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COMPUTERIZED NATIONAL WEATHER SERVICE GREAT LAKES ICE REPORTS FOR WINTER SEASONS 1899-1970

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ABSTRACT. Historical National Weather Service Great Lakes ice reports were digitized to provide a data set of ice thickness and ancillary ice information in the coastal zone of the Great Lakes for winter seasons from 1899 to 1970. These data are made available here for the first time in a computer compatible format. Temporal and spatial distribution patterns of ice report observations are discussed briefly.

INTRODUCTION

Because ice cover in the Great Lakes affects both the flora and fauna (Magnuson et al. 1997), retrospective ice cover information is useful for the construction of biological and physical models during the winter months, e.g., fishery recruitment, sediment re-suspension, and shore erosion. The presence or absence of a stable ice cover in shallow spawning grounds in northern Lake Michigan has been shown to affect whitefish recruitment (Brown et al. 1993). A stable ice cover can also contribute to increased under ice zooplankton activity (Vanderploeg et al. 1992) and to decreased resuspension of particulate matter in the water column (Schwab et al., submitted 2004). Computerized ice thickness data along the shores of the Great Lakes prior to about 1965 are extremely sparse. Historical NOAA National Weather Service (NWS) ice reports only existed in paper copy prior to this project. These reports are in text form and contain qualitative descriptions of ice conditions and quantitative information on ice thickness in specific nearshore areas of the Great Lakes. There are approximately 530 pages of reports spanning the winters from 1899 to 1970. In this project, ice reports were computerized by creating computer image files of the original paper reports and by digitizing (keying) the ice thickness data for specific site locations. The objective was to make these coastal ice data more accessible for climate, winter ecosystem, and engineering design and feasibility studies. The shore zone ice thickness data also provide a complementary data set for several historical Great Lakes ice data sets (Assel 2003, Assel et al. 2002, Bolsenga 1988, Bolsenga et al. 1988, Slator 1978) and have potential applications in GLERL's Great Lakes Coastal Forecasting System Project and the Lake Erie Integrated Program.

A NOAA Climate Database Modernization Program (CDMP) proposal was funded to support this work. Funds were used to digitize the ice reports under a contract to Lason (Beltsville, Maryland). A majority of GLERL staff time to support this work was provided by internal GLERL funds. The work was coordinated by the National Climate Data Center (NCDC) under the auspices of the National Environmental Satellite, Data, and Information Service. GLERL made an index of the NWS ice report dates for each year and developed the format and codes used to digitize the ice thickness data. This was documented in a task order to the NCDC contractor. The National Snow and Ice Data Center (NSIDC) collaborated with GLERL to organize the data and provide it to the contractor (NSIDC archives the original paper reports). The NCDC contractor provided GLERL with computer files of digitized NWS ice reports, a list of station names, and graphic image files of the original NWS ice charts. Ice thickness reports are summarized in tables sorted by lake and date for each winter season and are also summarized in tables sorted by winter

season. Software to make tabular summaries and software to make graphs that portray the NWS ice report sites were developed at GLERL. The digitized ice thickness data and image files of the original NWS reports and digitized ice thickness data were quality controlled for consistency but not checked for possible key entry errors in the digitizing process as this would have been prohibitively costly in time and funds due to the large volume of data involved. The data in this report is being made available to the NSIDC for archiving.

DATA

The following text from Snider, (1974), provides a historical context to the data that was digitized.

> "In 1897, the Weather Bureau Office at Detroit begin routine weekly publication of available ice information during the late winter and early spring. Observations were mostly from ports and narrow channels, but occasionally a report from a captain who had made an early passage was included. Forecasters preparing this publication soon begin including the probable effect of the past week's weather on the ice and hinting at the implications of the weather forecast for the next few days. Over a period of several decades, considerable skill was achieved in the subjective preparation of ice forecasts by meteorological methods. None of these methods were ever published, but shipping companies began using the Weather Bureau Ice Reports to time the outfitting of vessels and hiring of crews for their initial spring sailings."

Thus, the historical NWS ice reports were used primarily by shippers to determine when it was safe to begin navigation on the Great Lakes in spring.

The data abstracted and digitized from the historical paper copy NWS ice reports consisted of site name, lake or river, year, month, and day of report, ice thickness, ice condition, and a section of supplementary descriptive ice cover information. Ice condition codes are summarized in Table 1. An estimate of the latitude and longitude location of each site and a site number were added later. The digital data is summarized as two types of tabular listings: (1) all the reports for a given station over the 72 winters 1899-1970, and (2) all stations for a given winter season, see Table 2 and Table 3, respectively, for examples. Computer files of the tables are given as Appendix 1 and Appendix 2, respectively. File names, structure, and record format are also given in these appendices. The original paper copy reports were scanned and a graphic (Tag Image File Format, i.e.,TIF) image file was created of each of the original report pages (Appendix 3). The name of the image file was also included in the digitized ice report for each site. Thus, each digitized ice report record is cross referenced with its image file for those who may wish to examine the original data.

SITE TEMPORAL DISTRIBUTION

There are 36,599 individual records covering 501 stations and 72 winters (1899-1970). The temporal distribution of these data is summarized as a computer file (Appendix 4), which contains a matrix of 501 rows by 72 columns. The number of observations (records) for each winter for a given station is given by reading across columns for a given row. The stations with records and

the number of records for each station with data for a given year are obtained by reading down a given column. Figure 1 portrays the total number of sites per winter season and Figure 2 portrays the average number of reports per site over the 72 winter seasons. It is evident from Figure 1 that the number of sites was between 100 and 200 for most of the period of record, falling below 100 in the 1920s to early 1930s and above 200 sites from the mid 1940 to the mid 1960s. Figure 2 shows that less than 20% of the sites average more than 2 records per season. The upper 20% of the sites with the greatest number of records are summarized in order of ascending site number in Table 5. Figure 3 portrays the dates of first and last ice each winter. It shows that most seasons ice reports started in early March and ended any time between the end of the third week of March and the last week of April.

SITE LOCATIONS

No latitude and longitude coordinates were given in the original National Weather Service Reports. Latitude and longitude coordinates were estimated, from the site name, for each site location using Great Lakes Navigation Charts and geographic atlases. The latitude longitude coordinates given provide only a general location of each site. Readers interested in more specific location information should consult the images of the original NWS Ice Reports, Navigation Charts of the Great Lakes, and a place name Atlas. A comprehensive list of all sites, annotated by site number (No), Lake or River (L/R), Name, Latitude North (Lat. N) and Longitude West (Lon. W), and State or Province (S/P) is given as Table 4. The sites in Table 4 were first aggregated by lake or river and then arranged in order of decreasing latitude for a given lake or river. The approximate location of each site is portrayed in a series of charts given in Appendix 1. The location of all sites are portrayed in Figure 4. The location of all sites for a given winter is portrayed in a series of charts given in Appendix 2.

One site name on each lake is simply the lake's name or river name (e.g., site 22-Lake Superior, site 304-Lake Michigan, site 179-Lake Huron, site 384-Lake Erie, site 460-Lake Ontario, site 359-Detroit River, site 353-St Clair River, site 105-St, Marys River, and site 498-St Lawrence River). Reports at these sites refer to a general description about the lake or river either with no specific location given or a location given in the supplemental information section of the record. These sites were included to have a complete a record as possible of reported ice conditions.

SITE ALIASES

Many of the latitude and longitude coordinates given in Table 4 are associated with two or more different site names. Reasons for this include:

(1) over the years the same site has been known by several different names [e.g., Mackinac Island and Mackinaw Island; the Soo and Sault Ste Marie; Green Bay, Green Bay–Bay, and Green Bay Harbor],

(2) several different descriptions (lakeward, bay, harbor, island, in side breakwater, outside breakwater, in the lake, and others) are given for the same geographic location (e.g. Duluth) in the original NWS Report [each descriptor was given a different site name], and

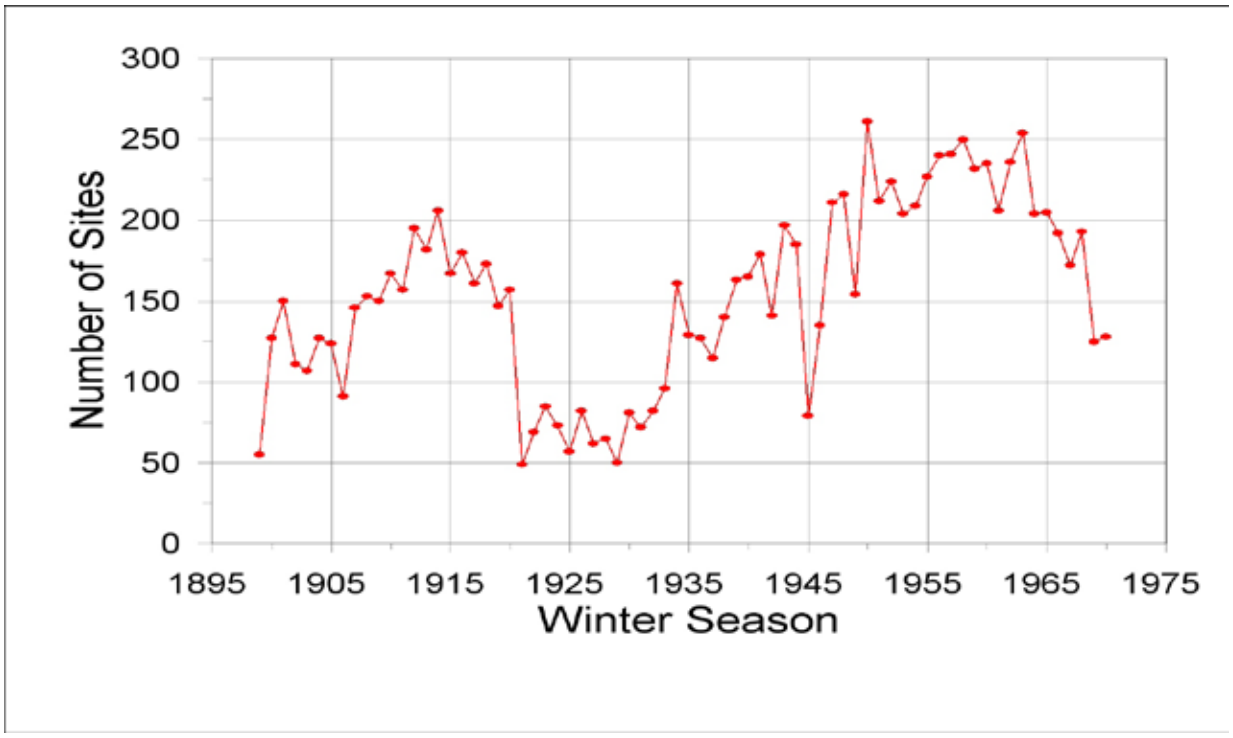

Figure 1. Total Number of Sites per Winter.

