



# Great Lakes Daily Ice Observations at NOAA Water Level Gauge Sites, Version 1

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## USER GUIDE

### How to Cite These Data

As a condition of using these data, you must include a citation:

National Snow and Ice Data Center. 1995. Great Lakes Daily Ice Observations at NOAA Water *Level Gauge Sites, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center. <https://doi.org/10.7265/N5PN93HT>. [Date Accessed].

FOR QUESTIONS ABOUT THESE DATA, CONTACT [NSIDC@NSIDC.ORG](mailto:NSIDC@NSIDC.ORG)

FOR CURRENT INFORMATION, VISIT <https://nsidc.org/data/G00945>



National Snow and Ice Data Center

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# 1 DETAILED DATA DESCRIPTION

The files in this directory contain daily visual ice observations taken at National Oceanic and Atmospheric Administration/National Ocean Service water level gauge sites in the Great Lakes Basin from 1955 to the 1997. Observations are made by cooperative observers who record ice observations while logging water level gauge data for the National Ocean Service, November 1 - April 30 of each year. Please see section F for the instructions on recording the ice conditions. Ice reports were first tabulated by the US Army Corps of Engineers Lake Survey Center in Detroit, then by the Lake Survey Center as part of ESSA, then by the Great Lakes Environmental Research Laboratory of NOAA, and now by the National Snow and Ice Data Center (NSIDC).

## 1.1 Format

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The files are in ASCII text format with following organization:

Table 1. File Organization

Column 1-2	blank (X2)
Column 3-4	Area number (I2)
Column 5-6	blank (X2)
Column 7-11	Gauge number (A5)
Column 12-13	blank (X2)
Column 14	Latitude direction (A1)
Column 15-19	Latitude (I5.2)
Column 20	Filler slash (A1)
Column 21	Longitude direction (A1)
Column 22-26	Longitude (I5.2)
Column 27-28	blank (X2)
Column 29-36	Date (CCYYMMDD) (I8)
Column 37-38	blank (X2)

<p>Column 39</p>	<p style="text-align: center;">Ice type code (A1)</p> <p>A = open water, no ice within vision                  B = solid ice, little or no signs of deterioration                  C = honeycombed ice, full of holes and showing evidence of deterioration                  D = windrowed ice, ice heaped up and frequently driven below water due to wind                  E = slush ice, broken or crushed ice usually extending well below surface                  F = drifting ice, large areas of ice which have broken off from larger fields and are drifting with the current                  G = ice gorge, an ice accumulation which wedges in and blocks the river                  X = date of first reported ice for the season                  Z = date of last reported ice for the season                  0 = date of first or last ice observation for a season during which no ice was observed at the gauge site</p>
<p>Column 40</p>	<p style="text-align: center;">Number of missing reports (I1)</p> <p>1 = One report missing before first reported ice or after last reported ice                  2 = two reports missing before first reported ice or after last reported ice                  3 = three or more reports missing before first reported</p>

## 1.2 File and Directory Structure

A list of files in this data set is as follows. All files have been tarred together in the file `ice_gage.tar` (4.9 MB) which can be downloaded via HTTPS:

<https://noaadata.apps.nsidc.org/NOAA/G00945/>.

- `ice_gage.txt` = Documentation
- `1.dat` = data for area 01, St. Lawrence River.
- `2.dat` = data for area 02, Lake Ontario.
- `3.dat` = data for area 03, Niagara River.
- `4.dat` = data for area 04, Lake Erie.
- `5.dat` = data for area 05, Detroit River.
- `6.dat` = data for area 06, Lake St. Clair.
- `7.dat` = data for area 07, St. Clair River.
- `8.dat` = data for area 08, Lake Huron.
- `9.dat` = data for area 09, St. Marys River.
- `10.dat` = data for area 10, Lake Michigan.
- `11.dat` = data for area 11, Lake Superior.

extract\_gage.template = example Fortran routine that can be used to extract records for a given gauge number

ice\_gage.tar = Unix tar' file containing the complete data set

names.dat = list of area and gauge names and numbers

summary\_chart.dat = list of gauge locations and numbers, with reporting years

summary.dat = all records for ice type = X, ice type = Z, or icetype 0, duplicated from the data files listed above. This file gives the first and last dates of reported ice for all gauge sites, for all years.

summary.txt = documentation file for summary.dat

## 1.3 Spatial Coverage

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Water level gauge location history and explanation of gauge number/letter codes:

Several gauge locations have been changed during the time ice observations have been collected. The information given here was obtained from NOAA National Ocean Service and is as complete as possible.

