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U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Environmental Research Laboratories

Lake Huron Beginning-of-Month Water Levels and Monthly Rates of Change of Storage

FRANK H. QUINN

BOULDER, COLO.
JULY 1975

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(GLERL Contribution No. 34)

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LAKE HURON BEGINNING-OF-MONTH WATER LEVELS AND MONTHLY RATES OF CHANGE OF STORAGE

Frank H. Quinn

This report describes the results of a study of Lake Huron beginning-of-month water levels and monthly changes of storage. The study established that the number and distribution of water level gages in the presently existing gage network is adequate for the computation of beginning-of-month water levels. Computed beginning-of-month water levels and changes of storage for the period 1900-1973 are listed for use in scientific and planning studies.

1. INTRODUCTION

A study of the Lake Huron beginning-of-month water levels was undertaken to provide information necessary for lake studies concerning hydrology, beach and shore erosion, navigation, and hydroelectric power and lake regulation. The monthly changes of storage, which are computed from the beginning-of-month levels from two consecutive months, are utilized in water budget studies such as the determination of lake evaporation rates and net ground water influx into the lakes.

Initial consideration was given to the 1950-1970 time base since it contains a sufficient number of water level gages to analyze the effect of the gage network size on the beginning-of-month level computations. This period is also significant as it includes the modern record high lake levels of 1952 as well as the record lows of 1964.

The Thiessen polygon procedure was used to compute the beginning-of-month lake levels. This is the technique commonly used by hydrologists to obtain a weighted average (a representative basin value) of point source measurements of precipitation within a basin. The Thiessen polygon procedure provides a better overall representative lake level than straight averaging and at the same time standardizes a procedure for computing these levels.

Results of the initial study revealed that the Thiessen polygon procedure was adequate and should be used in quantifying the data for the years prior to 1950, i.e., for the 1900-1949 period. Further, it showed that the presently existing gage network is adequate for updating the data in the future. Therefore, this report has quantified beginning-of-month levels and rates of change of lake storage data for the period of 1900-1973 as presented in section 3.

2. METHODOLOGY

2.1 Mathematical Procedure

The beginning-of-month water levels for Lake Huron were computed using a water level gage network located on the periphery of the Lake. Ideally, these beginning-of-month levels should represent the instantaneous levels at the beginning of the months. Practically, however, representative instantaneous true water levels are difficult, if not impossible, to measure because of the effect of short-term fluctuations in wind speed and direction and changes in atmospheric pressure over very small time periods. These fluctuations could cause considerable error in computing a true instantaneous level for the Lake. This error is lessened by specifying that the beginning-of-month level for each gage shall be equal to the average of the daily mean water levels of the first day of the month and the last day of the previous month.

The computations procedure was set forth by Quinn (1971) and consists of applying weighting factors to each water level gage in the network. The weighting factors were computed from Thiessen polygon networks drawn from the various water level gage networks. This is expressed mathematically as

$$L_o = W_1L_1 + W_2L_2 + W_3L_3 + \ldots\ldots + W_nL_n$$

$$\text{for } W_1 + W_2 + W_3 + \ldots\ldots W_n = 1.0$$

where L_o is the weighted Lake Huron beginning-of-month water level,
L_1-L_n are the beginning-of-month levels at the various gage locations,
W_1-W_n are the Thiessen polygon weighting factors for gage locations,
n is the number of water level gages in the network.

The basic data used consist of daily mean water levels for the first and last days of the months for each water level gage in operation. These levels were computed from the gages using sampling rates varying from hourly values in the current period to tri-daily readings in the early nineteen hundreds. The gage response time of less than 1 minute is sufficient to filter out wind waves and ship effects but maintain the longer period variations. The water level gages used in the study, along with their period of record, are given in table 1, and their location is shown in figure 1. Occasional missing gage data were interpolated from existing gages.

In the initial analysis five different gage networks were developed for the 1950-1970 period to determine the optimum network size as well as to quantify a data set for this period. For obtaining a quantified data set for the period 1900-1949, additional two, three, and four gage networks were established. The Thiessen polygons were drawn and weighting factors computed for their gages in the various networks. These networks with their corresponding gages and weighting factors are given in table 2. The Thiessen polygons for the 3-9 gage networks are shown on figures 2-5.

Table 1. Water Level Gages and Period of Record

Gage Location	Period of Record (daily means)
Harbor Beach	1892-1973
Mackinaw City	1899-1973
Collingwood	1906-1973
Goderich	1910-1973
Thessalon	1926-1973
De Tour	1951-1973
Essexville	1953-1973
Lakeport	1955-1973
Harrisville	1961-1973

2.2 Gages Not Used

Three additional gages were investigated for inclusion in the Thiessen polygon networks, but were rejected because of apparent gage datum problems. These gages (at Parry Sound, Tobermory, and Little Current) indicated beginning-of-month water levels ranging from 0.29 to 0.52 feet higher than the nine gage beginning-of-month levels for the 1963 to 1973 period. In addition, the apparent water level differences between the above three gages used in the study were not constant with time, but varied in an erratic manner.

Table 2. Gage Networks and Weighting Factors

Gage	2 Gage Network 1900-1973	3 Gage Network 1916-1973	4 Gage Network 1920-1973	5 Gage Network 1928-1973	6 Gage Network 1951-1973	7 Gage Network 1953-1973	8 Gage Network 1954-1973	9 Gage Network 1963-1973
Harbor Beach	0.500	0.527	0.360	0.360	0.360	0.325	0.309	0.099
Mackinaw City	0.500	0.228	0.228	0.169	0.018	0.018	0.018	0.018
Collingwood		0.245	0.245	0.245	0.245	0.245	0.245	0.245
Goderich			0.167	0.167	0.167	0.167	0.149	0.126
Thessalon				0.059	0.059	0.059	0.059	0.059
De Tour					0.151	0.151	0.151	0.115
Essexville						0.035	0.035	0.032
Lakeport							0.034	0.034
Harrisville								0.272

Figure 1. Water level gage locations.

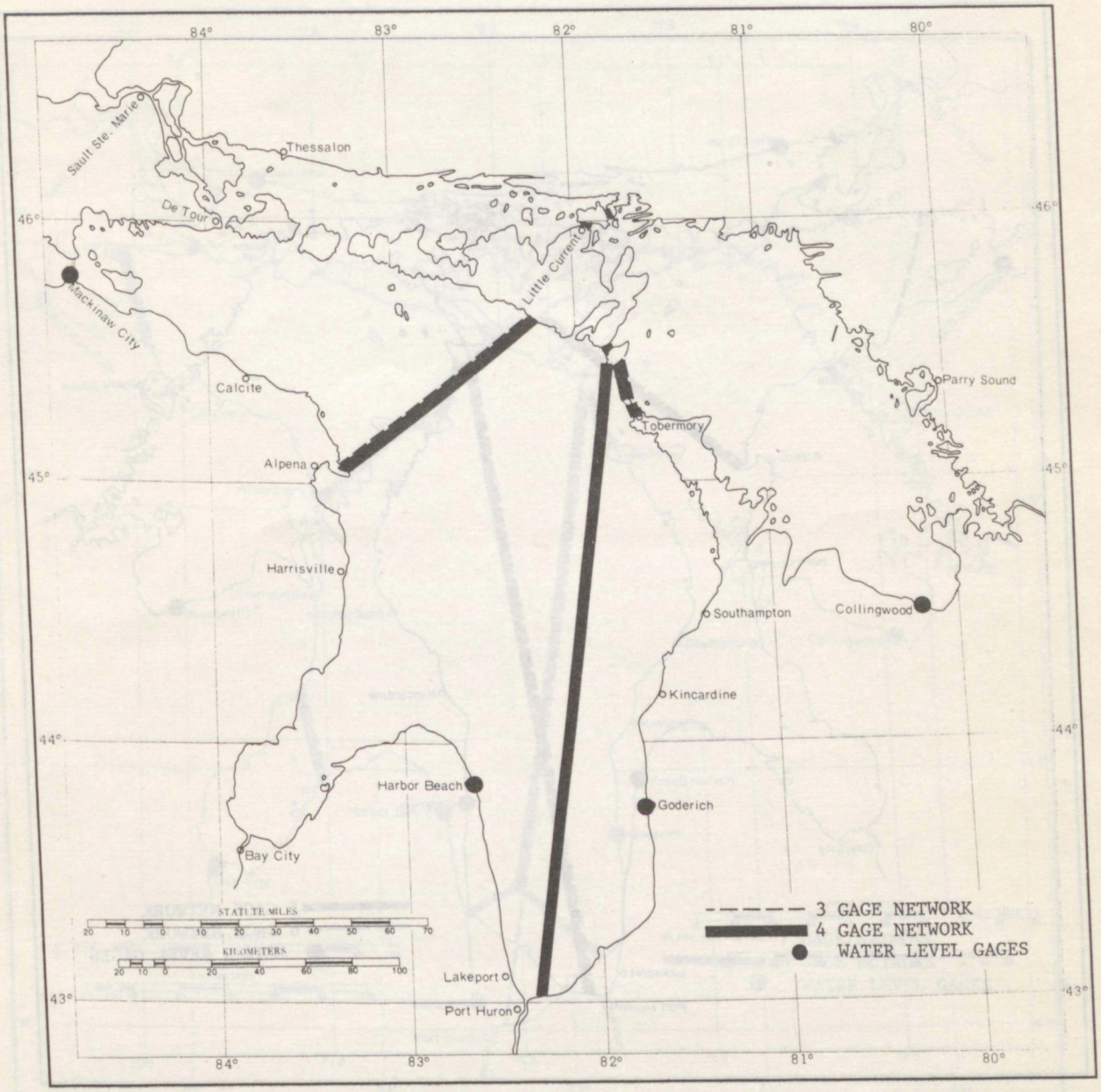

Figure 2. Thiessen polygon networks.

Figure 3. Thiessen polygon networks.