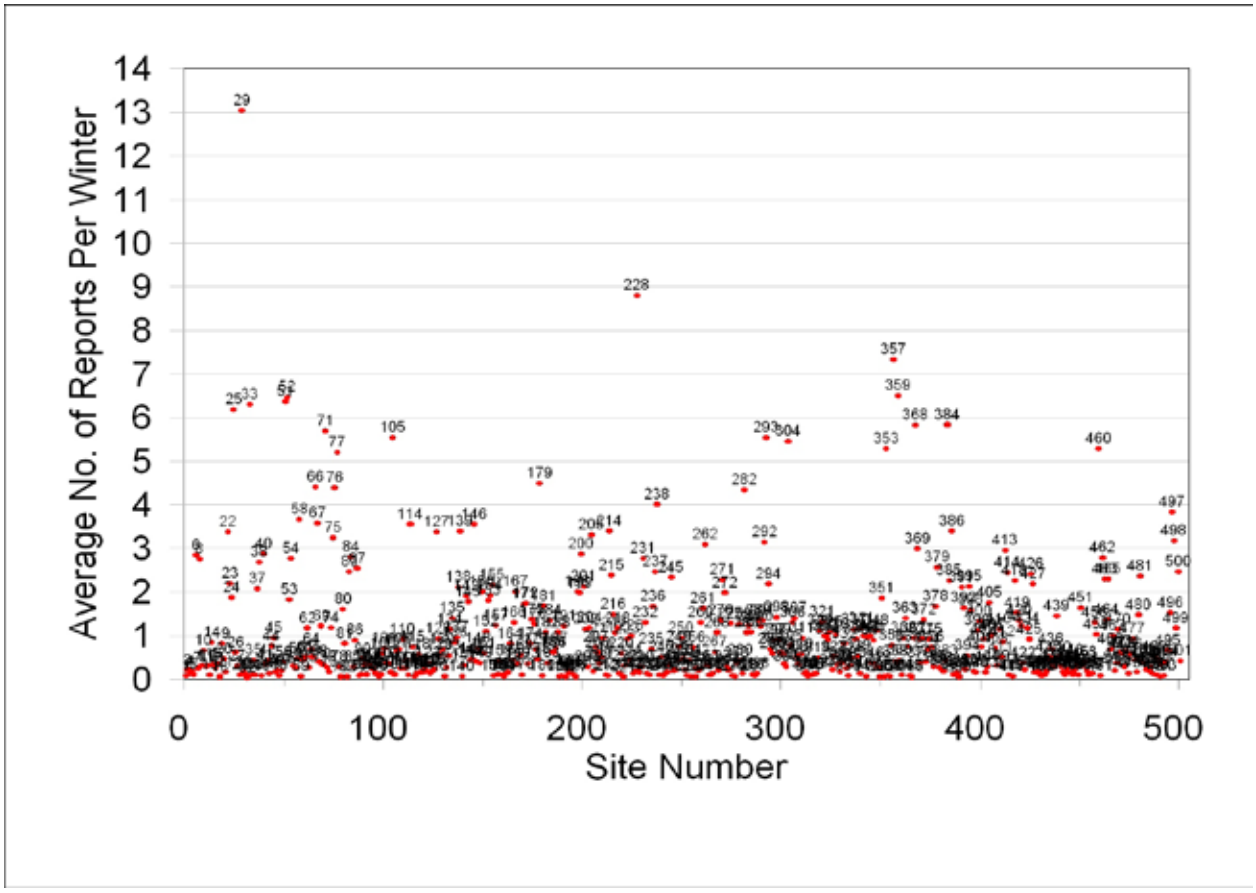

Figure 2. Average Number of Reports per Site.
Each ite (plotted as a dot) is labelled by its site number.

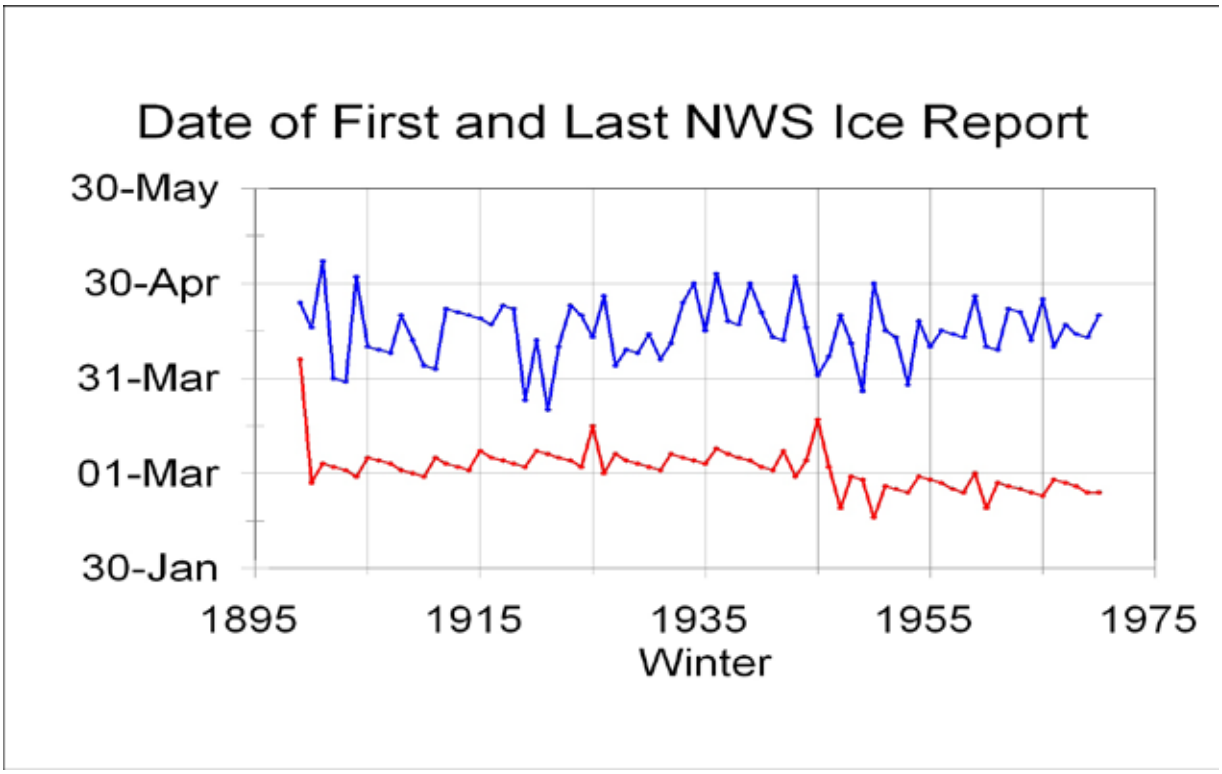

Figure 3. Composite Date of First and Last NWS Ice Report.

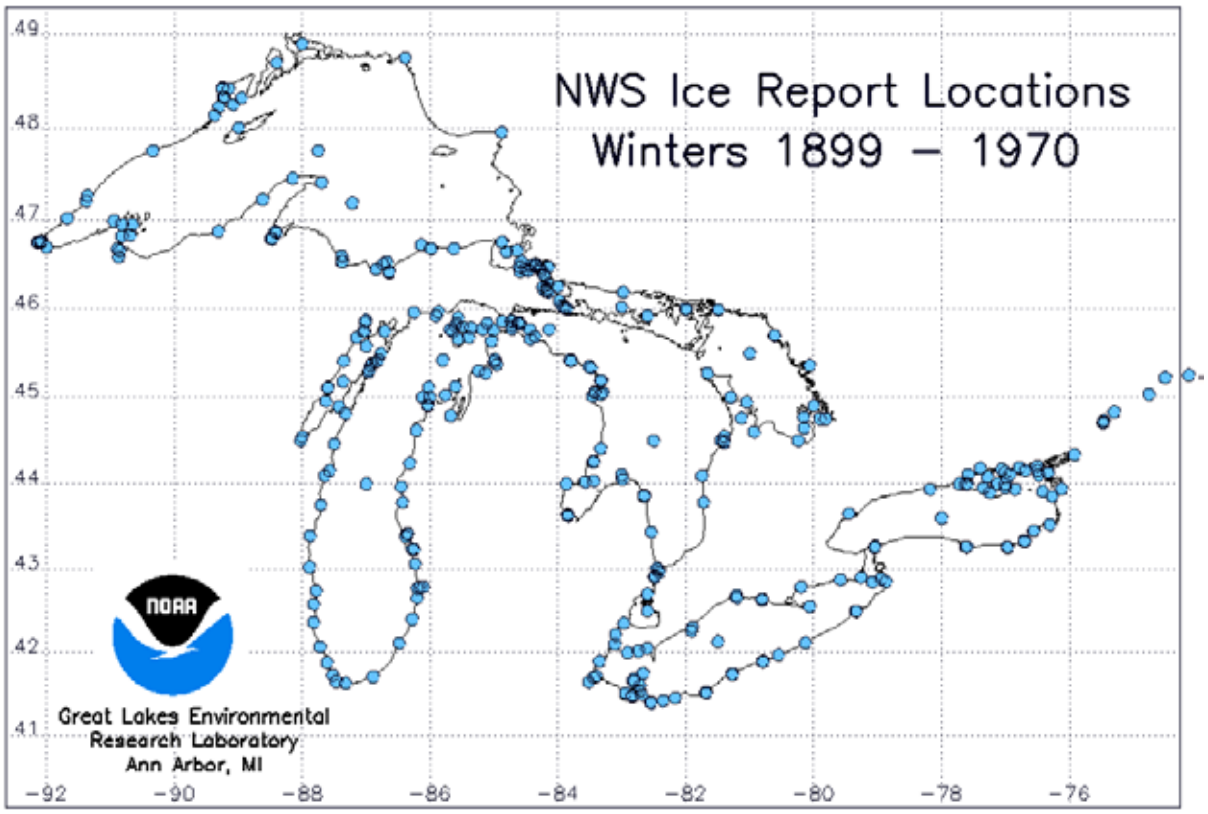

Figure 4. Composite Chart of all Site Locations.

(3) sites in the same proximity (Soo, Sault Ste Marie – Canadian Canal) exceeded the precision with which latitude and longitude were estimated and so were given the same latitude, longitude coordinate. Sites at different locations but with the same name, (e.g., Grand Marais, Michigan (Lake Superior) and Grand Marais, Minnesota (Lake Superior), Presque Isle (on Lakes Superior) and Presque Isle (on Huron), provided a further complicating factor for alias site names.

Sites that have different site descriptors but the same latitude longitude coordinate could have been combined. The stations in Table 4 do contain some sites that are combinations of earlier individual sites. The Keweenaw Waterway, site 29, provides the best example of this, where ice reports all along this waterway were included under that one site name. However, this was not done in the vast majority of the sites in this report as the individual sites given here may be of interest to some users, and combining sites is at best a subjective process. Since sites are indexed by site number (Table 4) and are available as computer files (Appendix 1), it would not be difficult to combine sites. The choice to do so is left to the discretion of the users of these data.

SUMMARY

Ice thickness and ice condition data was digitized from historical National Weather Service ice reports for winters from 1899 to 1970. Over 36,500 records at 501 sites were produced and given as tabulations in fixed formatted ASCII files. An estimate of the approximate latitude and longitude location and a cross reference to the name of image files from which the data was abstracted is included in each record. The dates of first ice reports frequently start the first week of March, and the dates of last ice reports occur anytime between the end of the third week in March and last week in April. Thus, any analysis of these data will likely be limited primarily to the months of March and April. Average dates of maximum ice thickness occur 8-15 March (Lake Superior) 24-28 February (Lakes Michigan and Huron), 16-23 February (Lake Ontario), and 1-7 February (Lake Erie), according to Bolsenga et al. (1988). Thus, these data are useful in estimating the seasonal maximum ice thickness in some areas of the Great Lakes.

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Table 1 Ice Condition Codes*

Code	Description
BI	Brash Ice, accumulation of floating ice made up of pieces less than 2 meters across
BK	Ice Broken
BV	Beyond Vision
CL	Clear Ice, ice transparent in appearance
DC	Decreasing
DI	Drift Ice
FD	Field Ice, an area of pack ice consisting of any size floes covering an area 10 km or more across
FS	Fast Ice, ice that is attached to the shore
HF	Heavy Field Ice, same as field ice but with a greater percent coverage or rafting or ridging
IB	Icebergs, large ice floes
IJ	Ice Jam, an accumulation of broken ice caught in a narrow channel or constricted area
IN	Increasing
IP	Ice Present
IR	Ice Bridge, a arc shaped ice cover that can form at the outlet of a lake, due to high water velocity
LF	Light Field Ice, same as field ice but with less percent coverage
LI	Very Little Ice
NC	No Change
NI	New Ice, a general term for recently formed ice
NS	Ice Not Safe
OW	No Ice In Area, Open Water
PI	Pack Ice, any area of ice other than fast ice, no matter what form it takes
PN	Pancaked, circular pieces of ice from 30 cm to 3 m across, up to 10 cm thick, with raised rims
PR	Pressure Ridges, a line or wall of broken ice forced up by pressure
RF	Refrozen
RI	Running Ice, ice moving with the current or wind
RT	Rotten Ice, ice which has become honeycombed and is in an advanced state of disintegration
SC	Snow Covered
SI	Slush Ice, ice formed from snow saturated with water
SL	Slush On Ice, snow saturated and mixed with water on the ice surface
SM	Smooth Ice
SO	Solid, ice that shows no signs of deterioration
SW	Some Open Water
WI	Windrowed, a hillock of broken ice which has been formed by the action of winds
WT	Water On Ice

*These descriptions are taken directly from the NWS ice reports. The meaning of most of the descriptions are self-evident. A brief explanation is given for the remaining terms, based primarily on WMO Sea-Ice Nomenclature, 1970. World Meteorological Organization publication WMO/OMM/BMO - No. 259. TP. 145.

