harbor, Illinois

47. 1903 Datum was never established at Calumet Harbor. Elevations at Calumet Harbor on 1935 Datum were established by water level transfer from Milwaukee, Mackinaw City, Harbor Beach, and Grand Haven for the months May through November 1935. The 1935 Datum elevation of B.M. "PIER LIGHT" at Calumet Harbor is 585.093 feet and depends on the elevation of B.M. "BREAKWATER NO. 1" at Milwaukee as being 585.934 feet, of B.M. "STATE DOCK" at Mackinaw City as being 585.196 feet, of B.M. "BOULDER" at Harbor Beach as being 582.296 feet, and of B.M. "10" at Grand Haven as being 591.226 feet on 1935 Datum. IGLD (1955) elevations at Calumet Harbor depend on B.M. "ENG" at elevation 586.461 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### C H R O N O L O G I C A L   T A B L E

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Feb 1903 - Apr 1935	No. 30	587.237	Recording Gauge, Hourly Scalings	U.S.E.O.
Apr 1935 - Aug 1949	Pier Lt.	583.334	Recording Gauge, Hourly Scalings	U.S.L.S.
Aug 1949 - Jun 1963	LED	587.240	Recording Gauge, Hourly Scalings	U.S.L.S.
Jun 1963 - Oct 1970	ENG	586.461	Recording Gauge, Hourly Scalings	U.S.L.S.
Oct 1970 - Oct 1971	ENG	586.461	Recording Gauge, Hourly Scalings	N.O.S.
Oct 1971 - Date	COM	583.318	Recording Gauge, Hourly Scalings	N.O.S.

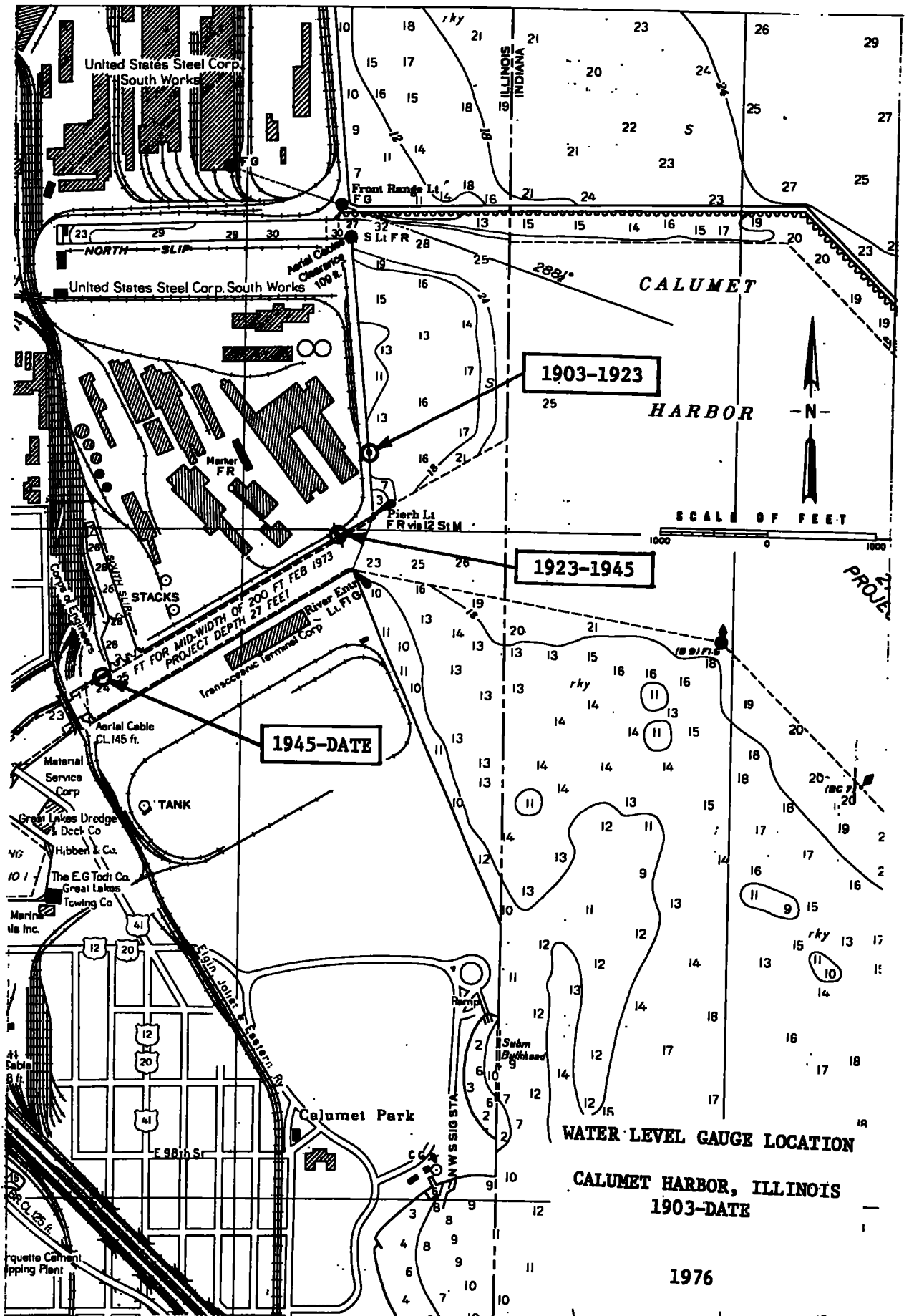
NOTE: Analog recording gauges used until October 1966. After that date, digital recording gauges were used at Calumet Harbor.

#### 48. Gauging Station Sites (see Plate 21, page 49):

(a) February 1903 - July 1923: Recording gauge located along the north pier at Calumet Harbor.

(b) July 1923 - September 1945: Recording gauge located on a crib on the north side of the Calumet River about 400 feet from the mouth of the river.

(c) September 1945 - Date: Recording gauge located on the north side of the Calumet River at the Corps of Engineers Calumet Field Office about 3,000 feet from the mouth of the river.



## GAUGE HISTORY

### Holland, Michigan

49. 1903 Datum was never established at Holland. Elevations at Holland on 1935 Datum were established by water level transfer from Milwaukee, Mackinaw City, Harbor Beach and Grand Haven using the gauge records for the period May - September 1935. The 1935 Datum elevation of B.M. 2 at Holland is 586.020 feet and depends on the elevation of B.M. "BREAKWATER NO. 1" at Milwaukee as being 585.934 feet, of B.M. "STATE DOCK" at Mackinaw City as being 585.196 feet, of B.M. "BOULDER" at Harbor Beach as being 582.294 feet and of B.M. "10" at Grand Haven as being 591.226 feet on 1935 Datum. IGLD (1955) elevations at Holland depend on B.M. "JESIEK" at elevation 580.857 as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

C H R O N O L O G I C A L   T A B L E

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jun 1894 - Nov 1908	B.M. 2	584.218	Staff Gauge, Monthly Means	U.S.E.O.
May 1935 - Sep 1935	B.M. 2	584.218	Staff Gauge, Tri-Daily	U.S.L.S.
Sep 1941 - Nov 1942	B.M. 2	584.218	Staff Gauge, Tri-Daily	U.S.E.O.
May 1956 - Sep 1956	Lily	583.617	Staff Gauge, Tri-Daily	U.S.L.S.
May 1959 - Oct 1970	Jesiek	580.857	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Data	Jesiek	580.857	Recording Gauge, Hourly Readings	N.O.S.

NOTE: Monthly means available for only 48 scattered months for the 1894 - 1908 period. Recording gauges with analog records in use at Holland since May 1959.

#### 50. Gauging Station Sites (see Plate 22, page 52):

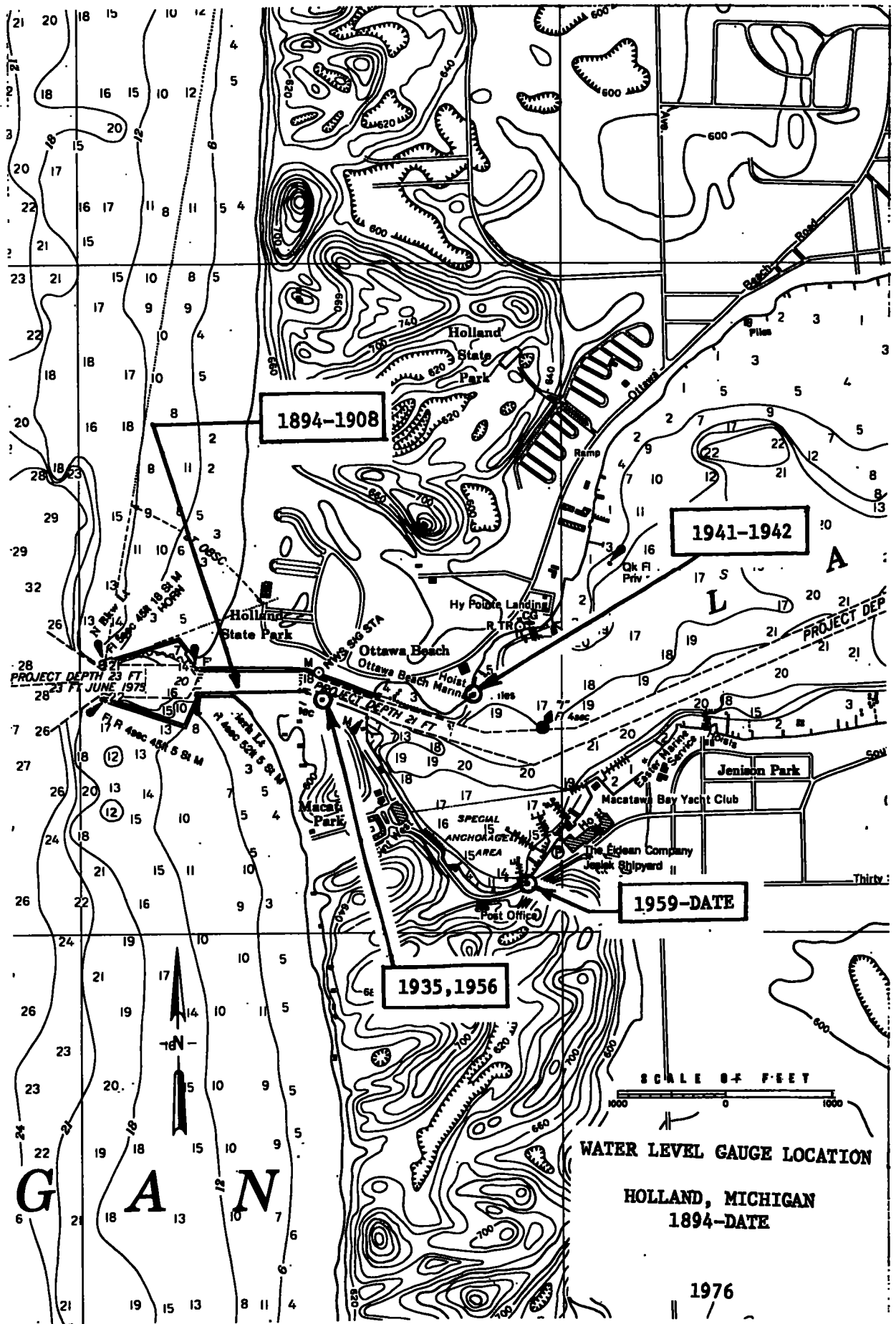
(a) June 1894 - November 1908: Staff gauges located at various sites along the entrance channel to Lake Macatawa at Holland, Michigan.

(b) May 1935 - September 1956: Staff gauges located near the inner end of the south entrance pier.



(c) September 1941 - November 1942: A staff gauge located about 950 feet east of the inner end of the north entrance pier.

(d) May 1959 - Date: Recording gauges located on south shore near the west end of Lake Macatawa at the Jesiek Brothers Ship Yard.



WATER LEVEL GAUGE LOCATION

HOLLAND, MICHIGAN  
1894-DATE

1976

PLATE 22

## GAUGE HISTORY

### Ludington, Michigan

51. 1903 Datum was never established at Ludington. Elevations at Ludington on 1935 Datum were established by water level transfer from Milwaukee, Mackinaw City, Sturgeon Bay Canal and Grand Haven, using the gauge records for the period May - September 1935. The 1935 Datum elevation of B.M. "NO. 2" at Ludington is 585.597 feet and depends on the elevation of B.M. "BREAKWATER NO. 1" at Milwaukee as being 585.934 feet, of B.M. "STATE DOCK" at Mackinaw City as being 585.196 feet, of B.M. "NO. 1" at Sturgeon Bay Canal as being 599.751 feet, and of B.M. "10" at Grand Haven as being 591.226 feet on 1935 Datum. IGLD (1955) elevations at Ludington depend on B.M. "PIPE" at elevation 582.898 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### C H R O N O L O G I C A L   T A B L E

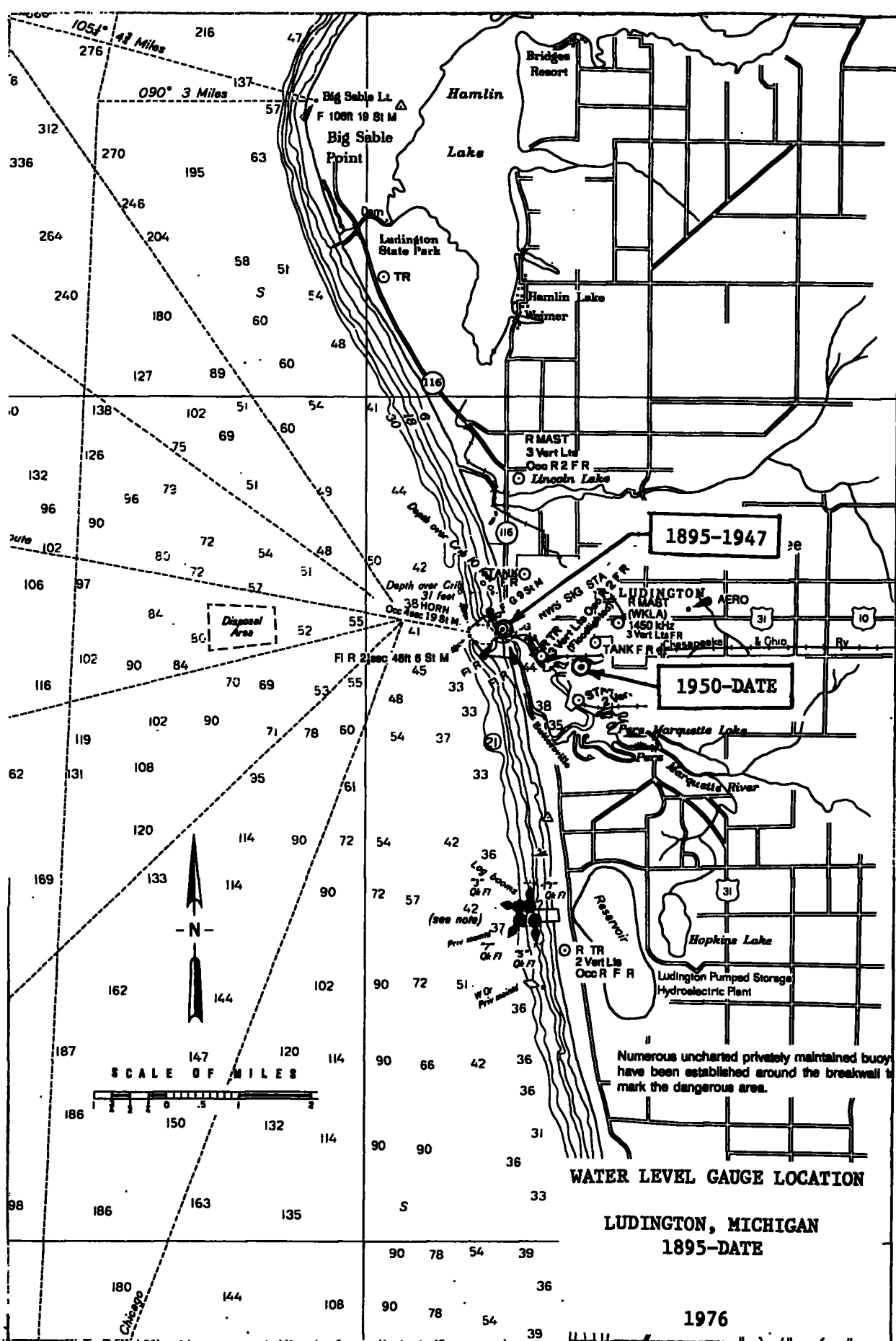
PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Nov 1895 - Dec 1908	No. 2	583.848	Staff Gauge, Monthly Means	U.S.E.O.
May 1935 - Sep 1935	No. 2	583.848	Staff Gauge, Tri-Daily	U.S.L.S.
Aug 1936 - Sep 1939	No. 2	583.848	Staff Gauge, Tri-Daily	U.S.E.O.
May 1944 - Sep 1944	No. 2	583.848	Staff Gauge, Tri-Daily	U.S.L.S.
May 1945 - Sep 1946	No. 2	583.848	Staff Gauge, Tri-Daily	U.S.E.O.
May 1947 - Sep 1947	No. 2	583.848	Staff Gauge, Tri-Daily	U.S.L.S.
Jul 1950 - Oct 1970	Pipe	582.898	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Nov 1976	Pipe	582.898	Recording Gauge, Hourly Readings	H.O.S.
Nov 1976 - Date	Wulbar	582.210	Recording Gauge, Hourly Readings	H.O.S.

NOTE: In the 1895 - 1908 period, 33 scattered monthly means are available. Analog recording gauges used until April 1969. After that date, digital recording gauges were used at Ludington.

### 52. Gauging Station Sites (see Plate 23, page 54):

(a) November 1895 - September 1947: Staff gauges located in the entrance channel to Pere Marquette Lake in the vicinity of the Coast Guard Station at Ludington.

(b) July 1950 - Date: Recording gauges located on the southwest corner of the city dock in Pere Marquette Lake near the sewage treatment plant.