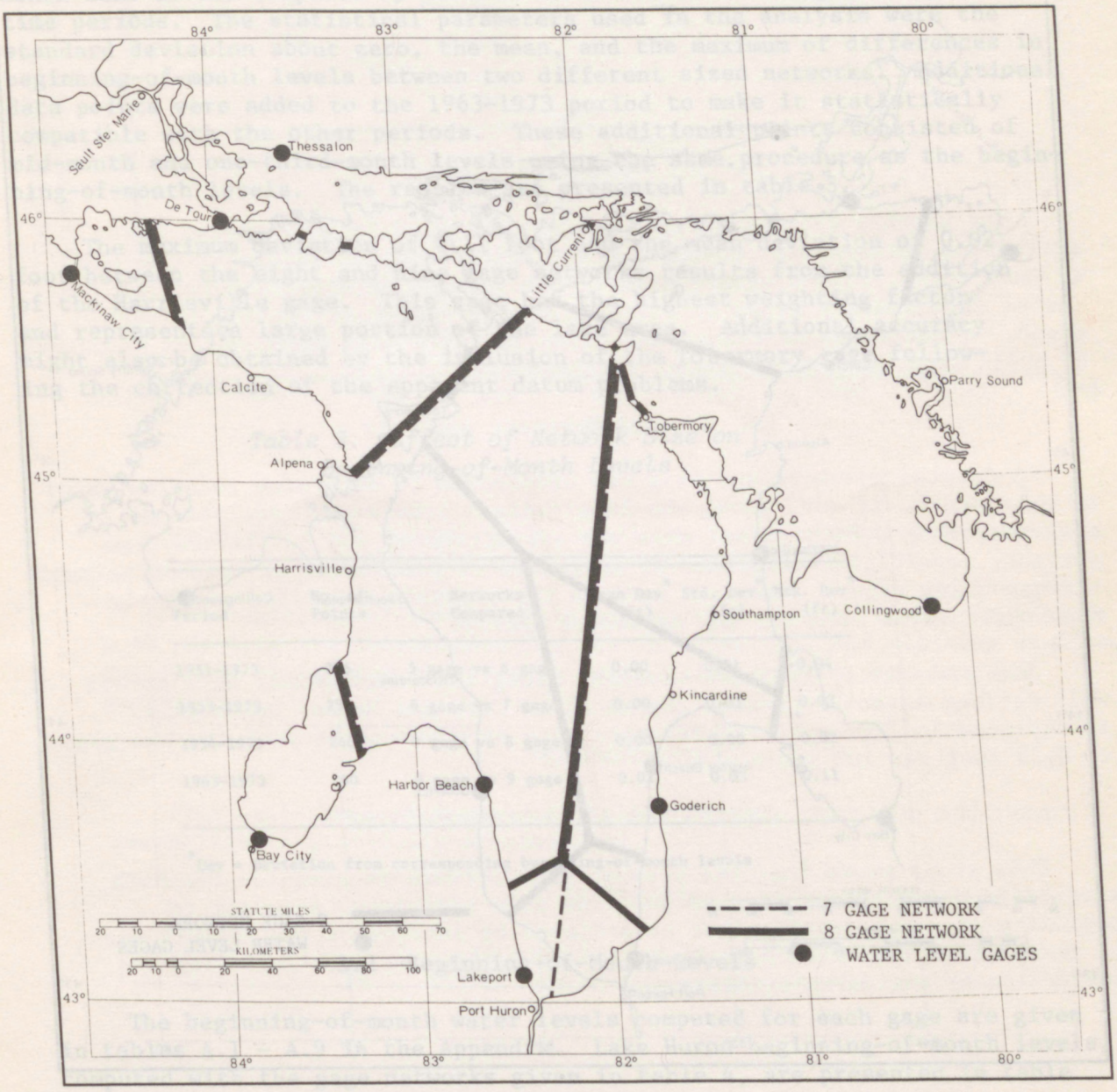

Figure 4. Thiessen polygon networks.

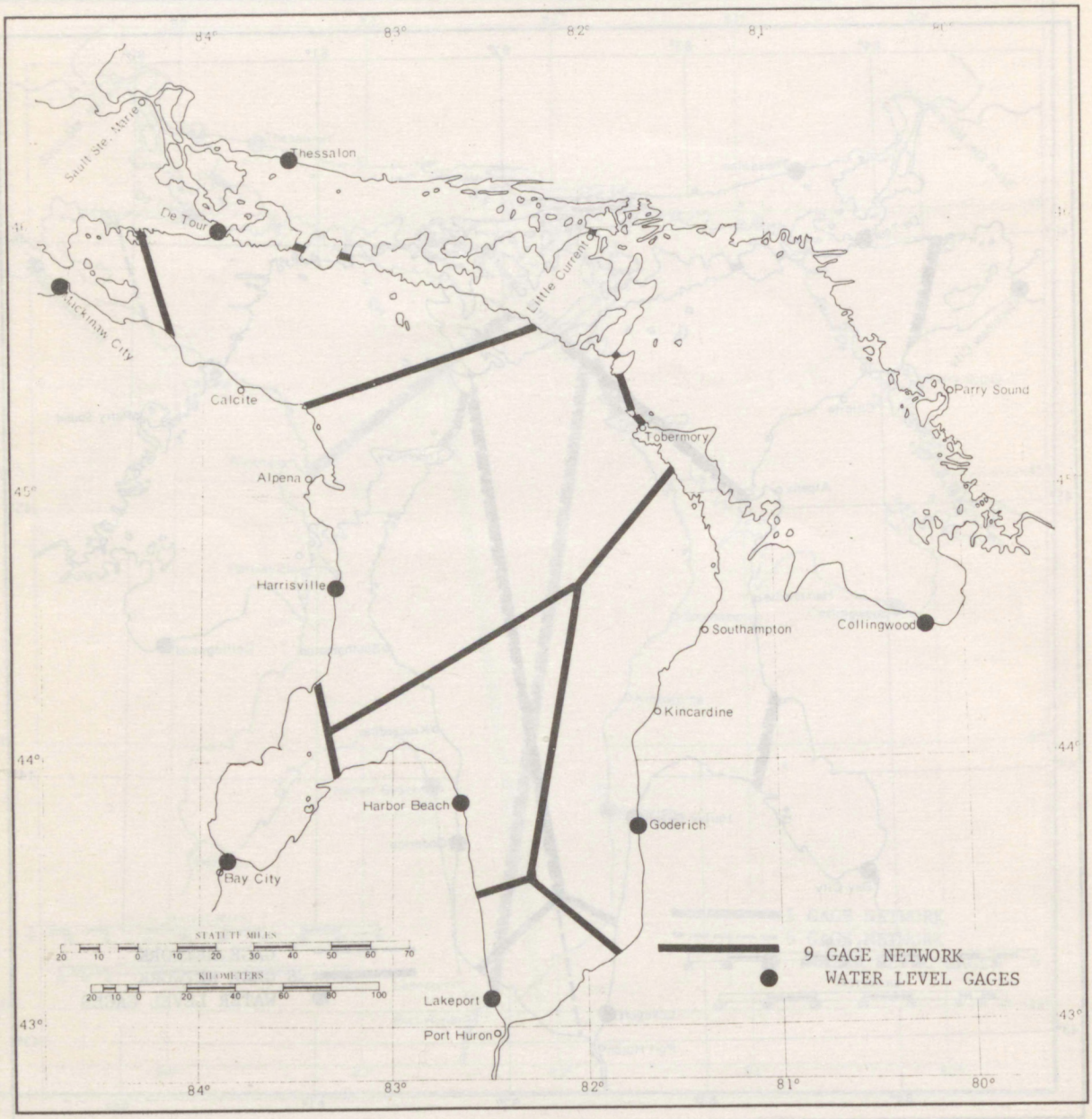

Figure 5. Thiessen polygon networks.

3. RESULTS

3.1 Effect of Gage Network Size

This analysis was based on the data for the 1950-1970 period. The effect of the gage network size was investigated by comparing beginning-of-month lake levels computed by various sized networks during corresponding time periods. The statistical parameters used in the analysis were the standard deviation about zero, the mean, and the maximum of differences in beginning-of-month levels between two different sized networks. Additional data points were added to the 1963-1973 period to make it statistically compatible with the other periods. These additional points consisted of mid-month and one-third-month levels using the same procedure as the beginning-of-month levels. The results are presented in table 3.

The maximum deviation of 0.11 foot and the mean deviation of 0.02 foot between the eight and nine gage networks results from the addition of the Harrisville gage. This gage has the highest weighting factor and represents a large portion of the lake area. Additional accuracy might also be obtained by the inclusion of the Tobermory gage following the correction of the apparent datum problems.

Table 3. Effect of Network Size on Beginning-of-Month Levels

Period	No. of Points	Networks Compared	Mean Dev* (ft)	Std. Dev* (ft)	Max. Dev* (ft)
1951-1973	276	5 gage vs 6 gage	0.00	0.01	-0.04
1953-1973	252	6 gage vs 7 gage	0.00	0.01	0.03
1954-1973	240	7 gage vs 8 gage	0.00	0.00	0.02
1963-1973	240	8 gage vs 9 gage	0.02	0.03	0.11

*Dev = Deviation from corresponding beginning-of-month levels

3.2 Beginning-of-Month Levels

The beginning-of-month water levels computed for each gage are given in tables A.1 - A.9 in the Appendix. Lake Huron beginning-of-month levels, computed with the gage networks given in table 4, are presented in table A.10.

Table 4. Gage Networks Used for Lake Huron Beginning-of-Month Levels

Period	No. of Gages in Network	Period	No. of Gages in Network
1900-1915	2	1951-1952	6
1916-1919	3	1953-1955	7
1920-1927	4	1956-1962	8
1928-1950	5	1963-1973	9

3.3 Change of Storage

The monthly changes in storage were computed by multiplying the difference between two consecutive beginning-of-month levels by the area of Lake Huron, 23,000 square miles. The changes in storage were then converted into monthly rates by dividing by the number of seconds in each month. These rates of change are given in table A.11 expressed as thousands of cubic feet per second months (TCFS-months).

3.4 Crustal Movement Analysis

A crustal movement analysis was undertaken to determine relative rates of subsidence, if any, along the longitudinal lake axis. Analysis of movement along a latitudinal axis was not attempted due to limited time periods, insufficient distance or intrusion of peninsulas or islands between corresponding gages. The data used in the analysis consisted of yearly mean-water-level data for the period of record.

The analysis of relative movement along the longitudinal axis showed well defined movement between the Mackinaw City and Harbor Beach gages. As depicted in figure 6, the relative rate of movement between the two gages is 0.29 foot per 100 years.

4. CONCLUSIONS AND RECOMMENDATIONS

This study shows that the present gage network is adequate for both scientific and planning studies but that some additional accuracy in beginning-of-month levels might be achieved by increasing the network size to ten gages. The tenth gage would be the Tobermorey gage following the correction of the datum problems.

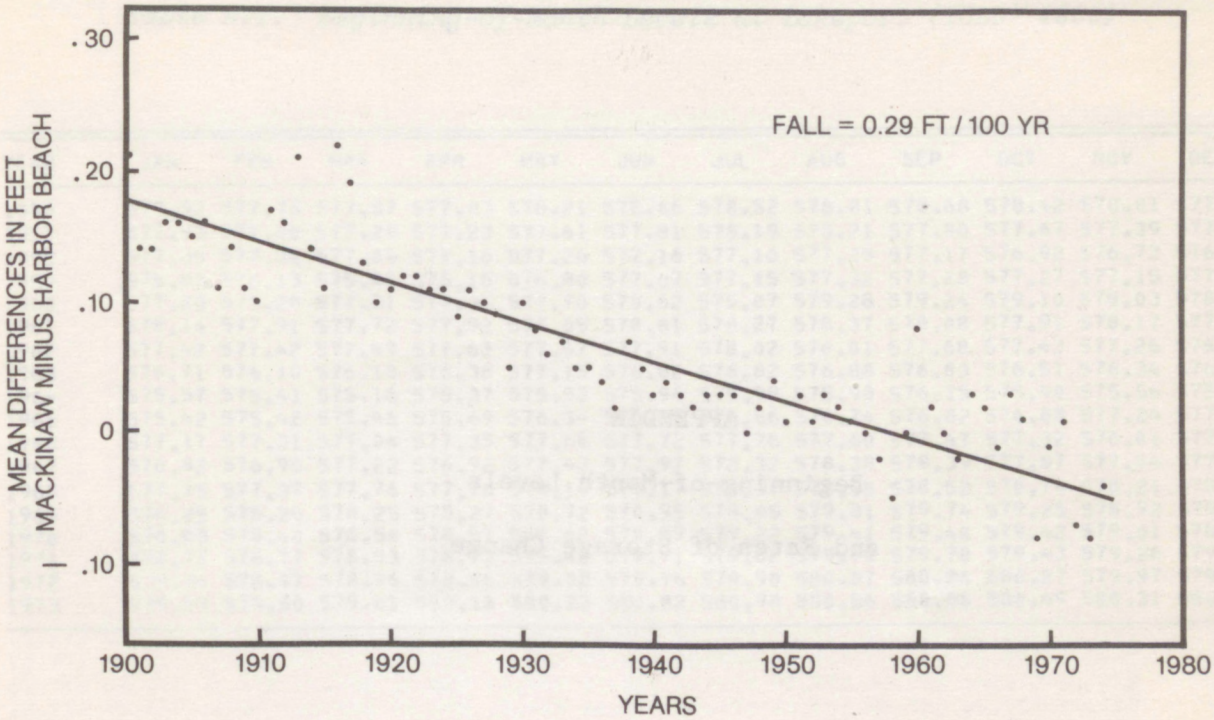

Figure 6. Plot demonstrating relative crustal movement between Harbor Beach and Mackinaw City gages.