Table 2. Example of Individual Site Tabulation

GREAT LAKES ENVIRONMENTAL RESEARCH LABORATORY, NOAA Climate Data Modernization Project
National Weather Service Historical Great Lakes Ice Reports for Winters 1899 - 1970

Site No. 001, Approximate Location: 48.90 N. Latitude, 88.00 W. Longitude
Site Name Nipigon Bay on Lake Superior

Year	Mo Da	T1	T2	C1	T1C2	T2C1	C2	T1C2	T2C2	C3	T1C3	T2C3	IMAGE	Supplemental Information*
1953	2 24	12	-1		-1	-1		-1	-1		-1	-1	375.tif	Rossport Harbor: To 1/2 mi out
1953	2 24	-1	-1	OW	-1	-1		-1	-1		-1	-1	375.tif	Rossport: Lake
1962	4 23	-1	-1	SO	-1	-1		-1	-1		-1	-1	455.tif	
1966	3 14	-1	-1	HF	-1	-1	SO	-1	-1		-1	-1	485.tif	
1966	3 21	-1	-1	SO	-1	-1		-1	-1		-1	-1	486.tif	
1967	4 17	-1	-1	SO	-1	-1		-1	-1		-1	-1	496.tif	

Ice thickness is in inches, -1 = no thickness reported, see report Table 1 for ice conditon codes.
T1 = ice thickness or part of a range if T2 is present, C1 = primary condtion of ice.
T1C1 = thickness of C1 or part of range if T2C1 is presnet.
C2, T1C2, T2C2, C3, T1C3, T2C3 are secondary and ternary ice conditon and condition thickness.

*Often there will be additional descriptive information on ice conditions at a site. This information is not given in the ice condition sections of the report.

Table 3. Example of Individual Winter Season Aggregated Site Tabulation.

GREAT LAKES ENVIRONMENTAL RESEARCH LABORATORY, NOAA Climate Data Modernization Project
National Weather Service Historical Great Lakes Ice Reports - Winter 1899

Site #	Year	MO	DA	T1	T2	C1	T1C1	T2C1	C2	T1C2	T2C2	C3	T1C3	T2C3	Image	Supplemental Information
25	1899	4	21	-1	-1	RT	-1	-1	SW	-1	-1		-1	-1	002.TIF	HARBOR
25	1899	4	21	-1	-1	RT	-1	-1	SW	-1	-1		-1	-1	002.TIF	BAY
33	1899	4	22	-1	-1	BK	-1	-1		-1	-1		-1	-1	002.TIF	HARBOR
44	1899	4	8	30	34	SO	-1	-1		-1	-1		-1	-1	529.TIF	BAY
44	1899	4	8	30	34	SO	-1	-1		-1	-1		-1	-1	529.TIF	CHANNEL
44	1899	4	8	-1	-1	SO	-1	-1		-1	-1		-1	-1	529.TIF	LAKE
44	1899	4	15	-1	-1	BK	-1	-1	RT	-1	-1		-1	-1	001.TIF	
44	1899	4	22	-1	-1	RT	-1	-1	NS	-1	-1		-1	-1	002.TIF	
50	1899	4	16	-1	-1	DI	-1	-1	BK	-1	-1		-1	-1	001.TIF	
51	1899	4	23	12	-1	DI	-1	-1	BV	-1	-1		-1	-1	002.TIF	LAKE
52	1899	4	16	-1	-1	OW	-1	-1		-1	-1		-1	-1	001.TIF	
52	1899	4	23	-1	-1	BK	-1	-1	RT	-1	-1	DI	-1	-1	002.TIF	(25% ICE COVER)
58	1899	4	11	-1	-1	HF	-1	-1	DI	-1	-1		-1	-1	529.TIF	ABOVE THE POINT
71	1899	4	11	24	-1		-1	-1		-1	-1		-1	-1	529.TIF	
71	1899	4	16	-1	-1	RT	-1	-1	NS	-1	-1		-1	-1	001.TIF	
71	1899	4	23	-1	-1	DI	-1	-1	RT	-1	-1		-1	-1	002.TIF	
74	1899	4	22	-1	-1	NC	-1	-1		-1	-1		-1	-1	002.TIF	
76	1899	4	15	-1	-1	SO	-1	-1		-1	-1		-1	-1	001.TIF	
76	1899	4	22	-1	-1	IP	-1	-1	RT	-1	-1		-1	-1	002.TIF	
77	1899	4	22	-1	-1	RT	-1	-1		-1	-1		-1	-1	002.TIF	BAY
77	1899	4	22	-1	-1	FD	-1	-1	BV	-1	-1		-1	-1	002.TIF	LAKE
81	1899	4	23	-1	-1	SW	-1	-1		-1	-1		-1	-1	002.TIF	
87	1899	4	11	16	34	RT	-1	-1		-1	-1		-1	-1	529.TIF	
87	1899	4	25	-1	-1	LI	-1	-1		-1	-1		-1	-1	002.TIF	WHITEFISH TO ENCAMPMENT
91	1899	4	17	-1	-1	RT	-1	-1	NS	-1	-1		-1	-1	001.TIF	
108	1899	4	17	15	-1		-1	-1		-1	-1		-1	-1	001.TIF	LOWER END
108	1899	4	25	-1	-1	BK	-1	-1		-1	-1		-1	-1	002.TIF	
110	1899	4	17	22	-1	CL	-1	-1		-1	-1		-1	-1	001.TIF	
138	1899	4	17	-1	-1	NC	-1	-1	RF	-1	-1		-1	-1	001.TIF	

Ice thickness is in inches, -1 = no thickness reported, see report Table 1 for ice conditon codes.
T1 = ice thickness or part of a range if T2 is present, C1 = primary condtion of ice.
T1C1 = thickness of C1 or part of range if T2C1 is presnet.
C2, T1C2, T2C2, C3, T1C3, T2C3 are secondary and ternary ice conditon and condition thickness.

Table 3. Example of Individual Winter Season Aggregated Site Tabulation (continued).

Site #	Year	MO	DA	T1	T2	C1	T1C1	T2C1	C2	T1C2	T2C2	C3	T1C3	T2C3	Image	Supplemental Information
150	1899	4	18	-1	-1	LF	-1	-1	DI	-1	-1		-1	-1	001.TIF	
151	1899	4	18	-1	-1	OW	-1	-1		-1	-1		-1	-1	001.TIF	ALPENA
154	1899	4	11	-1	-1	IP	-1	-1	BV	-1	-1		-1	-1	529.TIF	
154	1899	4	18	-1	-1	OW	-1	-1		-1	-1		-1	-1	001.TIF	
155	1899	4	11	-1	-1	OW	-1	-1		-1	-1		-1	-1	529.TIF	TO THE EAST OF ISLAND
159	1899	4	11	-1	-1	RT	-1	-1		-1	-1		-1	-1	529.TIF	
181	1899	4	13	-1	-1	RT	-1	-1		-1	-1		-1	-1	001.TIF	TO 1/4Mi OUT
181	1899	4	13	-1	-1	OW	-1	-1		-1	-1		-1	-1	001.TIF	BEYOND 1/4Mi OUT
183	1899	4	15	-1	-1	RT	-1	-1	SW	-1	-1		-1	-1	001.TIF	BAY
214	1899	4	11	-1	-1	HF	-1	-1		-1	-1		-1	-1	529.TIF	
214	1899	4	17	-1	-1	FD	-1	-1	BV	-1	-1		-1	-1	001.TIF	
224	1899	4	23	4	8	RT	-1	-1		-1	-1		-1	-1	002.TIF	
228	1899	4		-1	-1	SO	-1	-1	RT	-1	-1		-1	-1	529.TIF	
228	1899	4	11	36	48		-1	-1		-1	-1		-1	-1	529.TIF	
231	1899	4	11	-1	-1	RT	-1	-1		-1	-1		-1	-1	529.TIF	
231	1899	4	18	-1	-1	NC	-1	-1	SW	-1	-1		-1	-1	001.TIF	
231	1899	4	25	-1	-1	BK	-1	-1	RT	-1	-1		-1	-1	002.TIF	
237	1899	4	18	18	-1	RT	-1	-1	WT	-1	-1		-1	-1	001.TIF	
238	1899	4	23	-1	-1	BK	-1	-1		-1	-1		-1	-1	002.TIF	
262	1899	4	11	24	30	SO	-1	-1		-1	-1		-1	-1	529.TIF	
262	1899	4	13	-1	-1	SO	-1	-1		-1	-1		-1	-1	001.TIF	ALONG SHORE
262	1899	4	13	-1	-1	IP	-1	-1		-1	-1		-1	-1	001.TIF	2Mi OUT
272	1899	4	8	18	-1		-1	-1		-1	-1		-1	-1	529.TIF	
282	1899	4	15	-1	-1	OW	-1	-1		-1	-1		-1	-1	001.TIF	UPPER BAY: TO 4Mi OUT
293	1899	4	15	-1	-1	SO	-1	-1		-1	-1		-1	-1	001.TIF	EXCEPT AROUND SHOALS & ISLANDS
324	1899	4	8	-1	-1	OW	-1	-1		-1	-1		-1	-1	529.TIF	RIVER
324	1899	4	8	-1	-1	DI	-1	-1	RT	-1	-1		-1	-1	529.TIF	LAKE
325	1899	4	8	-1	-1	OW	-1	-1		-1	-1		-1	-1	529.TIF	

Ice thickness is in inches, -1 = no thickness reported, see report Table 1 for ice conditon codes.
T1 = ice thickness or part of a range if T2 is present, C1 = primary condtion of ice.
T1C1 = thickness of C1 or part of range if T2C1 is presnet.
C2, T1C2, T2C2, C3, T1C3, T2C3 are secondary and ternary ice conditon and condition thickness.

Table 3. Example of Individual Winter Season Aggregated Site Tabulation (continued).

Site #	Year	MO	DA	T1	T2	C1	T1C1	T2C1	C2	T1C2	T2C2	C3	T1C3	T2C3	Image	Supplemental Information
347	1899	4	11	-1	-1	DI	-1	-1		-1	-1		-1	-1	529.TIF	LAKE
348	1899	4	11	-1	-1	OW	-1	-1		-1	-1		-1	-1	529.TIF	
351	1899	4	11	-1	-1	HF	-1	-1	RI	-1	-1		-1	-1	529.TIF	
353	1899	4	17	-1	-1	OW	-1	-1		-1	-1		-1	-1	001.TIF	
368	1899	4	11	-1	-1	HF	-1	-1	BK	-1	-1	BV	-1	-1	529.TIF	EXCEPT IN CHANNEL
368	1899	4	17	-1	-1	BK	-1	-1	RT	-1	-1		-1	-1	001.TIF	OUTSIDE THE BW
368	1899	4	24	-1	-1	BK	-1	-1	RT	-1	-1		-1	-1	002.TIF	
386	1899	4	9	5	10	FD	-1	-1		-1	-1		-1	-1	529.TIF	LAKE
386	1899	4	15	-1	-1	RT	-1	-1		-1	-1		-1	-1	001.TIF	
386	1899	4	22	-1	-1	LI	-1	-1		-1	-1		-1	-1	002.TIF	
391	1899	4	14	-1	-1	OW	-1	-1		-1	-1		-1	-1	001.TIF	
392	1899	4	8	-1	-1	WI	-1	-1	RT	-1	-1		-1	-1	529.TIF	LAKE
392	1899	4	14	-1	-1	IP	-1	-1		-1	-1		-1	-1	001.TIF	LAKE
399	1899	4	7	-1	-1	OW	-1	-1		-1	-1		-1	-1	529.TIF	
400	1899	4	7	-1	-1	HF	-1	-1	DI	-1	-1		-1	-1	529.TIF	LAKE
413	1899	4	11	-1	-1	OW	-1	-1		-1	-1		-1	-1	529.TIF	
420	1899	4	8	-1	-1	OW	-1	-1		-1	-1		-1	-1	529.TIF	
421	1899	4	8	-1	-1	HF	-1	-1	DI	-1	-1		-1	-1	529.TIF	LAKE
424	1899	4	10	-1	-1	OW	-1	-1		-1	-1		-1	-1	529.TIF	LAKE
435	1899	4	8	-1	-1	BK	-1	-1	RT	-1	-1		-1	-1	529.TIF	CHANNEL
435	1899	4	8	-1	-1	SO	-1	-1	BV	-1	-1		-1	-1	529.TIF	TIBBETS POINT LIGHT
435	1899	4	8	-1	-1	OW	-1	-1		-1	-1		-1	-1	529.TIF	BELOW CLAYTON
435	1899	4	22	-1	-1	HF	-1	-1		-1	-1		-1	-1	002.TIF	FOOT OF LAKE
436	1899	4	18	-1	-1	SO	-1	-1		-1	-1		-1	-1	001.TIF	FOOT OF LAKE
462	1899	4	9	-1	-1	OW	-1	-1		-1	-1		-1	-1	529.TIF	
463	1899	4	9	-1	-1	OW	-1	-1		-1	-1		-1	-1	529.TIF	LAKE
498	1899	4	18	-1	-1	SO	-1	-1		-1	-1		-1	-1	001.TIF	HEAD OF RIVER
498	1899	4	22	-1	-1	RI	-1	-1		-1	-1		-1	-1	002.TIF	

Ice thickness is in inches, -1 = no thickness reported, see report Table 1 for ice conditon codes.
T1 = ice thickness or part of a range if T2 is present, C1 = primary condtion of ice.
T1C1 = thickness of C1 or part of range if T2C1 is presnet.
C2, T1C2, T2C2, C3, T1C3, T2C3 are secondary and ternary ice conditon and condition thickness.