## GAUGE HISTORY

### Mackinaw City, Michigan

53. Elevations at Mackinaw City on 1903 Datum depend on B.M. "R" at elevation 589.941 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at Mackinaw City on 1935 Datum were established by water level transfer from Harbor Beach, Michigan, using the gauge records of May through November for the years 1933-1935. The 1935 Datum elevation of B.M. "STATE DOCK" at Mackinaw City is 585.196 feet and depends on the elevation of B.M. "BOULDER" at Harbor Beach as being 582.296 feet on 1935 Datum. IGLD (1955) elevations at Mackinaw City depend on B.M. "STATE DOCK" at elevation 583.526 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### C H R O N O L O G I C A L   T A B L E

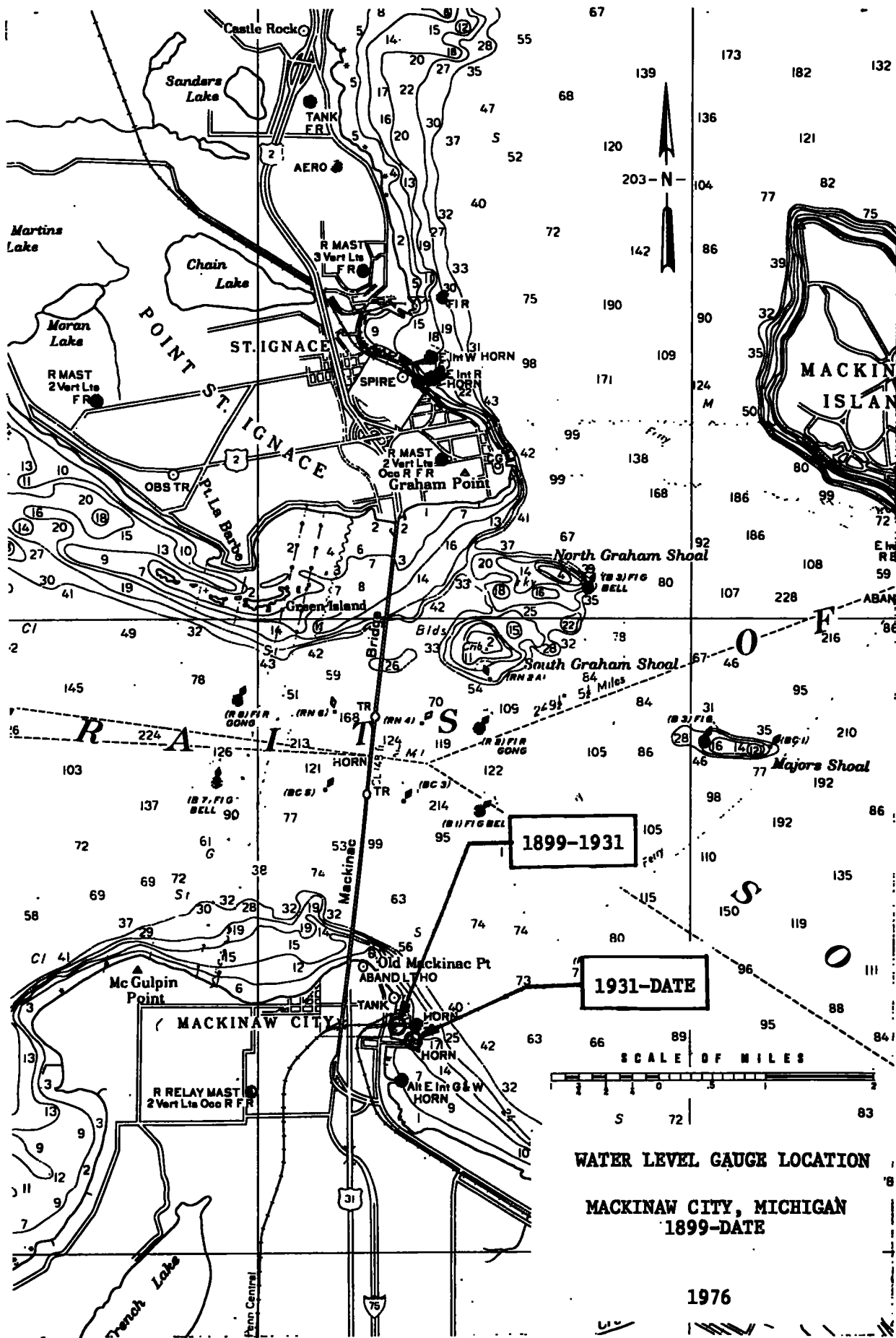
PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
May 1899 - Oct 1931	R	588.333	Recording Gauge, Hourly Scalings	U.S.L.S.
Oct 1931 - Oct 1970	State Dock	583.526	Recording Gauge, Hourly Scalings	U.S.L.S.
Oct 1970 - Date	State Dock	583.526	Recording Gauge, Hourly Scalings	N.O.S.

NOTE: Analog recording gauges used before May 1968. Since that date, digital recording gauges have been used at Mackinaw City.

#### 54. Gauging Station Sites (see Plate 24, page 56):

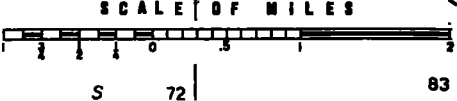
(a) May 1899 - October 1931: Recording gauge located on the north side of the Michigan Central R.R. Dock in Mackinaw City, Michigan.

(b) October 1931 - Date: Recording gauge located on the north side of the State Ferry Dock at Mackinaw City about 1250 feet from the shore.



1899-1931

1931-DATE



**WATER LEVEL GAUGE LOCATION**  
**MACKINAW CITY, MICHIGAN**  
**1899-DATE**

1976

## GAUGE HISTORY

### Harrisville, Michigan

55. Nineteen hundred and three Datum was never established at Harrisville. Elevations at Harrisville on 1935 Datum were established by water level transfer from Harbor Beach, Michigan, using gauge records for the period May through October 1948. The 1935 Datum elevation of B.M. "MAIN" at Harrisville is 594.075 feet and depends on the elevation of B.M. "HURON" at Harbor Beach as being 583.645 feet on 1935 Datum. IGLD (1955) elevations at Harrisville depend on B.M. "CURTIS" at elevation 585.851 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

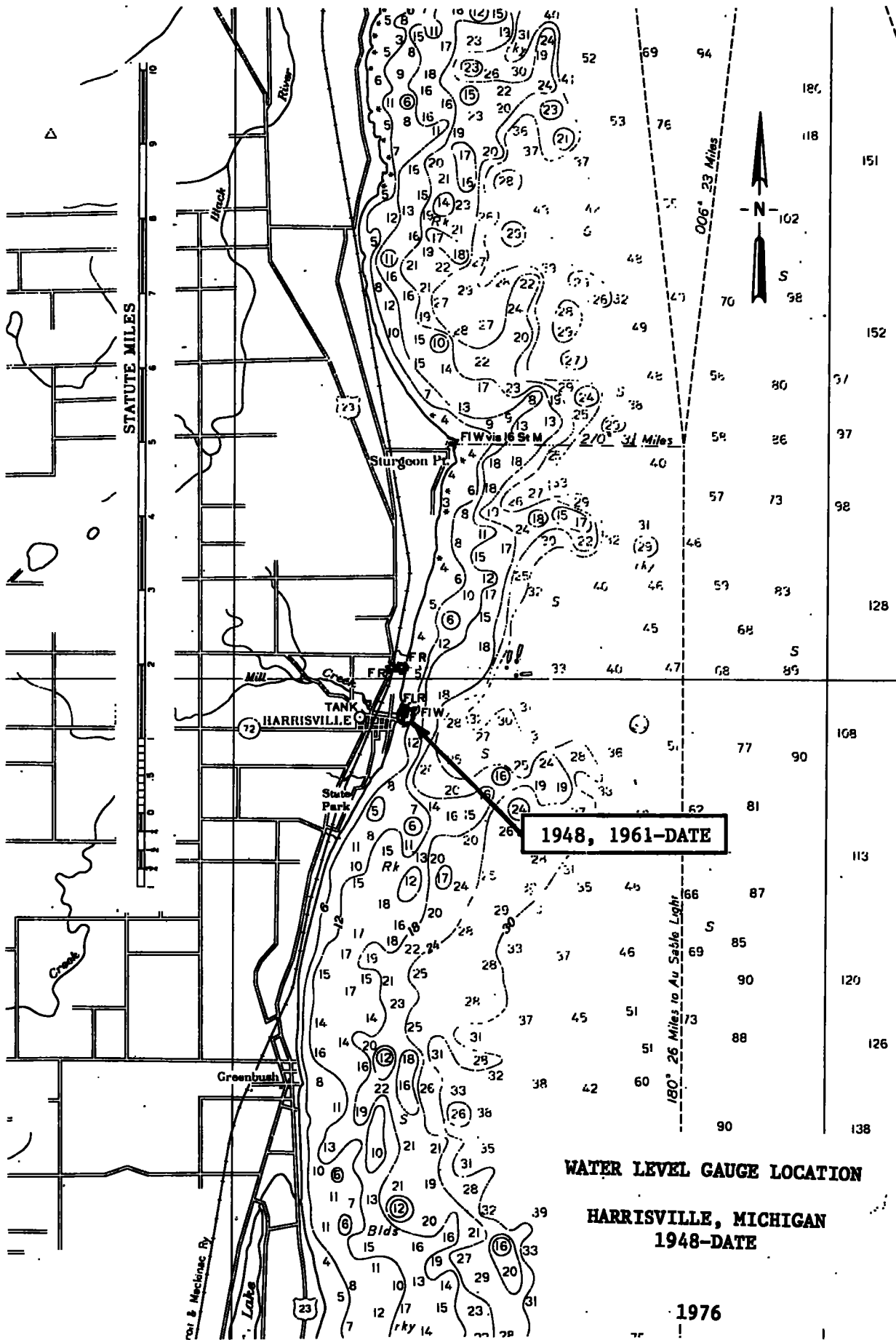
PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
May 1948 - Oct 1948	Main	592.331	Staff Gauge, Tri-Daily	U.S.L.S.
Sep 1961 - Oct 1970	Curtis	585.851	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Date	Curtis	585.851	Recording Gauge, Hourly Readings	N.O.S.

NOTE: Only analog recording gauges have been used since September 1961 at Harrisville.

#### 56. Gauging Station Sites (see Plate 25, page 58):

(a) May 1948 - October 1948: Staff gauge located on a crib near Le Clair's fish dock at the foot of Main Street in Harrisville.

(b) September 1961 - Date: Recording gauge located at the northerly end of the Harrisville Dock.



**WATER LEVEL GAUGE LOCATION**  
**HARRISVILLE, MICHIGAN**  
**1948-DATE**

1976



## GAUGE HISTORY

### Essexville, Michigan

57. 1903 Datum was never established at Essexville. Elevations at Essexville on 1935 Datum were established by water level transfer from Harbor Beach, Michigan, using recording gauge records for the period June 30 - September 15, 1935. The 1935 Datum elevation of B.M. "N.E.R.R." at Essexville is 580.534 feet and depends on the elevation of B.M. "BOULDER" at Harbor Beach as being 582.296 feet on 1935 Datum. IGLD (1955) elevations at Essexville depend on B.M. "CON" at elevation 587.146 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### C H R O N O L O G I C A L   T A B L E

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Oct 1884 - Jul 1900	Gauge Zero		Staff Gauge, Daily Means	U.S.F.O.
Jul 1915 - Nov 1915	N.E.R.R.	578.787	Staff Gauge, 4 Times Daily	U.S.L.S.
Jul 1916 - Oct 1916	N.E.R.R.	578.787	Staff Gauge, 4 Times Daily	U.S.L.S.
Jun 1935 - Sep 1935	N.E.R.R.	578.787	Recording Gauge, Hourly Readings	U.S.L.S.
Dec 1952 - Oct 1970	CON	587.146	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Date	CON	587.146	Recording Gauge, Hourly Readings	N.O.S.

NOTE: Gauge Zero elevation 579.03 feet for 1884 - 1900 period derived by comparison with Harbor Beach gauge record. Daily mean records for open water period 1884 - 1900 are broken and scattered. Analog recording gauges used in 1935 and since 1952 at Essexville.

#### 58. Gauging Station Sites (see Plate 26, page 61):

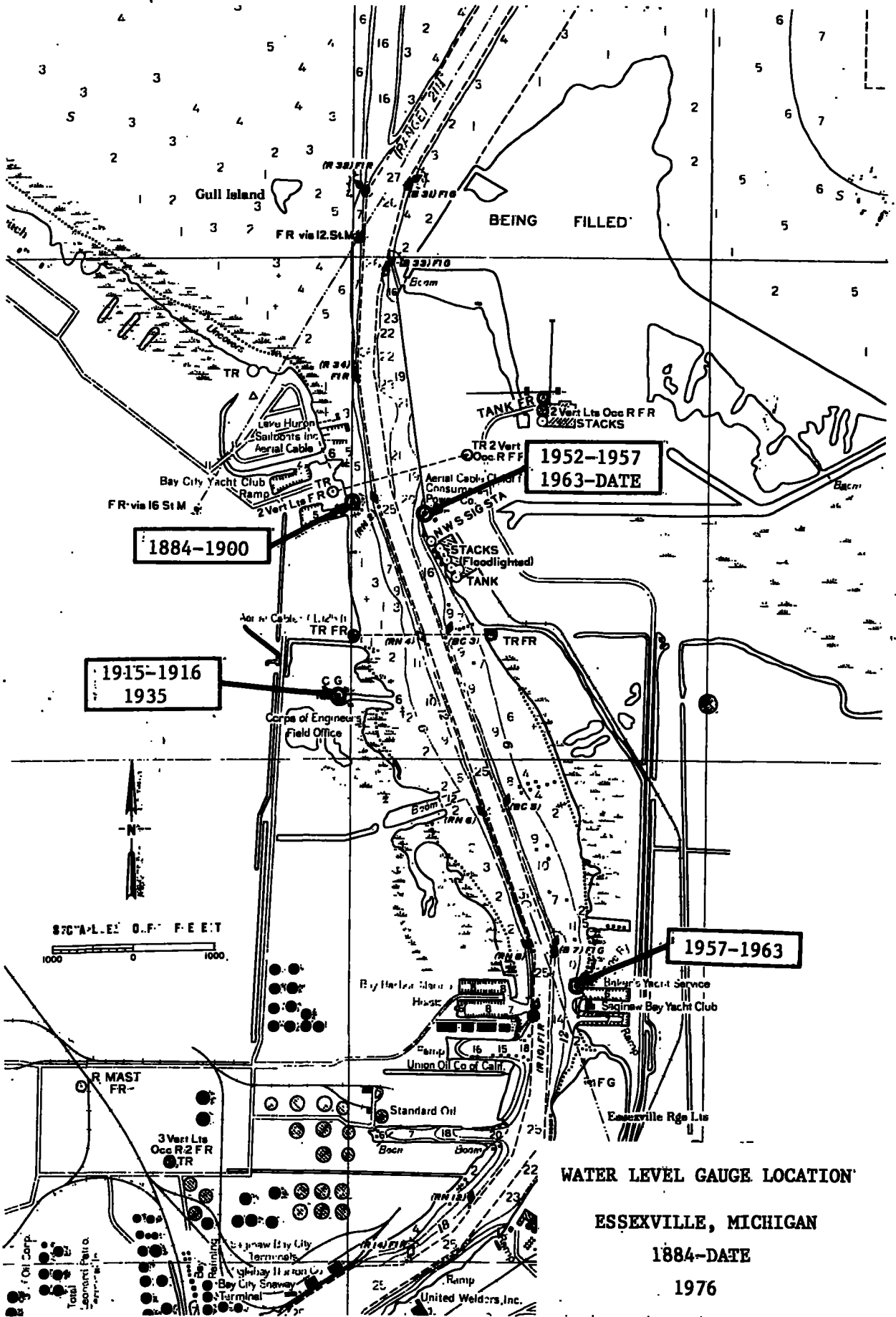
(a) October 1884 - July 1900: Staff gauges located on the Front Range Light crib at the mouth of the Saginaw River.

(b) July 1915 - September 1935: Staff and recording gauges located at the Rear Range Light near the mouth of the Saginaw River.

(c) December 1952 - May 1957: Recording gauge located on the east side of Saginaw River at the Consumers Power Company Weadock Plant near the mouth of the river.

(d) May 1957 - October 1963: Recording gauge located at Baker's Dock and Yacht Service about one mile upstream of the Weadock Plant.

(e) October 1963 - Date: Recording gauge located on the dock at the Weadock Plant.



1884-1900

1915-1916  
1935

1952-1957  
1963-DATE

1957-1963

WATER LEVEL GAUGE LOCATION

ESSEXVILLE, MICHIGAN

1884-DATE

1976

## GAUGE HISTORY

### Harbor Beach, Michigan

59. Elevations at Harbor Beach on 1903 Datum depend on B.M. "E" at elevation 583.207 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at Harbor Beach on 1935 Datum are the same as on 1903 Datum and depend on the elevation of B.M. "BOULDER" as being 582.296 feet on 1935 Datum. IGLD (1955) elevations at Harbor Beach depend on B.M. "BOULDER" at elevation 580.569 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

C H R O N O L O G I C A L   T A B L E

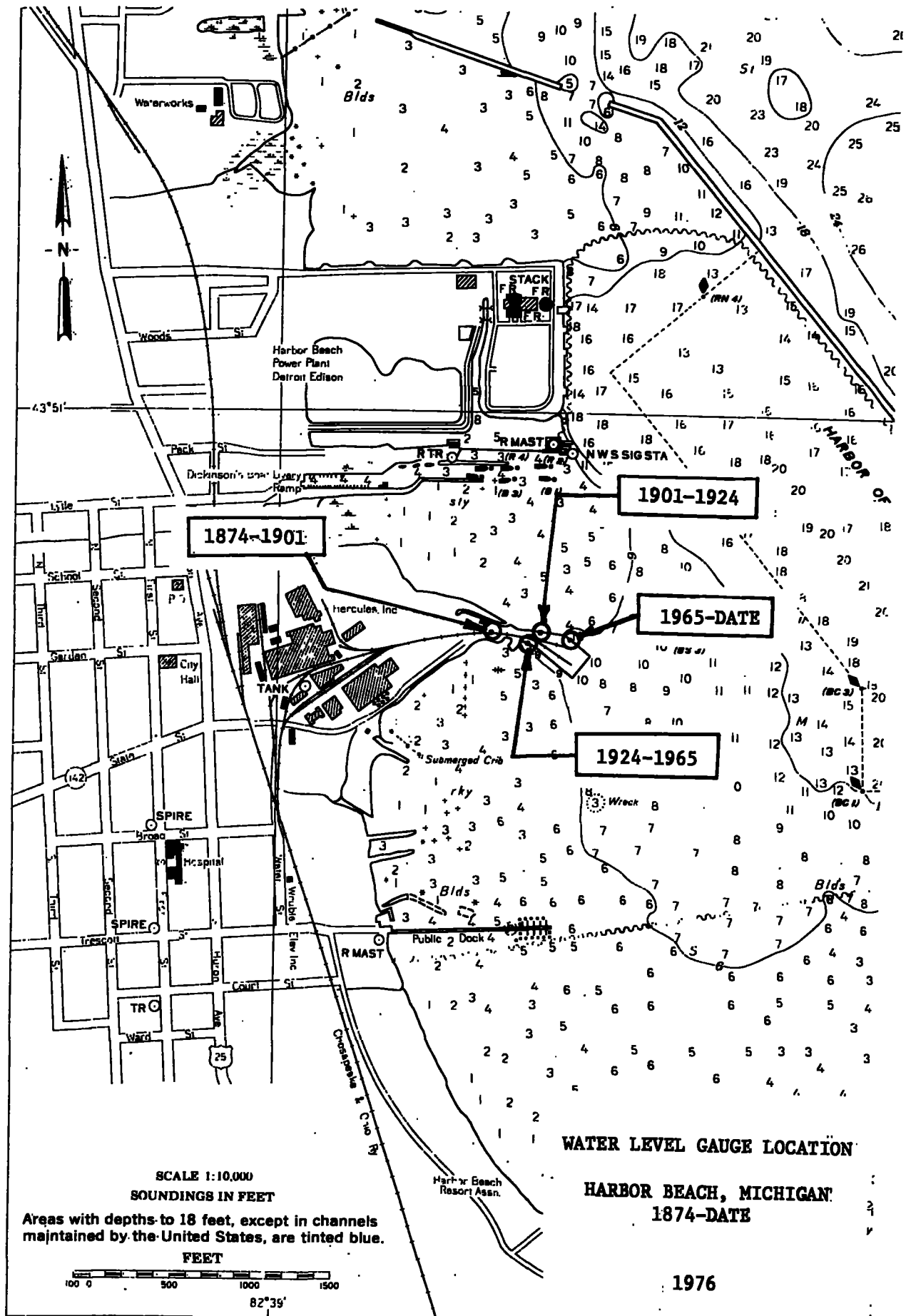
PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Sep 1874 - Mar 1901	Elevator	594.127	Staff Gauge, Monthly Means	U.S.E.O.
Mar 1901 - Oct 1919	E	581.477	Recording Gauge, Hourly Scalings	U.S.L.S.
Oct 1919 - May 1927	Eye Bar	583.127	Recording Gauge, Hourly Scalings	U.S.L.S.
May 1927 - Sep 1942	Bar	581.187	Recording Gauge, Hourly Scalings	U.S.L.S.
Sep 1942 - Oct 1970	Boulder	580.569	Recording Gauge, Hourly Scalings	U.S.L.S.
Oct 1970 - Date	Huron	581.901	Recording Gauge, Hourly Scalings	N.O.S.