The beginning-of-month levels and storage changes listed in tables A.10 and A.11 are recommended for use in scientific and planning studies and should be updated on a yearly basis using the Thiessen polygon procedure.

5. ACKNOWLEDGMENTS

The assistance of Raymond N. Kelley in data reduction and report assemblage is gratefully acknowledged.

6. REFERENCES

Quinn, F. H. 1971. Quantitative Mathematical Models for Great Lakes Research. Ph.D. Dissertation, University of Michigan, Ann Arbor, Michigan.

APPENDIX

Beginning-of-Month Levels

and Rates of Storage Change

Table A.1. Beginning-of-Month Levels at Lakeport (IGLD 1955)*

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1956	577.92	577.75	577.57	577.83	578.21	578.66	578.52	578.81	578.68	578.42	578.01	577.76
1957	577.93	577.40	577.29	577.23	577.61	577.81	578.19	578.21	577.80	577.67	577.39	577.46
1958	577.35	577.36	577.04	577.16	577.26	577.16	577.10	577.25	577.17	576.92	576.73	576.43
1959	575.83	576.13	575.87	576.16	576.80	577.07	577.15	577.32	577.28	577.27	577.15	577.10
1960	577.20	577.26	577.31	577.34	577.70	578.62	579.07	579.28	579.24	579.10	578.03	578.97
1961	578.14	577.91	577.72	577.92	578.05	578.01	578.27	578.37	578.08	577.91	578.17	577.59
1962	577.42	577.42	577.49	577.63	577.67	577.91	578.02	578.01	577.68	577.43	577.26	576.73
1963	576.71	576.10	576.18	576.38	577.15	576.82	576.82	576.88	576.83	576.51	576.34	576.40
1964	575.57	575.41	575.16	575.37	575.52	575.96	575.99	575.98	576.15	575.90	575.56	575.70
1965	575.42	575.42	575.46	575.69	576.34	576.65	576.86	576.74	576.82	576.88	577.24	577.02
1966	577.17	577.31	577.04	577.35	577.68	577.72	577.76	577.60	577.47	577.32	576.81	577.16
1967	576.82	576.90	577.22	576.92	577.43	577.97	578.32	578.38	578.39	577.87	577.54	577.70
1968	577.75	577.37	577.76	577.76	578.14	578.17	578.37	578.55	578.52	578.70	578.21	578.34
1969	578.25	578.26	578.25	578.27	578.72	578.95	579.65	579.81	579.74	579.25	578.92	579.34
1970	578.68	578.40	578.54	578.51	578.62	578.89	579.22	579.41	579.40	579.42	579.01	578.59
1971	578.77	578.77	578.93	578.70	579.42	579.71	579.82	579.79	579.78	579.43	579.26	579.27
1972	579.34	578.97	578.96	578.96	579.32	579.76	579.90	580.07	580.26	580.27	579.97	579.91
1973	579.59	579.50	579.61	580.16	580.23	580.82	580.98	580.86	580.86	580.49	580.31	580.33

*IGLD - International Great Lakes Datum

Table A.2. Beginning-of-Month Levels at Harbor Beach (IGLD 1955)*

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1900	578.18	578.12	578.12	578.14	578.45	578.38	578.69	579.00	578.97	578.99	578.51	578.85
1901	578.70	578.32	578.12	578.58	578.93	579.21	579.24	579.58	579.40	578.95	578.85	578.41
1902	578.59	578.00	577.63	578.32	578.33	578.44	578.82	579.14	578.93	578.80	578.33	578.36
1903	578.10	578.08	578.05	578.44	578.67	578.78	578.82	579.11	579.06	579.08	578.80	578.42
1904	578.39	578.24	578.25	578.50	579.14	579.51	579.74	579.83	579.59	579.92	579.33	579.16
1905	578.62	578.51	578.57	578.85	579.04	579.39	579.72	579.93	579.86	579.55	579.43	579.07
1906	579.05	579.14	578.94	579.19	579.41	579.51	579.80	579.75	579.56	579.39	579.11	579.28
1907	578.56	578.81	578.77	579.24	579.31	579.50	579.75	579.89	579.63	579.68	579.02	578.93
1908	578.98	578.60	578.70	578.93	579.35	579.84	579.91	580.11	579.68	579.43	579.08	578.61
1909	578.53	578.10	578.19	578.32	578.20	579.18	579.39	579.32	579.29	579.09	578.33	578.29
1910	578.16	578.27	578.20	578.30	578.49	578.89	578.75	578.68	578.63	578.50	578.04	578.13
1911	577.86	577.58	577.82	577.74	577.79	578.15	578.17	578.03	577.88	577.76	577.80	577.76
1912	577.11	577.56	577.53	577.53	577.79	578.57	578.61	578.79	578.73	578.96	578.75	578.52
1913	578.45	578.26	578.30	578.72	579.09	579.42	579.47	579.54	579.27	578.93	578.98	578.47
1914	578.36	578.59	578.45	578.21	578.46	578.74	578.88	578.92	578.80	578.62	578.32	577.86
1915	577.58	577.57	577.90	577.81	577.83	577.84	578.03	578.12	578.17	578.15	577.87	577.86
1916	577.45	577.71	577.77	577.73	578.36	578.83	579.29	579.42	579.17	578.97	578.89	578.89
1917	578.81	578.87	578.64	578.78	579.02	579.31	579.91	580.21	579.93	579.94	579.50	579.25
1918	578.80	578.97	579.17	579.41	579.76	580.10	580.17	580.03	579.85	579.52	579.46	579.44
1919	579.01	579.14	578.59	579.23	579.18	579.55	579.48	579.47	579.31	578.90	578.83	578.69
1920	578.26	578.02	578.17	578.41	578.94	578.85	579.18	579.35	579.27	579.25	578.70	578.27
1921	578.00	578.00	577.94	578.39	578.94	578.78	578.70	578.71	578.36	578.39	578.14	577.68
1922	577.93	577.30	577.68	577.81	578.33	578.66	578.71	578.95	578.51	578.31	577.77	577.61
1923	577.14	577.03	576.90	577.24	577.67	577.89	578.10	577.99	577.84	577.76	577.60	577.00
1924	576.86	576.74	576.85	576.98	577.31	577.58	577.78	577.82	577.99	577.79	576.99	576.89
1925	576.50	576.36	576.39	576.74	576.67	576.54	576.72	576.73	576.43	576.03	575.96	575.69
1926	575.76	575.62	575.64	575.71	576.14	576.42	576.75	576.77	576.72	576.46	576.58	576.73
1927	576.51	576.50	576.57	576.93	577.15	577.64	577.73	577.88	577.48	577.43	576.97	577.41
1928	577.34	576.97	577.16	577.39	577.94	578.26	578.58	578.64	578.78	578.52	578.83	578.84
1929	578.82	578.85	578.70	579.10	579.81	580.48	580.56	580.65	580.24	579.91	579.42	579.40
1930	578.82	578.84	578.81	578.92	578.93	579.21	579.43	579.50	579.02	578.91	578.40	578.04
1931	577.67	577.31	577.11	577.31	577.21	577.39	577.33	577.25	576.75	576.94	576.70	576.76
1932	576.06	576.85	576.68	576.52	576.56	576.81	576.77	576.84	576.77	576.41	576.19	575.87
1933	575.96	575.58	575.88	575.70	576.15	576.89	576.98	576.95	576.53	576.33	576.46	576.03
1934	575.78	575.66	575.46	575.51	575.96	575.97	576.24	576.24	575.90	576.15	575.87	575.71
1935	575.83	575.70	575.89	576.08	576.38	576.44	576.72	576.90	576.77	576.61	576.24	576.42
1936	576.00	576.21	576.22	576.52	576.47	576.78	576.91	576.78	576.76	576.70	576.46	576.15
1937	576.23	576.00	576.16	576.01	576.43	576.78	577.03	576.93	576.69	576.51	576.38	576.42
1938	575.50	576.12	576.42	576.86	577.17	577.24	577.64	577.81	577.85	577.79	577.41	577.35
1939	577.05	576.82	576.89	577.03	577.59	577.77	578.21	578.19	578.22	578.13	577.78	577.35
1940	577.25	576.97	576.86	576.85	576.84	577.25	577.61	577.63	577.51	577.49	577.02	577.08
1941	576.98	576.97	576.99	576.77	577.17	577.22	577.24	577.29	577.01	576.84	576.91	577.15
1942	577.06	577.23	577.17	577.48	577.63	578.07	578.47	578.40	578.04	578.02	577.90	577.59
1943	577.59	577.54	577.78	577.95	578.40	578.71	579.58	579.71	579.66	579.44	578.98	579.00
1944	578.73	578.73	578.61	578.58	578.57	578.81	579.20	579.09	578.64	578.76	578.33	578.40
1945	578.02	578.13	577.79	577.97	578.43	578.73	579.20	579.18	578.94	578.86	578.76	578.75
1946	578.65	578.45	578.46	578.75	578.89	579.03	579.23	579.16	578.87	578.79	578.38	578.01
1947	577.77	577.44	577.69	577.55	578.28	578.85	579.24	579.50	579.31	579.25	578.99	578.77
1948	578.33	578.10	578.09	578.40	578.94	579.09	579.20	579.22	578.79	578.31	577.70	577.79
1949	577.88	577.48	577.66	577.40	577.57	577.72	577.96	578.06	577.71	577.31	577.02	576.80
1950	576.45	576.66	576.65	576.72	577.43	577.63	578.05	578.20	578.22	578.07	577.84	578.03
1951	577.64	577.94	577.81	578.17	578.97	579.32	579.54	579.90	579.75	579.56	579.87	579.78
1952	579.55	579.81	579.86	579.86	580.47	580.63	580.72	581.02	580.74	580.51	579.87	579.89
1953	579.60	579.71	579.50	579.60	579.66	579.95	580.31	580.39	580.31	579.86	579.60	579.26
1954	579.14	578.79	578.95	578.88	579.31	579.40	579.92	579.94	579.91	579.67	580.01	579.96
1955	579.39	579.38	579.17	579.23	579.65	579.72	579.64	579.47	579.39	578.70	578.17	578.25
1956	577.93	577.73	577.66	577.80	578.14	578.66	578.57	578.76	578.71	578.40	578.00	577.82
1957	577.87	577.40	577.26	577.22	577.54	577.82	578.16	578.20	577.79	577.69	577.38	577.40
1958	577.37	577.34	577.07	577.15	577.32	577.11	577.15	577.21	577.19	576.98	576.69	576.43
1959	575.85	576.04	575.89	576.12	576.74	577.03	577.09	577.25	577.24	577.12	577.13	577.18