Table 4. Comprehensive List of All Sites: Number, Lake/River Name, Latitude, Longitude, and State/Province.

NO	Lake	Name	Lat.	Lon.	S/P
1	SUP	Nipigon Bay	48.90	88.00	ON
2	SUP	Peninsula Harbor	48.75	86.39	ON
3	SUP	Marathon Harbor	48.75	86.39	ON
4	SUP	Black Bay	48.70	88.40	ON
5	SUP	Lakehead	48.43	89.25	ON
6	SUP	Port Arthur	48.43	89.25	ON
7	SUP	Port Arthur Out of BW	48.42	89.15	ON
8	SUP	Port Arthur Harbor	48.42	89.25	ON
9	SUP	Port Arthur In BW	48.42	89.25	ON
10	SUP	Fort William Harbor	48.33	89.24	ON
11	SUP	Kam River	48.33	89.23	ON
12	SUP	Fort William	48.33	89.24	ON
13	SUP	Thunder Bay Harbor, Ont.	48.33	89.22	ON
14	SUP	Thunder Bay, Ont.	48.33	89.22	ON
15	SUP	Thunder Cape	48.32	88.95	ON
16	SUP	Pie Island	48.25	89.08	ON
17	SUP	Welcome Island	48.23	89.30	ON
18	SUP	Victoria Island	48.13	89.37	ON
19	SUP	Isle Royale	48.00	89.00	MN
20	SUP	Michipicoten Harbor	47.95	84.88	ON
21	SUP	Michipicoten	47.95	84.88	ON
22	SUP	Lake Superior	47.75	87.75	MI
23	SUP	Grand Marais Harbor, MN	47.75	90.34	MN
24	SUP	Grand Marais, MN	47.75	90.34	MN
25	SUP	Eagle Harbor	47.45	88.15	MI
26	SUP	Keweenaw Point	47.40	87.70	MI
27	SUP	Keweenaw	47.40	87.70	MI
28	SUP	Beaver Bay	47.26	91.36	MI
29	SUP	Keweenaw Waterway	47.22	88.62	MI
30	SUP	Ship Canal	47.22	88.62	MI
31	SUP	Split Rock	47.20	91.38	MN
32	SUP	Stannard Rock	47.18	87.22	MI
33	SUP	Two Harbors	47.01	91.68	MN
34	SUP	Sand Island	46.98	90.95	WI
35	SUP	Apostle Islands	46.94	90.65	WI
36	SUP	Raspberry Island	46.94	90.82	WI
37	SUP	Ontonagon Harbor	46.87	89.31	MI
38	SUP	Ontonagon	46.87	89.31	MI
39	SUP	Keweenaw Harbor	46.87	88.42	MI
40	SUP	Keweenaw Bay	46.86	88.42	MI
41	SUP	Pequaming Harbor	46.85	88.40	MI
42	SUP	Pequaming	46.85	88.40	MI
43	SUP	Madeline Island	46.82	90.69	WI
44	SUP	Bayfield	46.81	90.82	WI
45	SUP	Bayfield Harbor	46.81	90.82	WI
46	SUP	Baraga	46.78	88.49	MI
47	SUP	Sand Point Light Harbor	46.78	88.47	WI
48	SUP	Sand Point Harbor	46.78	88.47	WI
49	SUP	Sand Point Light	46.78	88.47	WI
50	SUP	Minnesota Point	46.76	92.08	MN
51	SUP	Duluth	46.76	92.09	MN
52	SUP	Duluth Harbor	46.76	92.09	MN
53	SUP	Superior	46.75	92.09	WI
54	SUP	Superior Harbor	46.75	92.09	WI
55	SUP	Superior Bay	46.75	92.09	WI
56	SUP	St. Louis Bay	46.75	92.12	MN
57	SUP	Whitefish Point Harbor	46.75	84.87	MI
58	SUP	Whitefish Point	46.75	84.88	MI
59	SUP	St. Louis River	46.74	92.14	MN
60	SUP	Sable Point	46.72	86.14	MI
61	SUP	Allouez	46.69	92.00	WI
62	SUP	Allouez Harbor	46.69	92.00	WI
63	SUP	Deer Park	46.67	85.63	MI
64	SUP	Washburn Harbor	46.67	90.89	WI
65	SUP	Washburn	46.67	90.89	WI
66	SUP	Grand Marais, MI	46.67	85.99	MI
67	SUP	Grand Marais Harbor, MI	46.67	85.98	MI

Table 4. Comprehensive List of All Sites: Number, Lake/River Name, Latitude, Longitude, and State/ Province (continued).

NO	Lake	Name	Lat.	Lon.	S/P
68	SUP	Chequamegon Bay Harbor	46.65	90.85	WI
69	SUP	Chequamegon Bay	46.65	90.85	WI
70	SUP	Ile Parisienne	46.65	84.64	ON
71	SUP	Whitefish Bay	46.64	84.81	MI
72	SUP	Presque Isle Harbor (SUP)	46.59	87.38	MI
73	SUP	Presque Isle (SUP)	46.59	87.38	MI
74	SUP	Ashland	46.58	90.87	WI
75	SUP	Ashland Harbor	46.58	90.87	WI
76	SUP	Marquette Harbor	46.53	87.37	MI
77	SUP	Marquette	46.53	87.38	MI
78	SUP	Grand Island	46.52	86.67	MI
79	SUP	Shelter Bay	46.50	86.74	MI
80	SUP	Sault Ste. Marie Harbor	46.49	84.34	MI
81	SUP	Iroquois Point	46.47	84.60	MI
82	SUP	Au Train Bay	46.45	86.85	MI
83	SUP	Munising	46.42	86.64	MI
84	SUP	Munising Harbor	46.41	86.64	MI
85	STM	Gros Cap Reef	46.53	84.58	ON
86	STM	Soo Harbor	46.50	84.35	MI
87	STM	Sault Ste. Marie	46.50	84.35	MI
88	STM	Big Point	46.49	84.42	MI
89	STM	Soo Locks	46.48	84.37	MI
90	STM	St. Marys R. - Canadian Canal	46.48	84.37	ON
91	STM	Hay Lake	46.47	84.15	MI
92	STM	Frechette	46.46	84.28	ON
93	STM	Round Island (STM)	46.44	84.51	MI
94	STM	Six Mile Point	46.43	84.26	MI
95	STM	Brush Point	46.43	84.46	MI
96	STM	Point Louise	46.43	84.46	MI
97	STM	Point Aux Pins	46.43	84.46	ON
98	STM	Waiska Bay	46.42	84.59	MI
99	STM	Nine Mile Point, MI	46.39	84.23	MI

MO	Lake	Name	Lat.	Lon.	S/P
100	STM	Lake Nicolet	46.37	84.21	MI
101	STM	St. Marys River - Neebish	46.28	84.16	MI
102	STM	Rock Cut	46.28	84.16	MI
103	STM	Little Rapids Cut	46.28	84.16	MI
104	STM	Sawmill Point	46.25	84.23	MI
105	STM	St. Marys River	46.25	84.00	MI
106	STM	Moon Island	46.22	84.17	MI
107	STM	Lake Munuscong	46.20	84.21	MI
108	STM	Mud Lake	46.20	84.17	MI
109	STM	Birch Point	46.18	84.15	MI
110	STM	Lime Island	46.09	83.98	MI
111	STM	Sweets Point	46.03	83.94	MI
112	STM	Pipe Island	46.02	83.90	MI
113	STM	Watsons Reef	46.01	83.90	MI
114	STM	Detour	46.01	83.86	MI
115	STM	Detour Harbor	46.00	83.86	MI
116	HUR	Blind River	46.19	82.98	ON
117	HUR	Blind River Harbor	46.19	82.98	ON
118	HUR	North Channel - Georgian Bay	46.02	83.00	ON
119	HUR	Little Current	46.00	82.00	ON
120	HUR	Little Current Harbor	45.99	81.99	ON
121	HUR	Killarney	45.99	81.50	ON
122	HUR	Killarney Harbor	45.99	81.49	ON
123	HUR	Gore Bay Harbor	45.92	82.60	ON
124	HUR	Gore Bay	45.92	82.60	ON
125	HUR	St. Ignace	45.87	84.73	MI
126	HUR	St. Ignace Harbor	45.86	84.72	MI
127	HUR	Mackinac Island	45.85	84.62	MI
128	HUR	Mackinac Island Harbor	45.84	84.61	MI
129	HUR	Round Island (HUR)	45.83	84.60	MI
130	HUR	Bois Blanc Island	45.77	84.44	MI
131	HUR	Spectacle Reef	45.77	84.14	MI
132	HUR	Byng Inlet	45.70	80.61	ON

Table 4. Comprehensive List of All Sites: Number, Lake/River Name, Latitude, Longitude, and State/ Province (continued).

NO	Lake	Name	Lat.	Lon.	S/P
133	HUR	Gereaux	45.70	80.62	ON
134	HUR	Britt Sound	45.70	80.62	ON
135	HUR	Britt Harbor	45.70	80.62	ON
136	HUR	Poes Reef	45.69	84.36	MI
137	HUR	Cheboygan Harbor	45.66	84.43	MI
138	HUR	Cheboygan	45.66	84.43	MI
139	HUR	Georgian Bay	45.50	81.00	ON
140	HUR	Rogers City	45.42	83.81	MI
141	HUR	Calcite Harbor	45.41	83.79	MI
142	HUR	Parry Sound	45.36	80.06	ON
143	HUR	Parry Sound Harbor	45.36	80.06	ON
144	HUR	North Bay	45.35	83.51	MI
145	HUR	Presque Isle Light	45.33	83.48	MI
146	HUR	Presque Isle	45.33	83.48	MI
147	HUR	Tobermory	45.27	81.66	ON
148	HUR	Tobermory Harbor	45.27	81.66	ON
149	HUR	Middle Island Harbor	45.19	83.32	MI
150	HUR	Middle Island	45.19	83.33	MI
151	HUR	Thunder Bay River, MI	45.06	83.42	MI
152	HUR	Alpena	45.05	83.30	MI
153	HUR	Alpena Harbor	45.05	83.30	MI
154	HUR	Alpena - Thunder Bay	45.05	83.30	MI
155	HUR	Thunder Bay Island, MI	45.05	83.30	MI
156	HUR	Thunder Bay Island Harbor, MI	45.05	83.43	MI
157	HUR	Thunder Bay, MI	45.03	83.33	MI
158	HUR	Thunder Bay Harbor, MI	45.03	83.33	MI
159	HUR	Alpena Island (to Mainland)	45.01	83.46	MI
160	HUR	Bruce Peninsula	45.00	81.30	ON
161	HUR	Cape Croker Harbor	44.94	81.05	ON

MO	Lake	Name	Lat.	Lon.	S/P
162	HUR	Giants Tomb	44.90	80.00	ON
163	HUR	Hope Island	44.77	80.16	ON
164	HUR	Wiarton Harbor	44.76	81.13	ON
165	HUR	Wiarton	44.76	81.13	ON
166	HUR	Port McNicoll	44.75	79.81	ON
167	HUR	Port McNicoll Harbor	44.75	79.81	ON
168	HUR	Midland	44.75	79.90	ON
169	HUR	Midland Harbor	44.75	79.90	ON
170	HUR	Nottawasaga Bay	44.65	80.15	ON
171	HUR	Owen Sound Harbor	44.60	80.93	ON
172	HUR	Owen Sound	44.60	80.93	ON
173	HUR	Saugeen Harbor	44.55	81.40	ON
174	HUR	Saugeen	44.55	81.40	ON
175	HUR	Southampton	44.50	81.40	ON
176	HUR	Southampton Harbor	44.50	81.45	ON
177	HUR	Collingwood Harbor	44.500	80.24	ON
178	HUR	Collingwood	44.50	80.24	ON
179	HUR	Lake Huron	44.50	82.50	MI
180	HUR	Chantry Island	44.48	81.40	ON
181	HUR	Oscoda	44.41	83.33	MI
182	HUR	Oscoda Harbor	44.41	83.33	MI
183	HUR	East Tawas	44.26	83.44	MI
184	HUR	Tawas Point	44.26	83.44	MI
185	HUR	Tawas Bay Harbor	44.26	83.44	MI
186	HUR	East Tawas Harbor	44.26	83.44	MI
187	HUR	Tawas Point Harbor	44.26	83.44	MI
188	HUR	Tawas Bay	44.26	83.44	MI
189	HUR	Tawas City Harbor	44.25	83.45	MI
190	HUR	Point aux Barques Harbor	44.10	83.00	MI
191	HUR	Point aux Barques	44.10	83.00	MI
192	HUR	Point Clark	44.09	81.75	ON
193	HUR	Port Austin Harbor	44.05	82.99	MI
194	HUR	Port Austin	44.05	82.99	MI

Table 4. Comprehensive List of All Sites: Number, Lake/River Name, Latitude, Longitude, and State/ Province (continued).