NOTE: Daily means also available in December 1891 - December 1898 period. Analog recording gauges were used until May 1968, and digital recording gauges have been used since then. Telemetering service was installed in October 1973 at Harbor Beach.

#### 60. Gauging Station Sites (see Plate 27, page 63):

(a) September 1874 - March 1901: Staff gauge located on the main dock in the harbor at the foot of Garden Street extended in Harbor Beach.

(b) March 1901 - Date: Recording gauges located on the coal dock in the harbor.



SCALE 1:10,000  
 SOUNDINGS IN FEET  
 Areas with depths to 18 feet, except in channels maintained by the United States, are tinted blue.



WATER LEVEL GAUGE LOCATION

HARBOR BEACH, MICHIGAN  
 1874-DATE

1976

## GAUGE HISTORY

### Lakeport, Michigan

61. Nineteen hundred and three Datum was never established at Lakeport. Elevations at Lakeport on 1935 Datum were established by precise levels from Port Huron, Michigan, in 1937. The 1935 Datum elevation of B.M. "LAKEPORT" is 595.444 feet and depends on the elevation of B.M. "FORT GRATIOT L.H." at Port Huron as being 590.329 feet on 1935 Datum. IGLD (1955) elevations at Lakeport depend on B.M. "H-6" at elevation 601.036 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

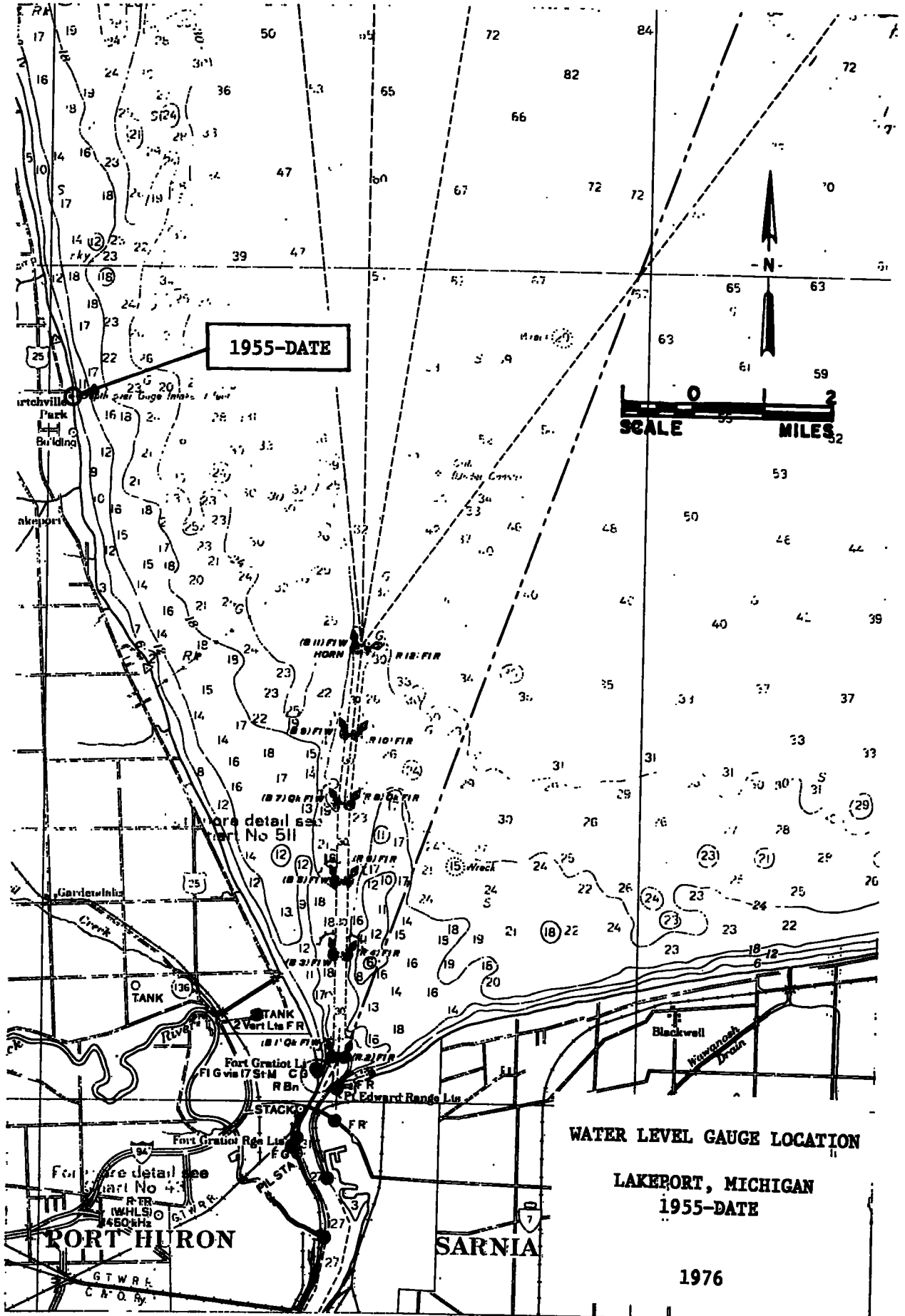
#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
May 1955 - Oct 1970	H-6	601.036	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Date	H-6	601.036	Recording Gauge, Hourly Readings	N.O.S.

NOTE: Analog recording gauges used until April 1967, and digital recording gauges after that time at Lakeport.

#### 62. Gauging Station Site (see Plate 28, page 65):

August 1955 - Date: Recording gauges in a gauge house located on the beach at the Burtchville Township Park at the north end of Lakeport, Michigan.



## GAUGE HISTORY

### Goderich, Ontario

63. Elevations on 1903 Datum at Goderich were based on a comparison of float gauge readings with water surface elevations at Harbor Beach, Michigan and at Mackinaw City, Michigan, 1910 to 1914. The 1903 Datum elevation for B.M. "STEEL RIVET" at Goderich is 588.579 feet and depends on B.M. "JENKS" at Harbor Beach as being 610.559 feet and B.M. "NO. 1" at Mackinaw City as being 590.917 feet on 1903 Datum. IGLD (1955) elevations at Goderich depend on B.M. "STEEL RIVET" at elevation 586.822 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jun 1910 - Date	Steel Rivet	586.822	Recording Gauge, Hourly Scalings	C.H.S.

NOTE: Prior to 1972 recording gauges with analog output were used; after 1972 a tel-announcing instrument and a telemetering recorder gauge with digital output every hour have been added.

#### 64. Gauging Station Sites (see Plate 29 , page 67 ):

(a) June 1910 - December 1918: Recording gauges located on south side of entrance pier on south side of harbour, between C.P.R. freight shed and Life Saving Station at Goderich, Ontario.

(b) May 1919 - February 1926: Recording gauges located over old waterworks intake well, behind new filtration basin.

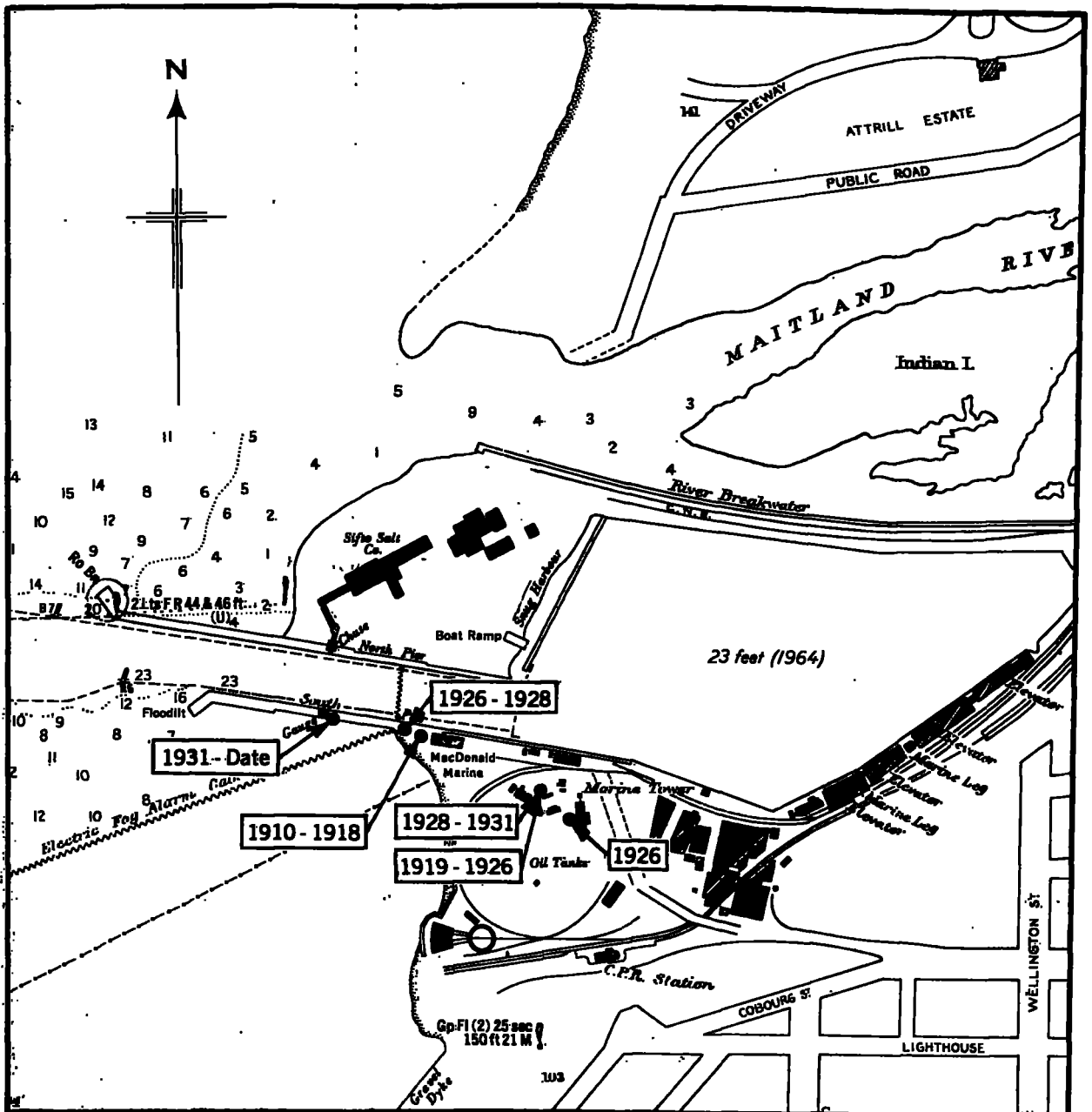
(c) February 1926 - September 1926: Recording gauges located over well inside new filtration basins behind pumping station.

(d) October 1926 - May 1928: Recording gauges located over well in south pier and about 15 feet west of Life Saving Station.

(e) May 1928 - July 1931: Recording gauges located over old waterworks intake well, behind new filtration basin.

(f) July 1931 - Date: Recording gauges located over concrete well on south side of entrance pier on south side of harbour.





**WATER LEVEL GAUGE LOCATION**

**GODERICH, ONTARIO**

1910 - DATE

1976

Scale of Feet



## GAUGE HISTORY

### Tobermory, Ontario

65. IGLD (1955) elevations at Tobermory\* depend on B.M. "101-R-2" at elevation 592.557 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

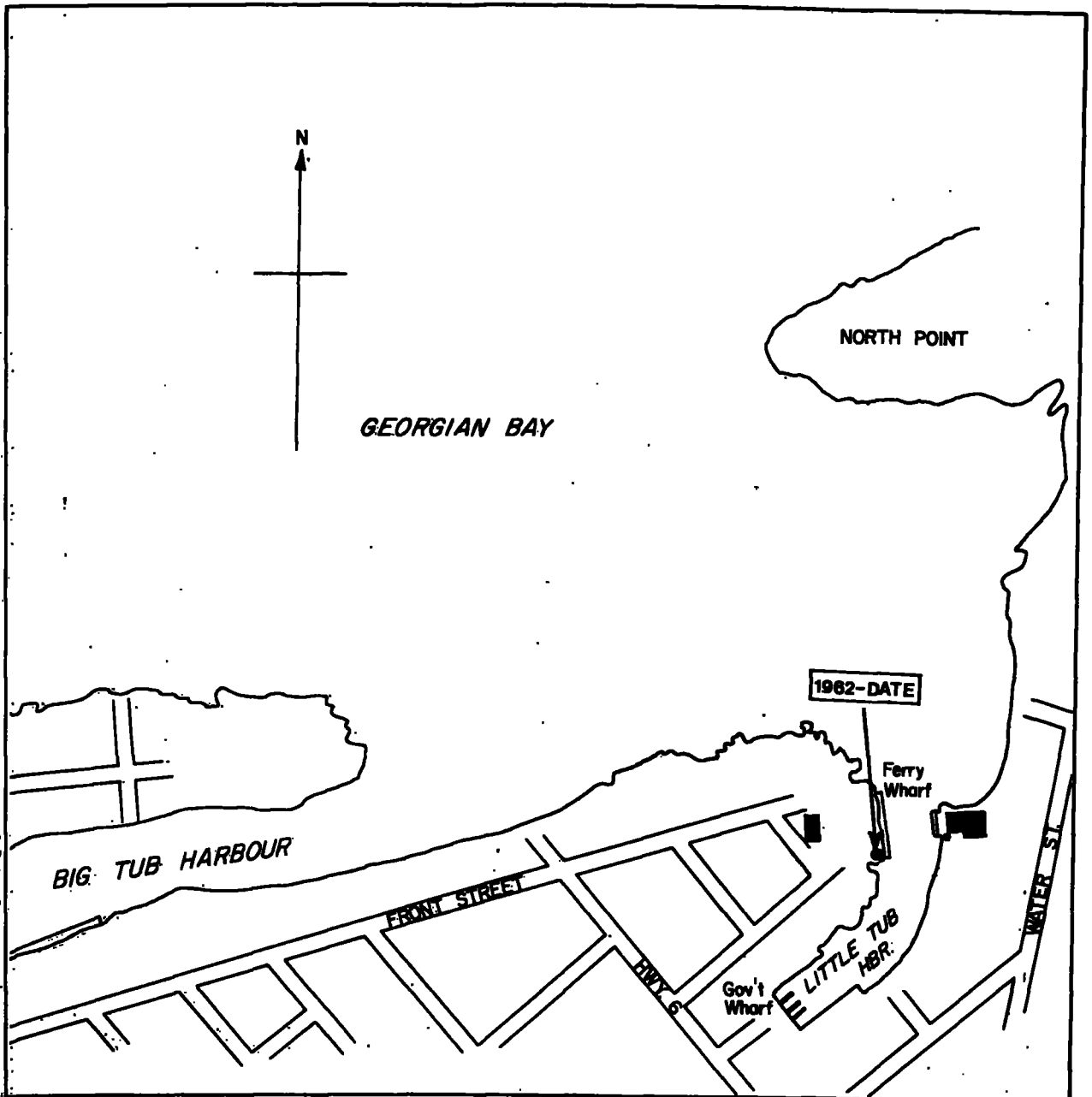
PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
May 1962 - Date	101-R-2	592.557	Recording Gauge, Hourly Readings	C.H.S.

NOTE: Prior to September 1975, recording gauges with analog records were used; after 1975 a recording gauge with digital output every 15 minutes has been added.

### 66. Gauging Station Site (see Plate 30 , page 69.):

(a) May 1962 - Date: Recording gauges located in gauge house at south end of ferry wharf; intakes to well leading from the east edge of wharf at Tobermory, Ontario.

\*1903 and 1935 Datum elevations were never established at Tobermory.



**WATER LEVEL GAUGE LOCATION**

**TOBERMORY, ONTARIO**

1962—DATE

1976

SCALE OF FEET



## GAUGE HISTORY

### Collingwood, Ontario

67. Elevations on 1903 Datum at Collingwood were based on a comparison of float gauge readings with water surface elevations at Harbor Beach, Michigan and at Mackinaw City, Michigan 1906 to 1911 and 1914. The 1903 Datum elevation for B.M. "DCLXIX" at Collingwood is 585.248 feet and depends on B.M. "JENKS" at Harbor Beach as being 610.559 feet and B.M. "NO. 1" at Mackinaw City as being 590.917 feet on 1903 Datum. IGLD (1955) elevations at Collingwood depend on B.M. "DCLXIX" at elevation 583.736 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
May 1906 - Date	DCLXIX	583.736	Recording Gauge, Hourly Scalings	C.H.S.

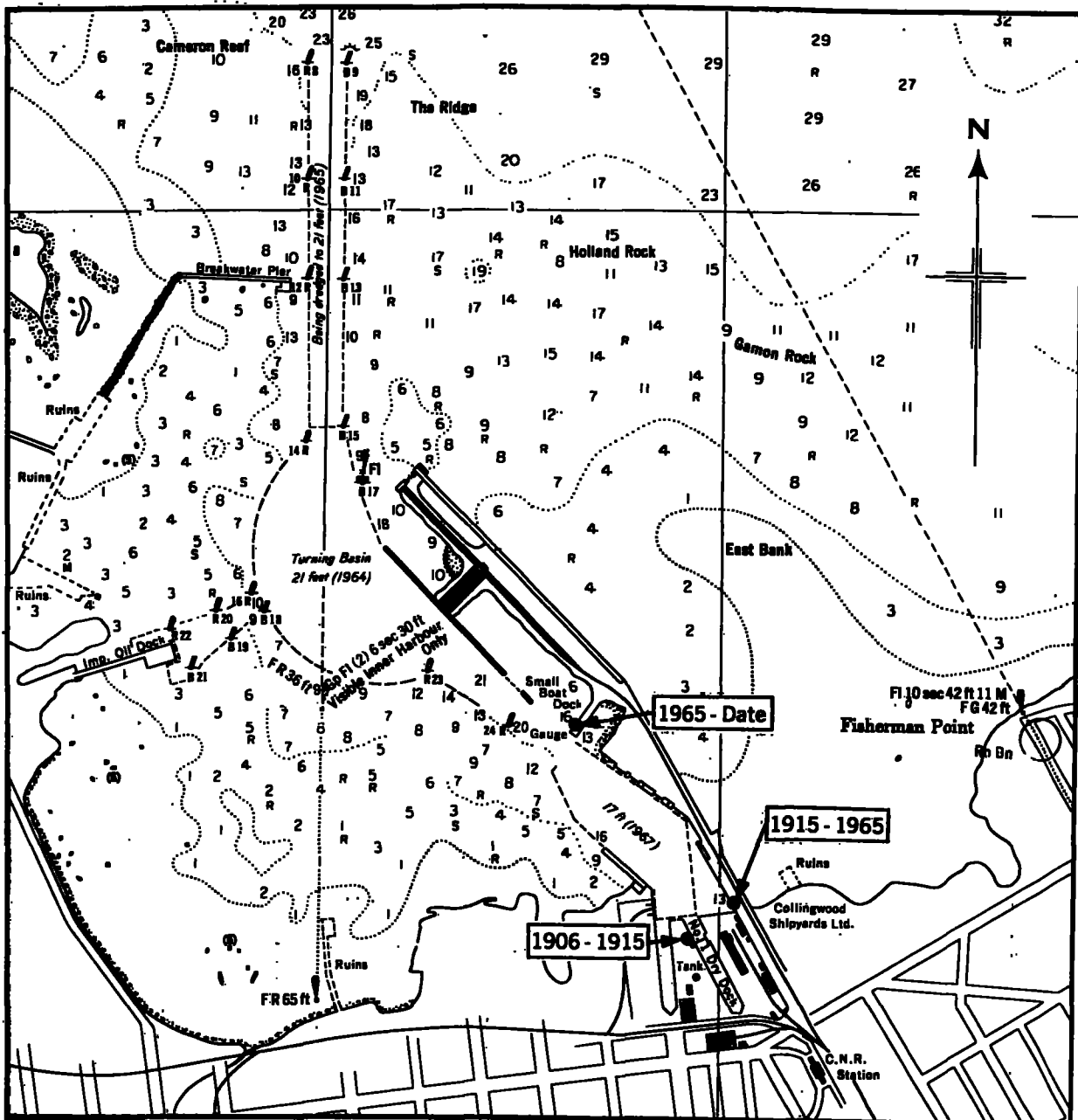
NOTE: Records 1906 - 1911 were taken during summer months only. No records available August through October 1915. Prior to 1975, recording gauges with analog output were used; after 1975 a recording gauge with digital output every 15 minutes has been added.