*IGLD - International Great Lakes Datum

Table A.2. Beginning-of-Month Levels at Harbor Beach (IGLD 1955) (continued)*

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1960	577.17	577.21	577.29	577.26	577.75	578.62	579.04	579.29	579.17	579.04	578.22	578.83
1961	578.13	577.90	577.74	577.83	578.03	578.06	578.26	578.25	578.11	578.01	578.13	577.59
1962	577.48	577.43	577.46	577.51	577.64	577.94	577.94	577.95	577.66	577.40	577.15	576.68
1963	576.08	576.18	576.20	576.32	576.85	576.81	576.81	576.89	576.81	576.53	576.31	576.24
1964	575.44	575.43	575.24	575.33	575.48	575.89	575.95	575.91	576.03	575.84	575.51	575.59
1965	575.41	575.43	575.38	575.59	576.28	576.58	576.77	576.68	576.73	576.90	577.22	577.06
1966	577.18	577.23	577.01	577.33	577.61	577.64	577.69	577.61	577.37	577.29	576.84	577.08
1967	576.85	576.85	577.12	576.88	577.52	577.86	578.33	578.36	578.30	577.91	577.77	577.61
1968	577.86	577.42	577.76	577.71	578.08	578.14	578.44	578.54	578.55	578.78	578.26	578.37
1969	578.32	578.32	578.23	578.35	578.67	578.99	579.65	579.88	579.74	579.30	578.98	579.27
1970	578.60	578.49	578.50	578.43	578.65	578.96	579.23	579.42	579.33	579.34	579.02	578.68
1971	578.77	578.78	579.02	578.80	579.44	579.68	579.86	579.83	579.75	579.45	579.38	579.18
1972	579.10	579.00	578.96	578.98	579.33	579.73	579.90	580.08	580.25	580.30	579.93	579.97
1973	579.70	579.58	579.68	580.09	580.23	580.86	580.99	580.85	580.91	580.43	580.36	580.22

*IGLD - International Great Lakes Datum

Table A.3. Beginning-of-Month Levels at Essexville (IGLD 1955)*

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1953	579.26	579.39	579.67	579.66	580.31	580.13	580.17	580.49	580.20	579.77	579.56	579.17
1954	578.80	578.66	578.79	578.58	579.31	579.32	579.86	579.87	579.83	579.59	579.91	579.81
1955	579.29	579.35	579.15	579.16	579.60	579.76	579.50	579.40	579.22	578.70	577.95	577.64
1956	577.88	577.68	577.61	577.80	578.22	578.66	578.51	578.87	578.60	578.35	578.08	577.45
1957	577.67	577.25	577.27	577.10	577.73	577.84	578.15	578.21	577.76	577.51	577.40	577.09
1958	577.91	577.29	577.27	577.19	576.95	577.23	577.01	577.23	576.88	576.46	576.72	576.36
1959	576.02	575.82	575.83	576.07	576.49	577.02	577.07	577.30	577.50	577.39	576.93	576.91
1960	577.15	577.11	577.14	577.58	577.49	578.66	579.13	579.15	579.18	579.08	577.63	578.74
1961	578.16	577.84	577.60	577.68	578.04	577.92	578.31	578.49	577.98	577.52	577.90	577.50
1962	577.33	577.35	577.18	577.49	577.54	577.85	577.99	577.81	577.45	577.38	577.18	576.55
1963	576.38	575.85	575.82	575.94	577.17	576.78	576.82	576.71	576.79	576.32	576.16	576.13
1964	575.43	575.14	574.79	575.29	575.59	576.05	575.95	575.85	576.08	575.61	575.53	575.60
1965	575.41	575.33	575.42	575.31	576.18	576.68	576.85	576.66	576.62	576.70	576.95	576.37
1966	576.96	577.09	576.87	577.28	577.66	577.74	577.80	577.50	577.42	577.13	576.55	576.87
1967	576.64	576.81	576.97	576.53	577.44	578.05	578.27	578.40	578.39	577.84	577.82	577.65
1968	577.73	577.53	577.72	577.59	578.12	578.13	578.25	578.49	578.46	578.50	578.13	578.23
1969	577.81	578.30	578.27	578.08	578.65	579.05	579.55	579.69	579.83	579.26	579.02	579.13
1970	578.67	578.40	578.46	578.47	578.35	578.84	579.34	579.41	579.30	579.31	578.86	578.48
1971	578.79	579.00	578.72	578.70	579.40	579.77	579.89	579.65	579.82	579.43	579.08	579.11
1972	578.74	578.97	578.90	579.61	579.38	579.21	579.92	580.08	580.24	580.10	580.05	579.68
1973	579.16	579.80	579.65	580.50	580.36	580.79	580.92	580.97	580.82	580.58	579.92	580.21

*IGLD - International Great Lakes Datum

Table A.4. Beginning-of-Month Levels at Harrisville (IGLD 1955)*

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1963	576.58	576.20	576.07	576.30	576.58	576.81	576.81	576.87	576.74	576.47	576.16	576.00
1964	575.54	575.24	575.25	575.23	575.44	575.83	575.89	575.98	575.94	575.78	575.45	575.46
1965	575.43	575.43	575.25	575.55	576.17	576.49	576.71	576.64	576.71	576.87	576.99	577.06
1966	577.14	577.05	576.92	577.25	577.47	577.57	577.59	577.48	577.28	577.14	576.77	576.91
1967	576.83	576.80	576.97	576.93	577.52	577.76	578.28	578.37	578.20	577.89	577.75	577.58
1968	577.77	577.47	577.66	577.69	578.03	578.13	578.35	578.55	578.47	578.76	578.25	578.35
1969	578.33	578.35	578.18	578.30	578.58	578.91	579.59	579.86	579.64	579.25	578.94	579.02
1970	578.57	578.56	578.45	578.37	578.70	578.93	579.11	579.38	579.24	579.27	579.03	578.80
1971	578.79	578.73	578.96	578.88	579.36	579.56	579.85	579.84	579.69	579.41	579.34	579.03
1972	579.17	578.93	578.85	578.87	579.25	579.65	579.72	579.96	580.17	580.24	579.86	579.94
1973	579.62	579.60	579.67	580.04	580.28	580.85	581.01	580.79	580.79	580.36	580.25	580.08

*IGLD - International Great Lakes Datum

Table A.5. Beginning-of-Month Levels at Mackinaw City (IGLD 1955)*

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1900	578.40	578.17	578.20	578.32	578.55	578.73	578.79	579.13	579.33	579.24	579.32	578.97
1901	578.66	578.51	578.46	578.65	579.13	579.34	579.50	579.59	579.36	579.14	579.08	578.64
1902	578.40	578.25	578.25	578.22	578.31	578.70	578.97	579.30	579.12	578.82	578.68	578.50
1903	578.38	578.14	578.23	578.56	578.73	578.84	579.06	579.03	579.16	579.26	578.98	578.54
1904	578.28	578.17	578.38	578.82	579.13	579.66	579.95	579.99	579.79	579.67	579.56	579.10
1905	578.87	578.69	578.67	578.85	579.09	579.62	579.86	579.94	579.85	579.77	579.01	579.22
1906	578.97	579.02	579.17	579.17	579.48	579.73	579.93	579.80	579.64	579.39	579.22	579.15
1907	579.01	579.14	579.07	579.05	579.32	579.57	579.82	579.95	579.81	579.63	579.34	579.05
1908	578.95	578.64	578.82	579.17	579.40	579.85	580.10	580.12	579.90	579.55	579.03	578.74
1909	578.43	578.27	578.39	578.36	579.01	579.20	579.44	579.41	579.09	578.85	578.58	578.46
1910	578.45	578.48	578.37	578.38	578.67	578.73	578.89	578.72	578.62	578.32	578.28	577.88
1911	577.82	577.83	577.78	577.58	577.79	578.35	578.48	578.38	578.14	577.88	577.77	577.84
1912	577.82	577.61	577.63	577.51	577.99	578.80	578.34	578.88	578.97	579.00	578.68	578.86
1913	578.66	578.49	578.52	578.82	579.13	579.58	579.75	579.72	579.51	579.20	578.95	578.82
1914	578.51	578.38	578.39	578.36	578.54	578.82	579.06	579.09	579.01	578.83	578.76	578.23
1915	577.88	577.81	577.82	577.69	577.82	578.00	578.24	578.31	578.41	578.25	578.10	577.89
1916	577.71	577.80	577.66	577.98	578.51	579.08	579.47	579.38	579.21	579.26	579.06	578.76
1917	578.76	578.52	578.80	578.86	579.34	579.74	580.22	580.50	580.24	579.81	579.58	579.31
1918	579.16	579.24	579.28	579.60	579.78	580.39	580.31	580.22	580.01	579.66	579.44	579.29
1919	579.16	579.00	578.90	578.88	579.43	579.82	579.68	579.49	579.18	578.91	578.82	578.68
1920	578.46	578.27	578.20	578.68	578.93	579.16	579.29	579.35	579.15	578.87	578.69	578.79
1921	578.48	578.30	578.30	578.01	578.74	578.83	578.92	578.60	578.59	578.32	577.93	577.74
1922	577.66	577.64	577.64	577.72	578.52	578.78	578.89	578.79	578.68	578.55	577.98	577.77
1923	577.66	577.24	577.23	577.31	577.62	578.03	578.22	578.20	577.95	577.79	577.66	577.32
1924	576.94	576.88	576.81	576.97	577.21	577.68	577.82	577.83	578.04	577.65	577.64	576.89
1925	576.68	576.59	576.49	576.46	576.51	576.74	576.86	576.75	576.60	576.33	576.28	575.89
1926	575.75	575.54	575.60	575.52	576.22	576.22	576.90	576.92	576.85	576.81	576.42	576.64
1927	576.51	576.73	576.63	576.75	577.23	577.69	577.92	577.78	577.63	577.49	577.49	577.21
1928	576.83	577.02	577.22	577.40	578.07	578.40	578.67	578.82	578.91	578.80	578.79	578.92
1929	578.76	578.87	578.71	578.77	579.66	580.54	580.71	580.63	580.47	580.02	579.82	579.16
1930	578.95	578.91	579.04	578.99	579.25	579.38	579.36	579.36	579.36	578.78	578.41	577.95
1931	578.14	577.47	577.11	577.22	577.42	577.46	577.52	577.30	576.95	577.19	576.68	576.76
1932	576.38	576.57	576.36	576.41	576.65	576.87	576.94	576.86	576.76	576.45	576.26	576.22
1933	576.15	576.03	575.86	575.89	576.42	576.92	577.02	577.00	576.58	576.40	576.14	575.86
1934	575.69	575.84	575.59	575.70	576.21	576.24	576.32	576.19	576.08	576.26	575.83	576.15
1935	576.15	575.93	575.91	576.10	576.29	576.49	576.82	576.94	576.78	576.59	576.39	576.30
1936	576.27	576.14	576.13	576.26	576.51	576.95	576.93	576.85	576.75	576.74	576.67	576.21
1937	576.28	575.97	576.22	576.14	576.53	576.78	576.92	576.84	576.84	576.59	576.39	576.21
1938	575.98	576.00	576.32	576.93	577.15	577.53	577.79	577.86	577.83	577.74	577.61	577.20
1939	577.08	576.95	577.00	577.13	577.44	577.79	578.22	578.19	578.27	578.07	577.80	577.57
1940	577.14	576.96	576.85	576.67	576.94	577.26	577.56	577.56	577.65	577.42	577.21	577.00
1941	576.97	577.01	576.88	576.79	577.21	577.29	577.36	577.23	576.98	577.13	577.12	577.30
1942	577.08	576.96	577.09	577.55	577.81	578.19	578.47	578.46	578.33	578.09	577.97	577.77
1943	577.51	577.54	577.54	578.01	578.27	578.95	579.55	579.76	579.76	579.47	579.19	579.20
1944	578.74	578.48	578.34	578.59	578.73	578.86	579.11	579.06	579.05	578.72	578.58	578.13
1945	577.98	577.69	577.92	578.16	578.29	578.70	579.28	579.23	579.09	578.98	578.75	578.73
1946	578.55	578.63	578.73	579.00	578.91	578.97	579.25	579.09	578.89	578.45	578.32	577.77
1947	577.70	577.59	577.54	577.56	578.25	578.96	579.27	579.39	579.37	579.06	578.99	578.90
1948	578.21	578.19	578.11	578.51	578.85	579.09	579.19	579.13	578.80	578.28	577.82	577.82
1949	577.21	577.51	577.19	577.33	577.70	577.74	578.00	578.02	577.60	577.30	577.14	576.64
1950	576.61	576.65	576.62	577.05	577.49	577.80	578.10	578.15	578.16	578.21	578.08	577.85
1951	577.98	577.77	578.03	578.29	579.05	579.29	579.56	579.81	579.73	579.75	579.77	579.90
1952	579.89	580.06	579.76	580.12	580.46	580.71	580.73	581.09	580.99	580.68	579.98	579.86
1953	579.77	579.44	579.36	579.54	579.74	580.14	580.44	580.34	580.35	579.94	579.59	579.27
1954	578.97	578.76	578.68	578.97	579.38	579.52	579.94	579.88	579.71	579.70	580.03	579.76
1955	579.65	579.35	579.23	579.31	579.56	579.66	579.74	579.55	579.16	578.61	578.49	578.17
1956	577.81	577.74	577.80	577.78	578.13	578.56	578.71	578.74	578.86	578.39	578.07	577.84
1957	577.43	577.35	577.32	577.26	577.53	577.76	577.99	578.13	577.84	577.67	577.45	577.30
1958	577.05	577.19	577.08	577.10	577.28	577.05	577.26	577.21	576.99	576.94	576.48	576.28
1959	575.99	575.82	575.99	576.13	576.80	577.02	577.07	577.05	577.20	577.01	577.12	577.21