NO	Lake	Name	Lat.	Lon.	S/P
195	HUR	Charity Island	44.03	83.44	MI
196	HUR	Gravelly Shoal	44.02	83.57	MI
197	HUR	Point Au Gres	44.00	83.87	MI
198	HUR	Harbor Beach	43.86	82.65	MI
199	HUR	Harbor Beach Harbor	43.85	82.65	MI
200	HUR	Goderich	43.78	81.72	ON
201	HUR	Goderich Harbor	43.78	81.72	ON
202	HUR	Bay City	43.64	83.85	MI
203	HUR	Bay City Harbor	43.64	83.85	MI
204	HUR	Bay City - Saginaw Bay	43.64	83.85	MI
205	HUR	Saginaw Bay	43.63	83.84	MI
206	HUR	Saginaw Harbor	43.63	83.84	MI
207	HUR	Saginaw River	43.62	83.84	MI
208	HUR	Port Sanilac	43.43	82.54	MI
209	HUR	Port Sanilac Harbor	43.43	82.54	MI
210	HUR	Port Huron - Black River	43.01	82.45	MI
211	HUR	Port Huron Harbor	42.99	82.43	MI
212	HUR	Lake View Beach	42.99	82.43	MI
213	HUR	Lake View	42.99	82.43	MI
214	HUR	Port Huron	42.99	82.43	MI
215	MIC	Port Inland Harbor	45.97	85.87	MI
216	MIC	Port Inland	45.97	85.87	MI
217	MIC	Manistique	45.96	86.25	MI
218	MIC	Manistique Harbor	45.96	86.25	MI
219	MIC	Seul Choix Point	45.92	85.91	MI
220	MIC	Lansing Shoal	45.90	85.56	MI
221	MIC	Kipling	45.87	87.01	MI
222	MIC	St. Helena Island	45.86	84.87	MI
223	MIC	Gladstone Harbor	45.85	87.02	MI
224	MIC	Gladstone	45.85	87.02	MI
225	MIC	White Shoal	45.84	85.11	MI
226	MIC	Squaw Island	45.84	85.59	MI
227	MIC	Whiskey Island	45.81	85.61	MI

MO	Lake	Name	Lat.	Lon.	S/P
228	MIC	Straits of Mackinac	45.81	84.72	MI
229	MIC	Garden Island	45.80	85.49	MI
230	MIC	Hog Island	45.79	85.36	MI
231	MIC	Mackinaw City	45.78	84.72	MI
232	MIC	Grays Reef	45.77	85.18	MI
233	MIC	Trout Island	45.77	85.69	MI
234	MIC	Waugoschance	45.76	85.01	MI
235	MIC	Big Bay De Noc	45.75	86.71	MI
236	MIC	Little Bay De Noc	45.75	87.04	MI
237	MIC	Escanaba	45.75	87.04	MI
238	MIC	Escanaba Harbor	45.74	87.03	MI
239	MIC	High Island	45.74	85.65	MI
240	MIC	Isle Aux Galets	45.68	85.39	MI
241	MIC	Ford River	45.68	87.15	MI
242	MIC	St. James	45.66	85.56	MI
243	MIC	St. James Harbor	45.66	85.56	MI
244	MIC	Beaver Island Harbor	45.66	85.56	MI
245	MIC	Beaver Island	45.66	85.56	MI
246	MIC	Cross Village	45.64	85.04	MI
247	MIC	Minneapolis Shoals Light	45.58	87.00	MI
248	MIC	St. Martins Island	45.50	86.77	MI
249	MIC	Harbor Springs Harbor	45.43	84.99	MI
250	MIC	Harbor Springs	45.43	84.99	MI
251	MIC	Rock Island	45.42	86.82	MI
252	MIC	Fox Islands	45.42	85.8	MI
253	MIC	Cedar River	45.41	87.35	MI
254	MIC	Little Traverse Bay	45.40	85.00	MI
255	MIC	Jackson Harbor	45.40	86.85	MI
256	MIC	Washington Island	45.38	86.90	MI
257	MIC	Petosky	45.37	84.96	MI
258	MIC	Detroit Island Harbor	45.36	86.93	MI
259	MIC	Plum Island Harbor	45.31	86.95	WI
260	MIC	Plum Island	45.31	86.95	WI

Table 4. Comprehensive List of All Sites: Number, Lake/River Name, Latitude, Longitude, and State/ Province (continued).

NO	Lake	Name	Lat.	Lon.	S/P
261	MIC	Charlevoix Harbor	45.30	85.25	MI
262	MIC	Charlevoix	45.30	85.25	MI
263	MIC	Porte des Morts Passage	45.29	86.96	MI
264	MIC	Charlevoix - Pine Lake	45.27	85.13	MI
265	MIC	Lake Charlevoix	45.27	85.13	MI
266	MIC	Chambers Island	45.18	87.36	MI
267	MIC	Northport	45.12	85.60	MI
268	MIC	Northport Harbor	45.12	85.60	MI
269	MIC	Menominee River	45.11	87.60	MI
270	MIC	North Manitou Island	45.11	86.02	MI
271	MIC	Menominee	45.11	87.60	MI
272	MIC	Menominee Harbor	45.10	87.60	MI
273	MIC	Leland Harbor	45.02	85.76	MI
274	MIC	South Manitou Island Harbor	45.00	86.12	MI
275	MIC	South Manitou Island	45.00	86.12	MI
276	MIC	Manitou Passage	45.00	86.00	MI
277	MIC	Peshtigo	44.95	87.63	WI
278	MIC	Sleeping Bear Point	44.91	86.04	MI
279	MIC	Glen Haven	44.90	86.03	MI
280	MIC	Glen Haven Harbor	44.90	86.03	MI
281	MIC	Sherwood Point	44.89	87.43	WI
282	MIC	Sturgeon Bay	44.81	87.32	WI
283	MIC	Sturgeon Bay Canal	44.81	87.32	WI
284	MIC	Sturgeon Bay Harbor	44.81	87.32	WI
285	MIC	Grand Traverse Bay	44.79	85.68	MI
286	MIC	Traverse City Harbor	44.79	85.68	MI
287	MIC	Traverse City	44.79	85.68	MI
288	MIC	Traverse Bay	44.79	85.68	MI

MO	Lake	Name	Lat.	Lon.	S/P
289	MIC	Frankfort	44.62	86.21	MI
290	MIC	Frankfort Harbor	44.62	86.21	MI
291	MIC	Fox River	44.54	88.00	MI
292	MIC	Green Bay	44.50	88.02	WI
293	MIC	Green Bay - Bay	44.50	88.02	WI
294	MIC	Green Bay Harbor	44.50	88.02	WI
295	MIC	Kewaunee Harbor	44.46	87.50	WI
296	MIC	Kewaunee	44.46	87.50	WI
297	MIC	Manistee - Little Lake	44.24	86.32	MI
298	MIC	Manistee	44.24	86.32	MI
299	MIC	Manistee Harbor	44.24	86.32	MI
300	MIC	Two Rivers Harbor	44.15	87.57	WI
301	MIC	Two Rivers	44.15	87.57	WI
302	MIC	Manitowoc Harbor	44.09	87.65	WI
303	MIC	Manitowoc	44.09	87.65	WI
304	MIC	Lake Michigan	44.00	87.00	MI
305	MIC	Pere Marquette Lake	43.96	86.45	MI
306	MIC	Ludington	43.96	86.45	MI
307	MIC	Ludington Harbor	43.96	86.45	MI
308	MIC	Pentwater	43.78	86.43	MI
309	MIC	Pentwater Harbor	43.78	86.43	MI
310	MIC	Sheboygan	43.75	87.71	WI
311	MIC	Sheboygan Harbor	43.75	87.71	WI
312	MIC	Montague	43.42	86.36	MI
313	MIC	Montague Harbor	43.42	86.36	MI
314	MIC	Whitehall Harbor	43.41	86.35	MI
315	MIC	Port Washington	43.39	87.88	WI
316	MIC	Port Washington Harbor	43.39	87.88	WI
317	MIC	White Lake	43.38	86.38	MI
318	MIC	White Lake Harbor	43.38	86.38	MI
319	MIC	Lake Muskegon	43.24	86.28	MI
320	MIC	Muskegon Harbor	43.23	86.25	MI
321	MIC	Muskegon	43.23	86.25	MI
322	MIC	Grand Haven	43.06	86.23	MI

Table 4. Comprehensive List of All Sites: Number, Lake/River Name, Latitude, Longitude, and State/ Province (continued).

NO	Lake	Name	Lat.	Lon.	S/P
323	MIC	Grand Haven Harbor	43.06	86.23	MI
324	MIC	Milwaukee	43.02	87.89	WI
325	MIC	Milwaukee Harbor	43.02	87.89	WI
326	MIC	Holland - Black Lake	42.78	86.11	MI
327	MIC	Holland Harbor	42.78	86.11	MI
328	MIC	Holland	42.78	86.11	MI
329	MIC	Lake Macatawa	42.78	86.16	MI
330	MIC	Macatawa	42.77	86.20	MI
331	MIC	Racine	42.74	87.78	WI
332	MIC	Racine Harbor	42.74	87.78	WI
333	MIC	Saugatuck	42.65	86.20	MI
334	MIC	Saugatuck Harbor	42.65	86.20	MI
335	MIC	Kenosha	42.58	87.82	WI
336	MIC	Kenosha Harbor	42.58	87.82	WI
337	MIC	South Haven Harbor	42.40	86.28	MI
338	MIC	South Haven	42.40	86.28	MI
339	MIC	Waukegan Harbor	42.36	87.82	IL
340	MIC	Waukegan	42.36	87.82	IL
341	MIC	St. Joseph Harbor	42.11	86.48	MI
342	MIC	St. Joseph	42.11	86.48	MI
343	MIC	Wilmette Harbor	42.07	87.72	IL
344	MIC	Chicago Harbor	41.88	87.61	IL
345	MIC	Chicago	41.88	87.61	IL
346	MIC	Calumet Harbor	41.73	87.52	IN
347	MIC	Michigan City	41.71	86.89	IN
348	MIC	Michigan City Harbor	41.71	86.89	IN
349	MIC	Indiana Harbor	41.65	87.47	IN
350	MIC	Gary	41.63	87.32	IN
351	STC	St. Clair River - Port Huron	42.99	82.43	MI
352	STC	Sarnia Harbor	42.96	82.42	ON
353	STC	St. Clair River	42.91	82.49	MI
354	STC	Marysville	42.90	82.48	MI
355	STC	Marysville Harbor	42.90	82.48	MI

MO	Lake	Name	Lat.	Lon.	S/P
356	STC	Algonac	42.70	82.60	MI
357	LSC	Lake St. Clair	42.50	82.60	MI
358	DTR	Detroit Harbor	42.35	82.97	MI
359	DTR	Detroit River	42.21	83.10	MI
360	DTR	Amherstburg	42.10	83.11	ON
361	DTR	Amherstburg Harbor	42.10	83.11	ON
362	ERI	Port Colborne Harbor	42.90	79.26	ON
363	ERI	Port Colborne	42.90	79.26	ON
364	ERI	Welland Canal	42.90	79.26	ON
365	ERI	Waverly Shoal	42.88	78.94	ON
366	ERI	Port Maitland	42.87	79.58	ON
367	ERI	Buffalo - Niagara River	42.85	78.87	NY
368	ERI	Buffalo	42.85	78.87	NY
369	ERI	Buffalo Harbor	42.85	78.87	NY
370	ERI	Point Abino	42.84	79.08	ON
371	ERI	Port Dover Harbor	42.78	80.20	ON
372	ERI	Port Dover	42.78	80.20	ON
373	ERI	Port Stanley Harbor	42.68	81.21	ON
374	ERI	Port Stanley	42.65	81.20	ON
375	ERI	Port Burwell Harbor	42.64	80.81	ON
376	ERI	Port Burwell	42.63	80.81	ON
377	ERI	Long Point	42.55	80.06	ON
378	ERI	Dunkirk Harbor	42.49	79.33	NY
379	ERI	Dunkirk	42.49	79.34	NY
380	ERI	Rondeau	42.30	81.90	ON
381	ERI	Rondeau Harbor	42.30	81.90	ON
382	ERI	Erieau	42.26	81.91	ON
383	ERI	Erieau Harbor	42.26	81.91	ON
384	ERI	Lake Erie	42.13	81.50	OH
385	ERI	Erie Harbor	42.12	80.13	PA
386	ERI	Erie	42.12	80.13	PA
387	ERI	Leamington Harbor	42.05	82.61	ON
388	ERI	Leamington	42.05	82.61	ON

Table 4. Comprehensive List of All Sites: Number, Lake/River Name, Latitude, Longitude, and State/ Province (continued).