#### 68. Gauging Station Sites (see Plate 31 , page 71 ):

(a) May 1906 - July 1915: Recording gauge located at southeast angle of the commercial wharf inside the entrance gate to the Collingwood Shipbuilding Company's property at Collingwood, Ontario.

(b) November 1915 - May 1965: Recording gauge located in the southeast corner, inside the Collingwood Shipbuilding Company's pumphouse for the dry dock. Intake to gauge well leads from a point just outside the dry dock gate.

(c) May 1965 - Date: Recording gauge located over north side of government wharf. This wharf runs off the road leading to the Collingwood Terminals elevator.



WATER LEVEL GAUGE LOCATION  
 COLLINGWOOD, ONTARIO  
 1906 - DATE

1976

Scale of Feet



## GAUGE HISTORY

### Parry Sound, Ontario

69. Elevations on 1903 Datum at Parry Sound were established by calculations with existing Geodetic Survey of Canada Datum bench mark. The 1903 Datum elevation for B.M. "420-A" is 661.504 feet and depends on adding 0.865 to the elevation of B.M. "420-A" as being 660.639 feet on G.S.C. Datum. IGLD (1955) elevations at Parry Sound depend on B.M. "420-A" at elevation 659.797 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

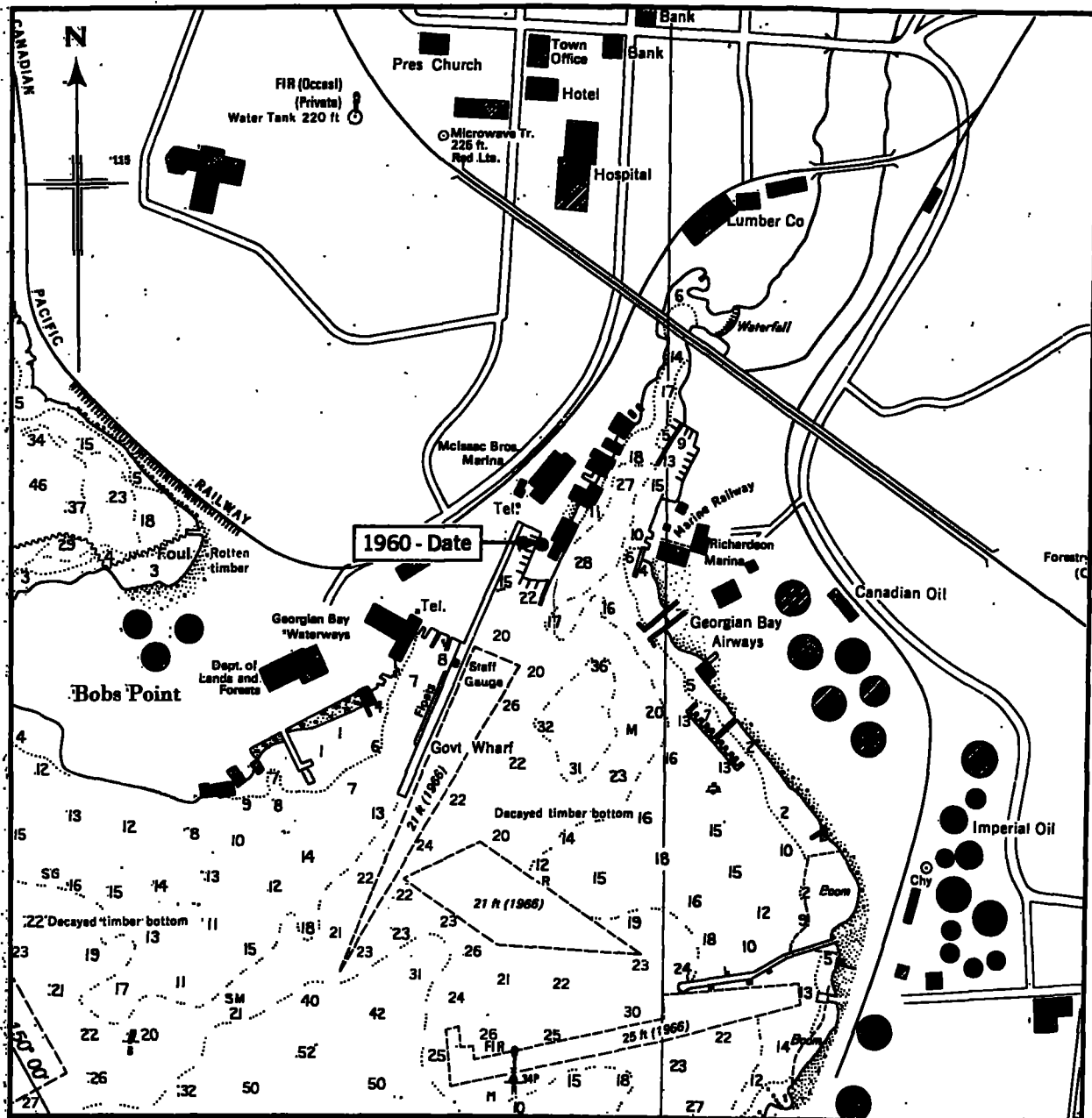
#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Mar 1960 - Date	420-A	659.797	Recording Gauge, Hourly Scalings	C.H.S.

NOTE: Prior to 1972 recording gauges with analog records were used; after 1972 a recording gauge with digital output every 15 minutes has been used.

### 70. Gauging Station Site (see Plate 32 , page 73 ):

(a) March 1960 - Date: Recording gauges located inside a standard gauge house, situated on the west side of the town wharf at Parry Sound, Ontario. Staff gauge located on government wharf approximately 400 feet south of gauge house.



**WATER LEVEL GAUGE LOCATION  
PARRY SOUND, ONTARIO  
1960 - DATE**

1976

Scale of Feet



## GAUGE HISTORY

### Little Current, Ontario

71. Elevations on 1903 Datum at Little Current were based on a comparison of float gauge readings at temporary gauge sites Little Current East and Little Current West with water surface elevations at Thessalon, Ontario, May 17 to May 31, 1959. The 1903 Datum elevation for B.M. "LICU-1" is 595.230 feet and depends on B.M. "1634" at Thessalon as being 584.515 feet on 1903 Datum. IGLD (1955) elevations at Little Current were established by using the 1962 level lines run by Geodetic Survey of Canada from Thessalon, Ontario. The IGLD (1955) elevation for B.M. "LICU-1" is 593.463 feet and depends on the elevation of B.M. "1634" at Thessalon as being 582.989 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

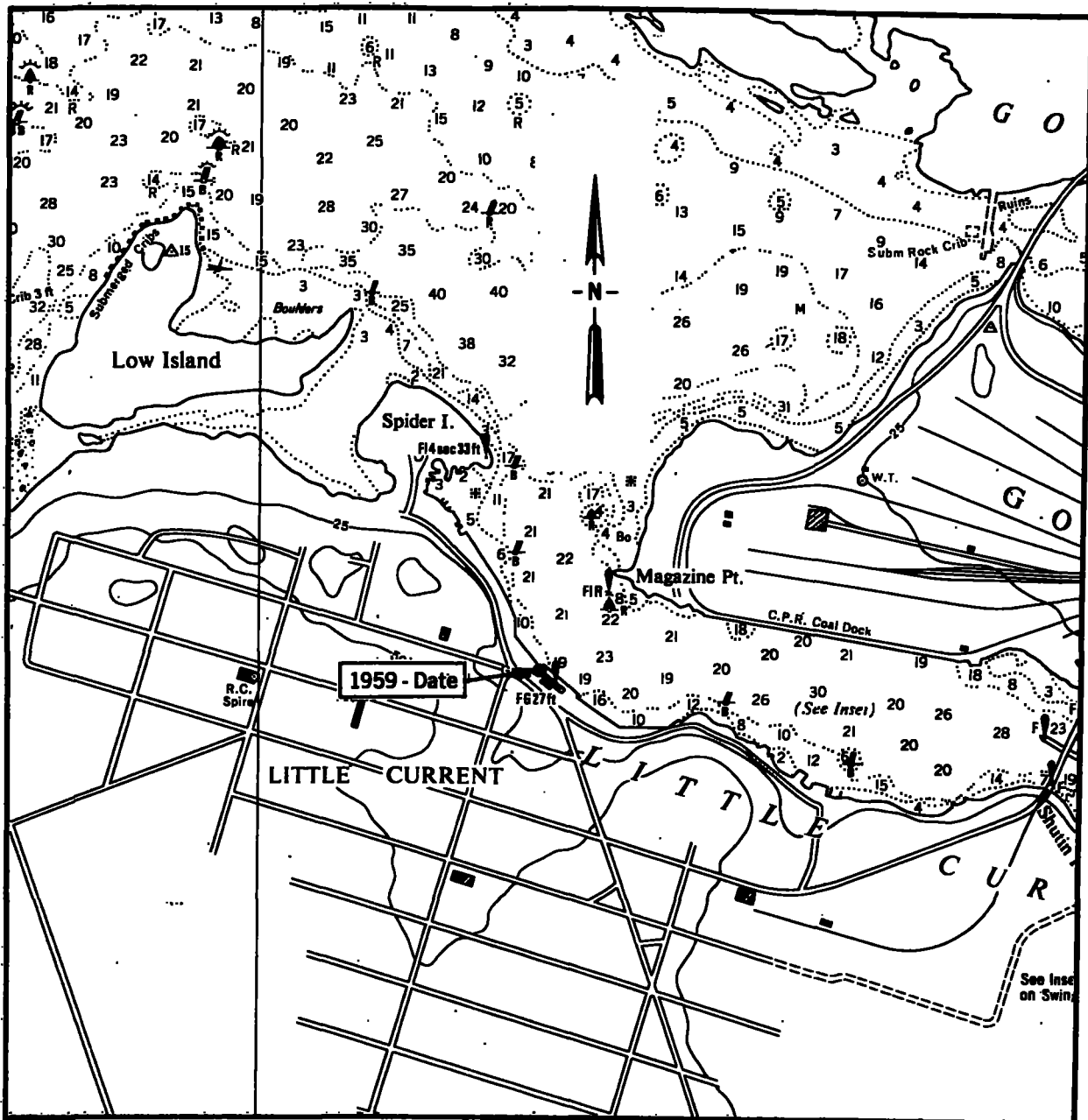
PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jun 1959 - Date	LICU-1	593.463	Recording Gauge, Hourly Readings	C.E.S.

NOTE: Prior to 1972 recording gauges with analog records were used; after 1972 a recording gauge with digital output every 15 minutes has been added.

### 72. Gauging Station Site (see Plate 33, page 75 ):

(a) June 1959 - Date: Recording gauges located inside gauge house at the west end of the concrete wharf behind the Post Office at Little Current, Ontario.





**WATER LEVEL GAUGE LOCATION  
LITTLE CURRENT, ONTARIO  
1959 - DATE**

1976

Scale of Feet



## GAUGE HISTORY

### Thessalon, Ontario

73. Elevations on 1903 Datum at Thessalon were based on a comparison of float gauge readings with water surface elevations at Harbor Beach, Michigan, 1926 - 1927, at Mackinaw City, Michigan, 1926, at Goderich, Ontario, 1926 - 1928 and at Collingwood, Ontario, 1926 - 1928. The 1903 Datum elevations for B.M. "1634" at Thessalon is 584.515 feet and depends on B.M. "JENKS" at Harbor Beach as being 610.559 feet, B.M. "NO. 1" at Mackinaw City as being 590.917 feet, B.M. "STEEL RIVET" at Goderich as being 588.579 feet and B.M. "DCLXIX" as being 585.248 feet. The IGLD (1955) elevations at Thessalon depend on B.M. "1634" at elevation 582.989 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

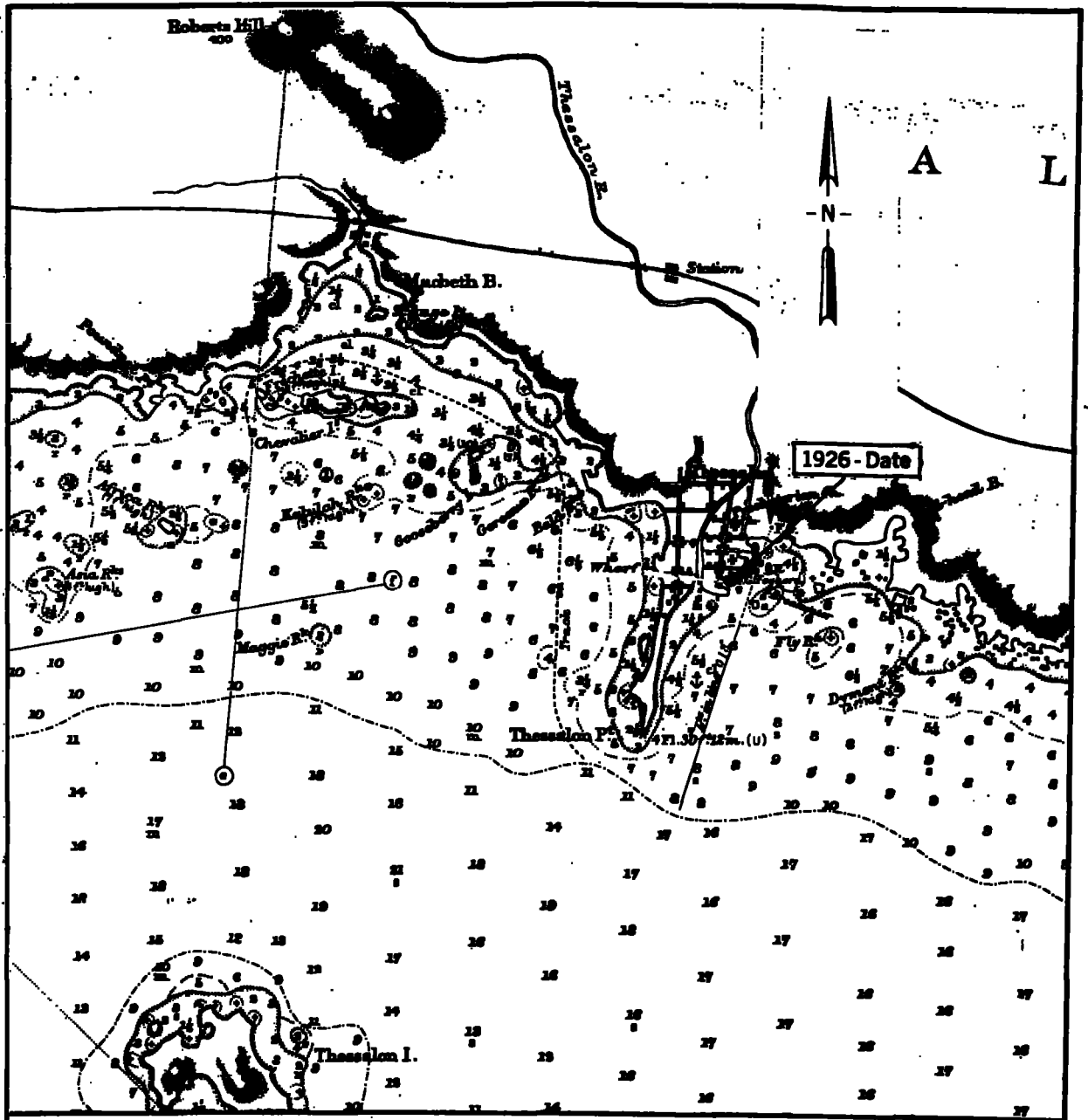
#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jun 1926 - Date	1634	582.989	Recording Gauge, Hourly Readings	C.N.S.

NOTE: Prior to 1975 recording gauges with analog records were used; after 1975 a recording gauge with digital output every 15 minutes has been added.

#### 74. Gauging Station Site (see Plate 34 , page 77 ):

(a) June 1926 - Date: Recording gauges located inside the warehouse built on cribs, on the north side of Department of Public Works concrete wharf at Thessalon, Ontario.



WATER LEVEL GAUGE LOCATION

THESSALON, ONTARIO

1926 - DATE

1976

Scale of Feet



## GAUGE HISTORY

### De Tour, Michigan

75. Elevations at De Tour on 1903 Datum depend on B.M. "TERRETT" at elevation 599.699 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at De Tour on 1935 Datum were established by water level transfer from Harbor Beach, Michigan, using recording gauge records of the summer months for the period 1934 and 1935. The 1935 Datum elevation of B.M. "TERRETT" is 599.758 feet and depends on the elevation of B.M. "HURON" at Harbor Beach as being 583.645 feet on 1935 Datum. IGLD (1955) elevations at De Tour depend on B.M. "TERRETT" at elevation 598.130 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### C H R O N O L O G I C A L   T A B L E

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Sep 1896 - Oct 1896	Terrett	598.130	Staff Gauge, Tri-Daily	U.S.L.S.
Dec 1901 - Apr 1903	Terrett	598.130	Recording Gauge, Hourly Scalings	U.S.L.S.
Jun 1934 - Oct 1936	Terrett	598.130	Recording Gauge, Hourly Scalings	U.S.E.O.
Jun 1944 - Dec 1950	Road	586.026	Staff Gauge, Twice Daily	U.S.L.S.
Jan 1951 - May 1954	Road	586.026	Staff Gauge, Tri-Daily	U.S.L.S.
Jun 1954 - Aug 1957	Road	586.026	Recording Gauge, Hourly Scalings	U.S.L.S.
Sep 1957 - Oct 1970	Road A	584.818	Recording Gauge, Hourly Scalings	U.S.L.S.
Oct 1970 - Data	Road A	584.818	Recording Gauge, Hourly Scalings	N.O.S.

NOTE: Gauge operated only during navigation season in 1934 - 1950 period. During summer months of 1899 and 1901 a staff gauge on Dawson Dock at De Tour was read at 10 and 15-minute intervals for parts of some days. Analog recording gauges were used at this site.

#### 76. Gauging Station Sites (See Plate 35, page 80):

(a) September 1896 - October 1896: Staff gauge located on the Mill Dock in De Tour, Michigan.