*IGLD - International Great Lakes Datum

Table A.5. Beginning-of-Month Levels at Mackinaw City (IGLD 1955) (continued)*

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1960	577.24	577.20	577.30	577.17	577.96	578.78	579.10	579.40	579.36	579.06	578.89	578.44
1961	578.05	577.75	577.85	577.83	578.06	578.20	578.27	578.26	578.20	578.25	577.89	577.66
1962	577.49	577.30	577.33	577.40	577.66	577.94	577.93	577.83	577.75	577.36	577.04	576.77
1963	576.41	576.40	576.16	576.42	576.46	576.90	576.93	576.93	576.80	576.64	576.18	575.82
1964	575.77	575.48	575.49	575.35	575.62	575.88	575.95	576.10	575.95	575.95	575.61	575.48
1965	575.43	575.45	575.49	575.66	576.24	576.59	576.77	576.82	576.86	577.15	576.90	577.18
1966	577.13	576.81	576.91	577.33	577.48	577.59	577.69	577.66	577.42	577.02	576.83	576.87
1967	577.04	577.01	576.88	577.13	577.88	577.88	578.45	578.35	578.18	577.87	577.75	577.78
1968	577.77	577.73	577.71	577.68	577.94	578.18	578.54	578.57	578.65	578.81	578.51	578.38
1969	578.45	578.31	578.14	578.32	578.76	579.22	579.66	579.91	579.62	579.23	579.15	578.63
1970	578.53	578.77	578.43	578.43	578.88	579.08	579.21	579.40	579.12	579.24	579.18	579.02
1971	578.84	578.67	578.97	579.09	579.56	579.54	579.84	580.00	579.73	579.63	579.48	579.05
1972	579.38	578.87	578.60	578.94	579.24	579.66	579.84	580.03	580.30	580.26	579.97	579.97
1973	580.06	579.90	579.77	580.00	580.34	580.85	581.02	580.83	580.94	580.44	580.33	579.95

*IGLD - International Great Lakes Datum

Table A.6. Beginning-of-Month Levels at De Tour (IGLD 1955)*

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1951	578.06	577.77	577.98	578.29	578.93	579.31	579.50	579.85	579.67	579.75	579.78	579.97
1952	580.01	580.15	579.83	580.04	580.47	580.69	580.75	581.05	581.06	580.67	580.01	579.93
1953	579.81	579.52	579.46	579.53	579.69	580.04	580.48	580.28	580.34	579.81	579.58	579.24
1954	578.85	578.90	578.62	579.04	579.30	579.49	579.91	579.86	579.71	579.74	580.10	579.87
1955	579.68	579.38	579.17	579.30	579.65	579.72	579.74	579.52	579.18	578.57	578.48	578.17
1956	577.91	577.82	577.84	577.86	578.12	578.57	578.68	578.72	578.82	578.41	578.04	577.85
1957	577.46	577.46	577.33	577.26	577.54	577.67	578.01	578.15	577.82	577.71	577.38	577.20
1958	576.94	577.23	576.99	577.11	577.38	577.03	577.26	577.22	577.03	577.00	576.53	576.35
1959	576.02	575.93	576.04	576.18	576.79	577.11	577.01	577.06	577.21	577.01	577.05	577.20
1960	577.15	577.14	577.22	577.11	577.82	578.64	578.96	579.27	579.25	578.92	578.67	578.27
1961	577.98	577.75	577.80	577.76	578.02	578.11	578.19	578.21	578.15	578.18	577.96	577.68
1962	577.49	577.32	577.23	577.37	577.61	577.92	577.92	577.80	577.72	577.35	576.99	576.75
1963	576.38	576.43	576.16	576.39	576.37	576.88	576.91	576.83	576.78	576.57	576.14	575.79
1964	575.77	575.46	575.58	575.25	575.48	575.80	575.95	575.98	575.93	575.90	575.60	575.41
1965	575.51	575.40	575.33	575.56	576.19	576.58	576.73	576.68	576.74	576.99	576.83	577.14
1966	577.11	576.87	576.96	577.27	577.45	577.55	577.66	577.59	577.37	577.00	576.81	576.84
1967	577.01	577.01	576.88	577.13	577.88	577.80	578.38	578.29	578.11	577.82	577.69	577.65
1968	577.74	577.59	577.58	577.71	577.92	578.17	578.45	578.53	578.59	578.80	578.40	578.40
1969	578.33	578.24	578.04	578.33	578.68	579.16	579.62	579.89	579.65	579.25	579.05	578.86
1970	578.51	578.77	578.43	578.43	578.80	579.07	579.21	579.42	579.11	579.24	579.10	578.95
1971	578.77	578.71	578.91	578.97	579.32	579.55	579.82	579.96	579.72	579.58	579.42	578.85
1972	579.40	578.91	578.55	578.91	579.21	579.67	579.86	580.03	580.28	580.25	579.88	579.93
1973	579.52	579.90	579.77	580.00	580.28	580.80	581.02	580.78	580.92	580.40	580.25	579.96