NO	Lake	Name	Lat.	Lon.	S/P
389	ERI	Kingsville	42.02	82.74	ON
390	ERI	Colchester	42.00	82.91	ON
391	ERI	Conneaut Harbor	41.97	80.55	OH
392	ERI	Conneaut	41.97	80.55	OH
393	ERI	Monroe	41.90	83.35	MI
394	ERI	Monroe Harbor	41.90	83.35	MI
395	ERI	Ashtabula	41.90	80.80	OH
396	ERI	Ashtabula Harbor	41.89	80.79	OH
397	ERI	Pelee	41.75	82.67	ON
398	ERI	Pelee Island	41.75	82.67	ON
399	ERI	Fairport Harbor	41.74	81.27	OH
400	ERI	Fairport	41.74	81.28	OH
401	ERI	Toledo - Maumee River	41.72	83.40	OH
402	ERI	Toledo - Maumee Bay	41.72	83.40	OH
403	ERI	Maumee Bay	41.70	83.44	OH
404	ERI	Bass Islands	41.68	82.82	OH
405	ERI	Put-in-Bay	41.65	82.82	OH
406	ERI	Put-In-Bay Harbor	41.65	82.82	OH
407	ERI	Toledo Harbor	41.64	83.52	OH
408	ERI	Toledo	41.64	83.52	OH
409	ERI	Kelleys Island Harbor	41.60	82.71	OH
410	ERI	Kelleys Island	41.60	82.71	OH
411	ERI	Marblehead Harbor	41.54	82.71	OH
412	ERI	Marblehead	41.54	82.71	OH
413	ERI	Cleveland	41.52	81.69	OH
414	ERI	Cleveland Harbor	41.51	81.68	OH
415	ERI	Port Clinton	41.51	82.94	OH
416	ERI	Cedar Point	41.49	82.69	OH
417	ERI	Cedar Point Harbor	41.49	82.69	OH
418	ERI	Sandusky	41.48	82.84	OH
419	ERI	Sandusky Harbor	41.47	82.84	OH
420	ERI	Lorain Harbor	41.45	82.17	OH
421	ERI	Lorain	41.45	82.17	OH

MO	Lake	Name	Lat.	Lon.	S/P
422	ERI	Vermilion	41.42	82.36	OH
423	ERI	Vermilion Harbor	41.42	82.36	OH
424	ERI	Huron	41.40	82.55	OH
425	ERI	Huron Harbor	41.39	82.54	OH
426	ONT	Kingston Harbor	44.20	76.50	ON
427	ONT	Kingston	44.20	76.50	ON
428	ONT	North Channel	44.19	76.78	ON
429	ONT	Belleville	44.18	77.39	ON
430	ONT	Deseronto	44.17	77.06	ON
431	ONT	Deseronto Harbor	44.17	77.06	ON
432	ONT	Wolfe Island	44.15	76.50	ON
433	ONT	Amherst Island	44.15	76.69	ON
434	ONT	Hay Bay	44.14	77.00	ON
435	ONT	Cape Vincent	44.13	76.33	NY
436	ONT	Cape Vincent Harbor	44.12	76.33	NY
437	ONT	Big Sandy	44.10	76.48	NY
438	ONT	Trenton Harbor	44.10	77.58	ON
439	ONT	Bay of Quinte	44.10	77.58	ON
440	ONT	Adolphus Reach	44.10	76.93	ON
441	ONT	Trent River	44.10	77.58	ON
442	ONT	Trenton	44.10	77.58	ON
443	ONT	Muscote Bay	44.08	77.28	ON
444	ONT	Picton Bay	44.00	77.13	ON
445	ONT	Presquille Bay	44.00	77.72	ON
446	ONT	Murray Canal	44.00	77.62	ON
447	ONT	Prince Edward Peninsula	44.00	77.00	ON
448	ONT	Weller Bay	43.99	77.59	ON
449	ONT	Prince Edward Bay	43.95	77.00	ON
450	ONT	Wellington Bay	43.95	77.35	ON
451	ONT	Sackets Harbor	43.94	76.12	NY
452	ONT	Long Reach	43.93	76.85	ON
453	ONT	Coburg	43.93	78.18	ON
454	ONT	Coburg Harbor	43.93	78.18	ON
455	ONT	Galloo Island	43.91	76.42	NY

Table 4. Comprehensive List of All Sites: Number, Lake/River Name, Latitude, Longitude, and State/ Province (continued).

NO	Lake	Name	Lat.	Lon.	S/P
456	ONT	Athol Bay	43.90	77.24	ON
457	ONT	Stony Point	43.85	76.27	NY
458	ONT	Toronto Harbor	43.65	79.45	ON
459	ONT	Toronto	43.65	79.45	ON
460	ONT	Lake Ontario	43.60	78.00	NY
461	ONT	Mexico Bay	43.52	76.30	NY
462	ONT	Oswego Harbor	43.45	76.55	NY
463	ONT	Oswego	43.45	76.56	NY
464	ONT	North Fair Haven	43.33	76.70	NY
465	ONT	North Fair Haven Harbor	43.33	76.70	NY
466	ONT	Fair Haven	43.32	76.70	NY
467	ONT	Fair Haven Harbor	43.32	76.70	NY
468	ONT	Niagara Harbor	43.27	79.04	NY
469	ONT	Niagara River - Niagara	43.27	79.04	NY
470	ONT	Niagara River	43.27	79.04	NY
471	ONT	Fort Niagara	43.27	79.04	NY
472	ONT	Niagara	43.27	79.04	NY
473	ONT	Rochester	43.26	77.60	NY
474	ONT	Rochester Harbor	43.26	77.60	NY
475	ONT	Irondequoit Bay	43.26	77.60	NY
476	ONT	Charlotte Harbor	43.26	77.62	NY
477	ONT	Charlotte	43.26	77.62	NY
478	ONT	Sodus Bay	43.26	76.97	NY
479	ONT	Sodus Bay Harbor	43.26	76.97	NY

MO	Lake	Name	Lat.	Lon.	S/P
480	ONT	Sodus Point	43.26	76.97	NY
481	ONT	Sodus Point Harbor	43.25	76.96	NY
482	ONT	Youngstown Harbor	43.25	79.05	NY
483	ONT	Youngstown	43.25	79.05	NY
484	STL	Jacques Cartier Bridge	45.67	73.75	QU
485	STL	Lachine	45.50	73.50	QU
486	STL	Montreal Harbor	45.44	73.50	QU
487	STL	Montreal	45.44	73.30	QU
488	STL	Lake St. Louis	45.40	73.70	QU
489	STL	Valleyfield Bridge	45.25	74.13	QU
490	STL	Lake St. Francis	45.22	74.50	QU
491	STL	Beauharnois	45.22	73.85	QU
492	STL	Cornwall Canal	45.22	73.86	ON
493	STL	Cornwall	45.03	74.75	ON
494	STL	Iroquois Lock	44.83	75.30	ON
495	STL	Prescott Harbor	44.73	75.46	NY
496	STL	Prescott	44.73	75.46	NY
497	STL	Ogdensburg	44.71	75.47	NY
498	STL	St. Lawrence River	44.71	75.47	NY
499	STL	Ogdensburg Harbor	44.70	75.47	NY
500	STL	Alexandria Bay	44.34	75.92	NY
501	STL	Alexandria Bay Harbor	44.34	75.92	NY

Table 5. Sites (in numerical order) with the Greatest Number of Records.

Site No.	Total Records	Site No.	Total Records	Site No.	Total Records	Site No.	Total Records
6	205	105	399	228	633	384	420
8	198	114	256	231	199	385	163
22	243	127	243	236	120	386	245
23	158	135	100	237	178	391	152
24	135	138	152	238	289	392	118
25	445	139	244	245	168	395	153
29	939	142	137	261	117	396	114
33	454	143	128	262	222	405	127
37	149	146	256	271	164	413	213
38	193	150	144	272	143	414	176
40	207	153	130	282	312	418	163
51	458	154	138	292	226	419	110
52	465	155	156	293	399	426	173
53	131	167	144	294	157	427	157
54	199	171	124	298	102	439	105
58	264	172	125	304	393	451	118
66	317	179	324	307	100	460	381
67	258	181	121	351	133	462	200
71	410	198	144	353	381	463	165
75	233	199	143	357	527	465	165
76	316	200	206	359	468	480	106
77	374	201	153	363	101	481	170
80	116	205	238	368	419	496	110
83	177	214	245	369	216	497	276
84	202	215	172	378	120	498	229
87	183	216	107	379	185	500	178

Appendix 1. Individual Site Reports for all Winters: 1899 - 1970

Table computer file structure

The first eight records contain the table title: site number, site name, and latitude and longitude, and column headings and the last five records of the file contain footnotes. The records in between are data records.

Data record format

The Fortran format used to write data records is: (1x, i4, 2(1x,i2), 3(1x, i4, 1x, i4, 3x, a2), i4,1x, i4, 2x, a7, 3x, a32). Each record contains 16 fixed formatted fields, where x = blank space, i = integer variable, a = character variable. Field descriptions are given below.

Field	Description
01-03.	Year, Month, Day
04.	T1 = ice thickness or part of a range if T2 is present
05.	T2,
06.	C1 = primary condition of ice.
07.	T1C1 = thickness of C1 or part of range if T2C1 is preset.
08.	T2C1
09-14.	C2, T1C2, T2C2, C3, T1C3, T2C3 are secondary and ternary ice condition and thickness of condition, if reported.
15.	Image = the image file of the original ice chart associated with this record.
16.	Supplemental information. Ice characteristics not given under ice conditions or location description.

Charts MAP001.GIF through MAP501.GIF are located at ftp://ftp.glerl.noaa.gov/publications/tech_reports/glerl-130/appendix1/Charts. File M001 corresponds to MAP001.GIF, File M002 corresponds to MAP502.GIF ..... File M501 corresponds to MAP501.GIF.

Tables SITE001.TXT through SITE501.TXT are located at ftp://ftp.glerl.noaa.gov/publications/tech_reports/glerl-130/appendix1/Tables. File T001 corresponds to SITE001.TXT, File T002 corresponds to SITE502.TXT ..... File T501 corresponds to SITE501.TXT.

Appendix 2. Individual Winter Season Aggregated Site Ice Reports

Table computer file structure

The first six records contain the table title, year, and headings and the last five records of the file contain footnotes. The records in between are data records.

Data record format.

The Fortran format used to write data records is: (3x, i4, 3x, i4, 2(1x,i2), 3(1x, i4, 1x, i4, 3x, a2), i4,1x, i4, 2x, a7,2x, a32). Each record contains 17 fixed formatted fields, where x = blank space, i = integer variable, a = character variable. Field descriptions are given below. Using the site number one can look up the site name in Table 4 of the report.