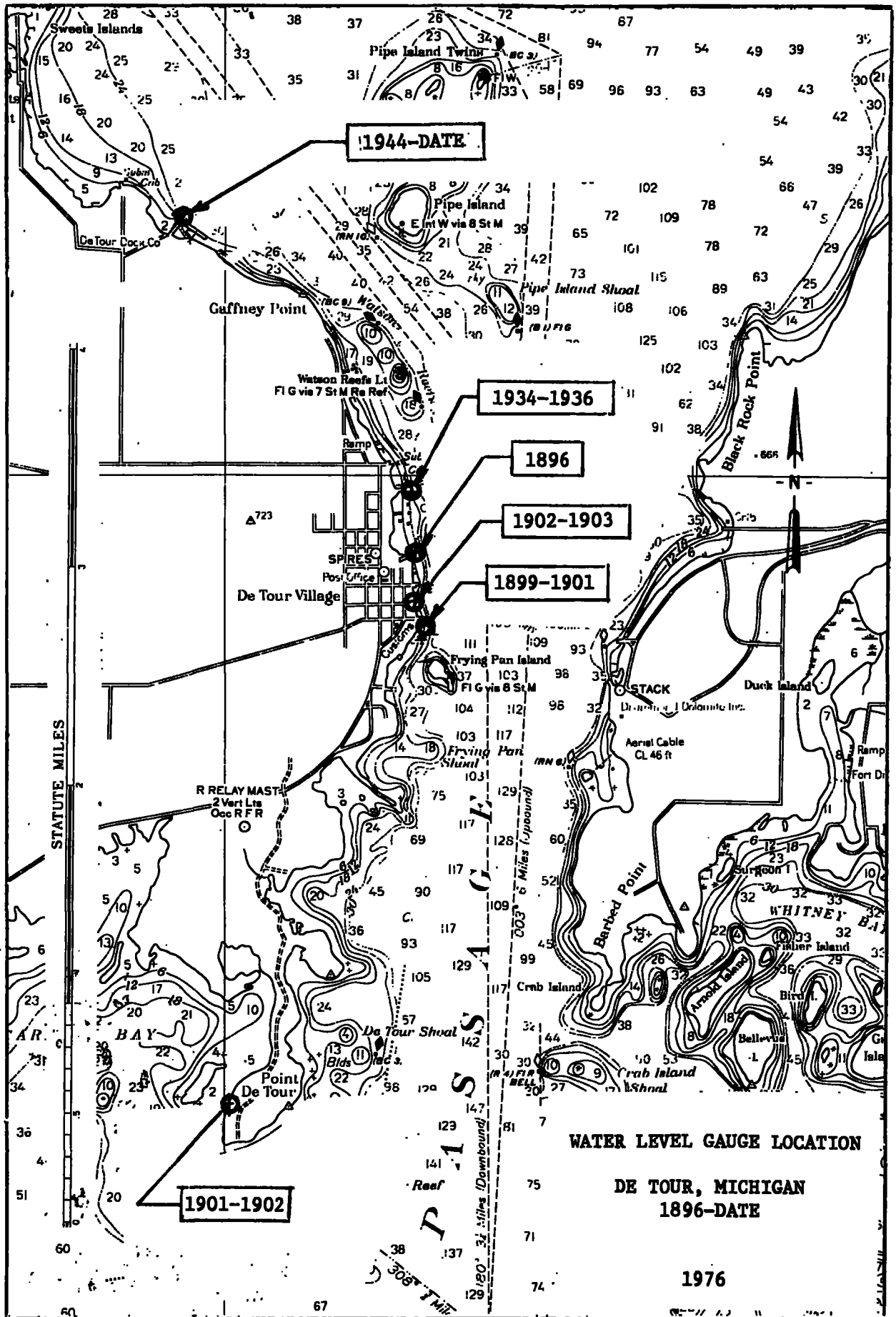
(b) June 1899 - Sept. 1901: Staff gauge located on Dawson Dock in De Tour, Michigan.

(c) December 1901 - June 1902: Recording gauge located on the west shore of De Tour Point.

(d) June 1902 - April 1903: Recording gauge located on Hitchcocks Dock in De Tour.

(e) May 1934 - October 1936: Recording gauge located on the old coal dock in DeTour.

(f) June 1944 - Date: Staff and recording gauges located on the De Tour Dock Company dock about 2-1/2 miles north of De Tour.



## GAUGE HISTORY

### Fort Gratiot, Michigan

77. Elevations at the Fort Gratiot gauge site on 1903 Datum depend on B.M. "FORT GRATIOT LIGHTHOUSE" at elevation 590.342 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at the Fort Gratiot site on 1935 Datum were established by precise levels from Monroe, Michigan. The 1935 Datum elevation of B.M. "FORT GRATIOT LIGHTHOUSE" is 590.364 feet and depends on the elevation of B.M. "REAR RANGE" at Monroe as being 579.989 feet on 1935 Datum. The 1949 Adjustment of 1935 Datum elevations between Monroe and Lexington, Michigan, gave the elevation of B.M. "FORT GRATIOT LIGHTHOUSE" as 590.329 feet. IGLD (1955) elevations at the Fort Gratiot gauge site depend on B.M. "FORT GRATIOT LIGHTHOUSE" at elevation 588.684 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Oct 1899 - Nov 1900	Ft Gratiot LH	588.684	Recording Gauge, Hourly Scalings	U.S.L.S.
May 1910 - Nov 1910	Ft Gratiot LH	588.684	Recording Gauge, Hourly Scalings	U.S.L.S.
Sep 1928 - Oct 1928	Ft Gratiot LH	588.684	Recording Gauge, Hourly Scalings	U.S.L.S.
May 1937 - Oct 1945	Ft Gratiot LH	588.684	Recording Gauge, Hourly Scalings	U.S.L.S.
Nov 1945 - Dec 1945	Ft Gratiot LH	588.684	Staff Gauge, Twice Daily	U.S.L.S.
Jan 1946 - Oct 1950	Ft Gratiot LH	588.684	Recording Gauge, Hourly Scalings	U.S.L.S.
Nov 1950 - Aug 1952	Ft Gratiot LH	588.684	Staff Gauge, Twice Daily	U.S.L.S.
Sep 1952 - Oct 1970	Ft Gratiot LH	588.684	Recording Gauge, Hourly Scalings	U.S.L.S.
Oct 1970 - Date	Ft Gratiot LH	588.684	Recording Gauge, Hourly Scalings	N.O.S.

#### 78. Gauging Station Sites (See Plate 36, page 85):

(a) October 1899 - November 1910: Analog recording gauge located about 600 feet north of the Fort Gratiot Lighthouse at Port Huron, Michigan.

(b) September 1928 - October 1928: Analog recording gauge on a crib at the foot of Riverview Avenue in Port Huron.

(c) May 1937 - August 1971: Staff and analog recording gauges located on the Fort Gratiot Coast Guard dock at Port Huron.

(d) November 1968 - Date: Digital recording gauge on the shore in a gauge house near the north property line of the Coast Guard Station.



## GAUGE HISTORY

### Point Edward, Ontario

79. Elevations on 1903 Datum at Point Edward were obtained in 1927 by level line from Fort Gratiot, Michigan. The 1903 Datum elevation for B.M. "MMMCCXLIV" is 588.680 feet and depends on the elevation of B.M. "FORT GRATIOT LIGHTHOUSE 1877" at Fort Gratiot as being 590.342 feet on 1903 Datum. IGLD (1955) elevations at Point Edward depend on B.M. "MMMCCXLIV" at elevation 587.008 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jun 1927 - Apr 1972	MMMCCXLIV	587.008	Recording Gauge, Hourly Scalings	C.H.S.
Apr 1972 - Date	PTED 1/1959	583.814	Recording Gauge, Hourly Scalings	C.H.S.

NOTE: Prior to 1972 recording gauges with analog output were used; after 1972 a recording gauge with digital output every 15 minutes has been used.

### 80. Gauging Station Sites (see Plate 36 , page 85 ):

(a) June 1927 - May 1938: Recording gauges located over well 125 feet downstream from Century Coal Company wharf and 200 feet upstream from International Boundary Monument No. 55 in Point Edward, Ontario.

(b) June 1938 - Date: Recording gauges located over well 100 feet downstream from Century Coal Company wharf and 175 feet upstream from International Boundary Monument No. 55.

## GAUGE HISTORY

### Dunn Paper, Michigan

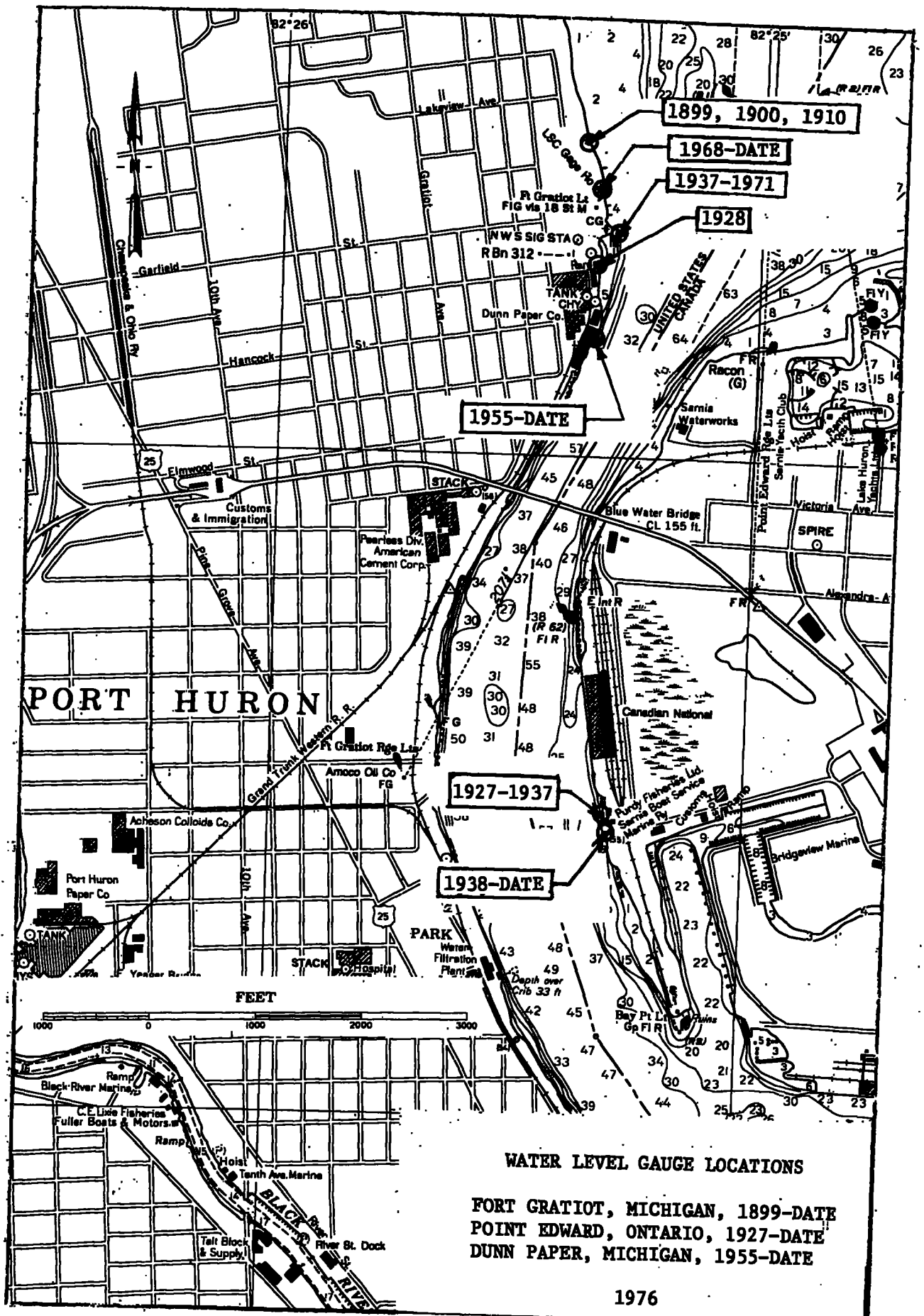
81. 1903 and 1935 Datum was never established at the Dunn Paper gauge site. The 1949 Adjustment of 1935 Datum elevations at the Dunn Paper site were established by precise levels from the Fort Gratiot gauge site in Port Huron, Michigan. The 1949 Adjustment elevation of B.M. "GORGE" is 585.268 feet and depends on the elevation of B.M. "RETAINING WALL" at Fort Gratiot as being 590.136 feet on 1949 Adjustment of 1935 Datum. IGLD (1955) elevations at Dunn Paper depend on B.M. "MALLARD" at elevation 587.238 feet.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Feb 1955 - Sep 1957	Gorge	583.622	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1957 - Oct 1961	Pumphouse	584.073	Recording Gauge, Hourly Readings	U.S.L.S.
Nov 1961 - Oct 1970	Mallard	587.238	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Date	Mallard	587.238	Recording Gauge, Hourly Readings	N.O.S.

#### 82. Gauging Station Site (See Plate 36, page 85):

(a) February 1955 - Date: Analog recording gauge located on the river face of the Dunn Paper Company dock about 1600 feet above the Blue Water Bridge at Port Huron, Michigan.



**WATER LEVEL GAUGE LOCATIONS**  
**FORT GRATIOT, MICHIGAN, 1899-DATE**  
**POINT EDWARD, ONTARIO, 1927-DATE**  
**DUNN PAPER, MICHIGAN, 1955-DATE**

1976

## GAUGE HISTORY

### Mouth of Black River, Michigan

83. Elevations at the Mouth of Black River (MBR) gauge site on 1903 Datum depend on B.M. "I" at elevation 585.361 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. 1935 Datum was never established at MBR site. The 1949 Adjustment of 1935 Datum elevations at the MBR site were established by precise levels from the Fort Gratiot gauge site in Port Huron, Michigan. The 1949 Adjustment elevation of B.M. "GULF" is 586.742 feet and depends on the elevation of B.M. "RETAINING WALL" at Fort Gratiot as being 590.136 feet on 1949 Adjustment of 1935 Datum. IGLD (1955) elevations at MBR depend on B.M. "GULF" at elevation 585.070 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### C H R O N O L O G I C A L   T A B L E

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jan 1901 - Dec 1903	I	583.676	Recording Gauge, Daily Means	U.S.L.S.
Jan 1903 - Dec 1905	I	583.676	Recording Gauge, Hourly Readings	U.S.L.S.
Nov 1908 - Oct 1910*	I	583.676	Recording Gauge, Hourly Readings	U.S.L.S.
Apr 1927 - Aug 1930*	Huron	585.205	Recording Gauge, Hourly Readings	U.S.L.S.
Nov 1952 - Mar 1955	Gulf	585.070	Staff Gauge, Tri-Daily	U.S.L.S.
Apr 1955 - Oct 1970	Gulf	585.070	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Date	Gulf	585.070	Recording Gauge, Hourly Readings	N.O.S.

\*NOTE: Gauge operated for 7 months during open water seasons 1908 - 1910 and for 11 months during open water seasons 1927 - 1930.

#### 84. Gauging Station Sites (See Plate 37, page 90):

(a) January 1901 - August 1930: Recording gauge located about 600 feet upriver from the mouth of the Black River in Port Huron, Michigan.

(b) November 1952 - Date: Staff and analog recording gauges located on the north bank of the Black River on a dock at the west side of the railroad bridge about 400 feet from the St. Clair River.

## GAUGE HISTORY

### Dry Dock, Michigan

85. Elevations at the Dry Dock gauge sites on 1903 Datum depend on B.M. "17" at elevation 596.726 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at Dry Dock on 1935 Datum were established by precise levels from Monroe, Michigan. The 1935 Datum elevation of B.M. "17" is 596.726 feet and of B.M. "GRATE BAR" is 597.242 feet, both elevations depending on the elevation of B.M. "REAR RANGE" at Monroe as being 579.989 feet on 1935 Datum. The 1949 Adjustment of 1935 Datum elevations between Monroe and Lexington, Michigan, gave the elevation of B.M. "17" as 596.691 feet and the elevation of B.M. "GRATE BAR" as 597.207 feet. IGLD (1955) elevations at the Dry Dock gauge site depend on B.M. "GRATE BAR A" at elevation 595.118 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### C H R O N O L O G I C A L   T A B L E

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Mar 1899 - Dec 1910	17	595.006	Recording Gauge, Hourly Scalings	U.S.L.S.
May 1918 - Jul 1924	17	595.006	Recording Gauge, Hourly Scalings	U.S.L.S.
Aug 1924 - Jul 1944	Grate Bar	595.522	Recording Gauge, Hourly Scalings	U.S.L.S.
Jul 1944 - Nov 1945	Wall	596.740	Recording Gauge, Hourly Scalings	U.S.L.S.
Nov 1945 - Oct 1970	Grate Bar A	595.118	Recording Gauge, Hourly Scalings	U.S.L.S.
Oct 1970 - Date	Grate Bar A	595.118	Recording Gauge, Hourly Scalings	N.O.S.

NOTE: During period from May 1918 - March 1926 gauge was operated only during the navigation season. Gauges with analog records were used before November 1967. Since that time a digital gauge with punched tape record has been used.

### 86. Gauging Station Sites (see Plate 37, page 90):

(a) March 1899 - July 1900: Recording gauge located on the downstream side of entrance to the dry dock on the St. Clair River about 2 miles below the mouth of the Black River in Port Huron, Michigan.

(b) July 1900 - May 1906: Recording gauge located on a dock at the foot of Grant Street about 1500 feet downstream of the initial site.

(c) June 1906 - November 1909: Recording gauge located at the initial site at the dry dock.

(d) May 1909 - November 1925: Recording gauge located at the Grant Street site.

(e) April 1926 - December 1927: Recording gauge located at the initial dry dock site.

(f) January 1928 - Date: Recording gauge located at the Grant Street site in Port Huron.

## GAUGE HISTORY

### Marysville, Michigan

87. 1903 Datum was never established at Marysville. Elevations on 1935 Datum were established by precise levels from Monroe, Michigan. The 1935 Datum elevation of B.M. "CREEK" is 586.320 feet and depends on the elevation of B.M. "REAR RANGE" at Monroe as being 579.989 feet on 1935 Datum. The 1949 Adjustment of 1935 Datum elevations between Monroe and Lexington, Michigan, gave the elevation of B.M. "CREEK" as 586.228 feet. IGLD (1955) elevations at Marysville depend on B.M. "CREEK" at elevation 584.495 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH-MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Nov 1924 - Jun 1925	Trolley	591.033	Staff Gauge, Tri-Daily Readings	U.S.L.S.
May 1928 - Sep 1928	Creek	584.495	Recording Gauge, Hourly Scalings	U.S.L.S.
May 1929 - Oct 1929	Creek	584.495	Recording Gauge, Hourly Scalings	U.S.L.S.
May 1947 - Nov 1947	C-20	583.666	Recording Gauge, Hourly Scalings	U.S.L.S.
Dec 1952 - Mar 1955	Creek	584.495	Staff Gauge, Tri-Daily Readings	U.S.L.S.
Feb 1955 - Apr 1962	C-20	583.666	Recording Gauge, Hourly Scalings	U.S.L.S.
Apr 1962 - Apr 1967	Creek	584.495	Recording Gauge, Hourly Scalings	U.S.L.S.
Apr 1967 - Oct 1970	C-20	583.666	Recording Gauge, Hourly Scalings	U.S.L.S.
Oct 1970 - Date	Mary	584.762	Recording Gauge, Hourly Scalings	N.O.S.