1. Gauge number 1060, Alexandria Bay, was moved across the river in June 1983. NOAA/NOS changed its number to 1062, the data set retains the number 1060.
2. Gauge number 4090, Mouth of the Black River, Port Huron, Michigan, has two reports for some years. 4090A is the Black River itself, 4090B is the St. Clair River.
3. Gauge number 4098, Ft. Gratiot, has two reports for some years. 4098A is the lake above the gauge site, 4098B is the river below the gauge site.
4. Gauge number 5098, Detour, was moved one-half mile to Detour Village in November 1977. NOAA/NOS changed the gauge number to 5099, the data set retains the number 5098.
5. Gauge number 7078, Green Bay, had a new containment building constructed in September 1979. NOAA/NOS changed the gauge number to 7079, the data set retains the number 7078.
6. Gauge number 9016, Marquette, was moved one-quarter to one-half mile in January 1980 and NOAA/NOS changed its number to 9018. The data set retains the number 9016.
7. Gauge number 9064, Duluth, has several reports for most years. Through 1980/81, the observations are: 9064 = gauge site; 9064A = canal toward harbor; 9064B = canal; 9064C = canal toward lake. Beginning with 1980/81, the observations are: 9064A = into harbor; 9064B = canal; 9064C = lakeward.
8. Gauge number 6060, U.S. Slip, has multiple observations for some years. the codes are: 6060 = below the locks; 6060A = inside the lock approach; 6060B = from lock to Topsail Island; 6060C = below the locks.



## 1.4 Sample Data Record

Examples of record format for dates of first and last reported ice:

Table 2. Examples of record format for dates of first and last reported ice

02 2058 N43.26/W77.62 19781115 B	Solid ice on 11/15/78.
02 2058 N43.26/W77.62 19781115 X	Date of first reported ice of the season; all "A" reports before this date.
02 2058 N43.26/W77.62 19791128 F	Drifting ice on 11/28/79
02 2058 N43.26/W77.62 19791128 X1	Date of first reported ice of the season; there is no report for the 1 day previous.
02 2058 N43.26/W77.62 19801115 E	Slush ice on 11/15/80.
02 2058 N43.26/W77.62 19801115 X2	Date of first reported ice of the season; there are no reports for the 2 days previous.
02 2058 N43.26/W77.62 19811231 B	Solid ice on 12/31/81.
02 2058 N43.26/W77.62 19811231 X3	Date of first reported ice of the season; there are no reports for the 3 or more days previous
02 2058 N43.26/W77.62 19820328 F	Floating ice on 3/28/82.
02 2058 N43.26/W77.62 19820328 Z3	Date of last reported ice of the season; there are no reports for 3 or more days following 28 March. All reports (if any) following the 3+ day gap are "A", open water.
02 2058 N43.62/W77.62 19831101 0	Date of first report when no ice is observed during the entire season.
02 2058 N43.26/W77.62 19840501 0	Date of last report when no ice is observed during the entire season.

## 2 DATA ACQUISITION AND PROCESSING

### 2.1 Data Acquisition Methods

Instructions to ice observers for recording ice conditions

1. Ice records are to be prepared by water level gauge observers during the cold weather season beginning on 1 November of each year and continuing through 30 April of the following year. The records will contain daily observations of ice conditions at the locations specified in the observers' contracts according to the instructions provided in paragraph 2, below, recorded on the calendar page forms provided by the National Snow and Ice Data Center, Boulder, Colorado.
2. On each day beginning 1 November and continuing through 30 April, record on the corresponding calendar date space a letter code indicating the ice condition, and any appropriate comments. The following tabulation shows the letter code to be used:

Code	Description
A	Open Water, no ice within vision.
B	Solid Ice, little or no signs of deterioration.
C	Honeycombed Ice, full of holes and showing evidence of deterioration.
D	Windrowed Ice, ice heaped up and frequently driven below water due to wind.
E	Slush Ice, broken or crushed ice usually extending well below surface.
F	Drifting Ice, large areas of ice which have broken off from larger fields and are drifting with the current.
G	Ice Gorge, an ice accumulation which wedges in and blocks the river.

- Use a single letter "A" if no ice is observed for that day. Use the appropriate single letter code if there is a single, uniform ice condition at the time of observation. Two or more codes may be used when two or more ice conditions are present at the time of the observation. Short additional comments may be added if necessary, to clarify the use of two or more codes.

### 3 DOCUMENT INFORMATION

#### 3.1 Publication Date

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October 1998

#### 3.2 Date Last Updated

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25 September 2023