Field	Description
01	Site number
02-04	Year, Month, Day
05	T1 = ice thickness or part of a range if T2 is present.
06	T2,
07	C1 = primary condition of ice.
08	T1C1 = thickness of C1 or part of range if T2C1 is present.
09	T2C1
10-15	C2, T1C2, T2C2, C3, T1C3, T2C3 are secondary and ternary ice conditon and thickness of condition, if reported.
16	Image = the image file of the original ice chart associated with this record.
17	Supplemental information = ice characteristics not given under ice conditions or location description.

Charts winter1899.gif through winter 1970.gif are located at ftp://ftp.glerl.noaa.gov/publications/tech_reports/glerl-130/appendix2/Charts.

Tables C1899.TXT through C1970.TXT are located at ftp://ftp.glerl.noaa.gov/publications/tech_reports/glerl-130/appendix2/Tables.

Appendix 3. Image Files Names and dates of Original NWS Ice Reports.

(Files are located at ftp://ftp.glerl.noaa.gov/publications/tech_reports/glerl-130/appendix3)

Year	Mo	Da	No.	Pg.	Name	Year	Mo	Da	No.	Pg.	Name	Year	Mo	Da	No.	Pg.	Name
1899	4	11	1	1	529.TIF	1906	3	6	1	1	045.TIF	1913	3	4	1	1	090.TIF
1899	4	18	2	1	001.TIF	1906	3	13	2	1	046.TIF	1913	3	11	2	1	091.TIF
1899	4	25	3	1	002.TIF	1906	3	20	3	1	047.TIF	1913	3	18	3	1	092.TIF
						1906	3	27	4	1	048.TIF	1913	3	25	4	1	093.TIF
1900	2	27	1	1	003.TIF	1906	4	3	5	1	049.TIF	1913	4	1	5	1	094.TIF
1900	3	6	2	1	004.TIF	1906	4	10	6	1	050.TIF	1913	4	8	6	1	095.TIF
1900	3	13	3	1	005.TIF							1913	4	15	7	1	096.TIF
1900	3	20	4	1	006.TIF	1907	3	5	1	1	051.TIF	1913	4	22	8	1	097.TIF
1900	3	27	5	1	007.TIF	1907	3	12	2	1	052.TIF						
1900	4	3	6	1	008.TIF	1907	3	19	3	1	053.TIF	1914	3	3	1	1	098.TIF
1900	4	10	7	1	009.TIF	1907	3	26	4	1	054.TIF	1914	3	10	2	1	099.TIF
1900	4	17	8	1	010.TIF	1907	4	2	5	1	055.TIF	1914	3	17	3	1	100.TIF
						1907	4	9	6	1	056.TIF	1914	3	24	4	1	101.TIF
1901	3	5	1	1	011.TIF							1914	3	31	5	1	102.TIF
1901	3	12	2	1	012.TIF	1908	3	3	1	1	057.TIF	1914	4	7	6	1	103.TIF
1901	3	19	3	1	013.TIF	1908	3	10	2	1	058.TIF	1914	4	14	7	1	104.TIF
1901	3	26	4	1	014.TIF	1908	3	17	3	1	059.TIF	1914	4	21	8	1	105.TIF
1901	4	2	5	1	015.TIF	1908	3	24	4	1	060.TIF						
1901	4	9	6	1	016.TIF	1908	3	31	5	1	524.TIF	1915	3	9	1	1	106.TIF
1901	4	16	7	1	017.TIF	1908	4	7	6	1	061.TIF	1915	3	16	2	1	107.TIF
1901	4	16	7	2	018.TIF	1908	4	14	7	1	062.TIF	1915	3	23	3	1	108.TIF
						1908	4	21	8	1	063.TIF	1915	3	30	4	1	109.TIF
1902	3	4	1	1	019.TIF							1915	4	6	5	1	110.TIF
1902	3	11	2	1	020.TIF	1909	3	2	1	1	064.TIF	1915	4	13	6	1	111.TIF
1902	3	18	3	1	021.TIF	1909	3	9	2	1	065.TIF	1915	4	20	7	1	112.TIF
1902	3	25	4	1	022.TIF	1909	3	16	3	1	066.TIF						
1902	4	1	5	1	023.TIF	1909	3	23	4	1	067.TIF	1916	3	7	1	1	113.TIF
						1909	3	30	5	1	068.TIF	1916	3	14	2	1	114.TIF
1903	3	3	1	1	024.TIF	1909	4	6	6	1	069.TIF	1916	3	21	3	1	115.TIF
1903	3	10	2	1	025.TIF	1909	4	13	7	1	070.TIF	1916	3	28	4	1	116.TIF
1903	3	17	3	1	026.TIF							1916	4	4	5	1	117.TIF
1903	3	24	4	1	027.TIF	1910	3	1	1	1	071.TIF	1916	4	11	6	1	118.TIF
1903	3	31	5	1	028.TIF	1910	3	8	2	1	072.TIF	1916	4	18	7	1	119.TIF
						1910	3	15	3	1	073.TIF						
1904	3	1	1	1	029.TIF	1910	3	22	4	1	074.TIF	1917	3	6	1	1	120.TIF
1904	3	8	2	1	030.TIF	1910	3	29	5	1	075.TIF	1917	3	13	2	1	121.TIF
1904	3	15	3	1	031.TIF	1910	4	5	6	1	076.TIF	1917	3	20	3	1	122.TIF
1904	3	22	4	1	032.TIF							1917	3	27	4	1	123.TIF
1904	3	29	5	1	033.TIF	1911	3	7	1	1	077.TIF	1917	4	3	5	1	124.TIF
1904	4	5	6	1	034.TIF	1911	3	14	2	1	078.TIF	1917	4	10	6	1	125.TIF
1904	4	12	7	1	035.TIF	1911	3	21	3	1	079.TIF	1917	4	17	7	1	126.TIF
1904	4	19	8	1	036.TIF	1911	3	28	4	1	080.TIF	1917	4	24	8	1	127.TIF
1904	4	26	9	1	037.TIF	1911	4	4	5	1	081.TIF						
1904	5	3	10	1	038.TIF							1918	3	5	1	1	128.TIF
												1918	3	12	2	1	129.TIF
1905	3	7	1	1	039.TIF	1912	3	5	1	1	082.TIF	1918	3	19	3	1	130.TIF
1905	3	14	2	1	040.TIF	1912	3	12	2	1	083.TIF	1918	3	26	4	1	131.TIF
1905	3	21	3	1	041.TIF	1912	3	19	3	1	084.TIF	1918	4	2	5	1	132.TIF
1905	3	28	4	1	042.TIF	1912	3	26	4	1	085.TIF	1918	4	9	6	1	133.TIF
1905	4	4	5	1	043.TIF	1912	4	2	5	1	086.TIF	1918	4	16	7	1	134.TIF
1905	4	11	6	1	044.TIF	1912	4	9	6	1	087.TIF	1918	4	23	8	1	135.TIF
						1912	4	16	7	1	088.TIF						
						1912	4	23	8	1	089.TIF						

Appendix 3. Image Files Names and dates of Original NWS Ice Reports (cont).

(Files are located at ftp://ftp.glerl.noaa.gov/publications/tech_reports/glerl-130/appendix3)

Year	Mo	Da	No.	Pg.	Name
1919	3	4	1	1	136.TIF
1919	3	11	2	1	137.TIF
1919	3	18	3	1	138.TIF
1919	3	25	4	1	139.TIF
1920	3	9	1	1	140.TIF
1920	3	16	2	1	141.TIF
1920	3	23	3	1	142.TIF
1920	3	30	4	1	143.TIF
1920	4	6	5	1	144.TIF
1920	4	13	6	1	145.TIF
1921	3	8	1	1	146.TIF
1921	3	15	2	1	147.TIF
1921	3	22	3	1	148.TIF
1922	3	7	1	1	149.TIF
1922	3	14	2	1	150.TIF
1922	3	21	3	1	151.TIF
1922	3	28	4	1	152.TIF
1922	4	4	5	1	153.TIF
1922	4	11	6	1	154.TIF
1923	3	6	1	1	155.TIF
1923	3	13	2	1	156.TIF
1923	3	20	3	1	157.TIF
1923	3	27	4	1	158.TIF
1923	4	3	5	1	159.TIF
1923	4	10	6	1	160.TIF
1923	4	17	7	1	161.TIF
1923	4	24	8	1	162.TIF
1924	3	4	1	1	163.TIF
1924	3	11	2	1	164.TIF
1924	3	18	3	1	165.TIF
1924	3	25	4	1	166.TIF
1924	4	1	5	1	167.TIF
1924	4	8	6	1	168.TIF
1924	4	15	7	1	169.TIF
1924	4	21	8	1	170.TIF
1925	3	17	1	1	171.TIF
1925	3	24	2	1	172.TIF
1925	3	31	3	1	173.TIF
1925	4	7	4	1	174.TIF
1925	4	14	5	1	175.TIF
1926	3	2	1	1	176.TIF
1926	3	9	2	1	177.TIF
1926	3	16	3	1	178.TIF
1926	3	23	4	1	179.TIF
1926	3	30	5	1	180.TIF
1926	4	6	6	1	181.TIF
1926	4	13	7	1	182.TIF
1926	4	20	8	1	183.TIF
1926	4	27	9	1	184.TIF
1927	3	8	1	1	185.TIF
1927	3	15	2	1	186.TIF
1927	3	22	3	1	187.TIF
1927	3	29	4	1	188.TIF
1927	4	5	5	1	189.TIF
1928	3	6	1	1	190.TIF
1928	3	13	2	1	191.TIF
1928	3	20	3	1	192.TIF
1928	3	27	4	1	193.TIF
1928	4	3	5	1	194.TIF
1928	4	10	6	1	195.TIF
1929	3	5	1	1	196.TIF
1929	3	12	2	1	197.TIF
1929	3	19	3	1	198.TIF
1929	3	26	4	1	199.TIF
1929	4	2	5	1	200.TIF
1929	4	9	6	1	201.TIF
1930	3	4	1	1	202.TIF
1930	3	11	2	1	203.TIF
1930	3	18	3	1	204.TIF
1930	3	25	4	1	205.TIF
1930	4	1	5	1	206.TIF
1930	4	8	6	1	207.TIF
1930	4	15	7	1	208.TIF
1931	3	3	1	1	209.TIF
1931	3	10	2	1	210.TIF
1931	3	17	3	1	211.TIF
1931	3	24	4	1	212.TIF
1931	3	31	5	1	213.TIF
1931	4	7	6	1	214.TIF
1932	3	8	1	1	215.TIF
1932	3	15	2	1	216.TIF
1932	3	22	3	1	217.TIF
1932	3	29	4	1	525.TIF
1932	4	5	5	1	218.TIF
1932	4	12	6	1	219.TIF
1933	3	7	1	1	220.TIF
1933	3	14	2	1	221.TIF
1933	3	21	3	1	222.TIF
1933	3	28	4	1	223.TIF
1933	4	4	5	1	224.TIF
1933	4	11	6	1	225.TIF
1933	4	18	7	1	226.TIF
1933	4	25	8	1	227.TIF
1934	3	6	1	1	228.TIF
1934	3	13	2	1	229.TIF
1934	3	20	3	1	230.TIF
1934	3	27	4	1	231.TIF
1934	4	3	5	1	232.TIF
1934	4	10	6	1	233.TIF
1934	4	17	7	1	234.TIF
1934	4	24	8	1	235.TIF
1934	5	1	9	1	236.TIF
1935	3	5	1	1	237.TIF
1935	3	12	2	1	238.TIF
1935	3	19	3	1	239.TIF
1935	3	26	4	1	240.TIF
1935	4	2	5	1	241.TIF
1935	4	9	6	1	242.TIF
1935	4	16	7	1	243.TIF
1936	3	10	1	1	244.TIF
1936	3	17	2	1	245.TIF
1936	3	23	3	1	246.TIF
1936	3	30	4	1	247.TIF
1936	4	6	5	1	248.TIF
1936	4	13	6	1	249.TIF
1936	4	20	7	1	250.TIF
1936	4	27	8	1	251.TIF
1936	5	4	9	1	252.TIF
1937	2	25	1	1	253.TIF
1937	3	8	2	1	254.TIF
1937	3	15	3	1	255.TIF
1937	3	22	4	1	256.TIF
1937	3	29	5	1	257.TIF
1937	4	5	6	1	258.TIF
1937	4	12	7	1	259.TIF
1937	4	19	8	1	260.TIF

Appendix 3. Image Files Names and dates of Original NWS Ice Reports (cont).