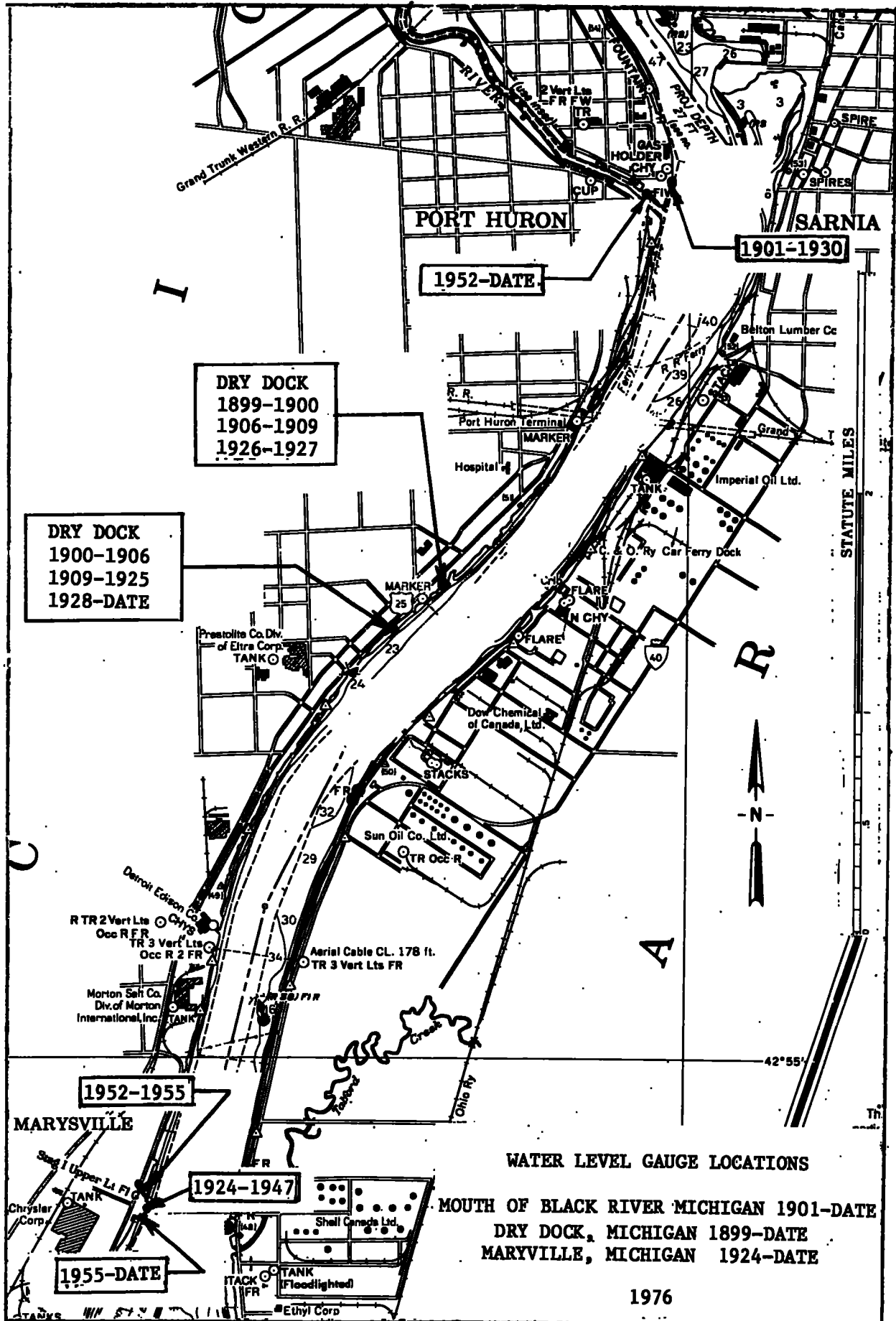
NOTE: All recording gauges at this location had analog records.

#### 88. Gauging Station Sites (see Plate 37, page 90):

(a) November 1924 - November 1947: Staff and recording gauges located on the dock at the foot of Huron Boulevard in Marysville, Michigan.

(b) December 1952 - March 1955: Staff gauge located on a dock about 600 feet upriver of the former site at Huron Boulevard.

(c) February 1955 - Date: Recording gauge located on the City Dock at the foot of Huron Boulevard in Marysville.





## GAUGE HISTORY

### St. Clair, Michigan

89. Elevations at St. Clair on 1903 Datum depend on B.M. "M" at elevation 588.758 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at St. Clair on 1935 Datum were established by precise levels from Monroe, Michigan. The 1935 Datum elevation of B.M. GAGE "M" is 588.788 feet and depends on the elevation of B.M. "BRIDGE" at Monroe as being 579.268 feet on 1935 Datum. The 1949 Adjustment of the 1935 Datum elevations between Monroe and Lexington, Michigan, gave the elevation of B.M. GAGE "M" as 588.746 feet. IGLD (1955) elevations at St. Clair depend on B.M. GAGE "M" at elevation 587.040 feet as published in Appendix A, Establishment of Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

C H R O N O L O G I C A L   T A B L E

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
May 1910 - Nov 1910	GAGE M	587.040	Recording Gauge, Hourly Scalings	U.S.L.S.
Nov 1924 - Jun 1925	GAGE M	587.040	Staff Gauge, Tri-Daily Readings	U.S.L.S.
May 1927 - Oct 1929	GAGE M	587.040	Recording Gauge, Hourly Scalings	U.S.L.S.
May 1944 - Oct 1944	GAGE M	587.040	Recording Gauge, Hourly Scalings	U.S.L.S.
May 1947 - Oct 1949	GAGE M	587.040	Recording Gauge, Hourly Scalings	U.S.L.S.
May 1950 - Dec 1953	Clair	587.194	Staff Gauge, Tri-Daily Readings	U.S.L.S.
Jan 1954 - Oct 1969	Clair	587.194	Recording Gauge, Hourly Scalings	U.S.L.S.
Oct 1969 - Oct 1970	C-30	593.142	Recording Gauge, Hourly Scalings	U.S.L.S.
Oct 1970 - Date	Cap	577.795	Recording Gauge, Hourly Scalings	N.O.S.

NOTE: During 1927 - 1949 period gauges were operated only in summer months. Before June 1970, recording gauges with analog records were used; since that time digital gauges were used.

### 90. Gauging Station Sites (see Plate 38, page 93):

(a) May 1910 - October 1929: Staff and recording gauges located at the foot of Adams Street in St. Clair, Michigan.

(b) May 1944 - December 1953: Staff and recording gauges located on Kemps Coal Dock on St. Clair River on north side of mouth of Pine River in St. Clair, Michigan.

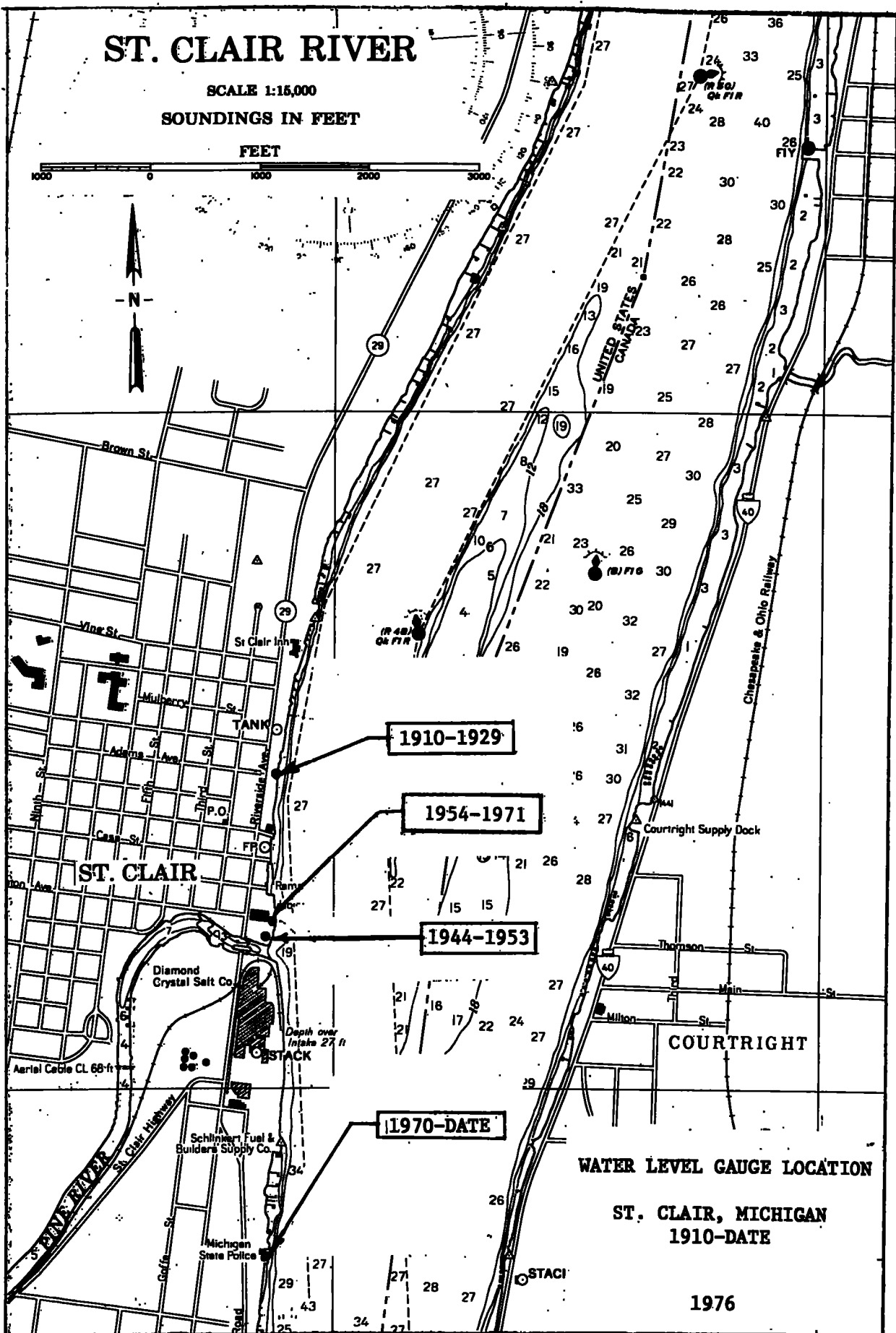
(c) January 1954 - July 1971: Recording gauge at the foot of Clinton Avenue extended in St. Clair, Michigan.

(d) June 1970 - Date: Recording gauge located about 3,000 feet downstream from the Clinton Avenue site on south side of Michigan State Police St. Clair Post property.

# ST. CLAIR RIVER

SCALE 1:15,000

SOUNDINGS IN FEET



1910-1929

1954-1971

1944-1953

1970-DATE

WATER LEVEL GAUGE LOCATION

ST. CLAIR, MICHIGAN  
1910-DATE

1976

## GAUGE HISTORY

### Roberts Landing, Michigan

91. Elevations at Roberts Landing on 1903 Datum depend on B.M. "28" at elevation 585.149 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at Roberts Landing on 1935 Datum were established by precise levels from Monroe, Michigan. The 1935 Datum elevation of B.M. "BAR NO. 5" is 583.860 feet and depends on the elevation of B.M. "BRIDGE" at Monroe as being 579.268 feet on 1935 Datum. The 1949 Adjustment of the 1935 Datum elevations between Monroe and Lexington, Michigan, gave the elevation of B.M. "BAR NO. 5" as 583.789 feet. IGLD (1955) elevations at Roberts Landing depend on B.M. "LANDING" at elevation 580.965 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

C H R O N O L O G I C A L   T A B L E

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jul 1899 - Dec 1900	C-47	580.744	Recording Gauge, Daily Means	U.S.L.S.
Jan 1903 - Apr 1905	C-47	580.744	Recording Gauge, Hourly Readings	U.S.L.S.
Nov 1908 - Dec 1908	C-47	580.744	Recording Gauge, Hourly Readings	U.S.L.S.
Nov 1909 - Dec 1909	C-47	580.744	Recording Gauge, Hourly Readings	U.S.L.S.
Apr 1910 - Dec 1910	C-47	580.744	Recording Gauge, Hourly Readings	U.S.L.S.
Aug 1924 - Mar 1946	O'Leary	576.871	Recording Gauge, Hourly Readings	U.S.L.S.
Mar 1946 - Aug 1958	Landing	580.965	Staff Gauge, Bi-Daily Readings	U.S.L.S.

NOTE: Hourly readings from recording gauge available at N.O.S. for period 5 July - 31 August 1899. Analog recording gauges were used during the periods indicated above.

### 92. Gauging Station Sites (see Plate 39, page 97):

(a) June 1899 - August 1958: Staff and recording gauges located at the St. Clair River ferry dock at Roberts Landing, Michigan.

## GAUGE HISTORY

### Port Lambton, Ontario

93. Elevations on 1903 Datum at Port Lambton were obtained in 1927 by level line from Roberts Landing, Michigan. The 1903 Datum elevation for B.M. "MMCLXXI" is 581.150 feet and B.M. "MMCLXX" is 583.950 feet and depends on the elevation of B.M. "27" at Roberts Landing as being 585.202 feet on 1903 Datum. IGLD (1955) elevations at Port Lambton depend on B.M. "MMCLXX" at elevation 582.206 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jun 1927 - Dec 1943	MMCLXXI	579.354	Recording Gauge, Hourly Scalings	C.H.S.
Jan 1944 - May 1971	MMCLXX	582.206	Recording Gauge, Hourly Scalings	C.H.S.
May 1971 - Date	POLA 1/1959	597.795	Recording Gauge, Hourly Scalings	C.H.S.

NOTE: Prior to 1970 recording gauges with analog output were used; after 1970 a recording gauge with digital output every 15 minutes has been used.

#### 94. Gauging Station Sites (see Plate 39 , page 97):

(a) June 1927 - May 1942: Recording gauges located in northeast corner at the foot of the street leading from railroad station to river in Port Lambton, Ontario.

(b) May 1942 - April 1964: Recording gauges located in northwest corner inside of Port Lambton waterworks pump house river bank.

(c) April 1964 - Date: Recording gauges located on northwest corner of new wharf: south of custom building and ferry landing.

## GAUGE HISTORY

### Algonac, Michigan

95. Elevations at Algonac on 1903 Datum depend on B.M. "28" at elevation 585.149 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at Algonac on 1935 Datum were established by precise levels from Monroe, Michigan. The 1935 Datum elevation of B.M. "28" is 585.198 feet and depends on the elevation of B.M. "BRIDGE" at Monroe as being 579.268 feet on 1935 Datum. The 1949 Adjustment of the 1935 Datum elevations between Monroe and Lexington, Michigan, gave the elevation of B.M. "28" as 585.134 feet. IGLD (1955) elevations at Algonac depend on B.M. "ZIESKE" at elevation 581.216 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

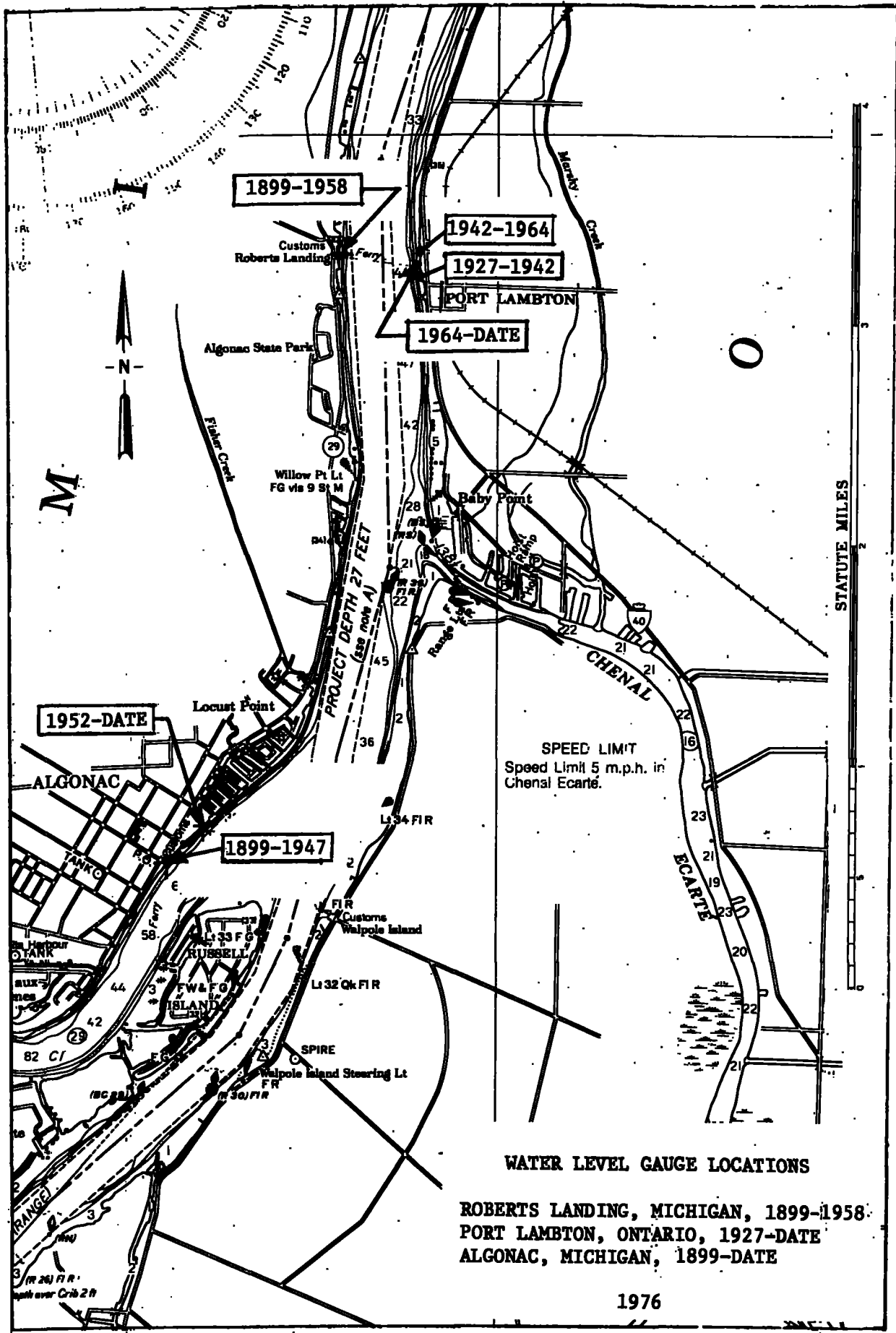
PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jul 1926 - Oct 1929	Zieske	581.216	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1947 - Nov 1947	Zieske	581.216	Staff Gauge, Tri-Daily Readings	U.S.L.S.
Aug 1952 - Oct 1970	Zieske	581.216	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Date	Zieske	581.216	Recording Gauge, Hourly Readings	N.O.S.

NOTE: Staff gauge readings depending on Controlling B.M. "28" are also available at N.O.S. taken at ten-minute intervals during the 26 June - 1 July 1899 period and once-daily during the 17 May - 5 June 1901 period. Analog recording gauges were used during the two periods listed above.

#### 96. Gauging Station Sites (see Plate 39, page 97):

(a) June 1899 - November 1947: Staff and recording gauges located at the ferry dock on the St. Clair River at Algonac, Michigan.

(b) August 1952 - Date: Recording gauge located on the the river bank at the Algonac Water Works about 1200 feet above the ferry dock.



1899-1958

1942-1964

1927-1942

PORT LAMBTON

1964-DATE

1952-DATE

1899-1947

SPEED LIMIT  
Speed Limit 5 m.p.h. in  
Chenal Ecarté.

**WATER LEVEL GAUGE LOCATIONS**

ROBERTS LANDING, MICHIGAN, 1899-1958  
PORT LAMBTON, ONTARIO, 1927-DATE  
ALGONAC, MICHIGAN, 1899-DATE

1976

## GAUGE HISTORY

### St. Clair Shores, Michigan

97. Elevations at St. Clair Shores on IGLD (1955)\* depend on B.M. "SC-30" at elevation 584.363 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Mar 1968 - Jun 1969	SC-30	584.363	Recording Gauge, Hourly Readings	U.S.L.S.
Jun 1969 - Oct 1970	Food	579.982	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Date	Food	579.982	Recording Gauge, Hourly Readings	N.O.S.