*IGLD - International Great Lakes Datum

Table A.7. Beginning-of-Month Levels at Goderich (IGLD 1955)*

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1920	578.51	578.03	578.21	578.41	578.95	578.86	579.20	579.32	579.26	579.17	578.76	578.26
1921	578.03	577.92	577.90	578.36	578.91	578.72	578.71	578.69	578.40	578.61	577.91	577.71
1922	578.23	577.31	577.69	577.73	578.33	578.63	578.71	578.96	578.48	578.34	577.73	577.79
1923	577.22	577.02	576.88	577.19	577.60	577.91	578.13	577.99	577.88	577.72	577.74	577.13
1924	576.98	576.51	576.78	576.95	577.33	577.60	577.77	577.74	578.02	577.78	577.18	577.12
1925	576.56	576.51	576.48	576.70	576.75	576.53	576.70	576.70	576.46	576.01	576.06	575.81
1926	575.90	287.87	575.65	575.76	576.15	576.39	576.71	576.62	576.65	576.41	576.63	576.73
1927	576.54	576.54	576.61	576.86	577.16	577.63	577.72	577.89	577.48	577.42	577.04	577.47
1928	577.47	577.04	577.20	577.41	577.99	578.27	578.55	578.69	578.76	578.49	578.93	578.85
1929	578.84	578.96	578.72	579.17	579.81	580.44	580.61	580.57	580.28	579.82	579.42	579.70
1930	578.84	578.83	578.84	578.95	578.91	579.27	579.45	579.47	579.04	578.93	578.45	578.27
1931	577.82	577.33	577.11	577.31	577.19	577.35	577.35	577.19	576.77	577.01	576.73	577.02
1932	575.87	577.10	576.70	576.57	576.55	576.79	576.83	576.86	576.75	576.52	576.15	575.89
1933	576.15	575.79	576.01	575.74	576.06	576.85	576.99	576.95	576.51	576.41	575.94	576.11
1934	575.69	575.76	575.40	575.57	575.91	575.95	576.25	576.21	575.90	576.14	576.00	575.78
1935	575.98	575.70	575.86	576.08	576.44	576.45	576.73	576.90	576.78	576.69	576.24	576.59
1936	576.08	576.25	576.20	576.44	576.44	576.86	576.86	576.79	576.77	576.68	576.52	576.09
1937	576.40	576.23	576.25	576.01	576.36	576.77	576.92	576.88	576.70	576.51	576.27	576.58
1938	575.34	576.18	576.43	576.99	577.15	577.24	577.59	577.81	577.88	577.75	577.40	577.40
1939	577.22	576.77	577.02	577.03	577.53	577.75	578.19	578.21	578.18	578.07	577.83	577.38
1940	577.57	576.95	576.84	576.84	576.80	577.25	577.61	577.53	577.53	577.48	576.98	577.09
1941	577.01	576.97	576.96	576.80	577.15	577.23	577.26	577.25	577.06	576.99	576.88	577.15
1942	577.02	577.25	577.17	577.47	577.56	578.00	578.43	578.40	578.06	578.04	577.93	577.65
1943	577.58	577.69	577.84	577.93	578.42	578.69	579.49	579.67	579.64	579.41	578.95	579.08
1944	578.69	578.79	578.54	578.70	578.54	578.80	579.08	579.02	578.76	578.73	578.35	578.64
1945	578.06	578.22	577.79	577.95	578.40	578.63	579.17	579.10	579.05	578.83	578.77	578.72
1946	578.68	578.64	578.45	578.69	578.89	579.05	579.21	579.11	578.98	578.75	578.43	578.09
1947	577.76	577.52	577.69	577.52	578.29	578.86	579.19	579.45	579.23	579.19	578.86	578.90
1948	578.15	578.08	578.05	578.32	578.92	579.07	579.20	579.25	578.68	578.28	577.69	577.92
1949	577.97	577.66	577.69	577.29	577.52	577.69	577.92	577.97	577.85	577.34	577.05	576.93
1950	576.41	576.65	576.75	576.78	577.37	577.64	578.07	578.24	578.25	578.09	577.87	578.23
1951	577.67	577.94	577.88	578.20	578.95	579.27	579.57	579.88	579.70	579.60	580.03	579.81
1952	579.59	579.86	579.91	579.85	580.45	580.64	580.69	581.03	580.80	580.50	579.96	579.96
1953	579.61	579.75	579.51	579.60	579.64	579.91	580.32	580.36	580.32	579.83	579.62	579.24
1954	579.26	578.86	579.00	578.90	579.24	579.37	579.88	579.89	579.85	579.72	580.01	580.05
1955	579.43	579.36	579.17	579.23	579.62	579.68	579.64	579.45	579.46	578.66	578.20	578.30
1956	577.97	577.76	577.61	577.75	578.08	578.62	578.56	578.69	578.69	578.42	577.97	577.88
1957	578.01	577.48	577.25	577.17	577.56	577.75	578.23	578.18	577.80	577.79	577.42	577.64
1958	577.48	577.37	577.04	577.16	577.36	577.11	577.16	577.22	577.29	577.20	576.74	576.65
1959	575.81	576.12	575.92	576.10	576.76	577.04	577.09	577.18	577.26	577.08	577.21	577.26
1960	577.17	577.25	577.34	577.20	577.74	578.60	579.02	579.25	579.13	578.95	578.21	579.02
1961	578.17	577.91	577.76	577.91	578.08	578.09	578.26	578.21	578.12	578.11	578.24	577.65
1962	577.59	577.44	577.48	577.50	577.62	577.95	577.93	577.93	577.73	577.50	577.27	576.71
1963	576.58	576.12	576.18	576.32	576.77	576.81	576.82	576.91	576.82	576.56	576.44	576.34
1964	575.64	575.47	575.33	575.35	575.50	575.90	575.98	575.89	576.09	575.83	575.57	575.65
1965	575.39	575.53	575.42	575.65	576.33	576.60	576.75	576.67	576.73	577.08	577.42	577.21
1966	577.26	577.43	577.14	577.36	577.58	577.70	577.73	577.67	577.42	577.38	576.90	577.20
1967	576.91	576.92	577.17	576.92	577.42	577.80	578.28	578.31	578.20	578.06	577.77	577.63
1968	578.03	577.53	577.84	577.86	578.18	578.25	578.54	578.71	578.66	578.94	578.35	578.39
1969	578.65	578.43	578.34	578.45	578.73	579.00	579.65	579.96	579.82	579.38	579.04	579.35
1970	578.61	578.64	578.64	578.55	578.75	579.09	579.34	579.57	579.40	579.37	578.98	578.63
1971	578.78	578.91	579.07	578.73	579.42	579.66	579.88	579.86	579.69	579.39	579.34	579.10
1972	579.25	578.98	578.93	578.96	579.32	579.73	579.91	580.03	580.25	580.28	579.91	580.08
1973	579.89	579.41	579.66	580.03	580.21	580.80	580.98	580.87	580.89	580.42	580.75	580.11

*IGLD - International Great Lakes Datum

Table A.8. Beginning-of-Month Levels at Collingwood (IGLD 1955)*

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1916	577.62	578.17	577.89	578.04	578.63	579.07	579.51	579.59	579.59	579.24	579.25	579.39
1917	579.27	578.64	578.86	578.93	579.21	579.54	580.19	580.59	580.26	580.25	579.92	579.28
1918	579.09	579.19	579.30	579.63	579.96	580.36	580.44	580.24	580.12	579.77	579.44	579.80
1919	579.03	579.46	578.94	579.31	579.30	579.77	579.68	579.72	579.50	579.06	579.12	579.57
1920	578.53	578.16	578.46	578.51	579.25	579.26	579.41	579.64	579.49	579.27	578.97	578.43
1921	578.24	577.92	578.11	578.68	579.15	578.92	578.86	578.94	578.50	578.88	578.03	577.93
1922	578.29	577.41	577.84	577.83	578.56	578.81	578.88	579.13	578.72	578.56	577.86	578.25
1923	577.54	576.86	577.15	577.46	577.91	578.03	578.25	578.13	578.07	577.92	577.91	577.26
1924	577.03	576.91	577.00	576.99	577.52	577.79	577.95	577.96	578.29	577.99	577.53	577.16
1925	576.53	576.65	576.78	576.78	576.84	576.76	576.95	576.87	576.76	576.06	576.29	576.01
1926	576.21	575.99	575.72	575.78	576.30	576.59	576.93	576.88	576.82	576.57	576.60	576.96
1927	576.57	576.84	576.69	576.95	577.33	577.85	577.90	578.03	577.61	577.72	577.26	577.61
1928	577.45	577.40	577.49	577.53	578.17	578.44	578.73	578.90	579.01	578.68	579.09	578.91
1929	578.89	579.01	578.86	578.82	579.88	580.64	580.79	580.79	580.46	579.97	579.51	580.10
1930	578.99	579.07	579.02	579.10	579.10	579.47	579.63	579.71	579.25	579.09	578.56	578.43
1931	578.05	577.48	577.17	577.31	577.38	577.53	577.51	577.35	576.93	577.23	576.84	577.26
1932	575.64	577.30	576.78	576.85	576.72	576.95	576.97	576.99	577.03	576.65	576.28	576.13
1933	576.41	575.96	576.09	575.79	576.21	577.00	577.16	577.18	576.57	576.68	576.04	576.47
1934	575.83	576.26	575.68	575.59	576.16	576.05	576.47	576.40	576.00	576.35	576.10	575.95
1935	576.05	575.90	576.05	576.18	576.67	576.57	576.80	577.17	576.95	576.85	576.36	576.58
1936	576.28	576.42	576.22	576.58	576.53	576.99	576.97	576.95	576.83	576.77	576.69	576.11
1937	576.79	576.51	576.48	576.07	576.42	576.93	577.06	577.02	576.86	576.61	576.40	576.82
1938	575.16	576.30	576.61	577.28	577.32	577.33	577.72	577.95	577.97	577.90	577.57	577.45
1939	577.38	576.73	577.07	577.15	577.68	577.78	578.36	578.28	578.29	578.15	577.91	577.54
1940	577.47	577.02	576.88	577.00	576.92	577.31	577.75	577.74	577.56	577.57	576.92	577.08
1941	577.00	577.09	576.99	576.75	577.27	577.24	577.35	577.34	577.26	577.10	576.87	577.23
1942	577.01	577.09	577.15	577.59	577.66	577.98	578.59	578.50	578.25	578.17	578.13	577.74
1943	577.60	577.77	577.94	578.04	578.53	578.81	579.62	579.79	579.76	579.44	578.96	579.22
1944	578.77	578.91	578.55	578.81	578.60	578.90	579.22	579.10	578.84	578.73	578.46	578.58
1945	578.17	578.13	577.94	578.04	578.51	578.74	579.35	579.16	579.17	578.80	578.96	578.69
1946	578.61	578.60	578.57	578.53	578.94	578.87	579.33	579.11	579.07	578.84	578.54	578.04
1947	577.75	577.44	577.70	577.57	578.23	578.95	579.34	579.58	579.31	579.32	578.80	579.11
1948	577.92	578.05	577.98	578.34	578.98	579.16	579.32	579.43	578.78	578.31	577.73	577.98
1949	578.05	577.89	577.56	577.17	577.55	577.69	577.94	578.07	577.80	577.32	577.23	576.96
1950	576.40	576.69	577.01	576.74	577.37	577.65	578.10	578.04	578.13	578.14	577.85	578.31
1951	577.84	577.81	577.87	578.18	578.89	579.28	579.56	579.97	579.32	579.66	580.21	579.92
1952	579.67	580.11	579.85	579.88	580.45	580.62	580.61	581.10	580.73	580.67	580.07	579.97
1953	579.64	579.85	579.40	579.56	579.40	580.02	580.36	580.40	580.37	579.93	579.55	579.19
1954	579.31	578.79	578.81	578.95	579.20	579.37	579.90	579.95	579.82	579.76	580.00	580.01
1955	579.47	579.23	579.24	579.33	579.68	579.74	579.68	579.49	579.50	578.74	578.33	578.32
1956	577.87	577.73	577.77	577.80	578.12	578.69	578.64	578.78	578.69	578.50	577.92	577.87
1957	577.83	577.52	577.20	577.18	577.59	577.75	578.19	578.20	577.79	577.90	577.41	577.70
1958	577.15	577.31	576.91	577.12	577.46	576.97	577.08	577.14	577.27	577.24	576.64	576.54
1959	575.63	575.90	575.82	575.94	576.72	576.91	576.94	577.28	577.12	577.02	577.28	577.23
1960	577.05	577.18	577.24	577.10	577.78	578.64	579.01	579.31	579.19	578.91	578.31	578.90
1961	577.99	577.81	577.70	577.79	578.02	578.01	578.14	578.11	578.19	578.23	578.34	577.60
1962	577.61	577.25	577.47	577.45	577.48	577.97	577.94	577.99	577.70	577.34	577.11	576.67
1963	576.59	576.12	576.13	576.23	576.61	576.75	576.77	576.89	576.77	576.41	576.26	576.33
1964	575.65	575.46	575.49	575.26	575.35	575.82	575.96	575.89	576.04	575.78	575.49	575.47
1965	575.32	575.46	575.29	575.51	576.27	576.50	576.69	576.56	576.68	576.90	577.32	577.22
1966	577.43	577.47	577.23	577.22	577.64	577.57	577.57	577.36	577.37	577.36	576.91	577.05
1967	577.03	576.97	577.08	576.99	577.41	577.82	578.28	578.31	578.17	577.81	577.61	577.53
1968	577.85	577.35	577.65	577.78	578.14	578.09	578.36	578.58	578.47	578.93	578.19	578.31
1969	578.61	578.35	578.06	578.37	578.59	578.86	579.61	579.76	579.70	579.22	578.77	579.20
1970	578.32	578.68	578.40	578.38	578.61	578.89	579.16	579.35	579.23	579.25	578.85	578.57
1971	578.61	578.81	579.31	578.64	579.35	579.53	579.83	579.83	579.55	579.39	579.32	578.98
1972	579.25	578.91	578.48	578.95	579.20	579.66	579.80	580.00	580.22	580.26	579.71	580.07
1973	580.04	579.08	579.70	579.81	580.01	580.75	580.87	580.71	580.78	580.28	580.65	580.17