(Files are located at ftp://ftp.glerl.noaa.gov/publications/tech_reports/glerl-130/appendix3)

Year	Mo	Da	No.	Pg.	Name	Year	Mo	Da	No.	Pg.	Name	Year	Mo	Da	No.	Pg.	Name
1938	3	7	1	1	261.TIF	1944	3	6	1	1	308.TIF	1950	2	16	1	1	348.TIF
1938	3	14	2	1	262.TIF	1944	3	13	2	1	309.TIF	1950	2	27	2	1	349.TIF
1938	3	21	3	1	263.TIF	1944	3	20	3	1	310.TIF	1950	3	6	1	1	350.TIF
1938	3	28	4	1	264.TIF	1944	3	27	4	1	311.TIF	1950	3	15	2	1	351.TIF
1938	4	4	5	1	265.TIF	1944	4	3	5	1	312.TIF	1950	3	20	3	1	352.TIF
1938	4	11	6	1	266.TIF	1944	4	10	6	1	313.TIF	1950	3	27	4	1	353.TIF
1938	4	18	7	1	267.TIF	1944	4	17	7	1	314.TIF	1950	4	3	5	1	354.TIF
												1950	4	10	6	1	355.TIF
1939	3	6	1	1	268.TIF	1945	3	19	3	1	315.TIF	1950	4	17	7	1	356.TIF
1939	3	13	2	1	269.TIF	1945	3	26	4	1	316.TIF	1950	4	24	8	1	357.TIF
1939	3	20	3	1	270.TIF	1945	4	2	5	1	317.TIF	1950	5	1	9	1	358.TIF
1939	3	27	4	1	271.TIF												
1939	4	3	5	1	272.TIF	1946	3	4	1	1	318.TIF	1951	2	26	0	1	359.TIF
1939	4	10	6	1	273.TIF	1946	3	11	2	1	319.TIF	1951	3	5	1	1	360.TIF
1939	4	17	7	1	274.TIF	1946	3	18	3	1	320.TIF	1951	3	12	2	1	361.TIF
1939	4	24	8	1	275.TIF	1946	3	25	4	1	321.TIF	1951	3	19	3	1	362.TIF
1939	5	1	9	1	276.TIF	1946	4	1	5	1	322.TIF	1951	3	26	4	1	363.TIF
						1946	4	8	6	1	323.TIF	1951	4	2	5	1	364.TIF
1940	3	4	1	1	277.TIF							1951	4	9	6	1	365.TIF
1940	3	11	2	1	278.TIF	1947	2	19	1	1	324.TIF	1951	4	16	7	1	366.TIF
1940	3	18	3	1	279.TIF	1947	2	19	1	2	325.TIF						
1940	3	24	4	1	280.TIF	1947	3	3	2	1	326.TIF	1952	2	25	0	1	367.TIF
1940	4	1	5	1	281.TIF	1947	3	10	3	1	327.TIF	1952	3	3	1	1	368.TIF
1940	4	8	6	1	282.TIF	1947	3	17	4	1	328.TIF	1952	3	10	2	1	369.TIF
1940	4	15	7	1	283.TIF	1947	3	24	5	1	329.TIF	1952	3	17	3	1	370.TIF
1940	4	22	8	1	284.TIF	1947	3	31	6	1	330.TIF	1952	3	24	4	1	371.TIF
						1947	4	7	7	1	331.TIF	1952	3	31	5	1	372.TIF
1941	3	3	1	1	285.TIF	1947	4	14	8	1	332.TIF	1952	4	7	6	1	373.TIF
1941	3	10	2	1	286.TIF	1947	4	21	9	1	333.TIF	1952	4	14	7	1	374.TIF
1941	3	17	3	1	287.TIF												
1941	3	24	4	1	288.TIF	1948	3	1	1	1	334.TIF	1953	2	24	0	1	375.TIF
1941	3	31	5	1	289.TIF	1948	3	8	2	1	335.TIF	1953	3	2	2	1	528.TIF
1941	4	7	6	1	290.TIF	1948	3	15	3	1	336.TIF	1953	3	9	2	1	376.TIF
1941	4	14	7	1	291.TIF	1948	3	22	4	1	337.TIF	1953	3	9	2	2	377.TIF
						1948	3	29	5	1	338.TIF	1953	3	16	3	1	378.TIF
1942	3	9	2	1	292.TIF	1948	4	5	6	1	339.TIF	1953	3	23	4	1	379.TIF
1942	3	16	3	1	293.TIF	1948	4	12	7	1	340.TIF	1953	3	30	5	1	380.TIF
1942	3	23	4	1	294.TIF												
1942	3	30	5	1	295.TIF	1949	2	28	1	1	526.TIF	1954	3	1	1	1	381.TIF
1942	4	6	6	1	296.TIF	1949	2	28	1	2	527.TIF	1954	3	8	2	1	382.TIF
1942	4	13	7	1	297.TIF	1949	3	7	2	1	341.TIF	1954	3	15	3	1	383.TIF
						1949	3	7	2	2	342.TIF	1954	3	22	4	1	384.TIF
1943	3	1	1	1	298.TIF	1949	3	14	3	1	343.TIF	1954	3	29	5	1	385.TIF
1943	3	8	2	1	299.TIF	1949	3	14	3	2	344.TIF	1954	4	5	6	1	386.TIF
1943	3	15	3	1	300.TIF	1949	3	21	4	1	345.TIF	1954	4	12	7	1	387.TIF
1943	3	22	4	1	301.TIF	1949	3	21	4	2	346.TIF	1954	4	19	8	1	388.TIF
1943	3	29	5	1	302.TIF	1949	3	28	5	1	347.TIF						
1943	4	5	6	1	303.TIF												
1943	4	12	7	1	304.TIF												
1943	4	19	8	1	305.TIF												
1943	4	26	9	1	306.TIF												
1943	5	3	10	1	307.TIF												

Appendix 3. Image Files Names and dates of Original NWS Ice Reports (cont).

(Files are located at ftp://ftp.glerl.noaa.gov/publications/tech_reports/glerl-130/appendix3)

Year	Mo	Da	No.	Pg.	Name	Year	Mo	Da	No.	Pg.	Name	Year	Mo	Da	No.	Pg.	Name
1955	2	28	1	1	389.TIF	1960	2	19	1	1	523.TIF	1965	2	23	0	1	473.TIF
1955	2	28	1	2	390.TIF	1960	2	29	2	1	522.TIF	1965	3	1	1	1	474.TIF
1955	3	7	2	1	391.TIF	1960	3	7	2	1	434.TIF	1965	3	8	2	1	475.TIF
1955	3	7	2	2	392.TIF	1960	3	14	3	1	435.TIF	1965	3	15	3	1	476.TIF
1955	3	14	3	1	393.TIF	1960	3	21	4	1	436.TIF	1965	3	22	4	1	477.TIF
1955	3	21	4	1	394.TIF	1960	3	28	5	1	437.TIF	1965	3	29	5	1	478.TIF
1955	3	28	5	1	395.TIF	1960	4	4	6	1	438.TIF	1965	4	5	6	1	479.TIF
1955	4	11	7	1	396.TIF	1960	4	11	7	1	439.TIF	1965	4	12	7	1	480.TIF
												1965	4	19	8	1	481.TIF
1956	2	27	1	1	397.TIF	1961	2	27	0	1	440.TIF	1965	4	26	9	1	482.TIF
1956	2	27	1	2	398.TIF	1961	3	6	1	1	441.TIF						
1956	3	5	2	1	399.TIF	1961	3	13	2	1	442.TIF	1966	2	28	0	1	483.TIF
1956	3	5	2	2	400.TIF	1961	3	20	3	1	443.TIF	1966	3	7	1	1	484.TIF
1956	3	12	3	1	401.TIF	1961	3	27	4	1	444.TIF	1966	3	14	2	1	485.TIF
1956	3	19	4	1	402.TIF	1961	4	3	5	1	445.TIF	1966	3	21	3	1	486.TIF
1956	3	26	5	1	403.TIF	1961	4	10	6	1	446.TIF	1966	3	28	4	1	487.TIF
1956	4	2	6	1	404.TIF							1966	4	4	5	1	488.TIF
1956	4	9	7	1	405.TIF	1962	2	26	0	1	447.TIF						
1956	4	16	8	1	406.TIF	1962	3	5	1	1	448.TIF	1967	2	27	0	1	489.TIF
						1962	3	12	2	1	449.TIF	1967	3	6	1	1	490.TIF
1957	2	25	1	1	407.TIF	1962	3	19	3	1	450.TIF	1967	3	13	2	1	491.TIF
1957	2	25	1	2	408.TIF	1962	3	26	4	1	451.TIF	1967	3	20	3	1	492.TIF
1957	3	4	2	1	409.TIF	1962	4	2	5	1	452.TIF	1967	3	27	4	1	493.TIF
1957	3	4	2	2	410.TIF	1962	4	9	6	1	453.TIF	1967	4	3	5	1	494.TIF
1957	3	11	3	1	411.TIF	1962	4	16	7	1	454.TIF	1967	4	10	6	1	495.TIF
1957	3	11	3	2	412.TIF	1962	4	23	8	1	455.TIF	1967	4	17	7	1	496.TIF
1957	3	25	5	1	413.TIF												
1957	4	1	6	1	414.TIF	1963	2	25	0	1	456.TIF	1968	2	26	1	1	521.TIF
1957	4	15	8	1	415.TIF	1963	3	4	1	1	457.TIF	1968	3	4	2	1	520.TIF
						1963	3	11	2	1	458.TIF	1968	3	11	2	1	497.TIF
1958	2	24	0	1	416.TIF	1963	3	18	3	1	459.TIF	1968	3	18	3	1	498.TIF
1958	3	3	1	1	417.TIF	1963	3	25	4	1	460.TIF	1968	3	25	4	1	499.TIF
1958	3	10	2	1	418.TIF	1963	4	1	5	1	461.TIF	1968	4	1	5	1	500.TIF
1958	3	17	3	1	419.TIF	1963	4	8	6	1	462.TIF	1968	4	8	6	1	501.TIF
1958	3	24	4	1	420.TIF	1963	4	15	7	1	463.TIF	1968	4	15	7	1	502.TIF
1958	3	31	5	1	421.TIF	1963	4	22	8	1	464.TIF						
1958	4	7	6	1	422.TIF							1969	2	24	0	1	503.TIF
1958	4	14	7	1	423.TIF	1964	2	24	0	1	465.TIF	1969	3	3	1	1	504.TIF
						1964	3	2	1	1	466.TIF	1969	3	10	2	1	505.TIF
1959	3	2	1	1	424.TIF	1964	3	9	2	1	467.TIF	1969	3	17	3	1	506.TIF
1959	3	9	2	1	425.TIF	1964	3	16	3	1	468.TIF	1969	3	24	4	1	507.TIF
1959	3	16	3	1	426.TIF	1964	3	23	4	1	469.TIF	1969	3	31	5	1	508.TIF
1959	3	23	4	1	427.TIF	1964	3	30	5	1	470.TIF	1969	4	7	6	1	509.TIF
1959	3	23	4	2	428.TIF	1964	4	6	6	1	471.TIF	1969	4	14	7	1	510.TIF
1959	3	30	5	1	429.TIF	1964	4	13	7	1	472.TIF						
1959	4	6	6	1	430.TIF							1970	2	24	1	1	519.TIF
1959	4	13	7	1	431.TIF							1970	3	3	2	1	518.TIF
1959	4	20	8	1	432.TIF							1970	3	10	3	1	511.TIF
1959	4	27	9	1	433.TIF							1970	3	17	4	1	512.TIF
												1970	3	24	5	1	513.TIF
												1970	3	31	6	1	514.TIF
												1970	4	7	7	1	515.TIF
												1970	4	14	8	1	516.TIF
												1970	4	14	8	1	516.TIF
												1970	4	21	9	1	517.TIF

Appendix 4. Distribution of Number of Reports Per Site Per Winter.

Table computer file structure

The first record contains the table title, the second record is left blank, the third record is a header for the station number label and 72 yearly labels. The last 510 records contain the station number in the first field of the record. The last 72 fields of the record contain either a zero or an integer, corresponding to the number of reports each winter.

Data record format

The Fortran format for the data records is: (1x, i3, 72(i4, 1x)). Each record contains 73 fixed formatted fields, where x = blank space, i = integer variable, 72 = the number of times the (i4,1x) part of the format is repeated. The first field as indicated below is the station number, followed by 72 fields that are the number of observations for each winter from 1899 to 1970 for that station.

This file are located at ftp://ftp.glerl.noaa.gov/publications/tech_reports/glerl-130/appendix4