#### 98. Gauging Station Site (see Plate 40, page 100):

(a) March 1968 - Date: Digital recording gauge located at the north end of U.S. Coast Guard property on Lake St. Clair at the foot of Revere Avenue in St. Clair Shores, Michigan.

\*1903 and 1935 Datum were never established at St. Clair Shores:



## GAUGE HISTORY

### Grosse Pointes, Michigan

99. Elevations at the three gauge sites at the lower end of Lake St. Clair on 1903 Datum depend on B.M. "W" at elevation 582.760 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at Grosse Pointe Club, Joy Dock, and Grosse Pointe Yacht Club on 1935 Datum were established by precise levels from Windmill Point. The 1935 Datum elevation of B.M. "36" is 606.111 feet and of B.M. "YACHT CLUB" is 579.822 feet, and they both depend on the elevation of B.M. "W" at Windmill Point as being 582.734 feet on 1935 Datum. The 1949 Adjustment of 1935 Datum elevations between Monroe and Lexington, Michigan, gave the elevation of B.M. "36" as 606.120 feet and the elevation of B.M. "YACHT CLUB" as 579.842 feet. IGLD (1955) elevations at the lower end of Lake St. Clair depend on B.M. "36" at elevation 604.294 feet and B.M. "YACHT CLUB" at 578.020 feet as published in Appendix A, Establishment of International Great Lakes Datum published in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Apr. 1894 - Dec 1894	36	604.294	Staff Gauge, Tri-Daily Readings	U.S.E.O.
Mar. 1895 - May 1897	36	604.294	Staff Gauge, Tri-Daily Readings	U.S.E.O.
Dec 1921 - Dec 1925	36	604.294	Recording Gauge, Hourly Readings	U.S.L.S.
Jun. 1933 - Oct 1952	Yacht Club	578.020	Staff Gauge, Tri-Daily Readings	U.S.L.S.
Oct 1952 - Apr 1970	Yacht Club	578.020	Recording Gauge, Hourly Readings	U.S.L.S.

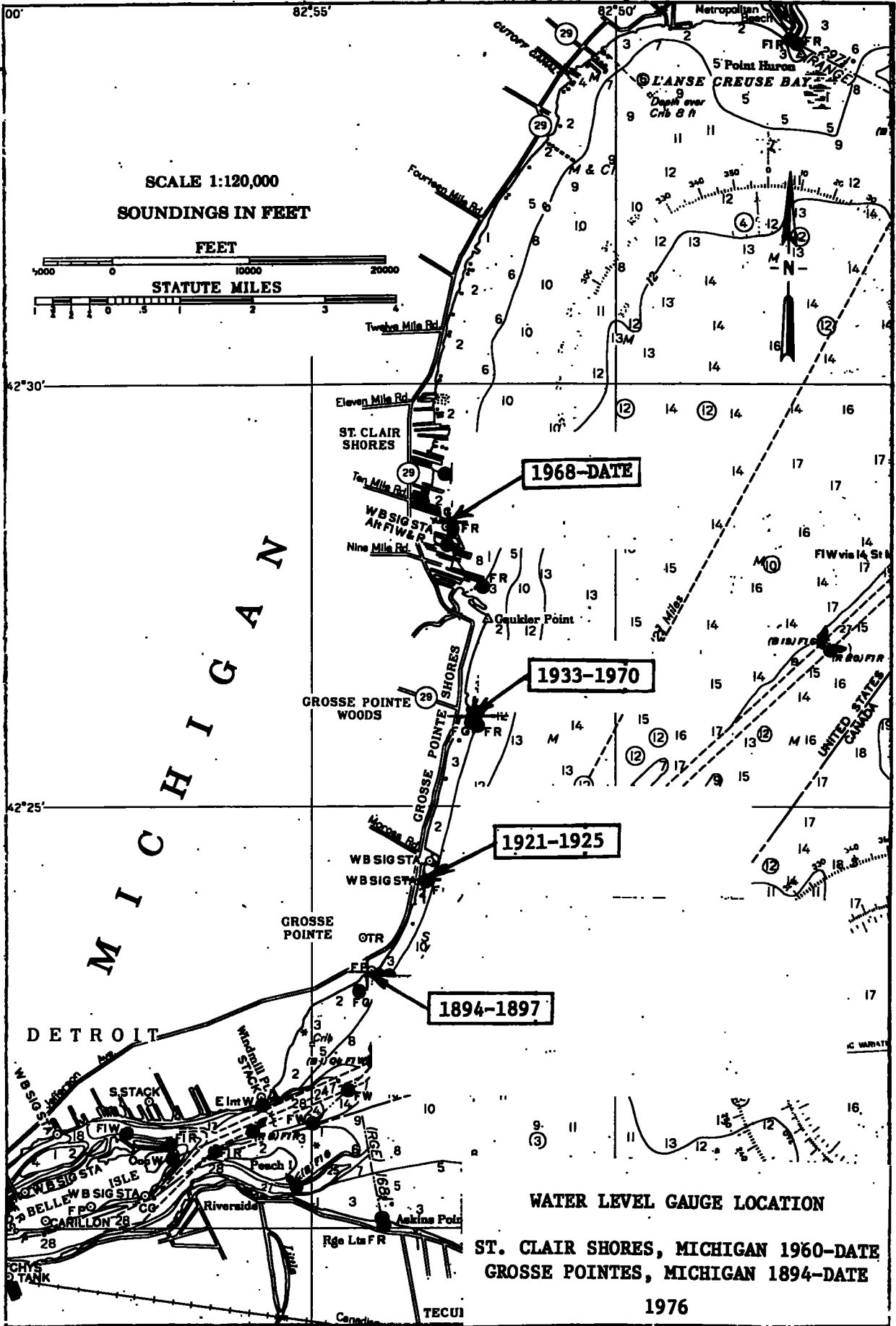
-NOTE: Recording gauges noted above had analog records.

#### 100. Gauging Station Sites (see Plate 40, page 100):

(a) April 1894 - May 1897: Staff gauge located at the Grosse Pointe Club on Lake St. Clair near the foot of Berkshire Avenue in Grosse Pointe, Michigan.

(b) December 1921 - December 1925: Recording gauge located at Joy Dock near the foot of Kerby Avenue in Grosse Pointe Farms, Michigan.

(c) June 1933 - April 1970: Staff gauge replaced in October 1952 with a recording gauge located at the Grosse Pointe Yacht Club at the foot of Vernier Road in Grosse Pointe Shores, Michigan.



## GAUGE HISTORY

### Belle River, Ontario

101. IGLD (1955)\* elevations at Belle River depend on B.M. "3061" at elevation 583.199 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Nov 1960 - Mar 1971	3061	583.199	Recording Gauge, Hourly Readings	C.N.S.
Apr 1971 - Date	BELL 1	578.733	Recording Gauge, Hourly Readings	C.N.S.

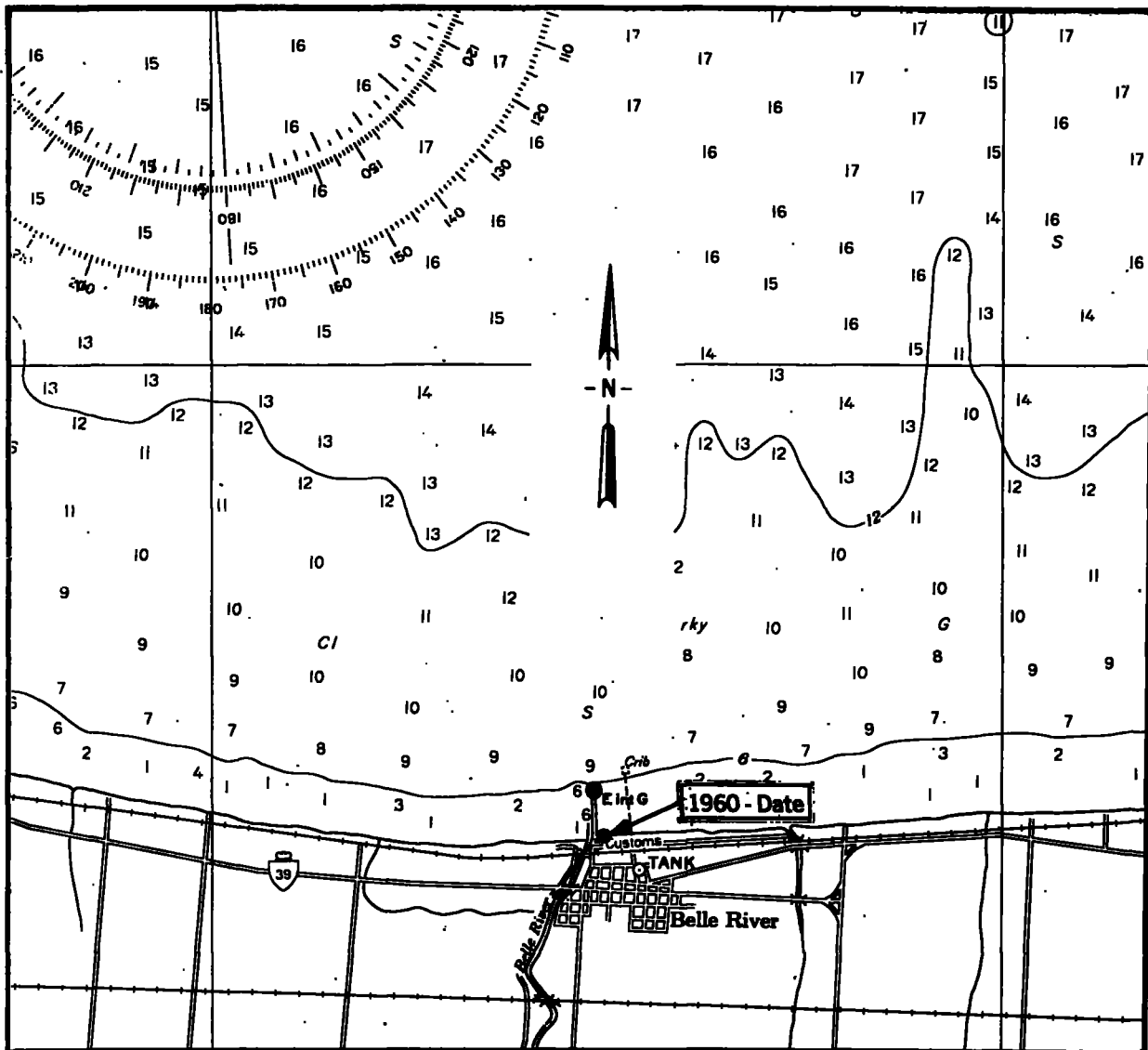
NOTE: Prior to 1971 recording gauges with analog output were used; after 1971 a recording gauge with digital output every 15 minutes has been used. Since December 1975 a tel-announcer and a telemetering recorder gauge with digital output every hour have been added.

#### 102. Gauging Station Sites (see Plate 41, page 102):

(a) November 1960 - November 1975: Recording gauges located on the eastern retaining wall where the Belle River enters Lake St. Clair, 600 feet north of the railway bridge in Belle River, Ontario.

(b) December 1975 - Date: Recording gauges located on the eastern retaining wall where the Belle River enters Lake St. Clair, at north side of railway bridge.

\*1903 and 1935 Datums were never established at Belle River.



**WATER LEVEL GAUGE LOCATION  
 BELLE RIVER, ONTARIO  
 1960 - DATE**

1976

Scale of Feet



## GAUGE HISTORY

### Tecumseh, Ontario

103. Elevations on 1903 Datum at Tecumseh were obtained in 1912 by level line and water surface transfer from Windmill Point, Michigan. The 1903 Datum elevation for B.M. "PLUG" is 576.754 feet and depends on the elevation of B.M. "NO. 12" at Windmill Point as being 584.220 feet on 1903 Datum. Elevation on 1903 Datum for B.M. "MMDLXXI" at Tecumseh is 579.551 feet and was obtained in 1926 by direct levelling from B.M. "PLUG." IGLD (1955) elevations at Tecumseh depend on B.M. "MMDLXXI" at elevation 577.723 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Dec 1926 - Dec 1968	MMDLXXI	577.723	Recording Gauge, Hourly Scalings	C.H.S.
Jan 1969 - Date	TECU 2	577.843	Recording Gauge, Hourly Scalings	C.H.S.

NOTE: Prior to 1969 recording gauges with analog output were used; after 1969 a recording gauge with digital output every 15 minutes has been used.

### 104. Gauging Station Site (see Plate 42 , page 106):

(a) December 1926 - Date: Recording gauges located over the northeast corner of the new intake well for the Tecumseh Waterworks Pumping Station on Riverside Drive in Riverside, Ontario.

## GAUGE HISTORY

### Windmill Point, Michigan

105. Elevations at Windmill Point gauge site on 1903 Datum depend on B.M. "W" at elevation 582.760 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at Windmill Point on 1935 Datum were established by precise levels from Monroe, Michigan. The 1935 Datum elevation of B.M. "W" is 582.734 feet and depends on the elevation of B.M. "BRIDGE" at Monroe as being 579.268 feet on 1935 Datum. IGLD (1955) elevations at Windmill Point depend on B.M. "D-1" at elevation 582.889 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jun 1897 - May 1940	W	580.917	Staff Gauge, Tri-Daily Readings	U.S.L.S.
Jun 1940 - Dec 1951	D-1	582.889	Staff Gauge, Tri-Daily Readings	U.S.L.S.
Jan 1952 - Oct 1970	D-1	582.889	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Date	D-1	582.889	Recording Gauge, Hourly Readings	N.O.S.

NOTE: Analog recording gauges were used before March 1968. Since that time a digital gauge with punched tape has been used at Windmill Point.

#### 106. Gauging Station Sites (see Plate 42, page 106):

(a) June 1897 - December 1910: Staff gauge located on the Old Lighthouse dock near the foot of Alter Road in Detroit, Michigan.

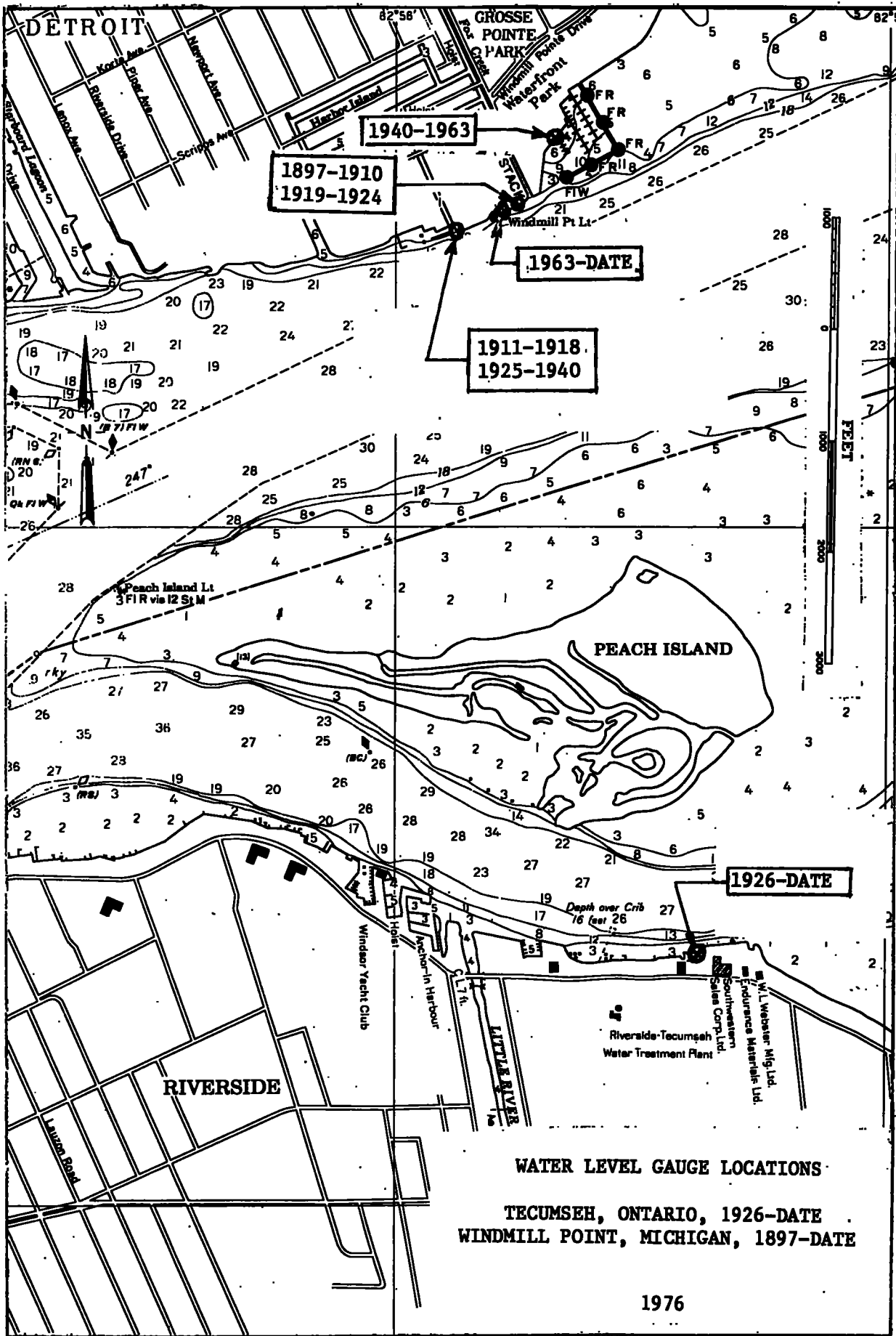
(b) January 1911 - June 1919: Staff gauge located about 400 feet downstream of the Old Lighthouse dock.

(c) June 1919 - December 1924: Staff gauge located on the Old Lighthouse dock near the foot of Alter Road.

(d) January 1925 - May 1940: Staff gauge located about 400 feet downriver from the Old Lighthouse dock.

(e) May 1940 - December 1963: Staff and recording gauges located on the Waterfront Park dock in Grosse Pointe Park, Michigan, about 500 feet upstream of the Old Lighthouse dock.

(f) December 1963 - Date: Recording gauge located at the Windmill Point Light near the foot of Alter Road in Detroit.