*IGLD - International Great Lakes Datum

Table A.9. Beginning-of-Month Levels at Thessalon (IGLD 1955)*

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1927	576.51	576.77	576.63	576.98	577.34	577.81	577.99	577.91	577.67	577.74	577.51	577.34
1928	576.83	577.25	577.38	577.58	578.21	578.50	578.78	578.90	578.91	578.84	579.01	578.97
1929	578.83	578.98	578.92	578.86	579.95	580.51	580.72	580.68	580.49	580.03	579.78	579.65
1930	579.10	578.97	579.12	579.11	579.29	579.51	579.65	579.68	579.39	578.90	578.44	577.96
1931	577.87	577.48	577.22	577.31	577.48	577.54	577.63	577.33	577.00	577.24	576.72	576.93
1932	576.31	576.96	576.61	576.68	576.78	577.03	577.03	576.96	576.89	576.61	576.28	576.28
1933	576.25	576.12	576.01	575.91	576.47	577.04	577.14	577.12	576.68	576.54	576.21	576.02
1934	575.81	576.10	575.95	575.80	576.35	576.27	576.40	576.29	576.13	576.34	575.94	576.17
1935	575.99	576.02	576.06	576.19	576.45	576.61	576.90	577.02	576.79	576.75	576.43	576.47
1936	576.37	576.28	576.28	576.48	576.59	577.08	577.01	576.95	576.82	576.81	576.87	576.32
1937	576.52	576.24	576.43	576.22	576.55	576.94	576.99	576.92	576.96	576.69	576.59	576.54
1938	575.87	576.22	576.48	577.16	577.29	577.54	577.83	577.89	577.90	577.78	577.67	577.33
1939	577.25	576.96	577.01	577.22	577.53	577.85	578.29	578.26	578.34	578.14	577.90	577.69
1940	577.21	577.03	576.92	576.85	577.04	577.36	577.66	577.63	577.70	577.47	577.20	577.04
1941	577.07	577.08	576.94	576.82	577.29	577.34	577.41	577.29	577.05	577.21	577.11	577.32
1942	577.18	576.93	577.17	577.61	577.83	578.14	578.53	578.50	578.40	578.17	578.07	577.86
1943	577.54	577.62	577.69	578.07	578.30	578.99	579.61	579.81	579.78	579.52	579.19	579.32
1944	578.80	578.59	578.41	578.74	578.75	578.94	579.17	579.08	579.07	578.74	578.58	577.93
1945	578.00	577.84	577.99	578.15	578.39	578.75	579.34	579.25	579.13	578.97	579.03	578.73
1946	578.34	578.59	578.75	578.92	578.96	578.93	579.25	579.11	578.86	578.38	578.49	577.77
1947	577.80	577.48	577.68	577.63	578.28	579.04	579.27	579.37	579.36	579.15	578.98	579.04
1948	578.17	578.21	578.04	578.50	578.97	579.17	579.28	579.21	578.78	578.27	577.82	577.92
1949	577.24	577.73	577.22	577.25	577.71	577.76	578.01	578.01	577.51	577.39	577.24	576.75
1950	576.62	576.74	576.83	577.04	577.43	577.81	578.16	578.13	578.21	578.24	578.06	578.09
1951	578.05	577.82	578.00	578.29	578.95	579.29	579.60	579.82	579.63	579.71	579.84	579.94
1952	579.82	580.13	579.80	580.01	580.44	580.64	580.70	581.06	580.94	580.64	579.99	579.88
1953	579.80	579.51	579.38	579.46	579.60	579.98	580.43	580.30	580.37	579.93	579.57	579.27
1954	579.06	578.94	578.71	578.99	579.34	579.47	579.93	579.88	579.73	579.75	580.08	579.82
1955	579.68	579.33	579.20	579.34	579.66	579.71	579.77	579.53	579.19	578.60	578.55	578.24
1956	577.91	577.79	577.81	577.83	578.14	578.58	578.68	578.71	578.83	578.40	578.04	577.84
1957	577.52	577.47	577.34	577.30	577.57	577.73	578.05	578.13	577.82	577.73	577.43	577.31
1958	576.99	577.23	576.98	577.12	577.45	577.04	577.28	577.20	577.08	577.09	576.58	576.42
1959	575.99	576.00	576.02	576.06	576.74	577.02	576.96	577.01	577.13	577.07	577.16	577.31
1960	577.21	577.21	577.29	577.14	577.94	578.67	578.98	579.31	579.29	578.96	578.71	578.29
1961	577.97	577.77	577.83	577.79	578.06	578.13	578.20	578.17	578.15	578.21	578.02	577.70
1962	577.61	577.21	577.29	577.35	577.53	578.03	577.88	577.91	577.77	577.34	576.97	576.65
1963	576.32	576.29	576.20	576.39	576.37	576.94	576.89	576.79	576.72	576.52	576.14	575.82
1964	575.71	575.49	575.59	575.35	575.51	575.88	575.97	575.97	575.93	575.88	575.59	575.42
1965	575.48	575.48	575.31	575.59	576.27	576.57	576.70	576.69	576.76	577.09	576.92	577.20
1966	577.17	576.92	576.87	577.21	577.43	577.55	577.63	577.54	577.35	577.00	576.82	576.80
1967	577.00	576.94	576.85	577.02	577.72	577.93	578.44	578.23	578.03	577.84	577.74	577.69
1968	577.72	577.58	577.54	577.61	577.90	578.14	578.46	578.51	578.55	578.79	578.42	578.43
1969	578.46	578.32	578.09	578.37	578.73	579.15	579.63	579.90	579.67	579.40	579.13	579.03
1970	578.51	578.71	578.42	578.43	578.80	579.03	579.17	579.36	579.05	579.21	579.13	579.01
1971	578.78	578.71	578.99	578.95	579.36	579.47	579.58	579.97	579.65	579.55	579.46	578.82
1972	579.23	578.95	578.59	578.95	579.23	579.63	579.81	580.02	580.24	580.21	579.89	580.06
1973	579.83	579.90	579.74	579.73	580.23	580.85	581.03	580.81	580.88	580.39	580.26	580.02

*IGLD - International Great Lakes Datum

Table A.10. Lake Huron Beginning-of-Month Levels (IGLD 1955)*

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1900	578.29	578.14	578.16	578.23	578.50	578.56	578.74	579.06	579.15	579.12	578.91	578.91
1901	578.68	578.41	578.29	578.62	579.03	579.28	579.37	579.58	579.38	579.04	578.96	578.52
1902	578.50	578.12	577.94	578.27	578.32	578.57	578.90	579.22	579.02	578.81	578.50	578.43
1903	578.24	578.11	578.14	578.50	578.70	578.81	578.94	579.07	579.11	579.17	578.89	578.48
1904	578.33	578.20	578.32	578.66	579.14	579.58	579.84	579.91	579.69	579.80	579.44	579.13
1905	578.74	578.60	578.62	578.85	579.06	579.50	579.79	579.94	579.86	579.66	579.22	579.14
1906	579.01	579.08	579.06	579.18	579.44	579.62	579.86	579.78	579.60	579.39	579.16	579.22
1907	578.78	578.98	578.92	579.14	579.31	579.54	579.78	579.92	579.72	579.66	579.18	578.99
1908	578.96	578.62	578.76	579.05	579.38	579.84	580.00	580.12	579.79	579.49	579.05	578.68
1909	578.48	578.18	578.29	578.34	578.60	579.19	579.42	579.36	579.19	578.97	578.45	578.38
1910	578.30	578.38	578.28	578.34	578.58	578.81	578.82	578.70	578.62	578.41	578.16	578.00
1911	577.84	577.70	577.80	577.66	577.79	578.25	578.32	578.20	578.01	577.82	577.78	577.80
1912	577.46	577.58	577.58	577.52	577.89	578.68	578.48	578.83	578.85	578.98	578.72	578.69
1913	578.56	578.38	578.41	578.77	579.11	579.50	579.61	579.63	579.39	579.06	578.96	578.64
1914	578.43	578.48	578.42	578.28	578.50	578.78	578.97	579.00	578.90	578.72	578.54	578.04
1915	577.73	577.69	577.86	577.75	577.82	577.92	578.14	578.22	578.29	578.20	577.98	577.88
1916	577.55	577.84	577.78	577.86	578.46	578.95	579.39	579.46	579.28	579.10	579.01	578.98
1917	578.91	578.73	578.73	578.84	579.14	579.46	580.05	580.37	580.08	579.99	579.62	579.27
1918	578.95	579.08	579.22	579.50	579.81	580.23	580.26	580.13	579.95	579.62	579.45	579.49
1919	579.05	579.19	578.75	579.18	579.27	579.67	579.57	579.54	579.33	578.94	578.90	578.91
1920	578.45	578.12	578.25	578.49	579.01	579.02	579.27	579.42	579.30	579.16	578.77	578.42
1921	578.18	578.04	578.06	578.37	578.94	578.82	578.79	578.74	578.46	578.53	578.03	577.76
1922	578.00	577.41	577.71	577.78	578.43	578.72	578.79	578.96	578.60	578.43	577.84	577.83
1923	577.37	577.04	577.03	577.30	577.70	577.96	578.17	578.07	577.93	577.80	577.71	577.16
1924	576.94	576.78	576.87	576.98	577.35	577.66	577.83	577.85	578.08	577.81	577.30	576.99
1925	576.56	576.51	576.52	576.68	576.70	576.64	576.80	576.77	576.55	576.11	576.13	575.84
1926	575.89	575.70	575.65	575.69	576.20	576.41	576.82	576.81	576.76	576.56	576.56	576.77
1927	576.54	576.64	576.62	576.88	577.21	577.70	577.81	577.89	577.55	577.51	577.17	577.42
1928	577.27	577.11	577.27	577.44	578.04	578.34	578.64	578.76	578.86	578.62	578.91	578.88
1929	578.83	578.92	578.76	578.97	579.81	580.52	580.66	580.67	580.35	579.94	579.53	579.60
1930	578.90	578.91	578.92	578.99	579.04	579.33	579.48	579.53	579.16	578.93	578.45	578.15
1931	577.88	577.39	577.13	577.29	577.30	577.44	577.43	577.28	576.85	577.08	576.74	576.94
1932	575.99	576.96	576.65	576.60	576.63	576.86	576.87	576.89	576.84	576.51	576.22	576.02
1933	576.15	575.82	575.96	575.77	576.21	576.92	577.04	577.02	576.55	576.45	576.20	576.12
1934	575.76	575.88	575.55	575.59	576.07	576.05	576.32	576.27	575.97	576.23	575.95	575.88
1935	575.97	575.81	575.94	576.11	576.45	576.49	576.77	576.98	576.82	576.69	576.31	576.47
1936	576.15	576.26	576.20	576.47	576.49	576.89	576.93	576.84	576.78	576.73	576.59	576.15
1937	576.42	576.17	576.28	576.06	576.44	576.82	577.00	576.93	576.77	576.56	576.38	576.52
1938	575.49	576.16	576.45	577.01	577.21	577.33	577.69	577.86	577.88	577.80	577.50	577.36
1939	577.18	576.82	576.98	577.09	577.57	577.78	578.25	578.22	578.25	578.12	577.83	577.46
1940	577.34	576.98	576.86	576.85	576.88	577.27	577.64	577.63	577.56	577.49	577.03	577.07
1941	576.99	577.01	576.96	576.78	577.20	577.25	577.30	577.29	577.08	577.00	576.94	577.20
1942	577.05	577.14	577.15	577.52	577.67	578.06	578.50	578.44	578.16	578.08	577.98	577.68
1943	577.57	577.63	577.78	577.99	578.41	578.79	579.57	579.74	579.70	579.44	579.02	579.12
1944	578.74	578.73	578.53	578.67	578.61	578.85	579.17	579.08	578.80	578.74	578.42	578.41
1945	578.06	578.05	577.86	578.03	578.42	578.71	579.25	579.17	579.05	578.87	578.82	578.73
1946	578.61	578.56	578.55	578.74	578.91	578.98	579.26	579.12	578.94	578.71	578.42	577.98
1947	577.75	577.48	577.67	577.56	578.26	578.91	579.26	579.48	579.31	579.22	578.92	578.91
1948	578.17	578.11	578.06	578.40	578.93	579.11	579.23	579.26	578.77	578.30	577.73	577.87
1949	577.79	577.63	577.54	577.30	577.59	577.71	577.96	578.04	577.72	577.32	577.11	576.83