**WATER LEVEL GAUGE LOCATIONS**  
**TECUMSEH, ONTARIO, 1926-DATE**  
**WINDMILL POINT, MICHIGAN, 1897-DATE**

1976



## GAUGE HISTORY

### Fort Wayne, Michigan

107. Elevations at Fort Wayne gauge site on 1903 Datum depend on B.M. "8" at elevation 601.508 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at the Fort Wayne site on 1935 Datum were established by precise levels from Monroe, Michigan. The 1935 Datum elevation of B.M. "CORNER" is 581.207 feet and depends on the elevation of B.M. "BRIDGE" at Monroe as being 579.268 feet on 1935 Datum. IGLD (1955) elevations at Fort Wayne depend on B.M. "FORT" at elevation 586.636 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

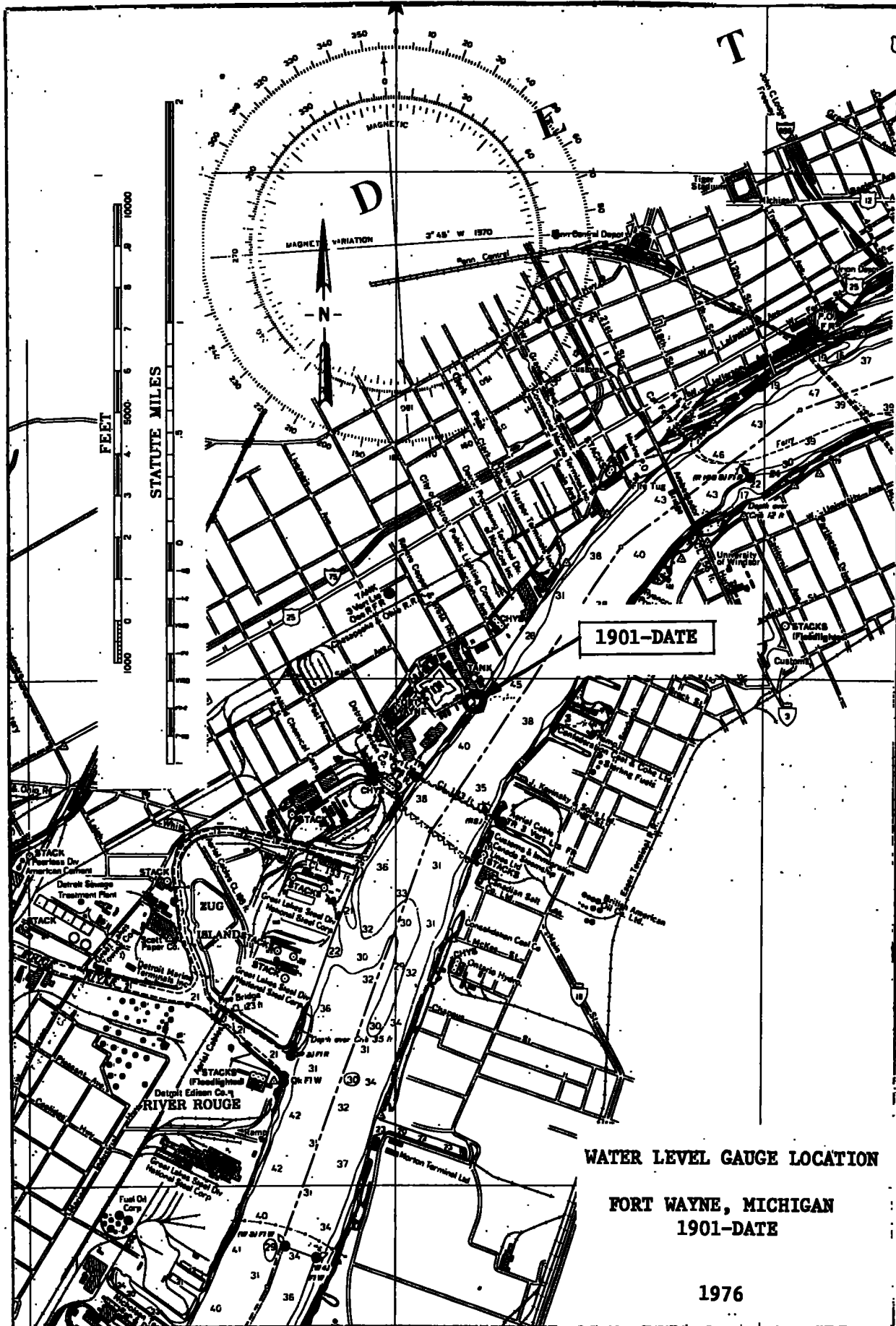
PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jul 1901 - Nov 1901	8	599.643	Staff Gauge, Tri-Daily Readings	U.S.L.S.
Jul 1902 - Oct 1902	8	599.643	Staff Gauge, Tri-Daily Readings	U.S.L.S.
Oct 1905 - Apr 1908	8	599.643	Recording Gauge, Hourly Scalings	U.S.L.S.
May 1908 - Dec 1938	Corner	579.380	Recording Gauge, Hourly Scalings	U.S.L.S.
Jan 1939 - Jul 1944	Corner	579.380	Staff Gauge, Tri-Daily Readings	U.S.L.S.
Aug 1944 - Mar 1945	Corner	579.380	Recording Gauge, Hourly Scalings	U.S.L.S.
Mar 1945 - Oct 1970	Fort	586.636	Recording Gauge, Hourly Scalings	U.S.L.S.
Oct 1970 - Date	Fort	586.636	Recording Gauge, Hourly Scalings	N.O.S.

NOTE: Analog recording gauges were used before November 1968. Since that time a digital gauge with punched tape has been used at the Fort Wayne site.

108. Gauging Station Sites (see Plate 43, page 109):

(a) July 1901 - May 1970: Staff and recording gauges located on the bank of the Detroit River at the north end of the Fort Wayne Reservation at the foot of Livernois Avenue in Detroit, Michigan.

(b) November 1968 - Date: Recording gauge on the bank of the river near the north boundary of Fort Wayne Reservation about 100 feet upstream of the old site.



1901-DATE

WATER LEVEL GAUGE LOCATION  
 FORT WAYNE, MICHIGAN  
 1901-DATE

1976

## GAUGE HISTORY

### La Salle, Ontario

109. Elevations on 1903 Datum at La Salle were obtained in 1925 by level line and water surface transfer from Fighting Island, Michigan. The 1903 Datum elevation for B.M. "BENOIT" at La Salle is 585.285 feet and depends on B.M. "BRASS PLUG" at Fighting Island as being 580.155 feet on 1903 Datum. IGLD (1955) elevations at La Salle depend on B.M. "BENOIT" at elevation 583.207 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Oct 1925 - Dec 1968	Benoit	583.207	Recording Gauge, Hourly Readings	C.H.S.
Jan 1969 - Date	MMDXLVIII	579.153	Recording Gauge, Hourly Readings	C.H.S.

NOTE: Prior to 1969 recording gauges with analog output were used; after 1969 a recording gauge with digital output every 15 minutes has been used.

#### 110. Gauging Station Sites (see Plate 44 , page 113):

(a) October 1925 - July 1964: Recording gauges located over a well at the outer end, upstream side, of Mayrand dredge cut. Mayrand cut is 0.2 miles west of the Conklin Lumber Company yard on Highway No. 18 in La Salle, Ontario.

(b) August 1964 - Date: Recording gauges located on the river bank at the west end of Gladstone Avenue.

## GAUGE HISTORY

### Wyandotte, Michigan

111. Elevations at Wyandotte on 1903 Datum depend on B.M "4" at elevation 585.737 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at Wyandotte on 1935 Datum were established by precise levels from Monroe, Michigan. The 1935 Datum elevation of B.M. "HLM 90" is 578.089 feet and depends on the elevation of B.M. "BRIDGE" at Monroe as being 579.268 feet on 1935 Datum. IGLD (1955) elevations at Wyandotte depend on B.M. "MEYERS" at elevation 575.609 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
May 1930 - Oct 1930	Orange	575.985	Recording Gauge, Hourly Readings	U.S.L.S.
May 1933 - Oct 1935	HLM 90	576.182	Recording Gauge, Hourly Readings	U.S.L.S.
May 1936 - Oct 1939	HLM 90	576.182	Staff Gauge, Tri-Daily Readings	U.S.L.S.
May 1941 - Sep 1941	Meyers	575.609	Recording Gauge, Hourly Readings	U.S.L.S.
May 1944 - Oct 1944	Meyers	575.609	Recording Gauge, Hourly Readings	U.S.L.S.
May 1945 - Oct 1951	Meyers	575.609	Staff Gauge, Tri-Daily Readings	U.S.L.S.
May 1952 - Apr 1956	Meyers	575.609	Staff Gauge, Tri-Daily Readings	U.S.L.S.
Apr 1957 - Nov 1964	Meyers	575.609	Recording Gauge, Hourly Readings	U.S.L.S.
Dec 1964 - Oct 1970	Chief	577.176	Recording Gauge, Hourly Readings	U.S.L.S.
Oct 1970 - Data	Chief	577.176	Recording Gauge, Hourly Readings	N.O.S.

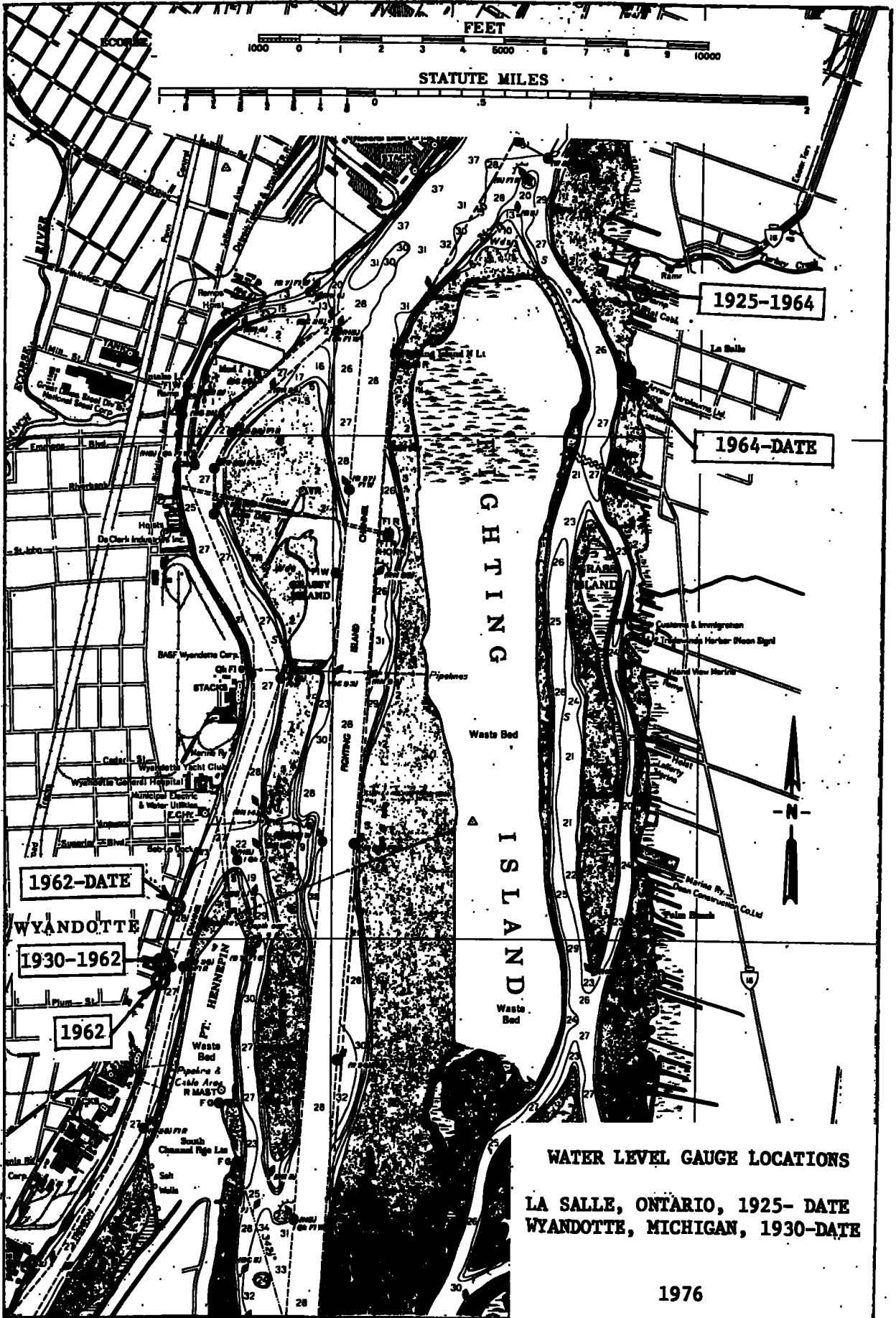
**NOTE:** Staff gauges before 1952 were generally operated during the May-October period. Analog recording gauges were used before April 1968. Since that time a digital gauge with punched tape has been used at Wyandotte.

112. Gauging Station Sites (see Plate 44, page 113):

(a) May 1930 - April 1962: Staff and recording gauges located in Detroit River at the foot of Orange Street, Wyandotte, Michigan.

(b) April 1962 - December 1962: Recording gauge located at the foot of Pine Street.

(c) April 1962 - Date: Recording gauge located on the bank of the Detroit River between Oak and Elm Streets.



1925-1964

1964-DATE

1962-DATE

1930-1962

1962

**WATER LEVEL GAUGE LOCATIONS**  
**LA SALLE, ONTARIO, 1925- DATE**  
**WYANDOTTE, MICHIGAN, 1930-DATE**

1976

## GAUGE HISTORY

### Amherstburg, Ontario

113. Elevations on 1903 Datum at Amherstburg were established by calculation with existing Geodetic Survey of Canada Datum benchmark. The 1903 Datum elevation for B.M. "RHEAUME" is 595.779 feet and depends on adding 1.09 to the elevation of B.M. "RHEAUME" as being 594.689 feet on G.S.C. Datum. IGLD (1955) elevations at Amherstburg depend on B.M. "RHEAUME" at elevation 593.860 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

#### CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Jan 1960 - Dec 1968	Rheume	593.860	Recording Gauge, Hourly Scalings	C.E.S.
Jan 1969 - Date	3019	585.108	Recording Gauge, Hourly Scalings	C.E.S.

NOTE: Prior to 1969 recording gauges with analog output were used; after 1969 a recording gauge with digital output every 15 minutes has been used.

#### 114. Gauging Station Site (see Plate 45, page 117):

(a) January 1960 - Date: Recording gauges located in the Wyandotte Indian Cemetery, which is approximately three miles north of the town of Amherstburg, Ontario.



GAUGE HISTORY

Gibraltar, Michigan

115. Elevations at Gibraltar on 1903 Datum depend on B.M. "GIBRALTAR" at elevation 582.528 feet as published in Appendix FFF, Annual Report of the Chief of Engineers for 1903. Elevations at Gibraltar on 1935 Datum were established by precise levels from Monroe, Michigan. The 1935 Datum elevation of B.M. "GIBRALTAR" is 582.566 feet and depends on the elevation of B.M. "BRIDGE" at Monroe as being 579.268 feet on 1935 Datum. IGLD (1955) elevations at Gibraltar depend on B.M. "GIBRALTAR" at elevation 580.718 feet as published in Appendix A, Establishment of International Great Lakes Datum (1955) prepared in September 1961 by the Coordinating Committee.

CHRONOLOGICAL TABLE

PERIOD	CONTROLLING BENCH MARK	IGLD (1955) ELEVATION	TYPE OF RECORD	AGENCY
Apr 1909 - Jul 1909	No. 1	585.771	Recording Gauge, Hourly Scalings	U.S.E.O.
May 1930 - Nov 1930	Gibraltar	580.718	Recording Gauge, Hourly Scalings	U.S.L.S.
Apr 1932 - Nov 1932	Gibraltar	580.718	Recording Gauge, Hourly Scalings	U.S.L.S.
Apr 1933 - Nov 1933	D-54	582.793	Recording Gauge, Hourly Scalings	U.S.L.S.
Apr 1937 - Oct 1970	D-54	582.793	Recording Gauge, Hourly Scalings	U.S.L.S.
Oct 1970 - Date	D-54	582.793	Recording Gauge, Hourly Scalings	N.O.S.

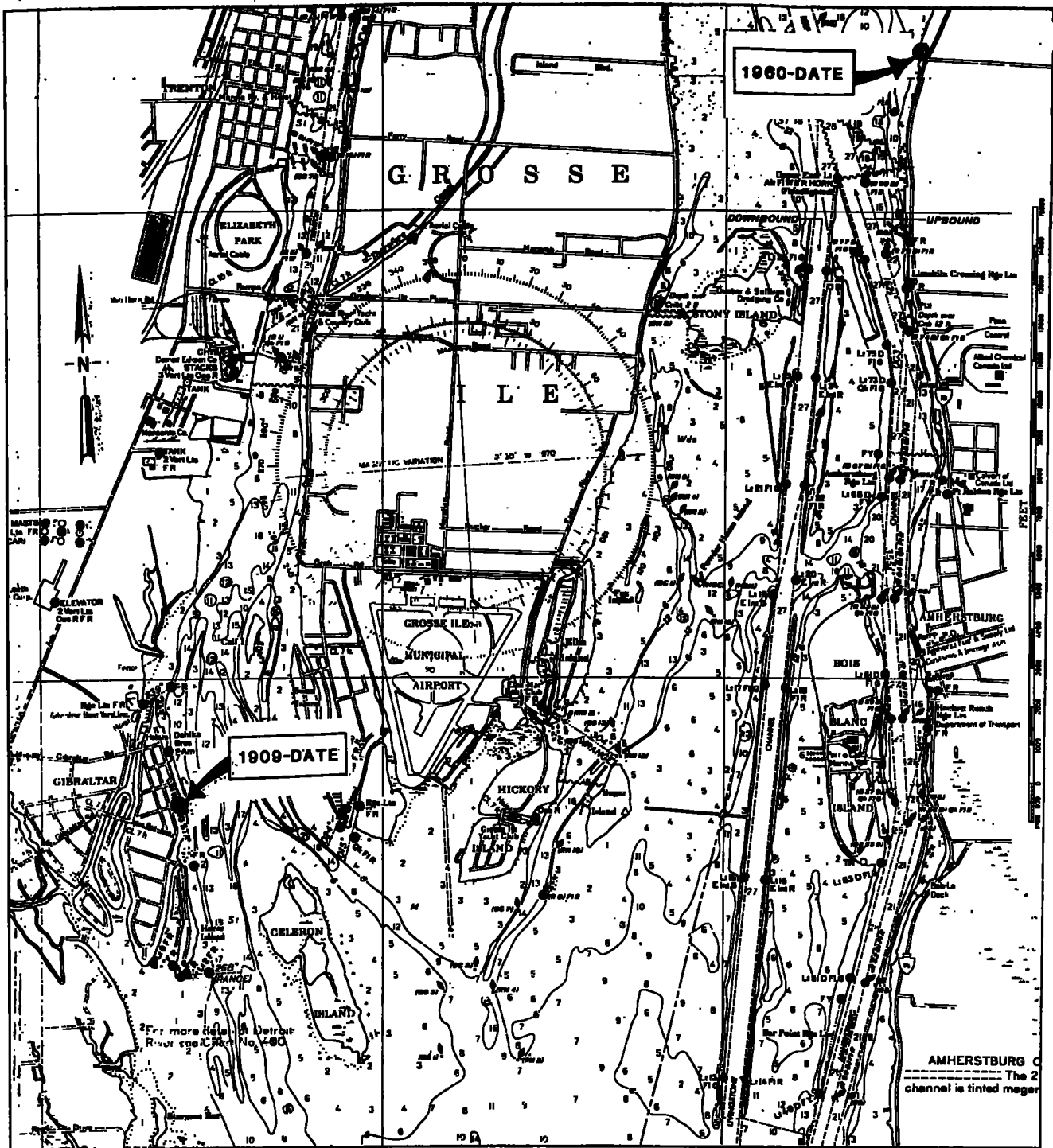
NOTE: Ten-minute readings of staff gauge are also available at N.O.S. for 6 days in October 1898 and during the 26 June - 1 July 1899 period. Analog recording gauges were used before May 1969. Since that time a digital gauge with punched tape has been used at Gibraltar.

116. Gauging Station Sites (see Plate 45, page 117):

(a) April 1909 - July 1909: Recording gauge on the south face of Hall's Dock in the Detroit River at the foot of Grandview Avenue in Gibraltar, Michigan.

(b) May 1930 - January 1940: Recording gauge on the north face of Hall's Dock at the foot of Grandview Avenue.

(c) May 1940 - Date: Recording gauge located on the river bank at the foot of Grandview Avenue.



**WATER LEVEL GAUGE LOCATION**

**AMHERSTBURG, ONTARIO, 1960-DATE**

**GIBRALTAR, MICHIGAN, 1909-DATE**

1976

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