*IGLD - International Great Lakes Datum

Table A.10. Lake Huron Beginning-of-Month Levels (IGLD 1955) (continued)*

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1950	576.47	576.67	576.76	576.81	577.42	577.68	578.08	578.15	578.19	578.12	577.90	578.11
1951	577.79	577.87	577.88	578.20	578.94	579.30	579.55	579.90	579.62	579.63	579.96	579.86
1952	579.68	579.97	579.86	579.90	580.46	580.64	580.69	581.05	580.81	580.58	579.96	579.93
1953	579.65	579.69	579.47	579.57	579.62	579.99	580.35	580.37	580.33	579.87	579.58	579.23
1954	579.14	578.82	578.85	578.92	579.27	579.40	579.91	579.91	579.83	579.71	580.02	579.96
1955	579.48	579.34	579.19	579.27	579.65	579.72	579.67	579.48	579.38	578.68	578.28	578.24
1956	577.91	577.75	577.71	577.80	578.13	578.64	578.61	578.75	578.72	578.43	577.99	577.83
1957	577.79	577.45	577.26	577.21	577.57	577.76	578.15	578.18	577.80	577.75	577.40	577.46
1958	577.26	577.31	577.02	577.14	577.36	577.06	577.15	577.20	577.18	577.07	576.65	576.47
1959	575.83	575.99	575.91	576.08	576.74	577.01	577.03	577.20	577.21	577.08	577.16	577.20
1960	577.14	577.20	577.27	577.19	577.77	578.63	579.02	579.28	579.19	578.98	578.32	578.75
1961	578.07	577.84	577.74	577.82	578.04	578.06	578.22	578.21	578.14	578.10	578.15	577.62
1962	577.53	577.35	577.41	577.46	577.58	577.95	577.94	577.93	577.69	577.39	577.13	576.69
1963	576.49	576.19	576.13	576.30	576.64	576.81	576.82	576.87	576.77	576.49	576.24	576.13
1964	575.61	575.39	575.36	575.28	575.45	575.85	575.94	575.94	576.00	575.81	575.52	575.50
1965	575.41	575.45	575.32	575.56	576.24	576.54	576.73	576.64	576.72	576.93	577.13	577.11
1966	577.22	577.20	577.04	577.27	577.55	577.60	577.64	577.51	577.36	577.22	576.83	576.99
1967	576.92	576.90	577.03	576.96	577.53	577.82	578.31	578.33	578.19	577.88	577.71	577.60
1968	577.82	577.47	577.68	577.73	578.07	578.14	578.40	578.57	578.52	578.82	578.28	578.35
1969	578.43	578.34	578.16	578.34	578.64	578.97	579.62	579.85	579.70	579.27	578.94	579.12
1970	578.51	578.62	578.47	578.42	578.69	578.96	579.19	579.41	579.25	579.28	578.99	578.73
1971	578.74	578.78	579.05	578.80	579.38	579.58	579.83	579.86	579.67	579.44	579.35	579.02
1972	579.22	578.94	578.73	578.95	579.26	579.66	579.82	580.01	580.22	580.25	579.85	579.99
1973	579.76	579.51	579.69	579.98	580.20	580.81	580.97	580.80	580.84	580.37	580.42	580.11

*IGLD - International Great Lakes Datum

*Table A.11. Lake Huron Monthly Change in Storage in TCFS-Months**

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1900	-36	5	17	67	14	44	77	22	-7	-50	0	-55
1901	-65	-32	79	101	60	22	50	-48	-84	-19	-109	-5
1902	-91	-48	79	12	60	82	77	-48	-52	-74	-17	-46
1903	-31	8	86	50	26	32	31	10	15	-67	-101	-36
1904	-31	31	81	119	105	64	17	-53	27	-86	-77	-93
1905	-34	5	55	52	105	72	36	-19	-50	-105	-20	-31
1906	17	-5	29	64	43	59	-19	-43	-52	-55	15	-105
1907	48	-16	53	42	55	59	34	-48	-15	-115	-47	-7
1908	-81	36	69	82	110	40	29	-79	-74	-105	-92	-48
1909	-72	29	12	64	141	57	-14	-41	-54	-124	-17	-19
1910	19	-26	14	59	55	2	-29	-19	-52	-60	-40	-38
1911	-34	26	-34	32	110	17	-29	-46	-47	-10	5	74
1912	29	0	-14	92	189	-50	84	5	32	-62	-7	-31
1913	-43	8	86	84	93	27	5	-58	-82	-24	-79	-50
1914	12	-16	-34	54	67	47	7	-24	-44	-43	-124	-74
1915	-10	45	-26	17	24	54	19	17	-22	-53	-25	-72
1916	69	-15	19	148	117	109	17	-43	-44	-22	-7	-17
1917	-43	0	26	74	77	146	77	-69	-22	-89	-87	-77
1918	31	37	67	77	100	7	-31	-43	-82	-41	10	-105
1919	34	-117	103	22	96	-25	-7	-50	-96	-10	2	-117
1920	-79	33	58	129	2	62	36	-29	-35	-93	-87	-58
1921	-34	5	74	141	-29	-7	-12	-67	17	-120	-67	58
1922	-141	80	17	161	69	17	41	-86	-42	-141	-2	-110
1923	-79	-3	65	99	62	52	-24	-34	-32	-22	-136	-53
1924	-38	23	26	92	74	42	5	55	-67	-122	-77	-103
1925	-12	3	38	5	-14	40	-7	-53	-109	5	-72	12
1926	-46	-13	10	126	50	101	-2	-12	-50	0	52	-55
1927	24	-5	62	82	117	27	19	-81	-10	-81	62	-34
1928	-38	41	41	148	72	74	29	24	-59	69	-7	-12
1929	22	-42	50	208	170	35	2	-77	-101	-98	17	-168
1930	2	3	17	12	69	37	12	-89	-57	-115	-74	-65
1931	-117	-69	38	2	34	-2	-36	-103	57	-81	50	-227
1932	232	-79	-12	7	55	2	5	-12	-82	-69	-50	31
1933	-79	37	-46	109	170	30	-5	-112	-25	-60	-20	-86
1934	29	-88	10	119	-5	67	-12	-72	64	-67	-17	22
1935	-38	34	41	84	10	69	50	-38	-32	-91	40	-77
1936	26	-15	65	5	96	10	-22	-14	-12	-34	-109	65
1937	-60	29	-53	94	91	44	-17	-38	-52	-43	35	-247
1938	160	77	134	50	29	89	41	5	-20	-72	-35	-43
1939	-86	42	26	119	50	116	-7	7	-32	-69	-92	-96
1940	-86	-31	-2	7	93	92	-2	-17	-17	-110	10	-19
1941	5	-13	-43	104	12	12	-2	-50	-20	-14	64	-36
1942	22	3	89	37	93	109	-14	-67	-20	-24	-74	-26
1943	14	40	50	104	91	193	41	-10	-64	-100	25	-91
1944	-2	-51	34	-15	58	79	-22	-67	-15	-77	-2	-84
1945	-2	-50	41	96	69	134	-19	-29	-44	-12	-22	-29
1946	-12	-3	46	42	17	69	-34	-43	-57	-69	-109	-55
1947	-65	50	-26	173	156	87	53	-41	-22	-72	-2	-177
1948	-14	-13	81	131	43	30	7	-117	-116	-136	35	-19
1949	-38	-24	-58	72	29	62	19	-77	-99	-50	-69	-86

*TCFS-Months - thousands of cubic feet per second months

Table A.11. Lake Huron Monthly Change in Storage in TCFS-Months (continued)*

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1950	48	24	12	151	62	99	17	10	-17	-53	52	-79
1951	19	3	77	183	86	62	84	-67	2	79	-25	-43
1952	69	-28	10	138	43	12	86	-58	-57	-148	-7	-65
1953	10	-58	24	12	89	89	5	-10	-114	-69	-87	-22
1954	-77	8	17	87	31	126	0	-19	-30	74	-15	-115
1955	-34	-40	19	94	17	-12	-46	-24	-173	-96	-10	-79
1956	-38	-10	22	82	122	-7	34	-7	-72	-105	-40	-10
1957	-81	-50	-12	89	46	96	7	-91	-12	-84	15	-48
1958	12	-77	29	54	-72	22	12	-5	-27	-100	-44	-153
1959	38	-21	41	163	65	5	41	2	-32	19	10	-14
1960	14	18	-19	144	206	96	62	-22	-52	-158	106	-163
1961	-55	-26	19	54	5	40	-2	-17	-10	12	-131	-22
1962	-43	16	12	30	89	-2	-2	-58	-74	-62	-109	-74
1963	-72	-16	41	84	41	2	12	-24	-69	-60	-27	-124
1964	-53	-8	-19	42	96	22	0	14	-47	-69	-5	-22
1965	10	-34	58	168	72	47	-22	19	52	48	-5	26
1966	-5	-42	55	69	12	10	-31	-36	-35	-93	40	-17
1967	-5	34	-17	141	69	121	5	-34	-77	-41	-27	53
1968	-84	54	12	84	17	64	41	-12	74	-129	17	19
1969	-22	-48	43	74	79	161	55	-36	-106	-79	44	-146
1970	26	-40	-12	67	65	57	53	-38	7	-69	-64	2
1971	10	72	-60	144	48	62	7	-46	-57	-22	-82	48
1972	-67	-54	53	77	96	40	46	50	7	-96	35	-55
1973	-60	48	69	54	146	40	-41	10	-116	12	-77	-62

*TCFS-Months - thousands of cubic feet per second months

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Atlantic Oceanographic and Meteorological Laboratories (AOML): Geology and geophysics of ocean basins and borders, oceanic processes, sea-air interactions and remote sensing of ocean processes and characteristics (Miami, Florida).

Pacific Marine Environmental Laboratory (PMEL): Environmental processes with emphasis on monitoring and predicting the effects of man's activities on estuarine, coastal, and near-shore marine processes (Seattle, Washington).

Great Lakes Environmental Research Laboratory (GLERL): Physical, chemical, and biological, limnology, lake-air interactions, lake hydrology, lake level forecasting, and lake ice studies (Ann Arbor, Michigan).

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Geophysical Fluid Dynamics Laboratory (GFDL): Dynamics and physics of geophysical fluid systems; development of a theoretical basis, through mathematical modeling and computer simulation, for the behavior and properties of the atmosphere and the oceans (Princeton, New Jersey).

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Marine EcoSystem Analysis Program Office (MESA): Plans and directs interdisciplinary analyses of the physical, chemical, geological, and biological characteristics of selected coastal regions to assess the potential effects of ocean dumping, municipal and industrial waste discharges, oil pollution, or other activity which may have environmental impact.

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